Hawaii Range Complex

Final Environmental Impact Statement/
Overseas Environmental Impact Statement (EIS/OEIS)

Executive Summary

Final EIS/OEIS CD Included

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EXECUTIVE SUMMARY

ES1.1 INTRODUCTION

This Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) analyzes the potential environmental consequences that may result from the United States (U.S.) Department of the Navy's Proposed Action and alternatives. The Proposed Action presented in this EIS/OEIS addresses ongoing and proposed activities within the Navy's existing Hawaii Range Complex (HRC) and represents current and anticipated future use of the "existing footprint." This EIS/OEIS contains analysis of research, development, test, and evaluation (RDT&E) of new technologies used by the Navy and other Federal agencies, including the Missile Defense Agency.

This EIS/OEIS has been prepared by the Department of the Navy in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] § 4321 et seq.) and Executive Order (EO) 12114, *Environmental Effects Abroad of Major Federal Actions*.

The Navy is the lead for the EIS/OEIS; the National Marine Fisheries Service (NMFS), Missile Defense Agency, U.S. Department of the Army, and the U.S. Department of Energy are cooperating agencies. Additionally, the Navy has worked with experts from the State of Hawaii and other Federal agencies to ensure that the effects on the environment of the Navy's Proposed Action are fully assessed in this document.

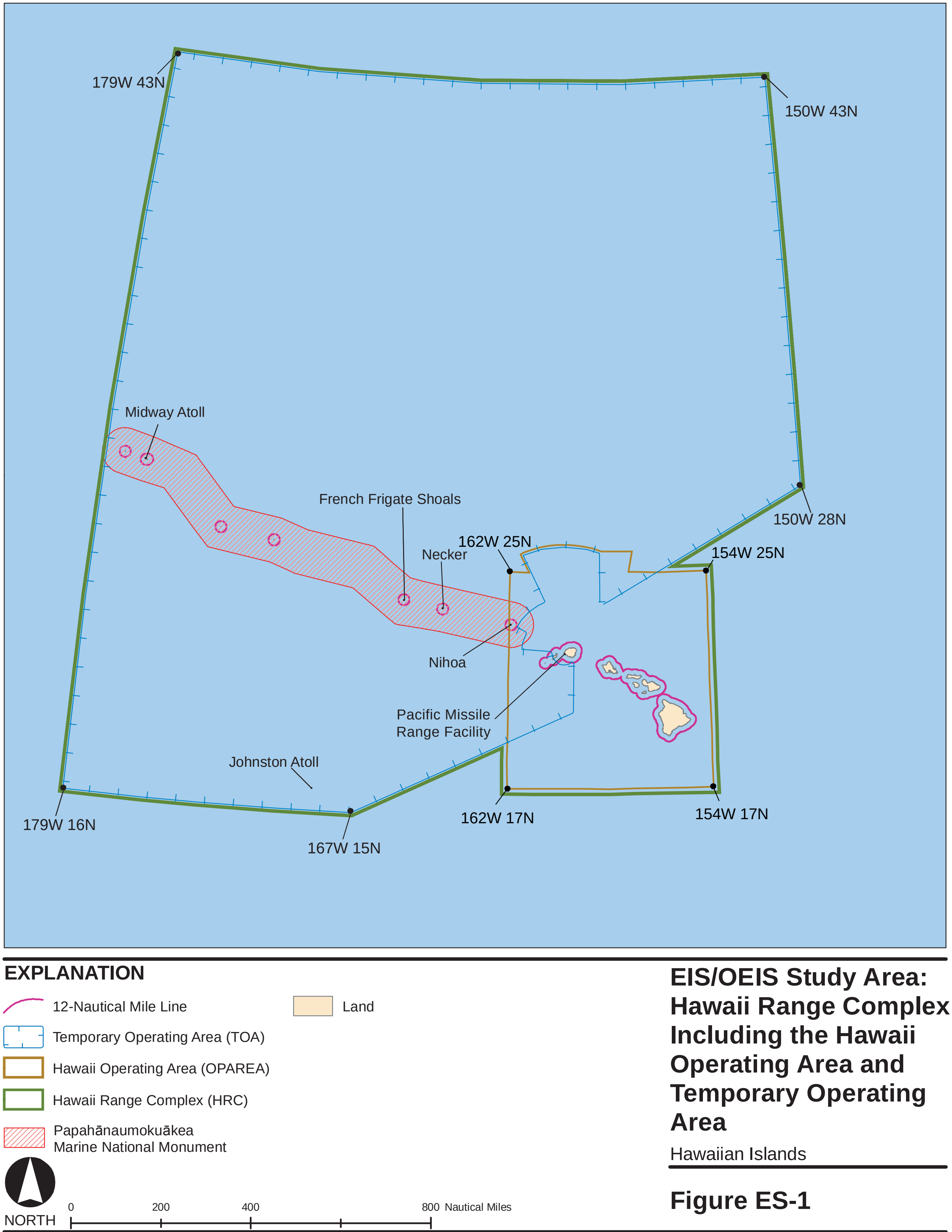
The HRC geographically encompasses the open ocean (outside 12 nautical miles [nm] from land), offshore waters (within 12 nm from land), and onshore areas located on or around the islands of the Hawaiian Islands chain (Figure ES-1).

There are three component areas of the HRC: (1) the Hawaii Operating Area (OPAREA) (includes surface and subsurface ocean areas and special use airspace); (2) the Temporary Operating Area (TOA) (composed of sea and airspace north and west of Kauai for RDT&E activities); and (3) various Navy land ranges and other Services' land for military training and RDT&E activities.

ES1.2 PURPOSE AND NEED

The purpose of the Proposed Action is to achieve and maintain fleet readiness using the HRC to support and conduct current, emerging, and future training and RDT&E activities, and enhance training resources through investment on the ranges. The mission of the HRC is to support naval operational readiness by providing a realistic, live training environment for forces assigned to the Pacific Fleet, the Fleet Marine Force, and other users.

The need for the Proposed Action is to enable the Navy to meet its statutory responsibility under Title 10 Sections 5013 and 5062 to organize, train, equip, and maintain combat-ready naval forces and to successfully fulfill its current and future global mission of winning wars, deterring aggression, and maintaining freedom of the seas. Activities involving RDT&E for Department of Defense (DoD) or Navy systems are an integral part of this readiness mandate.



EIS/OEIS Study Area: Hawaii Range Complex Including the Hawaii Operating Area and Temporary Operating Area

Hawaiian Islands

Figure ES-1

The HRC plays a vital part in the execution of this naval readiness mandate. The Hawaii area is home to a large concentration of U.S. naval forces. Naval forces based in Hawaii and those transiting across the Pacific Ocean use and rely on the HRC because of its capabilities and strategic location in the mid-Pacific region. The Navy's Proposed Action is essential to ensure the continued vitality of this training resource.

ES1.2.1 WHY THE NAVY TRAINS

The U.S. military is maintained to ensure the freedom and safety of all Americans both at home and abroad. In order to do so, Title 10 of the U.S.C requires the Navy to "maintain, train and equip combat-ready naval forces capable of winning wars, deterring aggression and maintaining freedom of the seas." Modern war and security operations are complex. Modern weaponry has brought both unprecedented opportunity and innumerable challenges to the Navy. Smart weapons, used properly, are accurate and allow the Navy to accomplish its mission with greater precision and less destruction than in past conflicts. U.S. military personnel must train regularly with these modern, complex weapons in order to understand their capabilities, limitations, and operation. Modern military actions require teamwork between hundreds or thousands of people, and their various equipment, vehicles, ships, and aircraft, all working individually and as a coordinated unit to achieve success. Navy training addresses all aspects of the team, from the individual to joint and coalition teamwork. To do this, the Navy employs a building-block approach to training. Training doctrine and procedures are based on operational requirements for deployment of naval forces. Training proceeds on a continuum, from teaching basic and specialized individual military skills, to intermediate skills or small unit training, to advanced, integrated training events, culminating in multi-service (Joint) exercises, coalition or combined exercises (with allied nations participating), or pre-deployment certification events.

In order to provide the experience so important to success and survival, training must be as realistic as possible. The Navy often employs simulators and synthetic training to provide early skill repetition and to enhance teamwork, but live training in a realistic environment is vital to success. Live training requires sufficient sea and airspace to maneuver tactically, realistic targets and objectives, simulated opposition that creates a realistic enemy, and instrumentation that monitors the events and provides essential feedback.

Range complexes, like the HRC, provide a controlled and safe environment with threat-representative targets that allow Navy forces to conduct realistic training as Navy men and women undergo all phases of the graduated buildup needed for combat-ready deployment. The range complexes are designed to provide the most realistic training in the most relevant environments, replicating to the greatest extent possible the operational stresses of warfare. The integration of undersea ranges and OPAREAs with land training ranges, safety landing fields, and amphibious landing sites are critical to this realism, allowing execution of multi-dimensional exercises in complex scenarios. The live-fire phase of training is fundamental to the adequate assessment of weapon precision under stressful conditions. Live training, most of it accomplished in the waters off the United States' coasts, will remain the cornerstone of readiness as the Navy prepares its military forces for a security environment characterized by uncertainty and surprise.

ES1.2.2 STRATEGIC IMPORTANCE OF THE EXISTING HAWAII RANGE COMPLEX

The HRC is used for training and assessment of operational forces, missile training, RDT&E of military systems and equipment, and other military activities. The HRC is characterized by a unique combination of attributes that make it a strategically important range complex for the Navy. These attributes include:

- Proximity to the homeport of Pearl Harbor
- Proximity to the Western Pacific
- Proximity to military families based in Hawaii
- New training terrain for west coast based naval forces

Refer to Section 1.3.5 of Chapter 1.0 for a detailed description of these attributes.

The large training area available to deployed forces within the HRC allows training to take place using a geographic scope that replicates possible real world events, with the channels between islands providing geography necessary for opposed transit scenarios. The presence of the instrumented tracking ranges at the Pacific Missile Range Facility (PMRF) as well as DoD-controlled warning areas and special use airspace also allow safe and structured training with sufficient flexibility to interject tactical challenges to enhance realism for exercise participants. Exercise participants at sea can conduct air strike sorties to Pohakuloa Training Area (PTA) and an Expeditionary Strike Group (ESG) can conduct amphibious landing on DoD beaches, while each simultaneously conducts Anti-Submarine Warfare (ASW) training. Finally, the presence of submarines homeported at Pearl Harbor allows for a readily available opposition force during the training event without having to transit to participate in the exercise events.

ES1.3 SCOPE AND CONTENT OF THE EIS/OEIS

The Navy’s analysis of environmental effects under NEPA includes areas of the HRC that lie within the territorial seas, which extend 12 nm from land. The environmental effects in the ocean areas that are outside of U.S. territorial seas are analyzed under EO 12114 and associated implementing regulations.

ES1.3.1 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

In 1969, Congress enacted NEPA, which provides for the consideration of environmental issues in Federal agency planning and decision-making. Regulations for Federal agency implementation of the act were established by the President’s Council on Environmental Quality (CEQ). NEPA requires that Federal agencies prepare an EIS if the agency’s proposed action might significantly affect the quality of the human environment. The EIS must disclose significant environmental impacts and inform decision makers and the public of the reasonable alternatives to the proposed action. Presidential Proclamation 5928, issued December 27, 1988, extended the exercise of United States sovereignty and jurisdiction under international law to 12 nm; however, the Proclamation expressly provides that it does not extend or otherwise alter existing Federal law or any associated jurisdiction, rights, legal interests, or obligations.

However, as a matter of policy, the Navy analyzes environmental effects and actions within 12 nm under NEPA and those effects occurring beyond 12 nm under the provisions of EO 12114.

This EIS/OEIS provides an assessment of the potential environmental impacts associated with sustainable range usage and enhancements within the Navy's HRC. The Navy completed the Supplement to the 2002 Rim of the Pacific (RIMPAC) Programmatic Environmental Assessment in May 2006 and the Undersea Warfare Exercise (USWEX) Programmatic Environmental Assessment in October 2007. This EIS/OEIS analyzes the continuation of these exercises in the baseline analysis. It also analyzes Navy training that currently occurs or is proposed to occur in open ocean, offshore, and onshore areas of the HRC.

The first step in the NEPA process is the publication of a Notice of Intent (NOI) to prepare an EIS. The NOI provides an overview of the proposed action and the scope of the EIS. The NOI for this project was published in the *Federal Register* on August 29, 2006, and in five local newspapers (i.e., *Honolulu Advertiser*, the *Honolulu Star Bulletin*, the *Maui News*, the *Hawaii Tribune Herald*, and the *Garden Island*) on September 2, 4, and 5, 2006.

Scoping is an early and open process for developing the "scope" of issues to be addressed in the EIS and for identifying significant issues related to a proposed action. During scoping, the public helps define and prioritize issues and convey these issues to the agency through both oral and written comments. The scoping period for the HRC EIS/OEIS began with the publication of an NOI. The scoping period lasted 46 days, concluding on October 13, 2006. Four scoping meetings were held on September 13, 14, 16, and 18, 2006 on the islands of Maui, Oahu, Hawaii, and Kauai, respectively. The scoping meetings were held in an open house format, presenting informational posters and written information, and making Navy staff and project experts available to answer participants' questions. Additionally, a court reporter was available to record participants' oral comments. This format allowed the public to interact informally, one-on-one, with project representatives or comment formally, on the record, to representatives of the Navy.

In addition to the scoping meetings, the public could make comments through a toll-free telephone number, by sending an email, or by mailing a written comment. Issues identified by the public were provided to resource specialists working on the EIS/OEIS to ensure that all comments were considered during the preparation of the document.

After scoping, the Draft EIS/OEIS was prepared to provide an assessment of the potential impacts of the Proposed Action and alternatives on the environment. Public hearings were conducted during the review process in Kauai (Lihue), Oahu (Honolulu), Maui (Wailuku), and Hawaii (Hilo). The Draft EIS/OEIS was circulated for public review and the comment period concluded on September 17, 2007. Approximately 2,500 public comments were received and appropriately incorporated into this EIS/OEIS. Responses to public comments on the Draft EIS/OEIS may be found in Chapter 13.0.

During the scoping and public review process, members of the public and non-governmental environmental organizations expressed concerns on a variety of topics. One of the issues receiving the most comments related to the potential effects associated with mid-frequency active (MFA) sonar use and testing in the HRC. These concerns are addressed in this EIS/OEIS.

The Navy recognizes that the potential impact on marine mammals caused by the use of sonar is controversial. Based on continued coordination with NMFS, the Navy has used best available science as the basis to assess impacts on marine mammals caused by MFA and high-frequency active (HFA) sonar used by a particular torpedo. The best available science has been used as a basis for development of the "Risk Function" model for predicting potential exposures of marine mammals to Navy MFA and HFA sonar use that will result in behavioral effects. What this model cannot do yet is to include in its calculations reductions in the behavioral effects estimates resulting from all of the procedures that the Navy has in place to protect marine mammals. These include personnel training, pre- and post-exercise surveys, power-down and power-off requirements for the sonar when mammals are within certain distances of the sound source, and passive detection of marine mammals.

During the public hearings, it was clear that many of those voicing concern were unaware that the training and testing activities proposed for the HRC are not new activities and have been occurring for approximately 40 years. No known marine mammal strandings directly related to Navy activities have occurred during this time. Nonetheless, by design, the Navy has taken an approach to modeling that calculates the maximum potential exposures to marine mammals to account for uncertainties in existing scientific data.

Since the publication of the Draft EIS/OEIS, the Navy, in coordination with the NMFS, re-analyzed the effects that MFA sonar has on marine mammals. This re-evaluation and consequent proposed changes to the Draft EIS/OEIS led the Navy to prepare a Supplement to the Draft EIS/OEIS. Accordingly, this EIS/OEIS incorporates the following changes and associated environmental analysis as presented in the Supplement to the Draft EIS/OEIS:

- Modifications to the analytical methodology used to evaluate the effects of MFA sonar on marine mammals;
- Changes to the amount and types of sonar allocated to each of the alternatives; and,
- The development of a new alternative.

The NOI for the Supplement to the Draft EIS/OEIS was published in the *Federal Register* on January 17, 2008. The Supplement to the Draft EIS/OEIS was circulated for public review, and the comment period ended on April 7, 2008. Responses to all comments on the Supplement to the Draft EIS/OEIS are presented in Chapter 14.0 of this document.

There is a 30-day wait period following the publication of the Notice of Availability of the Final EIS/OEIS in the Federal Register. At the conclusion of this wait period, the Navy will decide the action it will implement through its Record of Decision (ROD) which will be published in the Federal Register. The ROD will summarize the final decision and identify the selected alternative, describe the public involvement and agency decision-making processes, and present commitments to specific mitigation measures. The selected decision can then be implemented.

ES1.3.2 EXECUTIVE ORDER (EO 12114)

Environmental effects in the areas that are beyond the U.S. territorial sea are analyzed under EO 12114 and associated implementing regulations.

ES1.3.3 MARINE MAMMAL PROTECTION ACT, ENDANGERED SPECIES ACT COMPLIANCE

The Marine Mammal Protection Act (MMPA) of 1972 established, with limited exceptions, a moratorium on the “taking” of marine mammals in waters or on lands under U.S. jurisdiction. Section 101(a)(5) of the MMPA directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of marine mammals by U.S. citizens who engage in a specified activity (exclusive of commercial fishing). In support of the Proposed Action, the Navy applied for a Letter of Authorization from NMFS pursuant to Section 101(a) (5) (A) of the MMPA. NMFS intends to publish a proposed rule for public comment coincident with the publication of this EIS/OEIS, and anticipates issuing the final authorization toward the end of Calendar Year 2008.

On January 23, 2007, the Deputy Secretary of Defense exempted all military readiness activities employing MFA sonar or Improved Extended Echo Ranging (IEER) sonobuoys from compliance with the requirements of the MMPA for a period of 2 years. This exemption is limited to Major Exercises or training and RDT&E activities within established operating areas or established DoD maritime ranges. This National Defense Exemption (NDE) remains in effect until January 23, 2009 or authorization under the MMPA, whichever is earliest.

The NDE will cover MFA sonar and IEER sonobuoy activities on the HRC until an MMPA authorization is issued for these activities or the NDE expires whichever is earliest. While the NDE remains applicable (until an MMPA authorization is issued), the Navy will continue to employ the marine mammal mitigation measures outlined in Chapter 6.0 of this EIS/OEIS to protect marine mammals while training with the use of MFA sonar. These measures include safety zones around ships and trained lookouts based on coordination of science-based measures with NMFS. Additional measures that may be required as a result of the MMPA authorization would be implemented once authorization is received.

The Endangered Species Act (ESA) requires that Federal agencies, in consultation with the responsible wildlife agency, ensure that proposed actions are not likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of a critical habitat. Regulations implementing the ESA consultation requirement also include those actions that “may affect” a listed species or adversely modify critical habitat.

As part of the environmental documentation for this EIS/OEIS, and as an MMPA permit applicant, the Navy entered into early consultation procedures with NMFS, endangered species division. The Navy has been actively engaged in consultation with NMFS regarding the potential effects on ESA-listed species from the conduct of the activities outlined in this EIS/OEIS. In accordance with 50 Code of Federal Regulations (CFR) §402.11, prior to the issuance of the ROD, NMFS will issue a Preliminary Biological Opinion documenting its determination as to whether the activities conducted in the HRC are likely to jeopardize the continued existence of ESA-listed species, or result in the destruction or adverse modification of critical habitat. Additionally, a preliminary Incidental Take Statement will accompany the preliminary Biological Opinion. Because the Section 7 consultation is simultaneously conducted internally to address NMFS' issuance of an MMPA authorization, an Incidental Take Statement for marine mammals cannot be issued until an MMPA authorization is issued.

The Preliminary Biological Opinion and Preliminary Incidental Take Statement do not exempt the Navy from the prohibitions of Section 9 of the ESA. Further, the Navy has determined that activities occurring in the HRC prior to the issuance of an MMPA authorization (e.g., RIMPAC, USWEX, etc.) may affect endangered species in the HRC, and may incidentally take ESA-listed species, thus requiring consultation under the ESA and an associated Incidental Take Statement. As such, the Navy and NMFS are engaged in a separate Section 7 consultation on these specified activities. A separate Biological Opinion and Incidental Take Statement will be issued, as appropriate, for this subset of specified activities, which will occur prior to the issuance of the MMPA authorization and be covered by the NDE.

ES1.3.4 OTHER ENVIRONMENTAL REQUIREMENTS CONSIDERED

The Navy must comply with a variety of other Federal environmental laws, regulations, and EOs. These include (among other applicable laws and regulations):

- Migratory Bird Treaty Act;
- Coastal Zone Management Act;
- Rivers and Harbors Act;
- Magnuson-Stevens Fishery Conservation and Management Act;
- Clean Air Act;
- Federal Water Pollution Control Act (Clean Water Act);
- National Historic Preservation Act;
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- EO 13045, Environmental Health and Safety Risks to Children;
- EO 13423, *Strengthening Federal Environmental, Energy and Transportation Management;*
- EO 13089, *Coral Reef Protection;* and
- National Marine Sanctuaries Act.

In addition, laws and regulations of the State of Hawaii appropriate to Navy actions are identified and addressed in this EIS/OEIS. To the extent practicable, this document will be used as the basis for any required consultation and coordination.

ES1.4 PROPOSED ACTION AND ALTERNATIVES

The Proposed Action presented in this EIS/OEIS addresses ongoing and proposed activities within the Navy's existing HRC and contains analyses of RDT&E of new technologies used by the Navy and other Federal agencies.

ES1.4.1 ALTERNATIVES DEVELOPMENT

NEPA requires that an EIS evaluate the environmental consequences of a range of reasonable alternatives. Guidance for the development of alternatives is provided in CEQ regulations (40 CFR § 1502.14) and Navy procedures described in 32 CFR § 775. Reasonable alternatives must meet the stated purpose and need of the Proposed Action.

ES1.4.2 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

The Navy eliminated alternatives from further consideration. Specifically, the following alternatives (described in Chapter 2.0) were not carried forward for analysis:

- Reduction or Elimination of Training in the Hawaii Range Complex
- Alternative Locations for Training Conducted in the Hawaii Range Complex
- Computer Simulation Training

After careful consideration, none of these alternatives meet the Navy's purpose and need for the Proposed Action.

ES1.4.3 ALTERNATIVES CONSIDERED

Alternatives were selected based on their ability to meet the following criteria, which were developed from the purpose and need for the Proposed Action: (1) use existing Navy ranges and facilities in and around Hawaii; (2) be consistent with the stated current and emerging requirements for the range complex; (3) achieve training tempo requirements based on Fleet deployment schedules; (4) meet the requirements of DoD Directive 3200.15, Sustainment of Ranges and Operating Areas; (5) implement new training requirements and RDT&E activities; and (6) support realistic training that replicates expected operating environments for naval forces. Four alternatives are analyzed in the EIS/OEIS, including three action alternatives (Alternatives 1, 2, and 3) and the No-action Alternative.

ES1.4.3.1 No-Action Alternative

The No-action Alternative is required by CEQ regulations as a baseline against which the impacts of the Proposed Action are compared. In the EIS/OEIS, the No-action Alternative is represented by baseline training and RDT&E operations at current levels, including more than 9,300 training and RDT&E activities in the HRC annually. Training events, including those that make up Major Exercises (RIMPAC Exercise and five USWEXs) and RDT&E activities, would continue at the baseline levels. Ongoing training events include Anti-Air Warfare, Amphibious Warfare, Anti-Surface Warfare, ASW, Electronic Combat, Mine Warfare, Naval Special Warfare, and Strike Warfare Exercises. The No-action Alternative includes support activities such as

Command and Control, in-port ship and aircraft support, and personnel support. RDT&E activities occur primarily at one of two locations in Hawaii: PMRF and Naval Undersea Warfare Center Detachment Pacific ranges.

ES1.4.3.2 Alternative 1

Alternative 1 includes all ongoing Navy training associated with the No-action Alternative, and proposes an increased number of such training events. The Navy proposes to increase both the tempo and the frequency of training exercises in the HRC. Alternative 1 includes the addition of Field Carrier Landing Practice (FCLP), a series of touch-and-go landings to train and qualify pilots for aircraft carrier landings at PMRF airfield on Kauai and Marine Corps Base Hawaii (MCBH) on Oahu. The Navy proposes to enhance and add RDT&E activities above current levels.

ES1.4.3.3 Alternative 2

Alternative 2 would include all of the activities described in Alternative 1, plus a further increased tempo and frequency of training events, future RDT&E programs at PMRF, and the addition of Major Exercises, such as supporting three Carrier Strike Groups training at the same time.

ES1.4.3.4 Alternative 3 (Preferred Alternative)

The only difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2. As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events, future and enhanced RDT& E activities, and the addition of Major Exercises. Alternative 3 would consist of sonar usage as analyzed under the No-action Alternative. Sonar hours for Alternative 3 and effects associated with ASW training would be identical to that presented under the No-action Alternative.

Alternative 3 is the preferred alternative because it allows the Navy to meet its future non-ASW training and RDT&E mission objectives while maintaining historic levels of ASW training to avoid increases in potential effects to marine mammals in the HRC. At this time, the Navy believes that its ASW requirements will be met based on the No-action Alternative sonar hours.

ES1.5 SPORTS DATA

The data from the Sonar Positional Reporting System (SPORTS) provided a foundation for the sonar hours analyzed under each of the Alternatives. SPORTS is a database tool established by Commander, U.S. Fleet Forces Command in mid-2006. All commands employing MFA sonar and sonobuoys are required to populate the SPORTS database by reporting MFA sonar use. A review by senior officers determined that SPORTS data would be used in this EIS/OEIS in conjunction with previous planning data to assist in determining the amount of MFA sonar use for purposes of modeling potential effects on marine mammals.

The types of sonar sources used as part of ASW activities within the HRC are listed below:

- Surface ship sonar (AN/SQS-53 and AN/SQS-56)
- Helicopter dipping sonar (AN/AQS-22)
- Aircraft deployed sonobuoys (AN/SSQ-62)
- Submarine sonar (BQQ-10, BQQ-5, BSY-1)
- MK-48 torpedo

Table ES-1 presents a comparison of the sonar used for each of the alternatives analyzed. The majority of training and RDT&E activities in the HRC involve five types of narrowband sonars. Exposure estimates are calculated for each sonar according to the manner in which it operates. For example, the AN/SQS 53 and AN/SQS 56 are hull-mounted, MFA surface ship sonars that operate for many hours at a time (although sound is output—the “active” portion—only a small fraction of that time), so it is most useful to calculate and report surface ship sonar exposures per hour of operation. The BQQ-10 submarine sonar is also reported per hour of operation. However, the submarine sonar is modeled as pinging only twice per hour. The AN/AQS-22 is a helicopter-deployed sonar, which is lowered into the water, pings several times, and then moves to a new location; this sonar is used for localization and tracking a suspected contact as opposed to searching for contacts. For the AN/AQS-22, it is most helpful to calculate and report exposures per dip. The AN/SSQ-62 is a sonobuoy that is dropped into the water from an aircraft or helicopter and pings about 10 to 30 times in an hour. For the AN/SSQ-62, it is most helpful to calculate and report exposures per sonobuoy. For the MK-48 torpedo the sonar is modeled for a typical training event and the MK-48 reporting metric is the number of torpedo runs. See Table J-2 of Appendix J for a presentation of the deployment platform, frequency class, the metric for reporting exposures, and the units for each sonar.

Note that sonar usage for Alternative 3 and effects associated with ASW training would be identical to that presented under the No-action Alternative.

Table ES-1. Summary of Sonar Usage for Each Alternative

No-action Totals		
	Source	**Modeled**
	53	1,284 hours
	56	383 hours
	Dipping	1,010 dips
	Sonobuoy	2,423 buoys
	MK-48	313 runs
	Submarine	200 hours
Alternative 1 Totals		
	Source	**Modeled**
	53	1,788 hours
	56	551 hours
	Dipping	1,517 dips
	Sonobuoy	3,127 buoys
	MK-48	317 runs
	Submarine	200 hours

Table ES-1. Summary of Sonar Usage for Each Alternative (Continued)

	Source	Modeled
Alternative 2 Totals		
	Source	**Modeled**
	53	2,496 hours
	56	787 hours
	Dipping	1,763 dips
	Sonobuoy	3,528 buoys
	MK-48	374 runs
	Submarine	200 hours
Alternative 3 Totals		
	Source	**Modeled**
	53	1,284 hours
	56	383 hours
	Dipping	1,010 dips
	Sonobuoy	2,423 buoys
	MK-48	313 runs
	Submarine	200 hours

ES1.6 SUMMARY OF ENVIRONMENTAL EFFECTS

Environmental effects which might result from the implementation of the Navy's Proposed Action or alternatives have been analyzed in this EIS/OEIS. Resource areas analyzed included airspace, biological resources, cultural resources, hazardous materials and waste, health and safety, noise, water resources, geology and soils, land use, socioeconomics, transportation, and utilities. A summary of effects on the above-referenced resources where applicable have been addressed in Table ES-2 for Open Ocean areas, Table ES-3 for the Northwestern Hawaiian Islands, Tables ES-4 for Kauai, Tables ES-5 for Oahu, Table ES-6 for Maui, and Table for ES-7 for Hawaii. A detailed analysis of effects is provided in Chapter 4.0.

A comparison of the environmental impacts of the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 is presented in Tables ES-2 through ES-7. These tables summarize the conclusions of the analyses made for each of the areas of environmental consideration based on the application of the described methodology. Only those activities for which a potential environmental concern was determined at each location are described for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3.

ES1.6.1 CUMULATIVE IMPACTS

The analysis of cumulative impacts considers the effects of the Proposed Action in combination with other past, present, and reasonably foreseeable future actions taking place in the project area, regardless of what agency or person undertakes these actions. This EIS/OEIS analyzes cumulative impacts associated with implementation of Navy-sponsored activities and other non-Navy activities in the region. The cumulative project list includes over 140 Federal, State, and local projects ranging from minor construction to major infrastructure type projects, as well as various military training projects. Other activities included Commercial Fishing, Commercial and Recreational Vessel Traffic, Coastal Development Activities, Environmental Contamination and

Biotoxins, and Scientific Research Permits. Potential cumulative impacts resulting from other relevant projects (such as those listed above) combined with the Proposed Action addressed in this EIS/OEIS were determined to be less than significant.

ES1.6.2 MITIGATION MEASURES

The Navy is a global environmental leader. As part of the Navy's commitment to sustainable use of resources and environmental stewardship, the Navy incorporates mitigation measures that are protective of the environment into all of its activities. The Navy's current mitigation measures reflect a balance between training requirements and the Navy's important role in ensuring environmental protection. These measures have been the subject of extensive discussions between NMFS and the Navy, and evaluated for mission impacts, probable effectiveness, and the ability to implement. Mitigation measures are described in detail in Chapter 6.0.

Mitigation measures identified to reduce effects or ensure no future impacts occur are provided in Table ES-8.

ES1.6.3 OTHER NEPA CONSIDERATIONS

ES1.6.3.1 Conflicts with Federal, State, and Local Land Use Plans, Policies, and Controls for the Area Concerned

Based on an evaluation of consistency with statutory obligations, the Navy's proposed training and RDT&E activities for the HRC do not conflict with the objectives or requirements of Federal, State, regional, or local plans, policies, or legal requirements. The proposed training and RDT&E activities would not alter the use of the sites that currently support missile testing. Enhancement of the HRC would be in accordance with applicable Federal, State, and local planning plans and policies. The DoD maintains Federal jurisdiction for on-installation land use.

ES1.6.3.2 Energy Requirements and Conservation Potential

The proposed training and RDT&E activities include increased training events in the HRC. In order to implement the proposed training and RDT&E activities, increased amounts of fossil fuels would be required to power the increased use by ships and aircraft. These fuels are currently in adequate supply from either Navy owned sources or from commercial distributors. The required electricity demands would be met by the existing electrical generation infrastructure on the Hawaiian Islands. Anticipated energy requirements of the continued use and enhancement of the HRC would be well within the energy supply capacity of all facilities. Energy requirements would be subject to any established energy conservation practices at each facility. No additional power generation capacity other than the potential use of generators would be required for any of the training and RDT&E activities. The use of energy sources has been minimized wherever possible without compromising safety, training, or testing events. No additional conservation measures related to direct energy consumption by the proposed training and RDT&E activities are identified.

ES1.6.3.3 Irreversible or Irretrievable Commitment of Resources

The proposed training and RDT&E activities would have an irreversible or irretrievable effect due to the use of nonrenewable energy sources: hydrocarbon fuels for aircraft, vessels, and vehicles. However, among the alternative training scenarios there are no significant differences in the cost of fuel and the climatic consequences of large-scale combustion of hydrocarbon fuel. Implementation of the proposed training and RDT&E activities would not result in the destruction of environmental resources so as to cause the potential uses of the environment of the HRC to be limited. The proposed training and RDT&E activities would not adversely affect the biodiversity or cultural integrity within the HRC including the open ocean, offshore, onshore, or human environment.

ES1.6.3.4 Relationship Between Short-Term Environmental Impact and Long-Term Productivity

The Navy is committed to sustainable range management. Effective, sustainable range management addresses both short- and long-term effects on the human environment and strives to ensure the long-term productivity and availability of vital range training resources. The Navy is committed to the co-use of the HRC and surrounding areas with the general public and, for the open ocean areas, international community. This commitment to co-use is incorporated in the Navy's long-term range management and will enhance the long-term productivity of the range and surrounding areas for the public and commercial interests.

Table ES-2. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Open Ocean

Resource Category	Open Ocean
Airspace	No-action: No airspace impacts were identified in the analysis presented in Chapter 4.0. Any potential impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures, compliance with Department of Defense (DoD) Directive 4540.1, Office of the Chief of Naval Operations Instruction (OPNAVINST) 3770.4A, OPNAVINST 3721.20, and continued close coordination with the Federal Aviation Administration (FAA). No modifications or need for additional airspace are required. Alternative 1: No airspace impacts were identified in the analysis presented in Chapter 4.0. Any potential impacts on airspace from increased training activities, increased research, development, test, and operation (RDT&E) activities, planned test and evaluation activities, Hawaii Range Complex (HRC) enhancements, and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: No airspace impacts were identified in the analysis presented in Chapters 4.0. Any potential impacts on airspace from increases in training activities, additional RDT&E activities, and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Biological Resources (Open Ocean)	No-action: The modeling quantification of exposures to marine mammals from operation of MFA/HFA sonar and underwater detonations does not predict any marine mammal mortalities. Modeling quantification does not predict any marine mammal exposed to sonar or explosives in excess of the onset of permanent threshold shift; there are no exposures indicative of Level A injury. Modeling does predict TTS and sub-TTS Level B harassments of marine mammals, however, the results from this modeling are presented without consideration of mitigation measures employed per Navy standard operating procedures. The likelihood that many marine mammals can be readily detected, standard mitigation measures involving range clearance procedures should reduce the number of these exposures. There will be no impacts to sea turtles. To reiterate, based on the history of Navy activities in the HRC, and analysis in this document, military readiness activities are not expected to result in any Level A injury or mortalities to marine mammals. However, given the frequency of naturally occurring marine mammal strandings in Hawaii (e.g. natural mortality), it is conceivable that a stranding could co-occur within the timeframe of a Navy exercise even though the stranding may be unrelated to Navy activities. Based on NMFS' recommendation that Navy consider scientific uncertainty and potential for mortality, the Navy is requesting 20 serious injury or mortality takes for 7 commonly-stranded, non ESA-listed species and 3 species of beaked whales present within the HRC (2 mortality takes per species). These are bottlenose dolphin, Kogia *spp*., melon-headed whale, pantropical spotted dolphin, pygmy killer whale, short-finned pilot whale, striped dolphin, Cuvier's beaked whale, Longman's beaked whale, and Blainville's beaked whale Alternative 1: Any anticipated or potential impacts on biological resources from increased training activities, RDT&E activities, and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Any anticipated impacts on biological resources from additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Biological Resources (Open Ocean) impacts would be the same as those described under the No-action Alternative. Chapters 4.0 and 5.0 discuss Open Ocean and Offshore impacts in detail. Appendix J provides details on the acoustic modeling approach.
Cultural Resources	No-action: Cultural resources that occur in the Open Ocean Area are generally deeply submerged and inherently protected from the effect of all types of activity. Both the probability of encountering submerged resources and the probability of causing adverse effect on those resources are extremely low regardless of the action alternative being considered. To even further lower the probability of effect, areas where known submerged cultural resources exist will be avoided for operational activities involving expended material, debris dispersion, or underwater detonation. Procedures are in place to minimize any effects on underwater cultural resources. In accordance with Section 106 of the National Historic Preservation Act (36 CFR Part 800), cultural resources mitigation measures as described in various sections of Chapter 4.0 would be implemented. Alternative 1: Impacts on cultural resources from increased training activities, RDT&E activities, and Major Exercises (e.g., RIMPAC) would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on cultural resources from additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapters 4.0 and 5.0 discuss Open Ocean and Offshore impacts in detail.

Table ES-2. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Open Ocean (Continued)

Resource Category	Open Ocean
Hazardous Materials and Waste	No-action: Implementation of the No-action Alternative would not result in significant impacts associated with the use of hazardous materials. The Navy has appropriate plans in place to manage hazardous materials used and generated. Hazardous materials will continue to be controlled in compliance with OPNAVINST 5090.1B. Fragments of expended training materials, e.g. ammunition, bombs and missiles, targets, sonobuoys, chaff, and flares, could be deposited on the ocean floor. The widely dispersed, intermittent, minute size of the material minimizes the impact. Wave energy and currents will further disperse the materials. Alternative 1: Implementation of Alternative 1 would not result in significant impacts associated with the use of hazardous materials. Impacts from hazardous materials and waste from increased training activities, RDT&E activities, and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Implementation of Alternative 2 would not result in significant impacts associated with the use of hazardous materials. Impacts from hazardous materials and waste from additional increases in training activities, RDT&E activities, and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapters 4.0 and 5.0 discuss in detail the factors that influenced this analysis.
Health and Safety	No-action: Implementation of the No-action Alternative would not affect public health and safety. Any potential risk to public health and safety is minimized through standard operating procedures and compliance with DoD Directive 4540.1, OPNAVINST 3770.4 and Commander, Naval Surface Force, U.S. Pacific Fleet (COMNAVSURFPAC) Instruction 3120.8F. The Navy notifies the public of hazardous activities through the use of Notices to Airmen (NOTAMs) and Notices to Mariners (NOTMARs). Alternative 1: Implementation of Alternative 1 would not affect public health and safety. Any potential impacts on health and safety from the additional training activities, RDT&E activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Implementation of Alternative 2 would not affect public health and safety. Any potential impacts on health and safety from the additional training activities, RDT&E activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapters 4.0 and 5.0 discuss in detail the factors that influenced this analysis.
Noise	No-action: Implementation of the No-action Alternative would not incrementally affect noise within the HRC. Activities are remote, infrequent, and lack sensitive receptors. In addition, training activities do not have an effect on sensitive noise receptors because these activities are typically conducted away from populated areas and most sensitive noise receptors. Standard operating procedures are used to ensure the area is clear of civilian vessels or other non-participants. The public is notified of the location, date, and time of the hazardous activities via NOTMARs, thereby precluding any acoustical impacts on sensitive receptors. Alternative 1: Implementation of Alternative 1 would not incrementally affect noise within the HRC. Impacts from noise from increased training activities, RDT&E activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Implementation of Alternative 2 would not incrementally affect noise within the HRC. Impacts from noise from additional training activities, RDT&E activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Noise impacts would be the same as those described under Alternative 2. Chapters 4.0 and 5.0 discuss in detail the factors that influenced this analysis.
Water Resources	No-action: Potential water quality impacts associated with the implementation of the No-action Alternative are transitory in nature and would not reach a level of significance. No long-term significant impacts on water quality are anticipated. Impacts are not anticipated due to the small quantities of materials relative the extent of the sea ranges and large volumes of water in which they will be dispersed. Alternative 1: Impacts on water resources from increase training activities, RDT&E activities, and Major Exercises are not anticipated. Any potential impacts would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on water resources from increased training activities, future RDT&E activities, and Major Exercises are not anticipated. Any potential impacts would be minimized as described above in the No-action Alternative. Alternative 3: Water Resources impacts would be the same as those described under Alternative 2. Chapters 4.0 and 5.0 discuss in detail the factors that influenced this analysis.

Note: Impacts on Biological Resources (Onshore), Geology and Soils, Land Use, and Utilities are not applicable. Impacts discussed for biological resources in the Open Ocean apply to both offshore and onshore areas. There are no impacts on Air Quality, Socioeconomics or Transportation due to site activities under the No-action Alternative, Alternative 1, Alternative 2 or Alternative 3.

Table ES-3. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Northwestern Hawaiian Islands

Resource Category	Northwestern Hawaiian Islands
Biological Resources (Offshore and Onshore)	No-action: Some current flight trajectories could result in missiles such as the Terminal High Altitude Area Defense (THAAD) flying over portions of the Papahānaumokuākea Marine National Monument. Preliminary results of debris analysis indicate that debris is not expected to severely harm threatened, endangered, migratory, or other endemic species on or offshore of Nihoa and Necker Islands. The probability for debris to hit birds, seals, or other wildlife will be extremely low. Quantities of falling debris will be low and widely scattered so as not to present a toxicity issue. Falling debris will also have cooled down sufficiently so as not to present a fire hazard for vegetation and habitat. If feasible, consideration will be given to alterations in the missile flight trajectory, to further minimize the potential for debris impacts. Alternative 1: There are no additional proposed activities or exercises that would affect the Northwestern Hawaiian Islands; ongoing activities would be minimized as described above in the No-action Alternative. Alternative 2: There are no additional proposed activities or exercises that would affect the Northwestern Hawaiian Islands; ongoing activities would be minimized as described above in the No-action Alternative. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses in detail the factors that influenced this analysis.
Cultural Resources	No-action: Missile defense activities, including THAAD, have the potential to generate debris that falls within areas of the Papahānaumokuākea Marine National Monument. Debris analyses of the types, quantities, and sizes associated with the Pacific Missile Range Facility missile activities indicate that the potential to impact land resources of any type on Nihoa or Necker is low and extremely remote. In addition, trajectories can be altered under certain circumstances to further minimize the potential for impacts. Future missions will include consideration of missile flight trajectory alterations, if feasible, to minimize the potential for debris within these areas. As a result, impacts on cultural resources within the Northwestern Hawaiian Islands are not expected. Alternative 1: There are no additional proposed activities or exercises that would affect the Northwestern Hawaiian Islands; the potential for impacts from ongoing activities would be minimized as described above in the No-action Alternative. Alternative 2: There are no additional proposed activities or exercises that would affect the Northwestern Hawaiian Islands; the potential for impacts from ongoing activities would be minimized as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapters 4.0 and 5.0 discuss in detail the factors that influenced this analysis.

Note: No impacts on Air Quality, Airspace, Geology and Soils, Hazardous Materials and Waste, Health and Safety, Land Use, Noise, Socioeconomics, Transportation, Utilities, and Water Resources are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Air Quality	No-action: Air quality conditions will not differ from existing conditions. Compliance with standard operating procedures and air permits will continue to minimize impacts. Emissions generated by base activities do not affect the regional air quality. The tempo of launch events will continue to be managed by range activities in order to stay within the limits of current agreements. Alternative 1: Potential impacts on air quality from increased training activities, RDT&E activities, HRC enhancements, and Major Exercises would be minimized as described in the No-action Alternative. Construction would create fugitive dust emissions, diesel exhaust emissions; no change in regional air quality due to compliance with standard operating procedures for construction, including implementation of dust suppression methods and a vehicle maintenance program. No change to regional air quality is anticipated. Alternative 2: Impacts on air quality from increased training activities, RDT&E activities, and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. No change to regional air quality status is anticipated. Alternative 3: Air Quality impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Infrequent emissions associated with intermittent use of diesel generators; no change in current regional air quality. Alternative 1: Increased use of diesel generators; construction would create fugitive dust emissions, diesel exhaust emissions, and VOCs; no change in regional air quality due to compliance with standard operating procedures for construction, including implementation of dust suppression methods and a vehicle maintenance program is anticipated. No change to regional air quality is anticipated. Alternative 2: Impacts from increased training activities and Major Exercises would be minimized as described above in Alternative 1. Alternative 3: Air Quality impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Infrequent emissions associated with intermittent use of diesel generators; no change in current regional air quality. Alternative 1: Increased use of diesel generators; construction would create fugitive dust emissions, diesel exhaust emissions, and VOCs; no change in regional air quality due to compliance with standard operating procedures for construction, including implementation of dust suppression methods and a vehicle maintenance program is anticipated. No change to regional air quality is anticipated. Alternative 2: Impacts from increased training activities, and Major Exercises would be minimized as described in Alternative 1. Alternative 3: Air Quality impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Airspace	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, or airports and airfields will continue to be minimized through standard operating procedures, compliance with DoD Directive 4540.1, OPNAVINST 3770.4A, OPNAVINST 3721.20, and continued close coordination with the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from ongoing activities, increased training activities, increase RDT&E activities, planned test and evaluation activities, or HRC enhancements would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on airspace from ongoing activities, additional Major Exercises, increased training exercises, or additional RDT&E activities would be minimized as described in the No-action alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1 and Alternative 2 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Biological Resources (Offshore and Onshore)	No-action: Activities take place in current operating areas, with no expansion. Compliance with relevant Navy policies and procedures during these training activities will continue to minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. No impacts from electromagnetic radiation generation to wildlife are anticipated. Alternative 1: Impacts on biological resources from increased training activities, RDT&E activities, and HRC enhancements would be minimized as described above in the No-action Alternative. Because construction-related noise would be localized, intermittent, and occur over a relatively short-term, the potential for impacts on biological resources would be minimal. Additional electromagnetic radiation would not affect wildlife. Sound levels from FCLPs would be similar to existing sound levels on the runway. Alternative 2: Impacts on biological resources from increased training activities, RDT&E activities, and Major Exercises would be minimized as described above in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Additional it is anticipated that electromagnetic radiation would not affect wildlife. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion anticipated. Compliance with relevant Navy policies and procedures during these training activities will continue to minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Currently there are no impacts from electromagnetic radiation generation to wildlife. Alternative 1: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Effects on wildlife from construction-related noise and presence of additional personnel would be minimal. Additional electromagnetic radiation is not anticipated to affect wildlife. Alternative 2: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Additional electromagnetic radiation is not anticipated to affect wildlife. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion anticipated. Compliance with relevant Navy policies and procedures will continue to minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Currently there are no impacts from electromagnetic radiation generation to wildlife. Alternative 1: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Effects on wildlife from construction-related noise and presence of additional personnel would be minimal. Additional electromagnetic radiation is not anticipated to affect wildlife Alternative 2: Impacts on biological resources from increased training activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Additional electromagnetic radiation is not anticipated to affect wildlife. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Cultural Resources	No-action: Activities occur in designated areas and sensitive areas are avoided. Any potential for impacts on cultural resources are offset through compliance with the PMRF Integrated Cultural Resources Management Plan (ICRMP) and standard operating procedures. Alternative 1: Any potential impacts from increased training activities, RDT&E activities, and HRC enhancements would be minimized as described above in the No-action Alternative. Alternative 2: Any potential impacts from increased training activities, RDT&E activities, and Major Exercises (e.g., RIMPAC) would be minimized as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Makaha Ridge has been surveyed for archaeological, historical, and Native Hawaiian resources and none have been identified. As a result, No-action Alternative activities will not affect any cultural resources. Alternative 1: An increase in the tempo and frequency of training activities would not affect any cultural resources because Makaha Ridge has been surveyed for cultural resources and there are none present. If archaeological or Native Hawaiian resources are unexpectedly encountered during HRC enhancements, the Hawaii SHPO would be notified. Alternative 2: Any potential impacts and proposed mitigations would be the same as described in Alternative 1. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2 and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.
Geology and Soils	No-action: Ongoing training activities and exercises will continue to have minimal direct impact on the beach and inland areas, and soils are not being permanently affected. Alternative 1: New construction would follow standard methods to control erosion during construction. Soil disturbance would be limited to the immediate vicinity of the construction area and would be of short duration. Base personnel would exercise best management practices to reduce soil erosion. Alternative 2: Impacts would be minimized as described above in Alternative 1. Alternative 3: Geology and Soils impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Hazardous Materials and Waste	No-action: PMRF/Main Base has appropriate plans and standard operating procedures in place to manage hazardous materials and waste. Alternative 1: Impacts from hazardous materials and waste from increased training activities, RDT&E activities, and HRC enhancements would be minimized as described above in the No-action Alternative. Any construction activities would comply with standard operating procedures and adhere to the existing hazardous management plans. Alternative 2: Impacts from hazardous materials and waste from additional increases in training activities, RDT&E activities and additional Major Exercises would be minimized as described above in the No-action Alternative and Alternative 1. Alternative 3: Hazardous Materials and Wastes impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Makaha Ridge currently has appropriate plans in place to manage hazardous materials and waste. Alternative 1: The increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Any construction activities would comply with standard operating procedures and adhere to the existing hazardous management plans. Alternative 2: Impacts from hazardous materials and waste from additional increases in training activities and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Hazardous Materials and Wastes impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Kokee currently has appropriate plans in place to manage hazardous materials and waste. Alternative 1: The increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Any construction activities would comply with standard operating procedures and adhere to the existing hazardous management plans. Alternative 2: Impacts from additional increases in training activities and Major Exercises would be minimized as described above in the No-action Alternative and Alternative 1. Alternative 3: Hazardous Materials and Wastes impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Health and Safety	No-action: Risk to public health and safety is will continue to be minimized through compliance with standard operating procedures, policies, and plans. Alternative 1: Impacts on health and safety from additional training activities, RDT&E activities, HRC enhancements, and Major Exercises would be minimized as described above in the No-action Alternative. Construction would be in accordance with USACE Safety and Health Requirements Manual. Alternative 2: Impacts on health and safety from additional training activities, RDT&E activities, and additional Major Exercises would be minimized as described above in the No-action Alternative and Alternative 1. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with standard operating procedures will continue to minimize impacts. All location(s) are away from the public which results in no adverse public health and safety issues. Alternative 1: Impacts on health and safety from additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Construction would be in accordance with USACE Safety and Health Requirements Manual. Alternative 2: Impacts on health and safety from additional training activities and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with standard operating procedures will continue to minimize impacts. Alternative 1: Impacts on health and safety from additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Construction would be in accordance with USACE Safety and Health Requirements Manual. Alternative 2: Impacts on health and safety from additional training activities and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Land Use	No-action: Land uses and Agricultural Preservation Initiative are compatible with PMRF activities. The continuation of activities will be consistent to the maximum extent practicable with the Hawaii Coastal Zone Management Program. Closure of public recreational areas during hazardous activities will continue Alternative 1: Land use is compatible with increased training activities, training activities, RDT&E activities, HRC enhancements, and Major Exercises; additional closure of public recreation areas during hazardous activities is anticipated. Addition of FCLPs would not alter current land use patterns. Alternative 2: Land uses would be compatible with proposed increased training activities, training activities, RDT&E activities, and additional Major Exercises; additional closure of public recreation areas during hazardous activities is anticipated. Alternative 3: Land Use impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Noise	No-action: PMRF maintains a hearing protection program and has standard operating procedures in place that minimize impacts. Beach access to the areas of each of the exercises is restricted for the duration of the exercise. Alternative 1: Impacts from noise from increased training activities (including FCLPs), RDT&E activities, and HRC enhancements would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from noise from increased training activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Noise impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Socioeconomics	No-action: Beneficial impacts on economy and community on Kauai. Alternative 1: Small increase in beneficial impacts on economy on Kauai from increased training activities, future RDT&E activities, and Major Exercises. Alternative 2: Small increase in beneficial impacts on economy on Kauai from increased training activities, future RDT&E activities, and additional Major Exercises. Alternative 3: Socioeconomic impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Transportation	No-action: No impacts identified for the transportation system; PMRF events are discrete and intermittent. Transportation of ordnance and liquid propellants are conducted in accordance with established procedures. Alternative 1: Minimal increase in average daily traffic due to increased training activities, HRC enhancements, and Major Exercises. Traffic generated by construction personnel would be temporary and would result in minor additional traffic. Major exercises are discrete and intermittent with minimal temporary increase in traffic. Alternative 2: No additional traffic would be generated for increased training activities, RDT&E activities, and additional Major Exercises above what would be generated for Alternative 1. Alternative 3: Transportation impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis,	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Utilities	No-action: Current utility capacity meets demands. Alternative 1: Electricity demand, potable water consumption, wastewater generated, and solid waste disposal would be handled by existing facilities. Alternative 2: Additional electricity demand, potable water consumption, wastewater generated and solid waste disposal would be handled by existing facilities. Operation of a high-energy laser would require 30 megawatts of power (additional documentation would be required). Alternative 3: Utility impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Water Resources	No-action: Compliance with standard operating procedures and policies will continue to minimize impacts. Training activities have minimal impact on beach and inland areas and surface drainage is not permanently affected. Emissions from launches and exercises do not significantly affect water resources. Alternative 1: Impacts on water resources from increased training activities, RDT&E activities, HRC enhancements, and Major Exercises would be minimized as described in the No-action Alternative. Slight increase in missile launch emissions would not significantly affect water quality. Construction activities associated with HRC enhancements would follow standard operating procedures minimizing potential impacts from accidental spills of hazardous materials. Alternative 2: Impacts on water resources from increased training activities, RDT&E activities, HRC enhancements, and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Water Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-4B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai

Resource Category	Hawaii Air National Guard Kokee	Kamokala Magazines	Niihau	Kaula
Airspace	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Continued close coordination with the FAA and PMRF regarding continued activities and activities to controlled and uncontrolled airspace, special use airspace, en route airways, and jet routes will continue to minimize impacts. Alternative 1: Impacts on airspace from ongoing activities, increased training activities, RDT&E activities or HRC investments would be minimized as described above in the No-action Alternative. No new airspace proposal or any modification to existing airspace is anticipated. Alternative 2: Impacts on airspace from ongoing activities, additional Major Exercises, increased training exercises, or additional RDT&E activities or HRC investments would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Biological Resources (Offshore and Onshore)	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion anticipated. Compliance with relevant Navy policies and procedures will continue to minimize the effects on wildlife. Currently there are no impacts from electromagnetic radiation generation to wildlife. Alternative 1: Impacts on biological resources from increased training activities would be minimized as described above in the No-action Alternative. Additional electromagnetic radiation is not anticipated to affect wildlife. Alternative 2: Impacts on biological resources from increased training activities and additional Major Exercises would be minimized as described above in the No-action Alternative and Alternative 1. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion. Compliance with relevant Navy policies and procedures during these training activities will minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. No impacts from electromagnetic radiation generation to wildlife. Alternative 1: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Minimal impacts on biological resources from construction; additional electromagnetic radiation would not affect wildlife.	No-action: Currently there are minimal impacts on vegetation; Mitigation measures are in place that reduce or eliminate any potential impacts on marine mammals. Currently there are minimal impacts on migratory seabirds. Alternative 1: Training Activities and Major Exercises take place in current operating areas, with no expansion anticipated. Compliance with relevant Navy, NMFS, and USFWS policies and procedures during these training activities would minimize the effects on vegetation and wildlife.

Table ES-4B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	Hawaii Air National Guard Kokee	Kamokala Magazines	Niihau	Kaula
Biological Resources (Offshore and Onshore) (Continued)			Alternative 2: Impacts on biological resources from increased training activities and Major Exercises would be as described above in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	Alternative 2: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. No potential impacts on migratory seabird populations. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Cultural Resources	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.	No-action: There are no known cultural resources sites within the ROI for Kaula; therefore, there will be no impacts on cultural resources from training activities or Major Exercises. Alternative 1: There are no known cultural resources sites within the ROI for Kaula; therefore, there will be no impacts on cultural resources from increased training activities. Alternative 2: There will be no impacts on cultural resources from any additional increases in training activities because there are no known cultural resources within the Kaula ROI. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2.

Table ES-4B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	Hawaii Air National Guard Kokee	Kamokala Magazines	Niihau	Kaula
Geology and Soils	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Impacts are currently minimized due to concentrating targeting on the southeast tip of the island. Alternative 1: Impacts from Increased training and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from increased training and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Geology and Soils impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Hazardous Materials and Waste	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: PMRF currently has procedures in place to manage hazardous materials and waste. Storage and transportation or ordnance is conducted in accordance with established DOT, DoD, and Navy safety procedures. Alternative 1: Impacts would be minimized as described in the No-action Alternative. Alternative 2: Impacts would be minimized as described in the No-action Alternative. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: PMRF currently has appropriate plans in place to manage hazardous materials and waste. Alternative 1: Impacts from the increase in training activities and Major Exercises would be minimized as described in the No-action Alternative. Any construction activities would comply with standard operating procedures and adhere to the existing hazardous management plans. Alternative 2: Impacts from additional increases in training activities and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-4B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	Hawaii Air National Guard Kokee	Kamokala Magazines	Niihau	Kaula
Health and Safety	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Compliance with existing health and safety plans and procedures will continue to minimize impacts. No change in the type of ordnance stored and no increase safety risks. Storage and transportation of ordnance are conducted in accordance with established DOT, DoD and Navy safety procedures. Alternative 1: Impacts would be minimized as described above in the No-action Alternative. The factors that influenced this analysis. Alternative 2: Impacts would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with existing health and safety plans and procedures will continue to minimize impacts. Location of radar and electronic warfare sites away from the public results in no adverse public health and safety issues. Alternative 1: Impacts from additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Construction would be in accordance with USACE Safety and Health Requirements Manual. Alternative 2: Impacts from additional training activities and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with existing health and safety plans and procedures will continue to minimize health and safety risks. Alternative 1: Impacts from additional training activities would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from additional training activities would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2.
Land Use	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Land use is compatible with Navy activities. The continuation of activities will remain consistent to the maximum extent practicable with the Hawaii Coastal Zone Management Program. Alternative 1: Land use is compatible with increased activities and Major Exercises. Alternative 2: Land use is compatible with increased activities and Major Exercises. Alternative 3: Land use impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Note: No impacts at Port Allen, Kikiaola Small Boat Harbor, or Mt. Kahili are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. No impacts on Air Quality, Geology and Soils, Noise, Socioeconomics, Transportation, Utilities, and Water Resources are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-5A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	Naval Station Pearl Harbor	Ford Island	Naval Inactive Ship Maintenance Facility, Pearl Harbor
Biological Resources (Offshore and Onshore)	No-action: Procedures and policies are in place to minimize the potential for impacts on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. No impacts on essential fish habitat. Alternative 1: Impacts on biological resources from increased activities and Major Exercises would be minimized as described in the No-action Alternative. Activities would take place at existing locations; no expansion of the area would be involved. Alternative 2: Impacts on biological resources from increased activities and additional Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Procedures and policies are in place to minimize the potential for impacts on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. No impacts on essential fish habitat. No critical habitat has been identified. Alternative 1: Impacts on biological resources from increased activities and Major Exercises would be minimized as described in the No-action Alternative. Activities would take place at existing locations; no expansion of the area would be involved. Alternative 2: Impacts on biological resources from increased activities and additional Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Procedures and policies are in place to minimize impacts on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Minor and localized impacts on fish. No impacts on essential fish habitat. Alternative 1: Impacts on biological resources from increased activities and Major Exercises would be minimized as described in the No-action Alternative. Activities would take place at existing locations; no expansion of the area would be involved. Alternative 2: Impacts on biological resources from increased activities and additional Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Cultural Resources	No-action: To minimize any potential impacts, activities will continue to be conducted in accordance with the policies, guidelines, and standard operating procedures outlined in the Pearl Harbor Naval Complex Integrated Cultural Resources Management Plan (ICRMP), or any other agreement documents promulgated since completion of the ICRMP. There are no significant cultural resources within the direct ROI for activities. The Loko Okiokiolepe fishpond is the closest National Register property (approximately half a mile north of the EOD Shore Range). Alternative 1: Any potential impacts from increased training activities would be minimized as described above in the No-action Alternative. Alternative 2: Any potential impacts from additional increases in training activities would minimized as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: There are no training or Major Exercises with the potential to affect cultural resources. Alternative 1: Installation of equipment to support the ATF [Acoustic Test Facility] would be conducted in accordance with the Pearl Harbor Naval Complex ICRMP and would require coordination with the Navy Region Hawaii's cultural resource coordinator. Alternative 2: There are no new Major Exercises or training activities with the potential to affect cultural resources. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.

Table ES-5A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	Naval Station Pearl Harbor	Ford Island	Naval Inactive Ship Maintenance Facility, Pearl Harbor
Hazardous Materials and Waste	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Naval Inactive Ship Maintenance Facility, Pearl Harbor has appropriate plans in place to manage hazardous materials used and generated. Alternative 1: Impacts from the increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from additional increases in training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Hazardous Materials and Wastes impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Socioeconomics	No-action Beneficial impacts on economy and community on Oahu. Alternative 1: Current Beneficial impacts would continue. Small increase in beneficial impacts on economy on Oahu from increased RDT&E and Major Exercises. Alternative 2: Current Beneficial impacts would continue. Small increase in beneficial impacts on economy on Oahu from increased training activities, and additional Major Exercises. Alternative 3: Socioeconomic impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Water Resources	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: There are no training activities, RDT&E activities, or Major Exercises with the potential to affect water resources. Alternative 1: There are no training activities, RDT&E activities, or Major Exercises with the potential to affect water resources. HRC enhancements would adhere to standard operating procedures for construction to minimize and avoid adverse impacts on water quality. Alternative 2: Impacts would be minimized as described above in Alternative 1. Alternative 3: Water Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Note: No impacts on Air Quality, Airspace, Geology and Soils, Health and Safety, Land Use, Noise, Transportation, and Utilities, are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-5B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	EOD Range NAVMAG Pearl Harbor West Loch	Lima Landing	Puuloa Underwater Range
Biological Resources (Offshore and Onshore)	No-action: Procedures and policies are in place to minimize impacts on biological resources. Intrusive noise could startle noise-sensitive wildlife in the vicinity. Alternative 1: Impacts from increased activities and training exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from additional increases in activities and training exercises would be minimized as described above in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Procedures and policies are in place to minimize impacts on biological resources. Minor and localized impacts on fish. No impacts on essential fish habitat. Alternative 1: Impacts from increased activities and exercises would be minimized as described in the No-action Alternative. Activities would take place at existing locations; no expansion of the area would be involved. Minor and localized impacts on fish. Alternative 2: Impacts from increased activities and additional Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Procedures and policies are in place to minimize impacts on biological resources. Minor and localized impacts on fish. No impacts on essential fish habitat. Any effects from noise, shock, or residual chemicals will be localized and temporary. Alternative 1: Impacts from increased activities and Major Exercises would be minimized as described in the No-action Alternative. Activities would take place at existing locations; no expansion of the area would be involved. Alternative 2: Impacts from increased activities and additional Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Cultural Resources	No-action: There are no ongoing training activities with the potential to affect cultural resources because there are no cultural resources present in the ROI. Alternative 1: Increasing training activities would not affect cultural resources because there are no cultural resources present in the ROI. Alternative 2: Additional increases in training activities would not affect cultural resources because there are no cultural resources present in the ROI. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: There are no cultural resources within the ROI for Lima Landing's underwater demolition activities therefore no effects on cultural resources are expected. Any changes to the location of these activities would be coordinated with the Navy Region, Hawaii, cultural resources coordinator Alternative 1: Because there are no cultural resources within the ROI, no impacts on cultural resources are expected from increased training. Alternative 2: Because there are no cultural resources within the ROI, no impacts on cultural resources are expected from additional increases in training. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: There are no cultural resources within the ROI for Puuloa Underwater Range activities; therefore no effects on cultural resources are expected. Alternative 1: Because there are no cultural resources within the ROI, no impacts on cultural resources are expected from increased training. Alternative 2: Because there are no cultural resources within the ROI, no impacts on cultural resources are expected from increased training. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-5B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu (Continued)

Resource Category	EOD Range NAVMAG Pearl Harbor West Loch	Lima Landing	Puuloa Underwater Range
Geology and Soils	No-action: Policies and procedures are in place to minimize any impacts. EOD training is not expected to affect the geology of the Range; no construction or excavation is planned. Minor contamination of surface soil. Alternative 1: Impacts from increased training activities would be minimized as described above in the No-action Alternative Alternative 2: Impacts from additional Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Geology and Soils impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Hazardous Materials and Waste	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Lima Landing has appropriate plans in place to manage hazardous materials used and generated. Alternative 1: Impacts from the increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from additional increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Puuloa Underwater Range has appropriate plans in place to manage hazardous materials used and generated. Alternative 1: Impacts from the increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from the additional increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-5B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu (Continued)

Resource Category	EOD Range NAVMAG Pearl Harbor West Loch	Lima Landing	Puuloa Underwater Range
Health and Safety	No-action: Compliance with standard operating procedures will continue to minimize impacts. Location away from the public results in no adverse public health and safety issues. Alternative 1: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with standard operating procedures will minimize impacts. Location away from the public results in no adverse public health and safety issues. Demolition activities are conducted in accordance with COMNAVSURFPAC Instruction 3120.8F. Alternative 1: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with standard operating procedures will minimize impacts. Location away from the public results in no adverse public health and safety issues. Demolition activities are conducted in accordance with COMNAVSURFPAC Instruction 3120.8F Alternative 1: Impacts from the additional training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 2: Impacts from the additional training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Water Resources	No-action: Intermittent, short-term discharges of minute amounts of munitions constituents into surface waters and have no effect on water resources. Alternative 1: Increases in training activities would not significantly affect water resources. Alternative 2: Additional increases in training activities would not significantly affect water resources. Alternative 3: Water Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Note: No impacts on Air Quality, Airspace, Land Use, Noise, Socioeconomics, Transportation, and Utilities, are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-5C. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	Naval Defensive Sea Area	CG Station Barbers Point/Kalaeola Airport	Marine Corps Base Hawaii
Airspace	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures, and coordination with the State of Hawaii, U.S. Coast Guard, Kalaeloa Airport, and the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on airspace from increased training activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures and continued close coordination with the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from increased training activities, and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on airspace from ongoing activities, increased training activities, and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Biological Resources (Offshore and Onshore)	No-action: Procedures and policies are in place to minimize impacts on biological resources. No essential fish habitat affected. Alternative 1: Impacts would be minimized as described above in the No-action Alternative. Increased activities and Major Exercises would take place at existing locations; no expansion of the area would be involved. Alternative 2: Impacts would be minimized as described above in the No-action Alternative. Increased activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion. Compliance with relevant Navy and Coast Guard policies and procedures during these training activities will continue to minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Alternative 1: Impacts from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Marine Corps and Navy procedures and policies are in place to minimize impacts on biological resources and prevent introduction of invasive species. Alternative 1: Impacts from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 2: Impacts from increased activities and additional Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-5C. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu (Continued)

Resource Category	Naval Defensive Sea Area	CG Station Barbers Point/Kalaeola Airport	Marine Corps Base Hawaii
Cultural Resources	No-action: There are no known historic properties (i.e., cultural resources eligible for or listed in the National Register) located within the ROI for the Naval Defensive Sea Area; therefore, there will be no impacts on cultural resources from training and RDT&E operations under the No-action. Alternative 1: Because there are no known historic properties within the ROI, increased training activities and Major Exercises will have no impacts on cultural resources. Alternative 2: Because there are no known historic properties within the ROI, additional increases in training activities and Major Exercises will have no impacts on cultural resources. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.	No-action: Activities occur in designated areas and sensitive areas are avoided. Compliance with the standard operating procedures and policies minimizes impacts. If cultural resources are unexpectedly encountered the Hawaii SHPO will be notified. Alternative 1: Any impacts from increased training activities would be treated as described above in the No-action Alternative. Alternative 2: Any impacts from additional increases in training activities would be treated as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Health and Safety	No-action: Compliance with standard operating procedures will minimize impacts. The activities will be completely contained and the area cleared resulting in no adverse public health and safety issues. Alternative 1: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-5C. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu (Continued)

Resource Category	Naval Defensive Sea Area	CG Station Barbers Point/Kalaeola Airport	Marine Corps Base Hawaii
Noise	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Coast Guard Air Station Barbers Point has appropriate plans in place to manage noise levels. Noise produced is expected to stay within the existing noise contours. Alternative 1: Minor impacts are anticipated for areas near the airport from increased activities, training exercises, and Major Exercises. Alternative 2: Minor impacts are anticipated for areas near the airport from increased activities, training exercises, and Major Exercises. Alternative 3: Noise impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: MCBH maintains a hearing protection program that will continue to minimize impacts. Noise levels that reach off-post are mitigated by public notification and restricting training to daylight hours. Alternative 1: Increased training activities would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Alternative 3: Noise impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Note: No impacts on Air Quality, Geology and Soils, Hazardous Materials and Waste, Land Use, Socioeconomics, Transportation, Utilities, and Water Resources, are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-5D. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	MCTAB	Hickam AFB	Wheeler Army Airfield
Airspace	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures, and coordination with the Air Force, Honolulu International Airport, and the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from increased training activities would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on airspace from increased training activities and additional Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures, and coordination with the Army and the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from increased training activities would be minimized as described in the No-action Alternative. Alternative 2: Impacts on airspace from increased training activities and additional Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Biological Resources (Offshore and Onshore)	No-action: MCTAB and Navy procedures and policies are in place to minimize impacts on biological resources and prevent introduction of invasive species. Alternative 1: Increased training activities would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Hickam AFB and Navy procedures and policies are in place to continue to minimize impacts on biological resources and prevent introduction of invasive species. Chapter 4.0 discusses the factors that influenced this analysis. Alternative 1: Increased training activities and Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Army and Navy procedures and policies are in place to minimize impacts on biological resources and prevent introduction of invasive species. No critical habitat has been identified on Wheeler Army Airfield. Alternative 1: Increased training activities and Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-5D. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu (Continued)

Resource Category	MCTAB	Hickam AFB	Wheeler Army Airfield
Cultural Resources	No-action: Activities occur in designated areas and sensitive areas are avoided. Compliance with standard operating procedures and policies minimizes impacts. If cultural resources are unexpectedly encountered the Bellows AFS cultural resources coordinator will be notified. Alternative 1: Any impacts from increased training activities would be treated as described above in the No-action Alternative. Alternative 2: Any impacts from additional increases in training activities would be treated as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.

Note: No impacts on Air Quality, Geology and Soils, Hazardous Materials and Waste, Health and Safety, Land Use, Noise, Socioeconomics, Transportation, Utilities, and Water Resources, are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-5E. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	Makua Military Reservation	Kahuku Training Area	Dillingham Military Reservation
Biological Resources (Offshore and Onshore)	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion. Compliance with relevant Navy and Army policies, procedures, and plans during these training activities will continue to minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Critical habitat and sensitive areas will be avoided where possible. Alternative 1: Impacts from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion. Compliance with relevant Navy and Army policies, procedures, and plans during these training activities will minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Critical habitat and sensitive areas will be avoided where possible. Alternative 1: Impacts from increased training activities would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Army and Navy procedures and policies are in place to minimize impacts on biological resources and prevent introduction of invasive species. Alternative 1: Increased training activities and Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Cultural Resources	No-action: Activities occur in designated areas and sensitive areas are avoided. Compliance with standard operating procedures, policies, and plans minimizes impacts. If cultural resources are unexpectedly encountered the Schofield Barracks cultural resources manager will be notified. Alternative 1: Any impacts from increased training activities would be treated as described above in the No-action Alternative. Alternative 2: Any impacts from additional increases in training activities would be treated as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Activities occur in designated areas and sensitive areas are avoided. Compliance with standard operating procedures, policies, and plans minimizes impacts. If cultural resources are unexpectedly encountered the Schofield Barracks cultural resources manager will be notified. Alternative 1: Any impacts from increased training activities would be treated as described above in the No-action Alternative. Alternative 2: Any impacts from additional increases in training activities would be treated as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Activities occur in designated areas and sensitive areas are avoided. Compliance with standard operating procedures, policies, and plans minimizes impacts. If cultural resources are unexpectedly encountered the Hawaii SHPO (if the find is made by Marine Corps or Navy) or the Schofield Barracks cultural resources manager (if the find occurs during Army activities) will be notified. Alternative 1: Any impacts from increased training activities would be treated as described above in the No-action Alternative. Alternative 2: Any impacts from additional increases in training activities would be treated as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-5E. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu (Continued)

Resource Category	Makua Military Reservation	Kahuku Training Area	Dillingham Military Reservation
Health and Safety	No-action: Compliance with standard operating procedures and plans will continue to minimize impacts. Alternative 1: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from the additional training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Noise	No-action: Makua Military Reservation maintains a hearing protection program that will minimize impacts. Alternative 1: Increased training activities would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 3: Noise impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Note: No impacts on Air Quality, Airspace, Geology and Soils, Hazardous Materials and Waste, Land Use, Socioeconomics, Transportation, Utilities, and Water Resources, are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-5F. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	Ewa Training Minefield	Barbers Point Underwater Range	Naval Undersea Warfare Center
Biological Resources (Offshore and Onshore)	No-action: Procedures and policies are in place to minimize impacts on biological resources. Minor and localized impacts on fish. Any effects from noise, shock, or residual chemicals will continue to be localized and temporary. Alternative 1: Increased activities and Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Procedures and policies are in place to minimize impacts on biological resources. Minor and localized impacts on fish. No impacts on essential fish habitat. Alternative 1: Increased activities and Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Alternative 2: Increased activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	SESEF - No-action: Procedures and policies are in place to minimize impacts on biological resources. Alternative 1: Impacts from increased activities would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from increased activities would be minimized as described in the No-action Alternative. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis. FORACS - No-action: Procedures and policies are in place to minimize impacts on biological resources Alternative 1: Impacts from increased activities would be minimized as described in the No-action Alternative. Alternative 2: Impacts from increased activities would be minimized as described in the No-action Alternative. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Hazardous Materials and Waste	No-action: Ewa Training Minefield has appropriate plans in place to manage hazardous materials used and generated. Alternative 1: Increases in training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 2: Additional increases in training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Barbers Point Underwater Range has appropriate plans in place to manage hazardous materials used and generated. Alternative 1: Increases in training activities and Major Exercises would be minimized as described above in the No-action Alternative Alternative 2: Additional increases in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-5F. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	Ewa Training Minefield	Barbers Point Underwater Range	Naval Undersea Warfare Center
Health & Safety	No-action: Compliance with standard operating procedures will minimize impacts. Demolition activities are conducted in accordance with COMNAVSURFPAC Instruction 3120.8F. Alternative 1: The additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: The additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with standard operating procedures will minimize impacts. Demolition activities are conducted in accordance with COMNAVSURFPAC Instruction 3120.8F. Alternative 1: The additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: The additional training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	SESEF & FORACS - No-action: Compliance with standard operating procedures will minimize impacts. Alternative 1: The increased RDT&E activities would be minimized as described above in the No-action Alternative. Alternative 2: The increased RDT&E activities would be minimized as described in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Note: No impacts on Air Quality, Airspace, Cultural Resources, Geology and Soils, Land Use, Noise, Socioeconomics, Transportation, Utilities, and Water Resources, are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean. No impacts at Keehi Lagoon, Kaena Point, Mt. Kaala, Wheeler Network Communications Control, Mauna Kapu Communication Site, or Makua Radio/Repeater/Cable Head are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3.

Table ES-6. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Maui

Resource Category	Maui Offshore
Biological Resources (Offshore and Onshore)	No-action: Compliance with policies and procedures will continue to minimize impacts on biological resources. Alternative 1: Impacts on biological resources from increased training activities would be minimized as described in the No-action Alternative. The Portable Undersea Tracking Range would be used in areas around Maui with water depths less than 300 feet. Other than the temporary disturbance to marine species during instrumentation installation and recovery, no impacts would be expected to occur. Alternative 2: Impacts on biological resources from increased training activities and additional Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Impacts on biological resources would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Note: No impacts on Air Quality, Airspace, Cultural Resources, Geology and Soils, Hazardous Materials and Waste, Health and Safety, Land Use, Noise, Socioeconomics, Transportation, Utilities, or Water Resources are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean. No impacts at the Maui Space Surveillance Site, the Shallow Water Minefield Sonar Training Area, the Maui High Performance Computing Center, or the Sandia Maui Haleakala Facility are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3.

Table ES-7. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Hawaii

Resource Category	Pohakuloa Training Area	Bradshaw Army Airfield	Kawaihae Pier
Airspace	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures, coordination with PTA Range Control and the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on airspace from increased training activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures, coordination with PTA Range Control and the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on airspace from increased training activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2 and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Biological Resources (Offshore and Onshore)	No-action: Training Activities and Major Exercises will take place in current operating areas, with no expansion. Compliance with relevant Navy policies, procedures, and plans during these training activities will minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Alternative 1: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 2: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: These activities are limited in scope and are not anticipated to impact the areas beyond the airfield itself. Training Activities and Major Exercises take place in current operating areas, with no expansion. Compliance with relevant Navy policies, procedures, and plans during these training activities will minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Alternative 1: Impacts on biological resources from increased training activities would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on biological resources from increased training activities and additional Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion. Compliance with relevant Navy policies and procedures during these training activities will minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Sensitive biological resource areas are avoided. Alternative 1: No increases in training events at Kawaihae Pier are expected. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on biological resources from increased training activities and additional Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-7. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Hawaii (Continued)

Resource Category	Pohakuloa Training Area	Bradshaw Army Airfield	Kawaihae Pier
Cultural Resources	No-action: Activities occur in designated areas and sensitive areas are avoided. Compliance with standard operating procedures and policies minimizes impacts. If cultural resources are unexpectedly encountered then the PTA cultural resources manager will be contacted. Alternative 1: Any impacts from increased training activities would be treated as described above in the No-action Alternative. Alternative 2: Any impacts from additional increases in training activities would be treated as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: There are no training or Major Exercises with the potential to affect cultural resources at Bradshaw Army Airfield. Policies and procedures are in place to minimize any potential impacts. Alternative 1: Because there is no training or Major Exercises with the potential to affect cultural resources at Bradshaw Army Airfield, no impacts on cultural resources are expected. To avoid impacts from any HRC enhancements, activities would be coordinated with the PTA cultural resources manager. Policies and procedures are in place to minimize any potential impacts. Alternative 2: Because there is no training or Major Exercises with the potential to affect cultural resources at Bradshaw Army Airfield, no impacts on cultural resources are expected. To avoid impacts from any HRC enhancements, activities would be coordinated with the PTA cultural resources manager. Policies and procedures are in place to minimize any potential impacts. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.
Health and Safety	No-action: Compliance with existing health and safety plans and procedures will minimize impacts. Alternative 1: Impacts on health and safety from the additional training activities and HRC enhancements would be minimized as discussed above in the No-action Alternative. Alternative 2: Impacts on health and safety from the additional training activities and Major Exercises would be minimized as discussed above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-7. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Hawaii (Continued)

Resource Category	Pohakuloa Training Area	Bradshaw Army Airfield	Kawaihae Pier
Noise	No-action: PTA will continue to maintain a hearing protection program that will minimize impacts. Alternative 1: Increased training activities would take place at existing locations; no expansion of the area would be involved. Noise impacts would be minimized as discussed above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Noise impacts would be minimized as discussed above in the No-action Alternative. Alternative 3: Noise impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Note: No impacts on Air Quality, Geology and Soils, Hazardous Materials and Waste, Land Use, Socioeconomics, Transportation, Utilities, and Water Resources are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-8. Summary of Mitigation Measures

Resource Category*	Open Ocean	Northwestern Hawaiian islands	Kauai
Air Quality	None	None	Modify or renew current Title V permit for PMRF/Main Base for testing and operation of the Maritime Directed Energy Test Center.
Airspace	Depending on the intensity of the proposed lasers, nomenclature would need to be added to aeronautical charts, and certain test events could require Notices to Airmen (NOTAMs) and Notices to Mariners (NOTMARs).	None	Depending on the intensity of the lasers, nomenclature would need to be added to aeronautical charts, and certain test events could require NOTAMs and NOTMARs.
Biological Resources	Train personnel in lookout/watchstander duties. Always at least three people on watch with binoculars. At least two additional personnel on watch during ASW exercises. All personnel engaged in passive acoustic sonar operation to monitor for marine mammal vocalizations. During MFA sonar operations use all available sensor and optical systems (such as night vision goggles). Use only passive capability of sonobuoys when marine mammals are detected within 200 yards. When marine mammals are detected by any means within 1,000 yards of the sonar dome (the bow), the ship or submarine will limit active transmission levels to at least 6 decibels (dB) below normal operating levels. If need for power-down should arise, Navy to follow the requirements as though they were operating at 235 dB—the normal operating level. Operate sonar at lowest practicable level, not to exceed 235 dB, except as required to meet tactical training objectives Helicopters to observe/survey vicinity of an ASW Operation for 10 minutes before first deployment of active (dipping) sonar in the water. Do not dip sonar within 200 yards of a marine mammal and cease pinging if a marine mammal closes within 200 yards after pinging has begun.	None	Target areas are determined to be clear of marine mammals and sea turtles prior to commencement of exercises. Within 1 hour prior to initiation of Expeditionary Assault activities, landing routes and beach areas are surveyed for the presence of sensitive wildlife. An exercise is halted if marine mammals are detected on the beach or in a target area. Pressure wash vehicles on the mainland to prevent spread of invasive plants. Shield night lighting to the extent practical. Foster the reestablishment of native vegetation Monitor and treatment to eliminate establishing exotic species. Prohibit living plants brought from mainland. Work with owners of Niihau Ranch to develop Hawaiian monk seal and green turtle monitoring programs. Training operations to avoid any beach area with green turtle nests. Seasonal use of Kaula during periods when humpback whales are not present. Survey the waters off Kaula to ensure that no whales are present. Limit the impact area to the southern tip of Kaula. RIMPAC exercises use non-explosive rounds on Kaula.

Table ES-8. Summary of Mitigation Measures (Continued)

Resource Category*	Open Ocean	Northwestern Hawaiian islands	Kauai
Biological Resources (Continued)	Navy to coordinate with local NMFS Stranding Coordinator. Submit report containing discussion of nature of the effects, if observed, based on both modeled results of real-time events and sightings of marine mammals. Operating area must be determined clear of marine mammals and sea turtles prior to detonation. Pre-exercise observation of the area to start 30 minutes before and after commencement of Demolition and Ship Mine Countermeasures Operations. All weapons firing would be conducted during the period 1 hour after official sunrise to 30 minutes before official sunset. Establish exclusion zone with a radius of 1.0 nm around each target. Conduct series of surveillance over-flights within exclusion and safety zones, prior to and during the exercise, when assets are available and if safe and feasible. Monitored exclusion zone by passive acoustic means, when assets are available. If a protected species observed within the exclusion zone is diving, delay firing until animal is re-sighted outside the exclusion zone, or 30 minutes have elapsed. Prepare after action report.		

Table ES-8. Summary of Mitigation Measures (Continued)

Resource Category*	Open Ocean	Northwestern Hawaiian islands	Kauai
Cultural Resources	None	Within program requirements, alter missile trajectories to minimize the potential for debris to fall in the vicinity of Necker and Nihoa islands.	Avoid operations/construction in areas with known cultural resources. Monitoring all ground-disturbing activities and construction in medium and high sensitivity archaeological areas. Provide briefings about cultural resources to project personnel. Spray water on vegetation in immediate areas of launch vehicle prior to launch. Use open spray nozzle when possible to minimize erosion damage. Conduct post-burn archaeological surveys. Implement data recovery/research and documentation program. If unanticipated cultural resources are encountered (particularly human remains) during any activity, all activities will cease in the immediate vicinity of the find. Applicable procedures would be implemented and appropriate individuals contacted.
Geology and Soils	N/A	None	Navy minimizes the impact on Kaula by managing the targeting to the southeast tip of the island.
Hazardous Materials and Waste	None	None	Before any facility modifications, the areas to be modified would be surveyed for asbestos and lead-based paint.
Health and Safety	Ensure that no shipping is located within the hazard range of the longest-range weapon being fired for that event.	None	PMRF would develop and implement the necessary Standard Operating Procedures and range safety requirements necessary to provide safe operations associated with future high-energy laser tests. Appropriate remedial procedures would be taken before initiation of potentially hazardous laser operations on PMRF.
Noise	Limits have been set by DoD and OSHA to prevent damage to human hearing.	None	Limits have been set by DoD and OSHA to prevent damage to human hearing. All public, civilian, and nonessential personnel are required to be outside of ground hazard areas where expected noise levels will be below the 115 dBA limit for short-term exposure.

*No mitigation measures have been identified for Land Use, Socioeconomics, Transportation, Utilities, or Water Resources.

Table ES-8. Summary of Mitigation Measures (Continued)

Resource Category*	Oahu	Maui	Hawaii
Airspace	FAA coordination would include discussions regarding the anticipated number of aircraft including FCLP operations.	None	None
Biological Resources	Mitigation measures to protect critically endangered plants include: controlling threats, improving conditions for recruitment, propagation, and reintroduction, development of Implementation Plans that outline required mitigations to offset training risks and to stabilize the targeted plant and animal populations, and implementation of a Wildland Fire Management Plan. Only sandy areas that avoid/minimize potential impacts on coral are used for explosive charges in less than 40 feet of water. Where necessary, pre-exercise surveys for turtles conducted to avoid feeding and nesting areas. Conducting surveys prior to use of amphibious launch vehicles to ensure that humpback whales are not disturbed. Beach and offshore waters are monitored for presence of marine mammals and sea turtles 1 hour before and during Major Exercises, if any are seen, exercise is delayed until the animals leave the area.	None	Impacts on rare plants minimized by locating training activities away from areas with sensitive species, fencing to enclose sensitive species for protection from ungulates, fire and fuel corridors, fire breaks, additional surveys for threatened and endangered species, and continued sensitive plant propagation efforts. All off-road driving is prohibited. All fenced areas are off-limits. All lava tubes and sinkholes are off-limits. Digging is only permitted in previously disturbed areas. Hydrographic survey is performed to map out the precise Expeditionary Assault transit routes through sandy bottom areas. Personnel entering Bradshaw Army Airfield briefed on the guidelines set forth in the PTA Ecosystem Management Plan.
Cultural Resources	In the event unanticipated cultural remains are identified (particularly human remains), all operations will cease in the immediate vicinity and appropriate military branch protocols followed.	None	In the event unanticipated cultural remains are identified (particularly human remains), all operations will cease in the immediate vicinity and appropriate military branch protocols followed.
Hazardous Materials and Waste	Training operations in the Naval Defensive Sea Area are restricted to vessels owned and operated by military and DoD personnel.	None	Before any facility modifications, the areas to be modified would be surveyed for asbestos and lead-based paint.
Health and Safety	Ensure that no shipping is located within the hazard range of the longest-range weapon being fired for that event.	None	None
Noise	Limits have been set by DoD and OSHA to prevent damage to human hearing. Personnel required to work in noise hazard areas are required to use appropriate hearing protection to bring noise levels within established safety levels. Public notification and restricting training in Waimanalo Bay to daylight hours.	None	None

*No mitigation measures have been identified for Air Quality, Geology and Soils, Land Use, Socioeconomics, Transportation, Utilities, or Water Resources.

Acronyms and Abbreviations

AFB	Air Force Base
ASW	Anti-Submarine Warfare
CFR	Code of Federal Regulations
COMNAVSURFPAC	Commander, Naval Surface Force, U.S. Pacific Fleet
CEQ	Council on Environmental Quality
dB	Decibel
dBA	A-Weighted Decibels
DoD	Department of Defense
DOT	Department of Transportation
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
ESA	Endangered Species Act
ESG	Expeditionary Strike Group
FCLP	Field Carrier Landing Practice
FORACS	Fleet Operational Readiness
HFA	High-Frequency Active
HRC	Hawaii Range Complex
ICRMP	Integrated Cultural Resource Management Plan
IEER	Improved Extended Echo Ranging
MCBH	Marine Corps Base Hawaii
MCTAB	Marine Corps Training Area Bellows
MFA	Mid-Frequency Active
MMPA	Marine Mammal Protection Act
NDE	National Defense Exemption
NEPA	National Environmental Policy Act
nm	Nautical Mile(s)
nm^2	Square Nautical Mile(s)
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NOTAM	Notice to Airmen
NOTMAR	Notice to Mariners
OEIS	Overseas Environmental Impact Statement
OPAREA	Operating Area
OSHA	Occupational Safety and Health Administration
PMRF	Pacific Missile Range Facility
PTA	Pohakuloa Training Area
RDT&E	Research, Development, Test, and Evaluation
RIMPAC	Rim of the Pacific
ROD	Record of Decision
SESEF	Shipboard Electronic Systems Evaluation Facility
SPORTS	Sonar Positional Reporting System
THAAD	Terminal High Altitude Area Defense
TOA	Temporary Operating Area
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USWEX	Undersea Warfare Exercise

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Hawaii Range Complex

Final Environmental Impact Statement/ Overseas Environmental Impact Statement (EIS/OEIS)

Volume 1 of 5: Chapters 1-3

May 2008

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HAWAII RANGE COMPLEX
FINAL ENVIRONMENTAL IMPACT STATEMENT/
OVERSEAS ENVIRONMENTAL IMPACT STATEMENT

Volume 1 of 5

MAY 2008

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COVER SHEET
FINAL ENVIRONMENTAL IMPACT STATEMENT/
OVERSEAS ENVIRONMENTAL IMPACT STATEMENT
HAWAII RANGE COMPLEX (HRC)

Lead Agency for the EIS:	U.S. Department of the Navy
Title of the Proposed Action:	Hawaii Range Complex
Affected Jurisdiction:	Kauai, Honolulu, Maui, and Hawaii Counties
Designation:	Final Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS)

Abstract

This Final EIS/OEIS has been prepared by the U.S. Department of the Navy (Navy) in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code § 4321 et seq.); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] §§ 1500-1508); Navy Procedures for Implementing NEPA (32 CFR § 775); and Executive Order 12114 (EO 12114), *Environmental Effects Abroad of Major Federal Actions*. The Navy has identified the need to support and conduct current, emerging, and future training and research, development, test, and evaluation (RDT&E) activities in the Hawaii Range Complex (HRC). The alternatives—the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3—are analyzed in this Final EIS/OEIS. All alternatives include an analysis of potential environmental impacts associated with the use of mid-frequency active (MFA) and high-frequency active (HFA) sonar. The No-action Alternative stands as no change from current levels of HRC usage and includes HRC training, support, and RDT&E activities, Major Exercises, and maintenance of the technical and logistical facilities that support these activities and exercises. Alternative 1 includes all ongoing training associated with the No-action Alternative, an increased tempo and frequency of such training (including increases in MFA and HFA sonar use), a new training event (Field Carrier Landing Practice), enhanced and future RDT&E activities, enhancements to optimize HRC capabilities, and an increased number of Major Exercises. Alternative 2 includes all of the training associated with Alternative 1 plus additional increases in the tempo and frequency of training (including additional increases in MFA and HFA sonar use), enhanced RDT&E activities, future RDT&E activities, and additional Major Exercises, such as supporting three Strike Groups training at the same time. Alternative 3 would include all of the training and RDT&E activities associated with Alternative 2. The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events, future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Alternative 3 is the Navy's preferred alternative.

This Final EIS/OEIS addresses potential environmental impacts that result from activities that occur under the No-action Alternative and proposed activities that would occur under Alternatives 1, 2, and 3. This EIS/OEIS also addresses changes and associated environmental analyses that were presented in the Supplement to the Draft EIS/OEIS. Environmental resource topics evaluated include air quality, airspace, biological resources (open ocean, offshore, and onshore), cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

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May 2008

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Executive Summary

EXECUTIVE SUMMARY

ES1.1 INTRODUCTION

This Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) analyzes the potential environmental consequences that may result from the United States (U.S.) Department of the Navy's Proposed Action and alternatives. The Proposed Action presented in this EIS/OEIS addresses ongoing and proposed activities within the Navy's existing Hawaii Range Complex (HRC) and represents current and anticipated future use of the "existing footprint." This EIS/OEIS contains analysis of research, development, test, and evaluation (RDT&E) of new technologies used by the Navy and other Federal agencies, including the Missile Defense Agency.

This EIS/OEIS has been prepared by the Department of the Navy in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] § 4321 et seq.) and Executive Order (EO) 12114, *Environmental Effects Abroad of Major Federal Actions*.

The Navy is the lead for the EIS/OEIS; the National Marine Fisheries Service (NMFS), Missile Defense Agency, U.S. Department of the Army, and the U.S. Department of Energy are cooperating agencies. Additionally, the Navy has worked with experts from the State of Hawaii and other Federal agencies to ensure that the effects on the environment of the Navy's Proposed Action are fully assessed in this document.

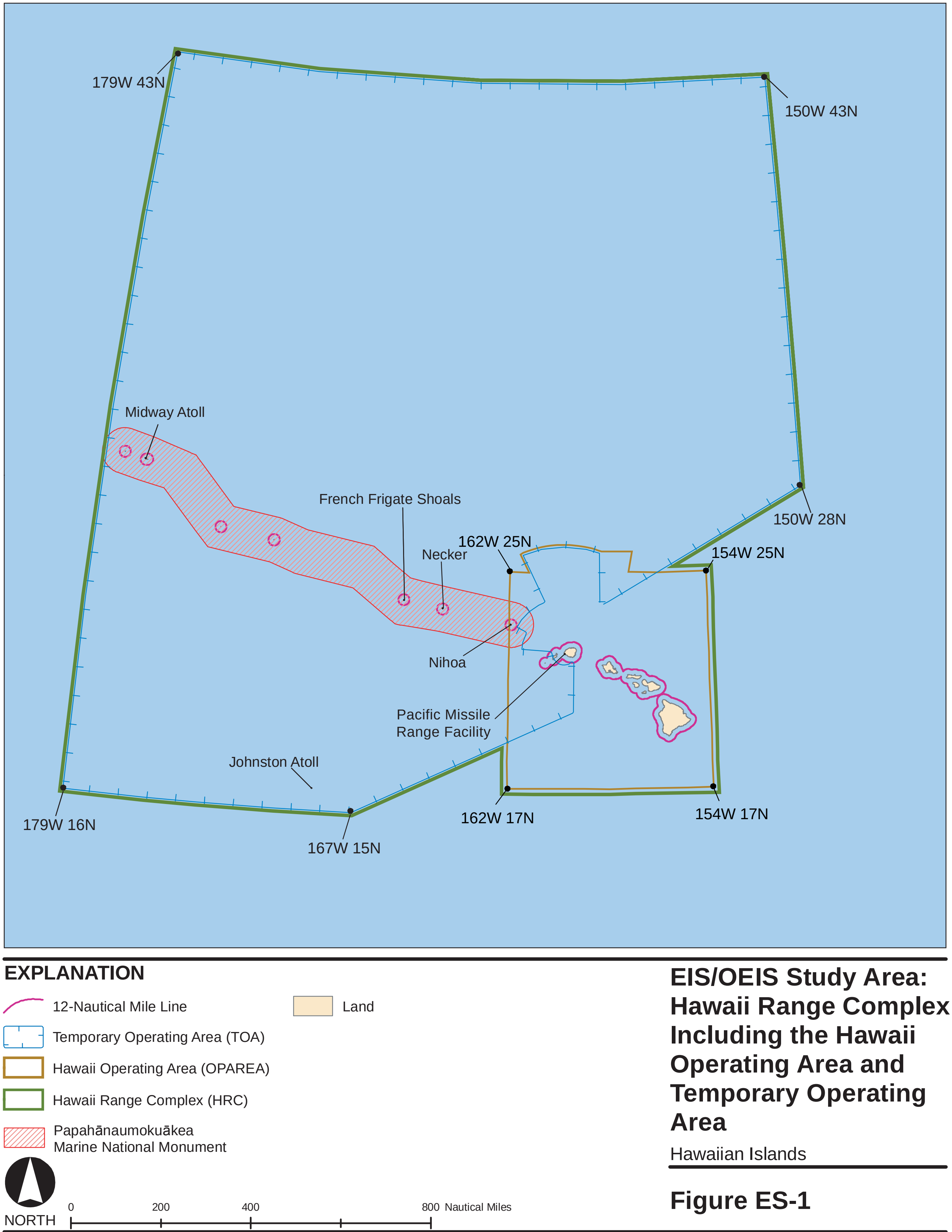
The HRC geographically encompasses the open ocean (outside 12 nautical miles [nm] from land), offshore waters (within 12 nm from land), and onshore areas located on or around the islands of the Hawaiian Islands chain (Figure ES-1).

There are three component areas of the HRC: (1) the Hawaii Operating Area (OPAREA) (includes surface and subsurface ocean areas and special use airspace); (2) the Temporary Operating Area (TOA) (composed of sea and airspace north and west of Kauai for RDT&E activities); and (3) various Navy land ranges and other Services' land for military training and RDT&E activities.

ES1.2 PURPOSE AND NEED

The purpose of the Proposed Action is to achieve and maintain fleet readiness using the HRC to support and conduct current, emerging, and future training and RDT&E activities, and enhance training resources through investment on the ranges. The mission of the HRC is to support naval operational readiness by providing a realistic, live training environment for forces assigned to the Pacific Fleet, the Fleet Marine Force, and other users.

The need for the Proposed Action is to enable the Navy to meet its statutory responsibility under Title 10 Sections 5013 and 5062 to organize, train, equip, and maintain combat-ready naval forces and to successfully fulfill its current and future global mission of winning wars, deterring aggression, and maintaining freedom of the seas. Activities involving RDT&E for Department of Defense (DoD) or Navy systems are an integral part of this readiness mandate.



EIS/OEIS Study Area: Hawaii Range Complex Including the Hawaii Operating Area and Temporary Operating Area

Hawaiian Islands

Figure ES-1

The HRC plays a vital part in the execution of this naval readiness mandate. The Hawaii area is home to a large concentration of U.S. naval forces. Naval forces based in Hawaii and those transiting across the Pacific Ocean use and rely on the HRC because of its capabilities and strategic location in the mid-Pacific region. The Navy's Proposed Action is essential to ensure the continued vitality of this training resource.

ES1.2.1 WHY THE NAVY TRAINS

The U.S. military is maintained to ensure the freedom and safety of all Americans both at home and abroad. In order to do so, Title 10 of the U.S.C requires the Navy to "maintain, train and equip combat-ready naval forces capable of winning wars, deterring aggression and maintaining freedom of the seas." Modern war and security operations are complex. Modern weaponry has brought both unprecedented opportunity and innumerable challenges to the Navy. Smart weapons, used properly, are accurate and allow the Navy to accomplish its mission with greater precision and less destruction than in past conflicts. U.S. military personnel must train regularly with these modern, complex weapons in order to understand their capabilities, limitations, and operation. Modern military actions require teamwork between hundreds or thousands of people, and their various equipment, vehicles, ships, and aircraft, all working individually and as a coordinated unit to achieve success. Navy training addresses all aspects of the team, from the individual to joint and coalition teamwork. To do this, the Navy employs a building-block approach to training. Training doctrine and procedures are based on operational requirements for deployment of naval forces. Training proceeds on a continuum, from teaching basic and specialized individual military skills, to intermediate skills or small unit training, to advanced, integrated training events, culminating in multi-service (Joint) exercises, coalition or combined exercises (with allied nations participating), or pre-deployment certification events.

In order to provide the experience so important to success and survival, training must be as realistic as possible. The Navy often employs simulators and synthetic training to provide early skill repetition and to enhance teamwork, but live training in a realistic environment is vital to success. Live training requires sufficient sea and airspace to maneuver tactically, realistic targets and objectives, simulated opposition that creates a realistic enemy, and instrumentation that monitors the events and provides essential feedback.

Range complexes, like the HRC, provide a controlled and safe environment with threat-representative targets that allow Navy forces to conduct realistic training as Navy men and women undergo all phases of the graduated buildup needed for combat-ready deployment. The range complexes are designed to provide the most realistic training in the most relevant environments, replicating to the greatest extent possible the operational stresses of warfare. The integration of undersea ranges and OPAREAs with land training ranges, safety landing fields, and amphibious landing sites are critical to this realism, allowing execution of multi-dimensional exercises in complex scenarios. The live-fire phase of training is fundamental to the adequate assessment of weapon precision under stressful conditions. Live training, most of it accomplished in the waters off the United States' coasts, will remain the cornerstone of readiness as the Navy prepares its military forces for a security environment characterized by uncertainty and surprise.

ES1.2.2 STRATEGIC IMPORTANCE OF THE EXISTING HAWAII RANGE COMPLEX

The HRC is used for training and assessment of operational forces, missile training, RDT&E of military systems and equipment, and other military activities. The HRC is characterized by a unique combination of attributes that make it a strategically important range complex for the Navy. These attributes include:

- Proximity to the homeport of Pearl Harbor
- Proximity to the Western Pacific
- Proximity to military families based in Hawaii
- New training terrain for west coast based naval forces

Refer to Section 1.3.5 of Chapter 1.0 for a detailed description of these attributes.

The large training area available to deployed forces within the HRC allows training to take place using a geographic scope that replicates possible real world events, with the channels between islands providing geography necessary for opposed transit scenarios. The presence of the instrumented tracking ranges at the Pacific Missile Range Facility (PMRF) as well as DoD-controlled warning areas and special use airspace also allow safe and structured training with sufficient flexibility to interject tactical challenges to enhance realism for exercise participants. Exercise participants at sea can conduct air strike sorties to Pohakuloa Training Area (PTA) and an Expeditionary Strike Group (ESG) can conduct amphibious landing on DoD beaches, while each simultaneously conducts Anti-Submarine Warfare (ASW) training. Finally, the presence of submarines homeported at Pearl Harbor allows for a readily available opposition force during the training event without having to transit to participate in the exercise events.

ES1.3 SCOPE AND CONTENT OF THE EIS/OEIS

The Navy's analysis of environmental effects under NEPA includes areas of the HRC that lie within the territorial seas, which extend 12 nm from land. The environmental effects in the ocean areas that are outside of U.S. territorial seas are analyzed under EO 12114 and associated implementing regulations.

ES1.3.1 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

In 1969, Congress enacted NEPA, which provides for the consideration of environmental issues in Federal agency planning and decision-making. Regulations for Federal agency implementation of the act were established by the President's Council on Environmental Quality (CEQ). NEPA requires that Federal agencies prepare an EIS if the agency's proposed action might significantly affect the quality of the human environment. The EIS must disclose significant environmental impacts and inform decision makers and the public of the reasonable alternatives to the proposed action. Presidential Proclamation 5928, issued December 27, 1988, extended the exercise of United States sovereignty and jurisdiction under international law to 12 nm; however, the Proclamation expressly provides that it does not extend or otherwise alter existing Federal law or any associated jurisdiction, rights, legal interests, or obligations.

However, as a matter of policy, the Navy analyzes environmental effects and actions within 12 nm under NEPA and those effects occurring beyond 12 nm under the provisions of EO 12114.

This EIS/OEIS provides an assessment of the potential environmental impacts associated with sustainable range usage and enhancements within the Navy's HRC. The Navy completed the Supplement to the 2002 Rim of the Pacific (RIMPAC) Programmatic Environmental Assessment in May 2006 and the Undersea Warfare Exercise (USWEX) Programmatic Environmental Assessment in October 2007. This EIS/OEIS analyzes the continuation of these exercises in the baseline analysis. It also analyzes Navy training that currently occurs or is proposed to occur in open ocean, offshore, and onshore areas of the HRC.

The first step in the NEPA process is the publication of a Notice of Intent (NOI) to prepare an EIS. The NOI provides an overview of the proposed action and the scope of the EIS. The NOI for this project was published in the *Federal Register* on August 29, 2006, and in five local newspapers (i.e., *Honolulu Advertiser*, the *Honolulu Star Bulletin*, the *Maui News*, the *Hawaii Tribune Herald*, and the *Garden Island*) on September 2, 4, and 5, 2006.

Scoping is an early and open process for developing the "scope" of issues to be addressed in the EIS and for identifying significant issues related to a proposed action. During scoping, the public helps define and prioritize issues and convey these issues to the agency through both oral and written comments. The scoping period for the HRC EIS/OEIS began with the publication of an NOI. The scoping period lasted 46 days, concluding on October 13, 2006. Four scoping meetings were held on September 13, 14, 16, and 18, 2006 on the islands of Maui, Oahu, Hawaii, and Kauai, respectively. The scoping meetings were held in an open house format, presenting informational posters and written information, and making Navy staff and project experts available to answer participants' questions. Additionally, a court reporter was available to record participants' oral comments. This format allowed the public to interact informally, one-on-one, with project representatives or comment formally, on the record, to representatives of the Navy.

In addition to the scoping meetings, the public could make comments through a toll-free telephone number, by sending an email, or by mailing a written comment. Issues identified by the public were provided to resource specialists working on the EIS/OEIS to ensure that all comments were considered during the preparation of the document.

After scoping, the Draft EIS/OEIS was prepared to provide an assessment of the potential impacts of the Proposed Action and alternatives on the environment. Public hearings were conducted during the review process in Kauai (Lihue), Oahu (Honolulu), Maui (Wailuku), and Hawaii (Hilo). The Draft EIS/OEIS was circulated for public review and the comment period concluded on September 17, 2007. Approximately 2,500 public comments were received and appropriately incorporated into this EIS/OEIS. Responses to public comments on the Draft EIS/OEIS may be found in Chapter 13.0.

During the scoping and public review process, members of the public and non-governmental environmental organizations expressed concerns on a variety of topics. One of the issues receiving the most comments related to the potential effects associated with mid-frequency active (MFA) sonar use and testing in the HRC. These concerns are addressed in this EIS/OEIS.

The Navy recognizes that the potential impact on marine mammals caused by the use of sonar is controversial. Based on continued coordination with NMFS, the Navy has used best available science as the basis to assess impacts on marine mammals caused by MFA and high-frequency active (HFA) sonar used by a particular torpedo. The best available science has been used as a basis for development of the “Risk Function” model for predicting potential exposures of marine mammals to Navy MFA and HFA sonar use that will result in behavioral effects. What this model cannot do yet is to include in its calculations reductions in the behavioral effects estimates resulting from all of the procedures that the Navy has in place to protect marine mammals. These include personnel training, pre- and post-exercise surveys, power-down and power-off requirements for the sonar when mammals are within certain distances of the sound source, and passive detection of marine mammals.

During the public hearings, it was clear that many of those voicing concern were unaware that the training and testing activities proposed for the HRC are not new activities and have been occurring for approximately 40 years. No known marine mammal strandings directly related to Navy activities have occurred during this time. Nonetheless, by design, the Navy has taken an approach to modeling that calculates the maximum potential exposures to marine mammals to account for uncertainties in existing scientific data.

Since the publication of the Draft EIS/OEIS, the Navy, in coordination with the NMFS, re-analyzed the effects that MFA sonar has on marine mammals. This re-evaluation and consequent proposed changes to the Draft EIS/OEIS led the Navy to prepare a Supplement to the Draft EIS/OEIS. Accordingly, this EIS/OEIS incorporates the following changes and associated environmental analysis as presented in the Supplement to the Draft EIS/OEIS:

- Modifications to the analytical methodology used to evaluate the effects of MFA sonar on marine mammals;
- Changes to the amount and types of sonar allocated to each of the alternatives; and,
- The development of a new alternative.

The NOI for the Supplement to the Draft EIS/OEIS was published in the *Federal Register* on January 17, 2008. The Supplement to the Draft EIS/OEIS was circulated for public review, and the comment period ended on April 7, 2008. Responses to all comments on the Supplement to the Draft EIS/OEIS are presented in Chapter 14.0 of this document.

There is a 30-day wait period following the publication of the Notice of Availability of the Final EIS/OEIS in the Federal Register. At the conclusion of this wait period, the Navy will decide the action it will implement through its Record of Decision (ROD) which will be published in the Federal Register. The ROD will summarize the final decision and identify the selected alternative, describe the public involvement and agency decision-making processes, and present commitments to specific mitigation measures. The selected decision can then be implemented.

ES1.3.2 EXECUTIVE ORDER (EO 12114)

Environmental effects in the areas that are beyond the U.S. territorial sea are analyzed under EO 12114 and associated implementing regulations.

ES1.3.3 MARINE MAMMAL PROTECTION ACT, ENDANGERED SPECIES ACT COMPLIANCE

The Marine Mammal Protection Act (MMPA) of 1972 established, with limited exceptions, a moratorium on the “taking” of marine mammals in waters or on lands under U.S. jurisdiction. Section 101(a)(5) of the MMPA directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of marine mammals by U.S. citizens who engage in a specified activity (exclusive of commercial fishing). In support of the Proposed Action, the Navy applied for a Letter of Authorization from NMFS pursuant to Section 101(a) (5) (A) of the MMPA. NMFS intends to publish a proposed rule for public comment coincident with the publication of this EIS/OEIS, and anticipates issuing the final authorization toward the end of Calendar Year 2008.

On January 23, 2007, the Deputy Secretary of Defense exempted all military readiness activities employing MFA sonar or Improved Extended Echo Ranging (IEER) sonobuoys from compliance with the requirements of the MMPA for a period of 2 years. This exemption is limited to Major Exercises or training and RDT&E activities within established operating areas or established DoD maritime ranges. This National Defense Exemption (NDE) remains in effect until January 23, 2009 or authorization under the MMPA, whichever is earliest.

The NDE will cover MFA sonar and IEER sonobuoy activities on the HRC until an MMPA authorization is issued for these activities or the NDE expires whichever is earliest. While the NDE remains applicable (until an MMPA authorization is issued), the Navy will continue to employ the marine mammal mitigation measures outlined in Chapter 6.0 of this EIS/OEIS to protect marine mammals while training with the use of MFA sonar. These measures include safety zones around ships and trained lookouts based on coordination of science-based measures with NMFS. Additional measures that may be required as a result of the MMPA authorization would be implemented once authorization is received.

The Endangered Species Act (ESA) requires that Federal agencies, in consultation with the responsible wildlife agency, ensure that proposed actions are not likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of a critical habitat. Regulations implementing the ESA consultation requirement also include those actions that “may affect” a listed species or adversely modify critical habitat.

As part of the environmental documentation for this EIS/OEIS, and as an MMPA permit applicant, the Navy entered into early consultation procedures with NMFS, endangered species division. The Navy has been actively engaged in consultation with NMFS regarding the potential effects on ESA-listed species from the conduct of the activities outlined in this EIS/OEIS. In accordance with 50 Code of Federal Regulations (CFR) §402.11, prior to the issuance of the ROD, NMFS will issue a Preliminary Biological Opinion documenting its determination as to whether the activities conducted in the HRC are likely to jeopardize the continued existence of ESA-listed species, or result in the destruction or adverse modification of critical habitat. Additionally, a preliminary Incidental Take Statement will accompany the preliminary Biological Opinion. Because the Section 7 consultation is simultaneously conducted internally to address NMFS' issuance of an MMPA authorization, an Incidental Take Statement for marine mammals cannot be issued until an MMPA authorization is issued.

The Preliminary Biological Opinion and Preliminary Incidental Take Statement do not exempt the Navy from the prohibitions of Section 9 of the ESA. Further, the Navy has determined that activities occurring in the HRC prior to the issuance of an MMPA authorization (e.g., RIMPAC, USWEX, etc.) may affect endangered species in the HRC, and may incidentally take ESA-listed species, thus requiring consultation under the ESA and an associated Incidental Take Statement. As such, the Navy and NMFS are engaged in a separate Section 7 consultation on these specified activities. A separate Biological Opinion and Incidental Take Statement will be issued, as appropriate, for this subset of specified activities, which will occur prior to the issuance of the MMPA authorization and be covered by the NDE.

ES1.3.4 OTHER ENVIRONMENTAL REQUIREMENTS CONSIDERED

The Navy must comply with a variety of other Federal environmental laws, regulations, and EOs. These include (among other applicable laws and regulations):

- Migratory Bird Treaty Act;
- Coastal Zone Management Act;
- Rivers and Harbors Act;
- Magnuson-Stevens Fishery Conservation and Management Act;
- Clean Air Act;
- Federal Water Pollution Control Act (Clean Water Act);
- National Historic Preservation Act;
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- EO 13045, Environmental Health and Safety Risks to Children;
- EO 13423, *Strengthening Federal Environmental, Energy and Transportation Management;*
- EO 13089, *Coral Reef Protection;* and
- National Marine Sanctuaries Act.

In addition, laws and regulations of the State of Hawaii appropriate to Navy actions are identified and addressed in this EIS/OEIS. To the extent practicable, this document will be used as the basis for any required consultation and coordination.

ES1.4 PROPOSED ACTION AND ALTERNATIVES

The Proposed Action presented in this EIS/OEIS addresses ongoing and proposed activities within the Navy's existing HRC and contains analyses of RDT&E of new technologies used by the Navy and other Federal agencies.

ES1.4.1 ALTERNATIVES DEVELOPMENT

NEPA requires that an EIS evaluate the environmental consequences of a range of reasonable alternatives. Guidance for the development of alternatives is provided in CEQ regulations (40 CFR § 1502.14) and Navy procedures described in 32 CFR § 775. Reasonable alternatives must meet the stated purpose and need of the Proposed Action.

ES1.4.2 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

The Navy eliminated alternatives from further consideration. Specifically, the following alternatives (described in Chapter 2.0) were not carried forward for analysis:

- Reduction or Elimination of Training in the Hawaii Range Complex
- Alternative Locations for Training Conducted in the Hawaii Range Complex
- Computer Simulation Training

After careful consideration, none of these alternatives meet the Navy's purpose and need for the Proposed Action.

ES1.4.3 ALTERNATIVES CONSIDERED

Alternatives were selected based on their ability to meet the following criteria, which were developed from the purpose and need for the Proposed Action: (1) use existing Navy ranges and facilities in and around Hawaii; (2) be consistent with the stated current and emerging requirements for the range complex; (3) achieve training tempo requirements based on Fleet deployment schedules; (4) meet the requirements of DoD Directive 3200.15, Sustainment of Ranges and Operating Areas; (5) implement new training requirements and RDT&E activities; and (6) support realistic training that replicates expected operating environments for naval forces. Four alternatives are analyzed in the EIS/OEIS, including three action alternatives (Alternatives 1, 2, and 3) and the No-action Alternative.

ES1.4.3.1 No-Action Alternative

The No-action Alternative is required by CEQ regulations as a baseline against which the impacts of the Proposed Action are compared. In the EIS/OEIS, the No-action Alternative is represented by baseline training and RDT&E operations at current levels, including more than 9,300 training and RDT&E activities in the HRC annually. Training events, including those that make up Major Exercises (RIMPAC Exercise and five USWEXs) and RDT&E activities, would continue at the baseline levels. Ongoing training events include Anti-Air Warfare, Amphibious Warfare, Anti-Surface Warfare, ASW, Electronic Combat, Mine Warfare, Naval Special Warfare, and Strike Warfare Exercises. The No-action Alternative includes support activities such as

Command and Control, in-port ship and aircraft support, and personnel support. RDT&E activities occur primarily at one of two locations in Hawaii: PMRF and Naval Undersea Warfare Center Detachment Pacific ranges.

ES1.4.3.2 Alternative 1

Alternative 1 includes all ongoing Navy training associated with the No-action Alternative, and proposes an increased number of such training events. The Navy proposes to increase both the tempo and the frequency of training exercises in the HRC. Alternative 1 includes the addition of Field Carrier Landing Practice (FCLP), a series of touch-and-go landings to train and qualify pilots for aircraft carrier landings at PMRF airfield on Kauai and Marine Corps Base Hawaii (MCBH) on Oahu. The Navy proposes to enhance and add RDT&E activities above current levels.

ES1.4.3.3 Alternative 2

Alternative 2 would include all of the activities described in Alternative 1, plus a further increased tempo and frequency of training events, future RDT&E programs at PMRF, and the addition of Major Exercises, such as supporting three Carrier Strike Groups training at the same time.

ES1.4.3.4 Alternative 3 (Preferred Alternative)

The only difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2. As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events, future and enhanced RDT& E activities, and the addition of Major Exercises. Alternative 3 would consist of sonar usage as analyzed under the No-action Alternative. Sonar hours for Alternative 3 and effects associated with ASW training would be identical to that presented under the No-action Alternative.

Alternative 3 is the preferred alternative because it allows the Navy to meet its future non-ASW training and RDT&E mission objectives while maintaining historic levels of ASW training to avoid increases in potential effects to marine mammals in the HRC. At this time, the Navy believes that its ASW requirements will be met based on the No-action Alternative sonar hours.

ES1.5 SPORTS DATA

The data from the Sonar Positional Reporting System (SPORTS) provided a foundation for the sonar hours analyzed under each of the Alternatives. SPORTS is a database tool established by Commander, U.S. Fleet Forces Command in mid-2006. All commands employing MFA sonar and sonobuoys are required to populate the SPORTS database by reporting MFA sonar use. A review by senior officers determined that SPORTS data would be used in this EIS/OEIS in conjunction with previous planning data to assist in determining the amount of MFA sonar use for purposes of modeling potential effects on marine mammals.

The types of sonar sources used as part of ASW activities within the HRC are listed below:

- Surface ship sonar (AN/SQS-53 and AN/SQS-56)
- Helicopter dipping sonar (AN/AQS-22)
- Aircraft deployed sonobuoys (AN/SSQ-62)
- Submarine sonar (BQQ-10, BQQ-5, BSY-1)
- MK-48 torpedo

Table ES-1 presents a comparison of the sonar used for each of the alternatives analyzed. The majority of training and RDT&E activities in the HRC involve five types of narrowband sonars. Exposure estimates are calculated for each sonar according to the manner in which it operates. For example, the AN/SQS 53 and AN/SQS 56 are hull-mounted, MFA surface ship sonars that operate for many hours at a time (although sound is output—the “active” portion—only a small fraction of that time), so it is most useful to calculate and report surface ship sonar exposures per hour of operation. The BQQ-10 submarine sonar is also reported per hour of operation. However, the submarine sonar is modeled as pinging only twice per hour. The AN/AQS-22 is a helicopter-deployed sonar, which is lowered into the water, pings several times, and then moves to a new location; this sonar is used for localization and tracking a suspected contact as opposed to searching for contacts. For the AN/AQS-22, it is most helpful to calculate and report exposures per dip. The AN/SSQ-62 is a sonobuoy that is dropped into the water from an aircraft or helicopter and pings about 10 to 30 times in an hour. For the AN/SSQ-62, it is most helpful to calculate and report exposures per sonobuoy. For the MK-48 torpedo the sonar is modeled for a typical training event and the MK-48 reporting metric is the number of torpedo runs. See Table J-2 of Appendix J for a presentation of the deployment platform, frequency class, the metric for reporting exposures, and the units for each sonar.

Note that sonar usage for Alternative 3 and effects associated with ASW training would be identical to that presented under the No-action Alternative.

Table ES-1. Summary of Sonar Usage for Each Alternative

No-action Totals		
	Source	**Modeled**
	53	1,284 hours
	56	383 hours
	Dipping	1,010 dips
	Sonobuoy	2,423 buoys
	MK-48	313 runs
	Submarine	200 hours
Alternative 1 Totals		
	Source	**Modeled**
	53	1,788 hours
	56	551 hours
	Dipping	1,517 dips
	Sonobuoy	3,127 buoys
	MK-48	317 runs
	Submarine	200 hours

Table ES-1. Summary of Sonar Usage for Each Alternative (Continued)

	Source	Modeled
Alternative 2 Totals		
	Source	**Modeled**
	53	2,496 hours
	56	787 hours
	Dipping	1,763 dips
	Sonobuoy	3,528 buoys
	MK-48	374 runs
	Submarine	200 hours
Alternative 3 Totals		
	Source	**Modeled**
	53	1,284 hours
	56	383 hours
	Dipping	1,010 dips
	Sonobuoy	2,423 buoys
	MK-48	313 runs
	Submarine	200 hours

ES1.6 SUMMARY OF ENVIRONMENTAL EFFECTS

Environmental effects which might result from the implementation of the Navy's Proposed Action or alternatives have been analyzed in this EIS/OEIS. Resource areas analyzed included airspace, biological resources, cultural resources, hazardous materials and waste, health and safety, noise, water resources, geology and soils, land use, socioeconomics, transportation, and utilities. A summary of effects on the above-referenced resources where applicable have been addressed in Table ES-2 for Open Ocean areas, Table ES-3 for the Northwestern Hawaiian Islands, Tables ES-4 for Kauai, Tables ES-5 for Oahu, Table ES-6 for Maui, and Table for ES-7 for Hawaii. A detailed analysis of effects is provided in Chapter 4.0.

A comparison of the environmental impacts of the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 is presented in Tables ES-2 through ES-7. These tables summarize the conclusions of the analyses made for each of the areas of environmental consideration based on the application of the described methodology. Only those activities for which a potential environmental concern was determined at each location are described for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3.

ES1.6.1 CUMULATIVE IMPACTS

The analysis of cumulative impacts considers the effects of the Proposed Action in combination with other past, present, and reasonably foreseeable future actions taking place in the project area, regardless of what agency or person undertakes these actions. This EIS/OEIS analyzes cumulative impacts associated with implementation of Navy-sponsored activities and other non-Navy activities in the region. The cumulative project list includes over 140 Federal, State, and local projects ranging from minor construction to major infrastructure type projects, as well as various military training projects. Other activities included Commercial Fishing, Commercial and Recreational Vessel Traffic, Coastal Development Activities, Environmental Contamination and

Biotoxins, and Scientific Research Permits. Potential cumulative impacts resulting from other relevant projects (such as those listed above) combined with the Proposed Action addressed in this EIS/OEIS were determined to be less than significant.

ES1.6.2 MITIGATION MEASURES

The Navy is a global environmental leader. As part of the Navy's commitment to sustainable use of resources and environmental stewardship, the Navy incorporates mitigation measures that are protective of the environment into all of its activities. The Navy's current mitigation measures reflect a balance between training requirements and the Navy's important role in ensuring environmental protection. These measures have been the subject of extensive discussions between NMFS and the Navy, and evaluated for mission impacts, probable effectiveness, and the ability to implement. Mitigation measures are described in detail in Chapter 6.0.

Mitigation measures identified to reduce effects or ensure no future impacts occur are provided in Table ES-8.

ES1.6.3 OTHER NEPA CONSIDERATIONS

ES1.6.3.1 Conflicts with Federal, State, and Local Land Use Plans, Policies, and Controls for the Area Concerned

Based on an evaluation of consistency with statutory obligations, the Navy's proposed training and RDT&E activities for the HRC do not conflict with the objectives or requirements of Federal, State, regional, or local plans, policies, or legal requirements. The proposed training and RDT&E activities would not alter the use of the sites that currently support missile testing. Enhancement of the HRC would be in accordance with applicable Federal, State, and local planning plans and policies. The DoD maintains Federal jurisdiction for on-installation land use.

ES1.6.3.2 Energy Requirements and Conservation Potential

The proposed training and RDT&E activities include increased training events in the HRC. In order to implement the proposed training and RDT&E activities, increased amounts of fossil fuels would be required to power the increased use by ships and aircraft. These fuels are currently in adequate supply from either Navy owned sources or from commercial distributors. The required electricity demands would be met by the existing electrical generation infrastructure on the Hawaiian Islands. Anticipated energy requirements of the continued use and enhancement of the HRC would be well within the energy supply capacity of all facilities. Energy requirements would be subject to any established energy conservation practices at each facility. No additional power generation capacity other than the potential use of generators would be required for any of the training and RDT&E activities. The use of energy sources has been minimized wherever possible without compromising safety, training, or testing events. No additional conservation measures related to direct energy consumption by the proposed training and RDT&E activities are identified.

ES1.6.3.3 Irreversible or Irretrievable Commitment of Resources

The proposed training and RDT&E activities would have an irreversible or irretrievable effect due to the use of nonrenewable energy sources: hydrocarbon fuels for aircraft, vessels, and vehicles. However, among the alternative training scenarios there are no significant differences in the cost of fuel and the climatic consequences of large-scale combustion of hydrocarbon fuel. Implementation of the proposed training and RDT&E activities would not result in the destruction of environmental resources so as to cause the potential uses of the environment of the HRC to be limited. The proposed training and RDT&E activities would not adversely affect the biodiversity or cultural integrity within the HRC including the open ocean, offshore, onshore, or human environment.

ES1.6.3.4 Relationship Between Short-Term Environmental Impact and Long-Term Productivity

The Navy is committed to sustainable range management. Effective, sustainable range management addresses both short- and long-term effects on the human environment and strives to ensure the long-term productivity and availability of vital range training resources. The Navy is committed to the co-use of the HRC and surrounding areas with the general public and, for the open ocean areas, international community. This commitment to co-use is incorporated in the Navy's long-term range management and will enhance the long-term productivity of the range and surrounding areas for the public and commercial interests.

Table ES-2. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Open Ocean

Resource Category	Open Ocean
Airspace	No-action: No airspace impacts were identified in the analysis presented in Chapter 4.0. Any potential impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures, compliance with Department of Defense (DoD) Directive 4540.1, Office of the Chief of Naval Operations Instruction (OPNAVINST) 3770.4A, OPNAVINST 3721.20, and continued close coordination with the Federal Aviation Administration (FAA). No modifications or need for additional airspace are required. Alternative 1: No airspace impacts were identified in the analysis presented in Chapter 4.0. Any potential impacts on airspace from increased training activities, increased research, development, test, and operation (RDT&E) activities, planned test and evaluation activities, Hawaii Range Complex (HRC) enhancements, and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: No airspace impacts were identified in the analysis presented in Chapters 4.0. Any potential impacts on airspace from increases in training activities, additional RDT&E activities, and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Biological Resources (Open Ocean)	No-action: The modeling quantification of exposures to marine mammals from operation of MFA/HFA sonar and underwater detonations does not predict any marine mammal mortalities. Modeling quantification does not predict any marine mammal exposed to sonar or explosives in excess of the onset of permanent threshold shift; there are no exposures indicative of Level A injury. Modeling does predict TTS and sub-TTS Level B harassments of marine mammals, however, the results from this modeling are presented without consideration of mitigation measures employed per Navy standard operating procedures. The likelihood that many marine mammals can be readily detected, standard mitigation measures involving range clearance procedures should reduce the number of these exposures. There will be no impacts to sea turtles. To reiterate, based on the history of Navy activities in the HRC, and analysis in this document, military readiness activities are not expected to result in any Level A injury or mortalities to marine mammals. However, given the frequency of naturally occurring marine mammal strandings in Hawaii (e.g. natural mortality), it is conceivable that a stranding could co-occur within the timeframe of a Navy exercise even though the stranding may be unrelated to Navy activities. Based on NMFS' recommendation that Navy consider scientific uncertainty and potential for mortality, the Navy is requesting 20 serious injury or mortality takes for 7 commonly-stranded, non ESA-listed species and 3 species of beaked whales present within the HRC (2 mortality takes per species). These are bottlenose dolphin, Kogia *spp*., melon-headed whale, pantropical spotted dolphin, pygmy killer whale, short-finned pilot whale, striped dolphin, Cuvier's beaked whale, Longman's beaked whale, and Blainville's beaked whale Alternative 1: Any anticipated or potential impacts on biological resources from increased training activities, RDT&E activities, and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Any anticipated impacts on biological resources from additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Biological Resources (Open Ocean) impacts would be the same as those described under the No-action Alternative. Chapters 4.0 and 5.0 discuss Open Ocean and Offshore impacts in detail. Appendix J provides details on the acoustic modeling approach.
Cultural Resources	No-action: Cultural resources that occur in the Open Ocean Area are generally deeply submerged and inherently protected from the effect of all types of activity. Both the probability of encountering submerged resources and the probability of causing adverse effect on those resources are extremely low regardless of the action alternative being considered. To even further lower the probability of effect, areas where known submerged cultural resources exist will be avoided for operational activities involving expended material, debris dispersion, or underwater detonation. Procedures are in place to minimize any effects on underwater cultural resources. In accordance with Section 106 of the National Historic Preservation Act (36 CFR Part 800), cultural resources mitigation measures as described in various sections of Chapter 4.0 would be implemented. Alternative 1: Impacts on cultural resources from increased training activities, RDT&E activities, and Major Exercises (e.g., RIMPAC) would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on cultural resources from additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapters 4.0 and 5.0 discuss Open Ocean and Offshore impacts in detail.

Table ES-2. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Open Ocean (Continued)

Resource Category	Open Ocean
Hazardous Materials and Waste	No-action: Implementation of the No-action Alternative would not result in significant impacts associated with the use of hazardous materials. The Navy has appropriate plans in place to manage hazardous materials used and generated. Hazardous materials will continue to be controlled in compliance with OPNAVINST 5090.1B. Fragments of expended training materials, e.g. ammunition, bombs and missiles, targets, sonobuoys, chaff, and flares, could be deposited on the ocean floor. The widely dispersed, intermittent, minute size of the material minimizes the impact. Wave energy and currents will further disperse the materials. Alternative 1: Implementation of Alternative 1 would not result in significant impacts associated with the use of hazardous materials. Impacts from hazardous materials and waste from increased training activities, RDT&E activities, and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Implementation of Alternative 2 would not result in significant impacts associated with the use of hazardous materials. Impacts from hazardous materials and waste from additional increases in training activities, RDT&E activities, and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapters 4.0 and 5.0 discuss in detail the factors that influenced this analysis.
Health and Safety	No-action: Implementation of the No-action Alternative would not affect public health and safety. Any potential risk to public health and safety is minimized through standard operating procedures and compliance with DoD Directive 4540.1, OPNAVINST 3770.4 and Commander, Naval Surface Force, U.S. Pacific Fleet (COMNAVSURFPAC) Instruction 3120.8F. The Navy notifies the public of hazardous activities through the use of Notices to Airmen (NOTAMs) and Notices to Mariners (NOTMARs). Alternative 1: Implementation of Alternative 1 would not affect public health and safety. Any potential impacts on health and safety from the additional training activities, RDT&E activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Implementation of Alternative 2 would not affect public health and safety. Any potential impacts on health and safety from the additional training activities, RDT&E activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapters 4.0 and 5.0 discuss in detail the factors that influenced this analysis.
Noise	No-action: Implementation of the No-action Alternative would not incrementally affect noise within the HRC. Activities are remote, infrequent, and lack sensitive receptors. In addition, training activities do not have an effect on sensitive noise receptors because these activities are typically conducted away from populated areas and most sensitive noise receptors. Standard operating procedures are used to ensure the area is clear of civilian vessels or other non-participants. The public is notified of the location, date, and time of the hazardous activities via NOTMARs, thereby precluding any acoustical impacts on sensitive receptors. Alternative 1: Implementation of Alternative 1 would not incrementally affect noise within the HRC. Impacts from noise from increased training activities, RDT&E activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Implementation of Alternative 2 would not incrementally affect noise within the HRC. Impacts from noise from additional training activities, RDT&E activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Noise impacts would be the same as those described under Alternative 2. Chapters 4.0 and 5.0 discuss in detail the factors that influenced this analysis.
Water Resources	No-action: Potential water quality impacts associated with the implementation of the No-action Alternative are transitory in nature and would not reach a level of significance. No long-term significant impacts on water quality are anticipated. Impacts are not anticipated due to the small quantities of materials relative the extent of the sea ranges and large volumes of water in which they will be dispersed. Alternative 1: Impacts on water resources from increase training activities, RDT&E activities, and Major Exercises are not anticipated. Any potential impacts would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on water resources from increased training activities, future RDT&E activities, and Major Exercises are not anticipated. Any potential impacts would be minimized as described above in the No-action Alternative. Alternative 3: Water Resources impacts would be the same as those described under Alternative 2. Chapters 4.0 and 5.0 discuss in detail the factors that influenced this analysis.

Note: Impacts on Biological Resources (Onshore), Geology and Soils, Land Use, and Utilities are not applicable. Impacts discussed for biological resources in the Open Ocean apply to both offshore and onshore areas. There are no impacts on Air Quality, Socioeconomics or Transportation due to site activities under the No-action Alternative, Alternative 1, Alternative 2 or Alternative 3.

Table ES-3. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Northwestern Hawaiian Islands

Resource Category	Northwestern Hawaiian Islands
Biological Resources (Offshore and Onshore)	No-action: Some current flight trajectories could result in missiles such as the Terminal High Altitude Area Defense (THAAD) flying over portions of the Papahānaumokuākea Marine National Monument. Preliminary results of debris analysis indicate that debris is not expected to severely harm threatened, endangered, migratory, or other endemic species on or offshore of Nihoa and Necker Islands. The probability for debris to hit birds, seals, or other wildlife will be extremely low. Quantities of falling debris will be low and widely scattered so as not to present a toxicity issue. Falling debris will also have cooled down sufficiently so as not to present a fire hazard for vegetation and habitat. If feasible, consideration will be given to alterations in the missile flight trajectory, to further minimize the potential for debris impacts. Alternative 1: There are no additional proposed activities or exercises that would affect the Northwestern Hawaiian Islands; ongoing activities would be minimized as described above in the No-action Alternative. Alternative 2: There are no additional proposed activities or exercises that would affect the Northwestern Hawaiian Islands; ongoing activities would be minimized as described above in the No-action Alternative. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses in detail the factors that influenced this analysis.
Cultural Resources	No-action: Missile defense activities, including THAAD, have the potential to generate debris that falls within areas of the Papahānaumokuākea Marine National Monument. Debris analyses of the types, quantities, and sizes associated with the Pacific Missile Range Facility missile activities indicate that the potential to impact land resources of any type on Nihoa or Necker is low and extremely remote. In addition, trajectories can be altered under certain circumstances to further minimize the potential for impacts. Future missions will include consideration of missile flight trajectory alterations, if feasible, to minimize the potential for debris within these areas. As a result, impacts on cultural resources within the Northwestern Hawaiian Islands are not expected. Alternative 1: There are no additional proposed activities or exercises that would affect the Northwestern Hawaiian Islands; the potential for impacts from ongoing activities would be minimized as described above in the No-action Alternative. Alternative 2: There are no additional proposed activities or exercises that would affect the Northwestern Hawaiian Islands; the potential for impacts from ongoing activities would be minimized as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapters 4.0 and 5.0 discuss in detail the factors that influenced this analysis.

Note: No impacts on Air Quality, Airspace, Geology and Soils, Hazardous Materials and Waste, Health and Safety, Land Use, Noise, Socioeconomics, Transportation, Utilities, and Water Resources are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Air Quality	No-action: Air quality conditions will not differ from existing conditions. Compliance with standard operating procedures and air permits will continue to minimize impacts. Emissions generated by base activities do not affect the regional air quality. The tempo of launch events will continue to be managed by range activities in order to stay within the limits of current agreements. Alternative 1: Potential impacts on air quality from increased training activities, RDT&E activities, HRC enhancements, and Major Exercises would be minimized as described in the No-action Alternative. Construction would create fugitive dust emissions, diesel exhaust emissions; no change in regional air quality due to compliance with standard operating procedures for construction, including implementation of dust suppression methods and a vehicle maintenance program. No change to regional air quality is anticipated. Alternative 2: Impacts on air quality from increased training activities, RDT&E activities, and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. No change to regional air quality status is anticipated. Alternative 3: Air Quality impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Infrequent emissions associated with intermittent use of diesel generators; no change in current regional air quality. Alternative 1: Increased use of diesel generators; construction would create fugitive dust emissions, diesel exhaust emissions, and VOCs; no change in regional air quality due to compliance with standard operating procedures for construction, including implementation of dust suppression methods and a vehicle maintenance program is anticipated. No change to regional air quality is anticipated. Alternative 2: Impacts from increased training activities and Major Exercises would be minimized as described above in Alternative 1. Alternative 3: Air Quality impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Infrequent emissions associated with intermittent use of diesel generators; no change in current regional air quality. Alternative 1: Increased use of diesel generators; construction would create fugitive dust emissions, diesel exhaust emissions, and VOCs; no change in regional air quality due to compliance with standard operating procedures for construction, including implementation of dust suppression methods and a vehicle maintenance program is anticipated. No change to regional air quality is anticipated. Alternative 2: Impacts from increased training activities, and Major Exercises would be minimized as described in Alternative 1. Alternative 3: Air Quality impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Airspace	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, or airports and airfields will continue to be minimized through standard operating procedures, compliance with DoD Directive 4540.1, OPNAVINST 3770.4A, OPNAVINST 3721.20, and continued close coordination with the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from ongoing activities, increased training activities, increase RDT&E activities, planned test and evaluation activities, or HRC enhancements would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on airspace from ongoing activities, additional Major Exercises, increased training exercises, or additional RDT&E activities would be minimized as described in the No-action alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1 and Alternative 2 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Biological Resources (Offshore and Onshore)	No-action: Activities take place in current operating areas, with no expansion. Compliance with relevant Navy policies and procedures during these training activities will continue to minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. No impacts from electromagnetic radiation generation to wildlife are anticipated. Alternative 1: Impacts on biological resources from increased training activities, RDT&E activities, and HRC enhancements would be minimized as described above in the No-action Alternative. Because construction-related noise would be localized, intermittent, and occur over a relatively short-term, the potential for impacts on biological resources would be minimal. Additional electromagnetic radiation would not affect wildlife. Sound levels from FCLPs would be similar to existing sound levels on the runway. Alternative 2: Impacts on biological resources from increased training activities, RDT&E activities, and Major Exercises would be minimized as described above in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Additional it is anticipated that electromagnetic radiation would not affect wildlife. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion anticipated. Compliance with relevant Navy policies and procedures during these training activities will continue to minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Currently there are no impacts from electromagnetic radiation generation to wildlife. Alternative 1: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Effects on wildlife from construction-related noise and presence of additional personnel would be minimal. Additional electromagnetic radiation is not anticipated to affect wildlife. Alternative 2: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Additional electromagnetic radiation is not anticipated to affect wildlife. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion anticipated. Compliance with relevant Navy policies and procedures will continue to minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Currently there are no impacts from electromagnetic radiation generation to wildlife. Alternative 1: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Effects on wildlife from construction-related noise and presence of additional personnel would be minimal. Additional electromagnetic radiation is not anticipated to affect wildlife Alternative 2: Impacts on biological resources from increased training activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Additional electromagnetic radiation is not anticipated to affect wildlife. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Cultural Resources	No-action: Activities occur in designated areas and sensitive areas are avoided. Any potential for impacts on cultural resources are offset through compliance with the PMRF Integrated Cultural Resources Management Plan (ICRMP) and standard operating procedures. Alternative 1: Any potential impacts from increased training activities, RDT&E activities, and HRC enhancements would be minimized as described above in the No-action Alternative. Alternative 2: Any potential impacts from increased training activities, RDT&E activities, and Major Exercises (e.g., RIMPAC) would be minimized as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Makaha Ridge has been surveyed for archaeological, historical, and Native Hawaiian resources and none have been identified. As a result, No-action Alternative activities will not affect any cultural resources. Alternative 1: An increase in the tempo and frequency of training activities would not affect any cultural resources because Makaha Ridge has been surveyed for cultural resources and there are none present. If archaeological or Native Hawaiian resources are unexpectedly encountered during HRC enhancements, the Hawaii SHPO would be notified. Alternative 2: Any potential impacts and proposed mitigations would be the same as described in Alternative 1. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2 and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.
Geology and Soils	No-action: Ongoing training activities and exercises will continue to have minimal direct impact on the beach and inland areas, and soils are not being permanently affected. Alternative 1: New construction would follow standard methods to control erosion during construction. Soil disturbance would be limited to the immediate vicinity of the construction area and would be of short duration. Base personnel would exercise best management practices to reduce soil erosion. Alternative 2: Impacts would be minimized as described above in Alternative 1. Alternative 3: Geology and Soils impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Hazardous Materials and Waste	No-action: PMRF/Main Base has appropriate plans and standard operating procedures in place to manage hazardous materials and waste. Alternative 1: Impacts from hazardous materials and waste from increased training activities, RDT&E activities, and HRC enhancements would be minimized as described above in the No-action Alternative. Any construction activities would comply with standard operating procedures and adhere to the existing hazardous management plans. Alternative 2: Impacts from hazardous materials and waste from additional increases in training activities, RDT&E activities and additional Major Exercises would be minimized as described above in the No-action Alternative and Alternative 1. Alternative 3: Hazardous Materials and Wastes impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Makaha Ridge currently has appropriate plans in place to manage hazardous materials and waste. Alternative 1: The increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Any construction activities would comply with standard operating procedures and adhere to the existing hazardous management plans. Alternative 2: Impacts from hazardous materials and waste from additional increases in training activities and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Hazardous Materials and Wastes impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Kokee currently has appropriate plans in place to manage hazardous materials and waste. Alternative 1: The increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Any construction activities would comply with standard operating procedures and adhere to the existing hazardous management plans. Alternative 2: Impacts from additional increases in training activities and Major Exercises would be minimized as described above in the No-action Alternative and Alternative 1. Alternative 3: Hazardous Materials and Wastes impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Health and Safety	No-action: Risk to public health and safety is will continue to be minimized through compliance with standard operating procedures, policies, and plans. Alternative 1: Impacts on health and safety from additional training activities, RDT&E activities, HRC enhancements, and Major Exercises would be minimized as described above in the No-action Alternative. Construction would be in accordance with USACE Safety and Health Requirements Manual. Alternative 2: Impacts on health and safety from additional training activities, RDT&E activities, and additional Major Exercises would be minimized as described above in the No-action Alternative and Alternative 1. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with standard operating procedures will continue to minimize impacts. All location(s) are away from the public which results in no adverse public health and safety issues. Alternative 1: Impacts on health and safety from additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Construction would be in accordance with USACE Safety and Health Requirements Manual. Alternative 2: Impacts on health and safety from additional training activities and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with standard operating procedures will continue to minimize impacts. Alternative 1: Impacts on health and safety from additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Construction would be in accordance with USACE Safety and Health Requirements Manual. Alternative 2: Impacts on health and safety from additional training activities and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Land Use	No-action: Land uses and Agricultural Preservation Initiative are compatible with PMRF activities. The continuation of activities will be consistent to the maximum extent practicable with the Hawaii Coastal Zone Management Program. Closure of public recreational areas during hazardous activities will continue Alternative 1: Land use is compatible with increased training activities, training activities, RDT&E activities, HRC enhancements, and Major Exercises; additional closure of public recreation areas during hazardous activities is anticipated. Addition of FCLPs would not alter current land use patterns. Alternative 2: Land uses would be compatible with proposed increased training activities, training activities, RDT&E activities, and additional Major Exercises; additional closure of public recreation areas during hazardous activities is anticipated. Alternative 3: Land Use impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Noise	No-action: PMRF maintains a hearing protection program and has standard operating procedures in place that minimize impacts. Beach access to the areas of each of the exercises is restricted for the duration of the exercise. Alternative 1: Impacts from noise from increased training activities (including FCLPs), RDT&E activities, and HRC enhancements would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from noise from increased training activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Noise impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Socioeconomics	No-action: Beneficial impacts on economy and community on Kauai. Alternative 1: Small increase in beneficial impacts on economy on Kauai from increased training activities, future RDT&E activities, and Major Exercises. Alternative 2: Small increase in beneficial impacts on economy on Kauai from increased training activities, future RDT&E activities, and additional Major Exercises. Alternative 3: Socioeconomic impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-4A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	PMRF/Main Base	Makaha Ridge	Kokee
Transportation	No-action: No impacts identified for the transportation system; PMRF events are discrete and intermittent. Transportation of ordnance and liquid propellants are conducted in accordance with established procedures. Alternative 1: Minimal increase in average daily traffic due to increased training activities, HRC enhancements, and Major Exercises. Traffic generated by construction personnel would be temporary and would result in minor additional traffic. Major exercises are discrete and intermittent with minimal temporary increase in traffic. Alternative 2: No additional traffic would be generated for increased training activities, RDT&E activities, and additional Major Exercises above what would be generated for Alternative 1. Alternative 3: Transportation impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis,	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Utilities	No-action: Current utility capacity meets demands. Alternative 1: Electricity demand, potable water consumption, wastewater generated, and solid waste disposal would be handled by existing facilities. Alternative 2: Additional electricity demand, potable water consumption, wastewater generated and solid waste disposal would be handled by existing facilities. Operation of a high-energy laser would require 30 megawatts of power (additional documentation would be required). Alternative 3: Utility impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Water Resources	No-action: Compliance with standard operating procedures and policies will continue to minimize impacts. Training activities have minimal impact on beach and inland areas and surface drainage is not permanently affected. Emissions from launches and exercises do not significantly affect water resources. Alternative 1: Impacts on water resources from increased training activities, RDT&E activities, HRC enhancements, and Major Exercises would be minimized as described in the No-action Alternative. Slight increase in missile launch emissions would not significantly affect water quality. Construction activities associated with HRC enhancements would follow standard operating procedures minimizing potential impacts from accidental spills of hazardous materials. Alternative 2: Impacts on water resources from increased training activities, RDT&E activities, HRC enhancements, and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Water Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-4B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai

Resource Category	Hawaii Air National Guard Kokee	Kamokala Magazines	Niihau	Kaula
Airspace	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Continued close coordination with the FAA and PMRF regarding continued activities and activities to controlled and uncontrolled airspace, special use airspace, en route airways, and jet routes will continue to minimize impacts. Alternative 1: Impacts on airspace from ongoing activities, increased training activities, RDT&E activities or HRC investments would be minimized as described above in the No-action Alternative. No new airspace proposal or any modification to existing airspace is anticipated. Alternative 2: Impacts on airspace from ongoing activities, additional Major Exercises, increased training exercises, or additional RDT&E activities or HRC investments would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Biological Resources (Offshore and Onshore)	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion anticipated. Compliance with relevant Navy policies and procedures will continue to minimize the effects on wildlife. Currently there are no impacts from electromagnetic radiation generation to wildlife. Alternative 1: Impacts on biological resources from increased training activities would be minimized as described above in the No-action Alternative. Additional electromagnetic radiation is not anticipated to affect wildlife. Alternative 2: Impacts on biological resources from increased training activities and additional Major Exercises would be minimized as described above in the No-action Alternative and Alternative 1. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion. Compliance with relevant Navy policies and procedures during these training activities will minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. No impacts from electromagnetic radiation generation to wildlife. Alternative 1: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Minimal impacts on biological resources from construction; additional electromagnetic radiation would not affect wildlife.	No-action: Currently there are minimal impacts on vegetation; Mitigation measures are in place that reduce or eliminate any potential impacts on marine mammals. Currently there are minimal impacts on migratory seabirds. Alternative 1: Training Activities and Major Exercises take place in current operating areas, with no expansion anticipated. Compliance with relevant Navy, NMFS, and USFWS policies and procedures during these training activities would minimize the effects on vegetation and wildlife.

Table ES-4B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	Hawaii Air National Guard Kokee	Kamokala Magazines	Niihau	Kaula
Biological Resources (Offshore and Onshore) (Continued)			Alternative 2: Impacts on biological resources from increased training activities and Major Exercises would be as described above in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	Alternative 2: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. No potential impacts on migratory seabird populations. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Cultural Resources	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.	No-action: There are no known cultural resources sites within the ROI for Kaula; therefore, there will be no impacts on cultural resources from training activities or Major Exercises. Alternative 1: There are no known cultural resources sites within the ROI for Kaula; therefore, there will be no impacts on cultural resources from increased training activities. Alternative 2: There will be no impacts on cultural resources from any additional increases in training activities because there are no known cultural resources within the Kaula ROI. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2.

Table ES-4B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	Hawaii Air National Guard Kokee	Kamokala Magazines	Niihau	Kaula
Geology and Soils	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Impacts are currently minimized due to concentrating targeting on the southeast tip of the island. Alternative 1: Impacts from Increased training and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from increased training and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Geology and Soils impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Hazardous Materials and Waste	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: PMRF currently has procedures in place to manage hazardous materials and waste. Storage and transportation or ordnance is conducted in accordance with established DOT, DoD, and Navy safety procedures. Alternative 1: Impacts would be minimized as described in the No-action Alternative. Alternative 2: Impacts would be minimized as described in the No-action Alternative. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: PMRF currently has appropriate plans in place to manage hazardous materials and waste. Alternative 1: Impacts from the increase in training activities and Major Exercises would be minimized as described in the No-action Alternative. Any construction activities would comply with standard operating procedures and adhere to the existing hazardous management plans. Alternative 2: Impacts from additional increases in training activities and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-4B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Kauai (Continued)

Resource Category	Hawaii Air National Guard Kokee	Kamokala Magazines	Niihau	Kaula
Health and Safety	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Compliance with existing health and safety plans and procedures will continue to minimize impacts. No change in the type of ordnance stored and no increase safety risks. Storage and transportation of ordnance are conducted in accordance with established DOT, DoD and Navy safety procedures. Alternative 1: Impacts would be minimized as described above in the No-action Alternative. The factors that influenced this analysis. Alternative 2: Impacts would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with existing health and safety plans and procedures will continue to minimize impacts. Location of radar and electronic warfare sites away from the public results in no adverse public health and safety issues. Alternative 1: Impacts from additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Construction would be in accordance with USACE Safety and Health Requirements Manual. Alternative 2: Impacts from additional training activities and Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with existing health and safety plans and procedures will continue to minimize health and safety risks. Alternative 1: Impacts from additional training activities would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from additional training activities would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2.
Land Use	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Land use is compatible with Navy activities. The continuation of activities will remain consistent to the maximum extent practicable with the Hawaii Coastal Zone Management Program. Alternative 1: Land use is compatible with increased activities and Major Exercises. Alternative 2: Land use is compatible with increased activities and Major Exercises. Alternative 3: Land use impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Note: No impacts at Port Allen, Kikiaola Small Boat Harbor, or Mt. Kahili are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. No impacts on Air Quality, Geology and Soils, Noise, Socioeconomics, Transportation, Utilities, and Water Resources are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-5A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	Naval Station Pearl Harbor	Ford Island	Naval Inactive Ship Maintenance Facility, Pearl Harbor
Biological Resources (Offshore and Onshore)	No-action: Procedures and policies are in place to minimize the potential for impacts on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. No impacts on essential fish habitat. Alternative 1: Impacts on biological resources from increased activities and Major Exercises would be minimized as described in the No-action Alternative. Activities would take place at existing locations; no expansion of the area would be involved. Alternative 2: Impacts on biological resources from increased activities and additional Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Procedures and policies are in place to minimize the potential for impacts on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. No impacts on essential fish habitat. No critical habitat has been identified. Alternative 1: Impacts on biological resources from increased activities and Major Exercises would be minimized as described in the No-action Alternative. Activities would take place at existing locations; no expansion of the area would be involved. Alternative 2: Impacts on biological resources from increased activities and additional Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Procedures and policies are in place to minimize impacts on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Minor and localized impacts on fish. No impacts on essential fish habitat. Alternative 1: Impacts on biological resources from increased activities and Major Exercises would be minimized as described in the No-action Alternative. Activities would take place at existing locations; no expansion of the area would be involved. Alternative 2: Impacts on biological resources from increased activities and additional Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Cultural Resources	No-action: To minimize any potential impacts, activities will continue to be conducted in accordance with the policies, guidelines, and standard operating procedures outlined in the Pearl Harbor Naval Complex Integrated Cultural Resources Management Plan (ICRMP), or any other agreement documents promulgated since completion of the ICRMP. There are no significant cultural resources within the direct ROI for activities. The Loko Okiokiolepe fishpond is the closest National Register property (approximately half a mile north of the EOD Shore Range). Alternative 1: Any potential impacts from increased training activities would be minimized as described above in the No-action Alternative. Alternative 2: Any potential impacts from additional increases in training activities would minimized as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: There are no training or Major Exercises with the potential to affect cultural resources. Alternative 1: Installation of equipment to support the ATF [Acoustic Test Facility] would be conducted in accordance with the Pearl Harbor Naval Complex ICRMP and would require coordination with the Navy Region Hawaii's cultural resource coordinator. Alternative 2: There are no new Major Exercises or training activities with the potential to affect cultural resources. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.

Table ES-5A. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	Naval Station Pearl Harbor	Ford Island	Naval Inactive Ship Maintenance Facility, Pearl Harbor
Hazardous Materials and Waste	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Naval Inactive Ship Maintenance Facility, Pearl Harbor has appropriate plans in place to manage hazardous materials used and generated. Alternative 1: Impacts from the increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from additional increases in training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Hazardous Materials and Wastes impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Socioeconomics	No-action Beneficial impacts on economy and community on Oahu. Alternative 1: Current Beneficial impacts would continue. Small increase in beneficial impacts on economy on Oahu from increased RDT&E and Major Exercises. Alternative 2: Current Beneficial impacts would continue. Small increase in beneficial impacts on economy on Oahu from increased training activities, and additional Major Exercises. Alternative 3: Socioeconomic impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Water Resources	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: There are no training activities, RDT&E activities, or Major Exercises with the potential to affect water resources. Alternative 1: There are no training activities, RDT&E activities, or Major Exercises with the potential to affect water resources. HRC enhancements would adhere to standard operating procedures for construction to minimize and avoid adverse impacts on water quality. Alternative 2: Impacts would be minimized as described above in Alternative 1. Alternative 3: Water Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Note: No impacts on Air Quality, Airspace, Geology and Soils, Health and Safety, Land Use, Noise, Transportation, and Utilities, are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-5B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	EOD Range NAVMAG Pearl Harbor West Loch	Lima Landing	Puuloa Underwater Range
Biological Resources (Offshore and Onshore)	No-action: Procedures and policies are in place to minimize impacts on biological resources. Intrusive noise could startle noise-sensitive wildlife in the vicinity. Alternative 1: Impacts from increased activities and training exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from additional increases in activities and training exercises would be minimized as described above in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Procedures and policies are in place to minimize impacts on biological resources. Minor and localized impacts on fish. No impacts on essential fish habitat. Alternative 1: Impacts from increased activities and exercises would be minimized as described in the No-action Alternative. Activities would take place at existing locations; no expansion of the area would be involved. Minor and localized impacts on fish. Alternative 2: Impacts from increased activities and additional Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Procedures and policies are in place to minimize impacts on biological resources. Minor and localized impacts on fish. No impacts on essential fish habitat. Any effects from noise, shock, or residual chemicals will be localized and temporary. Alternative 1: Impacts from increased activities and Major Exercises would be minimized as described in the No-action Alternative. Activities would take place at existing locations; no expansion of the area would be involved. Alternative 2: Impacts from increased activities and additional Major Exercises would be minimized as described in the No-action Alternative and Alternative 1. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Cultural Resources	No-action: There are no ongoing training activities with the potential to affect cultural resources because there are no cultural resources present in the ROI. Alternative 1: Increasing training activities would not affect cultural resources because there are no cultural resources present in the ROI. Alternative 2: Additional increases in training activities would not affect cultural resources because there are no cultural resources present in the ROI. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: There are no cultural resources within the ROI for Lima Landing's underwater demolition activities therefore no effects on cultural resources are expected. Any changes to the location of these activities would be coordinated with the Navy Region, Hawaii, cultural resources coordinator Alternative 1: Because there are no cultural resources within the ROI, no impacts on cultural resources are expected from increased training. Alternative 2: Because there are no cultural resources within the ROI, no impacts on cultural resources are expected from additional increases in training. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: There are no cultural resources within the ROI for Puuloa Underwater Range activities; therefore no effects on cultural resources are expected. Alternative 1: Because there are no cultural resources within the ROI, no impacts on cultural resources are expected from increased training. Alternative 2: Because there are no cultural resources within the ROI, no impacts on cultural resources are expected from increased training. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-5B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu (Continued)

Resource Category	EOD Range NAVMAG Pearl Harbor West Loch	Lima Landing	Puuloa Underwater Range
Geology and Soils	No-action: Policies and procedures are in place to minimize any impacts. EOD training is not expected to affect the geology of the Range; no construction or excavation is planned. Minor contamination of surface soil. Alternative 1: Impacts from increased training activities would be minimized as described above in the No-action Alternative Alternative 2: Impacts from additional Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Geology and Soils impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Hazardous Materials and Waste	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Lima Landing has appropriate plans in place to manage hazardous materials used and generated. Alternative 1: Impacts from the increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from additional increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Puuloa Underwater Range has appropriate plans in place to manage hazardous materials used and generated. Alternative 1: Impacts from the increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from the additional increase in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-5B. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu (Continued)

Resource Category	EOD Range NAVMAG Pearl Harbor West Loch	Lima Landing	Puuloa Underwater Range
Health and Safety	No-action: Compliance with standard operating procedures will continue to minimize impacts. Location away from the public results in no adverse public health and safety issues. Alternative 1: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with standard operating procedures will minimize impacts. Location away from the public results in no adverse public health and safety issues. Demolition activities are conducted in accordance with COMNAVSURFPAC Instruction 3120.8F. Alternative 1: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with standard operating procedures will minimize impacts. Location away from the public results in no adverse public health and safety issues. Demolition activities are conducted in accordance with COMNAVSURFPAC Instruction 3120.8F Alternative 1: Impacts from the additional training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 2: Impacts from the additional training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Water Resources	No-action: Intermittent, short-term discharges of minute amounts of munitions constituents into surface waters and have no effect on water resources. Alternative 1: Increases in training activities would not significantly affect water resources. Alternative 2: Additional increases in training activities would not significantly affect water resources. Alternative 3: Water Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Note: No impacts on Air Quality, Airspace, Land Use, Noise, Socioeconomics, Transportation, and Utilities, are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-5C. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	Naval Defensive Sea Area	CG Station Barbers Point/Kalaeola Airport	Marine Corps Base Hawaii
Airspace	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures, and coordination with the State of Hawaii, U.S. Coast Guard, Kalaeloa Airport, and the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on airspace from increased training activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures and continued close coordination with the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from increased training activities, and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on airspace from ongoing activities, increased training activities, and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Biological Resources (Offshore and Onshore)	No-action: Procedures and policies are in place to minimize impacts on biological resources. No essential fish habitat affected. Alternative 1: Impacts would be minimized as described above in the No-action Alternative. Increased activities and Major Exercises would take place at existing locations; no expansion of the area would be involved. Alternative 2: Impacts would be minimized as described above in the No-action Alternative. Increased activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion. Compliance with relevant Navy and Coast Guard policies and procedures during these training activities will continue to minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Alternative 1: Impacts from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Marine Corps and Navy procedures and policies are in place to minimize impacts on biological resources and prevent introduction of invasive species. Alternative 1: Impacts from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 2: Impacts from increased activities and additional Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-5C. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu (Continued)

Resource Category	Naval Defensive Sea Area	CG Station Barbers Point/Kalaeola Airport	Marine Corps Base Hawaii
Cultural Resources	No-action: There are no known historic properties (i.e., cultural resources eligible for or listed in the National Register) located within the ROI for the Naval Defensive Sea Area; therefore, there will be no impacts on cultural resources from training and RDT&E operations under the No-action. Alternative 1: Because there are no known historic properties within the ROI, increased training activities and Major Exercises will have no impacts on cultural resources. Alternative 2: Because there are no known historic properties within the ROI, additional increases in training activities and Major Exercises will have no impacts on cultural resources. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.	No-action: Activities occur in designated areas and sensitive areas are avoided. Compliance with the standard operating procedures and policies minimizes impacts. If cultural resources are unexpectedly encountered the Hawaii SHPO will be notified. Alternative 1: Any impacts from increased training activities would be treated as described above in the No-action Alternative. Alternative 2: Any impacts from additional increases in training activities would be treated as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Health and Safety	No-action: Compliance with standard operating procedures will minimize impacts. The activities will be completely contained and the area cleared resulting in no adverse public health and safety issues. Alternative 1: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-5C. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu (Continued)

Resource Category	Naval Defensive Sea Area	CG Station Barbers Point/Kalaeola Airport	Marine Corps Base Hawaii
Noise	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Coast Guard Air Station Barbers Point has appropriate plans in place to manage noise levels. Noise produced is expected to stay within the existing noise contours. Alternative 1: Minor impacts are anticipated for areas near the airport from increased activities, training exercises, and Major Exercises. Alternative 2: Minor impacts are anticipated for areas near the airport from increased activities, training exercises, and Major Exercises. Alternative 3: Noise impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: MCBH maintains a hearing protection program that will continue to minimize impacts. Noise levels that reach off-post are mitigated by public notification and restricting training to daylight hours. Alternative 1: Increased training activities would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Alternative 3: Noise impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Note: No impacts on Air Quality, Geology and Soils, Hazardous Materials and Waste, Land Use, Socioeconomics, Transportation, Utilities, and Water Resources, are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-5D. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	MCTAB	Hickam AFB	Wheeler Army Airfield
Airspace	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures, and coordination with the Air Force, Honolulu International Airport, and the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from increased training activities would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on airspace from increased training activities and additional Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures, and coordination with the Army and the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from increased training activities would be minimized as described in the No-action Alternative. Alternative 2: Impacts on airspace from increased training activities and additional Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Biological Resources (Offshore and Onshore)	No-action: MCTAB and Navy procedures and policies are in place to minimize impacts on biological resources and prevent introduction of invasive species. Alternative 1: Increased training activities would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Hickam AFB and Navy procedures and policies are in place to continue to minimize impacts on biological resources and prevent introduction of invasive species. Chapter 4.0 discusses the factors that influenced this analysis. Alternative 1: Increased training activities and Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Army and Navy procedures and policies are in place to minimize impacts on biological resources and prevent introduction of invasive species. No critical habitat has been identified on Wheeler Army Airfield. Alternative 1: Increased training activities and Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-5D. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu (Continued)

Resource Category	MCTAB	Hickam AFB	Wheeler Army Airfield
Cultural Resources	No-action: Activities occur in designated areas and sensitive areas are avoided. Compliance with standard operating procedures and policies minimizes impacts. If cultural resources are unexpectedly encountered the Bellows AFS cultural resources coordinator will be notified. Alternative 1: Any impacts from increased training activities would be treated as described above in the No-action Alternative. Alternative 2: Any impacts from additional increases in training activities would be treated as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.

Note: No impacts on Air Quality, Geology and Soils, Hazardous Materials and Waste, Health and Safety, Land Use, Noise, Socioeconomics, Transportation, Utilities, and Water Resources, are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-5E. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	Makua Military Reservation	Kahuku Training Area	Dillingham Military Reservation
Biological Resources (Offshore and Onshore)	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion. Compliance with relevant Navy and Army policies, procedures, and plans during these training activities will continue to minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Critical habitat and sensitive areas will be avoided where possible. Alternative 1: Impacts from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion. Compliance with relevant Navy and Army policies, procedures, and plans during these training activities will minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Critical habitat and sensitive areas will be avoided where possible. Alternative 1: Impacts from increased training activities would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Army and Navy procedures and policies are in place to minimize impacts on biological resources and prevent introduction of invasive species. Alternative 1: Increased training activities and Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Cultural Resources	No-action: Activities occur in designated areas and sensitive areas are avoided. Compliance with standard operating procedures, policies, and plans minimizes impacts. If cultural resources are unexpectedly encountered the Schofield Barracks cultural resources manager will be notified. Alternative 1: Any impacts from increased training activities would be treated as described above in the No-action Alternative. Alternative 2: Any impacts from additional increases in training activities would be treated as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Activities occur in designated areas and sensitive areas are avoided. Compliance with standard operating procedures, policies, and plans minimizes impacts. If cultural resources are unexpectedly encountered the Schofield Barracks cultural resources manager will be notified. Alternative 1: Any impacts from increased training activities would be treated as described above in the No-action Alternative. Alternative 2: Any impacts from additional increases in training activities would be treated as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Activities occur in designated areas and sensitive areas are avoided. Compliance with standard operating procedures, policies, and plans minimizes impacts. If cultural resources are unexpectedly encountered the Hawaii SHPO (if the find is made by Marine Corps or Navy) or the Schofield Barracks cultural resources manager (if the find occurs during Army activities) will be notified. Alternative 1: Any impacts from increased training activities would be treated as described above in the No-action Alternative. Alternative 2: Any impacts from additional increases in training activities would be treated as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-5E. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu (Continued)

Resource Category	Makua Military Reservation	Kahuku Training Area	Dillingham Military Reservation
Health and Safety	No-action: Compliance with standard operating procedures and plans will continue to minimize impacts. Alternative 1: Impacts from the additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from the additional training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Noise	No-action: Makua Military Reservation maintains a hearing protection program that will minimize impacts. Alternative 1: Increased training activities would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 3: Noise impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Note: No impacts on Air Quality, Airspace, Geology and Soils, Hazardous Materials and Waste, Land Use, Socioeconomics, Transportation, Utilities, and Water Resources, are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-5F. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	Ewa Training Minefield	Barbers Point Underwater Range	Naval Undersea Warfare Center
Biological Resources (Offshore and Onshore)	No-action: Procedures and policies are in place to minimize impacts on biological resources. Minor and localized impacts on fish. Any effects from noise, shock, or residual chemicals will continue to be localized and temporary. Alternative 1: Increased activities and Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Increased activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Procedures and policies are in place to minimize impacts on biological resources. Minor and localized impacts on fish. No impacts on essential fish habitat. Alternative 1: Increased activities and Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described in the No-action Alternative. Alternative 2: Increased activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Impacts would be minimized as described above in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	SESEF - No-action: Procedures and policies are in place to minimize impacts on biological resources. Alternative 1: Impacts from increased activities would be minimized as described above in the No-action Alternative. Alternative 2: Impacts from increased activities would be minimized as described in the No-action Alternative. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis. FORACS - No-action: Procedures and policies are in place to minimize impacts on biological resources Alternative 1: Impacts from increased activities would be minimized as described in the No-action Alternative. Alternative 2: Impacts from increased activities would be minimized as described in the No-action Alternative. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.
Hazardous Materials and Waste	No-action: Ewa Training Minefield has appropriate plans in place to manage hazardous materials used and generated. Alternative 1: Increases in training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 2: Additional increases in training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Barbers Point Underwater Range has appropriate plans in place to manage hazardous materials used and generated. Alternative 1: Increases in training activities and Major Exercises would be minimized as described above in the No-action Alternative Alternative 2: Additional increases in training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Hazardous Materials and Waste impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-5F. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Oahu

Resource Category	Ewa Training Minefield	Barbers Point Underwater Range	Naval Undersea Warfare Center
Health & Safety	No-action: Compliance with standard operating procedures will minimize impacts. Demolition activities are conducted in accordance with COMNAVSURFPAC Instruction 3120.8F. Alternative 1: The additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: The additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Compliance with standard operating procedures will minimize impacts. Demolition activities are conducted in accordance with COMNAVSURFPAC Instruction 3120.8F. Alternative 1: The additional training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: The additional training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	SESEF & FORACS - No-action: Compliance with standard operating procedures will minimize impacts. Alternative 1: The increased RDT&E activities would be minimized as described above in the No-action Alternative. Alternative 2: The increased RDT&E activities would be minimized as described in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Note: No impacts on Air Quality, Airspace, Cultural Resources, Geology and Soils, Land Use, Noise, Socioeconomics, Transportation, Utilities, and Water Resources, are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean. No impacts at Keehi Lagoon, Kaena Point, Mt. Kaala, Wheeler Network Communications Control, Mauna Kapu Communication Site, or Makua Radio/Repeater/Cable Head are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3.

Table ES-6. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Maui

Resource Category	Maui Offshore
Biological Resources (Offshore and Onshore)	No-action: Compliance with policies and procedures will continue to minimize impacts on biological resources. Alternative 1: Impacts on biological resources from increased training activities would be minimized as described in the No-action Alternative. The Portable Undersea Tracking Range would be used in areas around Maui with water depths less than 300 feet. Other than the temporary disturbance to marine species during instrumentation installation and recovery, no impacts would be expected to occur. Alternative 2: Impacts on biological resources from increased training activities and additional Major Exercises would be minimized as described in the No-action Alternative. Alternative 3: Impacts on biological resources would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Note: No impacts on Air Quality, Airspace, Cultural Resources, Geology and Soils, Hazardous Materials and Waste, Health and Safety, Land Use, Noise, Socioeconomics, Transportation, Utilities, or Water Resources are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean. No impacts at the Maui Space Surveillance Site, the Shallow Water Minefield Sonar Training Area, the Maui High Performance Computing Center, or the Sandia Maui Haleakala Facility are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3.

Table ES-7. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Hawaii

Resource Category	Pohakuloa Training Area	Bradshaw Army Airfield	Kawaihae Pier
Airspace	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures, coordination with PTA Range Control and the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on airspace from increased training activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Airspace impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Impacts on airspace from continued activities and activities to controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, or airports and airfields are minimized through standard operating procedures, coordination with PTA Range Control and the FAA. No modifications or need for additional airspace is required. Alternative 1: Impacts on airspace from increased training activities and Major Exercises would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on airspace from increased training activities and additional Major Exercises would be minimized as described above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2 and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.
Biological Resources (Offshore and Onshore)	No-action: Training Activities and Major Exercises will take place in current operating areas, with no expansion. Compliance with relevant Navy policies, procedures, and plans during these training activities will minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Alternative 1: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Alternative 2: Impacts on biological resources from increased training activities and Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: These activities are limited in scope and are not anticipated to impact the areas beyond the airfield itself. Training Activities and Major Exercises take place in current operating areas, with no expansion. Compliance with relevant Navy policies, procedures, and plans during these training activities will minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Alternative 1: Impacts on biological resources from increased training activities would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on biological resources from increased training activities and additional Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds are anticipated. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: Training Activities and Major Exercises take place in current operating areas, with no expansion. Compliance with relevant Navy policies and procedures during these training activities will minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. Sensitive biological resource areas are avoided. Alternative 1: No increases in training events at Kawaihae Pier are expected. Impacts would be minimized as described above in the No-action Alternative. Alternative 2: Impacts on biological resources from increased training activities and additional Major Exercises would be minimized as described in the No-action Alternative. Temporary, short-term startle effects from noise to wildlife and birds anticipated. The intensity and duration of wildlife startle responses may decrease with the number and frequency of exposures. Alternative 3: Biological Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.

Table ES-7. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Hawaii (Continued)

Resource Category	Pohakuloa Training Area	Bradshaw Army Airfield	Kawaihae Pier
Cultural Resources	No-action: Activities occur in designated areas and sensitive areas are avoided. Compliance with standard operating procedures and policies minimizes impacts. If cultural resources are unexpectedly encountered then the PTA cultural resources manager will be contacted. Alternative 1: Any impacts from increased training activities would be treated as described above in the No-action Alternative. Alternative 2: Any impacts from additional increases in training activities would be treated as described above in the No-action Alternative. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	No-action: There are no training or Major Exercises with the potential to affect cultural resources at Bradshaw Army Airfield. Policies and procedures are in place to minimize any potential impacts. Alternative 1: Because there is no training or Major Exercises with the potential to affect cultural resources at Bradshaw Army Airfield, no impacts on cultural resources are expected. To avoid impacts from any HRC enhancements, activities would be coordinated with the PTA cultural resources manager. Policies and procedures are in place to minimize any potential impacts. Alternative 2: Because there is no training or Major Exercises with the potential to affect cultural resources at Bradshaw Army Airfield, no impacts on cultural resources are expected. To avoid impacts from any HRC enhancements, activities would be coordinated with the PTA cultural resources manager. Policies and procedures are in place to minimize any potential impacts. Alternative 3: Cultural Resources impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	Analysis of any potential impacts from training and RDT&E operations under the No-action, Alternative 1, Alternative 2, and Alternative 3 has been performed. Analysis indicates that neither short- nor long-term impacts are anticipated from the proposed alternatives.
Health and Safety	No-action: Compliance with existing health and safety plans and procedures will minimize impacts. Alternative 1: Impacts on health and safety from the additional training activities and HRC enhancements would be minimized as discussed above in the No-action Alternative. Alternative 2: Impacts on health and safety from the additional training activities and Major Exercises would be minimized as discussed above in the No-action Alternative. Alternative 3: Health and Safety impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Table ES-7. Summary of Environmental Impacts for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, Hawaii (Continued)

Resource Category	Pohakuloa Training Area	Bradshaw Army Airfield	Kawaihae Pier
Noise	No-action: PTA will continue to maintain a hearing protection program that will minimize impacts. Alternative 1: Increased training activities would take place at existing locations; no expansion of the area would be involved. Noise impacts would be minimized as discussed above in the No-action Alternative. Alternative 2: Increased training activities and additional Major Exercises would take place at existing locations; no expansion of the area would be involved. Noise impacts would be minimized as discussed above in the No-action Alternative. Alternative 3: Noise impacts would be the same as those described under Alternative 2. Chapter 4.0 discusses the factors that influenced this analysis.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.	A review of this environmental resource against training and RDT&E operations under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed. Analysis indicated that the proposed alternatives would not result in either short-or-long term impacts for this resource.

Note: No impacts on Air Quality, Geology and Soils, Hazardous Materials and Waste, Land Use, Socioeconomics, Transportation, Utilities, and Water Resources are anticipated due to site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Impacts on Biological Resources are also discussed under Open Ocean.

Table ES-8. Summary of Mitigation Measures

Resource Category*	Open Ocean	Northwestern Hawaiian islands	Kauai
Air Quality	None	None	Modify or renew current Title V permit for PMRF/Main Base for testing and operation of the Maritime Directed Energy Test Center.
Airspace	Depending on the intensity of the proposed lasers, nomenclature would need to be added to aeronautical charts, and certain test events could require Notices to Airmen (NOTAMs) and Notices to Mariners (NOTMARs).	None	Depending on the intensity of the lasers, nomenclature would need to be added to aeronautical charts, and certain test events could require NOTAMs and NOTMARs.
Biological Resources	Train personnel in lookout/watchstander duties. Always at least three people on watch with binoculars. At least two additional personnel on watch during ASW exercises. All personnel engaged in passive acoustic sonar operation to monitor for marine mammal vocalizations. During MFA sonar operations use all available sensor and optical systems (such as night vision goggles). Use only passive capability of sonobuoys when marine mammals are detected within 200 yards. When marine mammals are detected by any means within 1,000 yards of the sonar dome (the bow), the ship or submarine will limit active transmission levels to at least 6 decibels (dB) below normal operating levels. If need for power-down should arise, Navy to follow the requirements as though they were operating at 235 dB—the normal operating level. Operate sonar at lowest practicable level, not to exceed 235 dB, except as required to meet tactical training objectives Helicopters to observe/survey vicinity of an ASW Operation for 10 minutes before first deployment of active (dipping) sonar in the water. Do not dip sonar within 200 yards of a marine mammal and cease pinging if a marine mammal closes within 200 yards after pinging has begun.	None	Target areas are determined to be clear of marine mammals and sea turtles prior to commencement of exercises. Within 1 hour prior to initiation of Expeditionary Assault activities, landing routes and beach areas are surveyed for the presence of sensitive wildlife. An exercise is halted if marine mammals are detected on the beach or in a target area. Pressure wash vehicles on the mainland to prevent spread of invasive plants. Shield night lighting to the extent practical. Foster the reestablishment of native vegetation Monitor and treatment to eliminate establishing exotic species. Prohibit living plants brought from mainland. Work with owners of Niihau Ranch to develop Hawaiian monk seal and green turtle monitoring programs. Training operations to avoid any beach area with green turtle nests. Seasonal use of Kaula during periods when humpback whales are not present. Survey the waters off Kaula to ensure that no whales are present. Limit the impact area to the southern tip of Kaula. RIMPAC exercises use non-explosive rounds on Kaula.

Table ES-8. Summary of Mitigation Measures (Continued)

Resource Category*	Open Ocean	Northwestern Hawaiian islands	Kauai
Biological Resources (Continued)	Navy to coordinate with local NMFS Stranding Coordinator. Submit report containing discussion of nature of the effects, if observed, based on both modeled results of real-time events and sightings of marine mammals. Operating area must be determined clear of marine mammals and sea turtles prior to detonation. Pre-exercise observation of the area to start 30 minutes before and after commencement of Demolition and Ship Mine Countermeasures Operations. All weapons firing would be conducted during the period 1 hour after official sunrise to 30 minutes before official sunset. Establish exclusion zone with a radius of 1.0 nm around each target. Conduct series of surveillance over-flights within exclusion and safety zones, prior to and during the exercise, when assets are available and if safe and feasible. Monitored exclusion zone by passive acoustic means, when assets are available. If a protected species observed within the exclusion zone is diving, delay firing until animal is re-sighted outside the exclusion zone, or 30 minutes have elapsed. Prepare after action report.		

Table ES-8. Summary of Mitigation Measures (Continued)

Resource Category*	Open Ocean	Northwestern Hawaiian islands	Kauai
Cultural Resources	None	Within program requirements, alter missile trajectories to minimize the potential for debris to fall in the vicinity of Necker and Nihoa islands.	Avoid operations/construction in areas with known cultural resources. Monitoring all ground-disturbing activities and construction in medium and high sensitivity archaeological areas. Provide briefings about cultural resources to project personnel. Spray water on vegetation in immediate areas of launch vehicle prior to launch. Use open spray nozzle when possible to minimize erosion damage. Conduct post-burn archaeological surveys. Implement data recovery/research and documentation program. If unanticipated cultural resources are encountered (particularly human remains) during any activity, all activities will cease in the immediate vicinity of the find. Applicable procedures would be implemented and appropriate individuals contacted.
Geology and Soils	N/A	None	Navy minimizes the impact on Kaula by managing the targeting to the southeast tip of the island.
Hazardous Materials and Waste	None	None	Before any facility modifications, the areas to be modified would be surveyed for asbestos and lead-based paint.
Health and Safety	Ensure that no shipping is located within the hazard range of the longest-range weapon being fired for that event.	None	PMRF would develop and implement the necessary Standard Operating Procedures and range safety requirements necessary to provide safe operations associated with future high-energy laser tests. Appropriate remedial procedures would be taken before initiation of potentially hazardous laser operations on PMRF.
Noise	Limits have been set by DoD and OSHA to prevent damage to human hearing.	None	Limits have been set by DoD and OSHA to prevent damage to human hearing. All public, civilian, and nonessential personnel are required to be outside of ground hazard areas where expected noise levels will be below the 115 dBA limit for short-term exposure.

*No mitigation measures have been identified for Land Use, Socioeconomics, Transportation, Utilities, or Water Resources.

Table ES-8. Summary of Mitigation Measures (Continued)

Resource Category*	Oahu	Maui	Hawaii
Airspace	FAA coordination would include discussions regarding the anticipated number of aircraft including FCLP operations.	None	None
Biological Resources	Mitigation measures to protect critically endangered plants include: controlling threats, improving conditions for recruitment, propagation, and reintroduction, development of Implementation Plans that outline required mitigations to offset training risks and to stabilize the targeted plant and animal populations, and implementation of a Wildland Fire Management Plan. Only sandy areas that avoid/minimize potential impacts on coral are used for explosive charges in less than 40 feet of water. Where necessary, pre-exercise surveys for turtles conducted to avoid feeding and nesting areas. Conducting surveys prior to use of amphibious launch vehicles to ensure that humpback whales are not disturbed. Beach and offshore waters are monitored for presence of marine mammals and sea turtles 1 hour before and during Major Exercises, if any are seen, exercise is delayed until the animals leave the area.	None	Impacts on rare plants minimized by locating training activities away from areas with sensitive species, fencing to enclose sensitive species for protection from ungulates, fire and fuel corridors, fire breaks, additional surveys for threatened and endangered species, and continued sensitive plant propagation efforts. All off-road driving is prohibited. All fenced areas are off-limits. All lava tubes and sinkholes are off-limits. Digging is only permitted in previously disturbed areas. Hydrographic survey is performed to map out the precise Expeditionary Assault transit routes through sandy bottom areas. Personnel entering Bradshaw Army Airfield briefed on the guidelines set forth in the PTA Ecosystem Management Plan.
Cultural Resources	In the event unanticipated cultural remains are identified (particularly human remains), all operations will cease in the immediate vicinity and appropriate military branch protocols followed.	None	In the event unanticipated cultural remains are identified (particularly human remains), all operations will cease in the immediate vicinity and appropriate military branch protocols followed.
Hazardous Materials and Waste	Training operations in the Naval Defensive Sea Area are restricted to vessels owned and operated by military and DoD personnel.	None	Before any facility modifications, the areas to be modified would be surveyed for asbestos and lead-based paint.
Health and Safety	Ensure that no shipping is located within the hazard range of the longest-range weapon being fired for that event.	None	None
Noise	Limits have been set by DoD and OSHA to prevent damage to human hearing. Personnel required to work in noise hazard areas are required to use appropriate hearing protection to bring noise levels within established safety levels. Public notification and restricting training in Waimanalo Bay to daylight hours.	None	None

*No mitigation measures have been identified for Air Quality, Geology and Soils, Land Use, Socioeconomics, Transportation, Utilities, or Water Resources.

Acronyms and Abbreviations

AFB	Air Force Base
ASW	Anti-Submarine Warfare
CFR	Code of Federal Regulations
COMNAVSURFPAC	Commander, Naval Surface Force, U.S. Pacific Fleet
CEQ	Council on Environmental Quality
dB	Decibel
dBA	A-Weighted Decibels
DoD	Department of Defense
DOT	Department of Transportation
EIS	Environmental Impact Statement
EO	Executive Order
EOD	Explosive Ordnance Disposal
ESA	Endangered Species Act
ESG	Expeditionary Strike Group
FCLP	Field Carrier Landing Practice
FORACS	Fleet Operational Readiness
HFA	High-Frequency Active
HRC	Hawaii Range Complex
ICRMP	Integrated Cultural Resource Management Plan
IEER	Improved Extended Echo Ranging
MCBH	Marine Corps Base Hawaii
MCTAB	Marine Corps Training Area Bellows
MFA	Mid-Frequency Active
MMPA	Marine Mammal Protection Act
NDE	National Defense Exemption
NEPA	National Environmental Policy Act
nm	Nautical Mile(s)
nm^2	Square Nautical Mile(s)
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NOTAM	Notice to Airmen
NOTMAR	Notice to Mariners
OEIS	Overseas Environmental Impact Statement
OPAREA	Operating Area
OSHA	Occupational Safety and Health Administration
PMRF	Pacific Missile Range Facility
PTA	Pohakuloa Training Area
RDT&E	Research, Development, Test, and Evaluation
RIMPAC	Rim of the Pacific
ROD	Record of Decision
SESEF	Shipboard Electronic Systems Evaluation Facility
SPORTS	Sonar Positional Reporting System
THAAD	Terminal High Altitude Area Defense
TOA	Temporary Operating Area
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USWEX	Undersea Warfare Exercise

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1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

This Environmental Impact Statement/Overseas Environmental Impact Statement (hereafter referred to as the EIS/OEIS) has been prepared by the Navy in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States [U.S.] Code [U.S.C.] § 4321 et seq.); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] §§ 1500-1508 [2005]); Navy Procedures for Implementing NEPA (32 CFR Part 775 [2005]); and Executive Order (EO) 12114, *Environmental Effects Abroad of Major Federal Actions*. The NEPA process ensures that environmental effects of proposed major Federal actions are considered in the decision-making process. EO 12114 requires environmental consideration for actions that may significantly harm the environment of the global commons. This EIS/OEIS satisfies the requirements of both NEPA and EO 12114.

The U.S. Department of the Navy (Navy) has prepared this Final EIS/OEIS to assess the potential environmental impacts associated with ongoing and proposed Naval activities (described in detail in Chapter 2.0) within the Navy's existing Hawaii Range Complex (HRC). Following publication of the Draft EIS/OEIS in July 2007, the Navy, in coordination with the National Marine Fisheries Service (NMFS), conducted a re-evaluation of the analysis in that document. This re-evaluation subsequent to identification of new information led the Navy to prepare a Supplement to the Draft EIS/OEIS, which was released to the public in February 2008.

This EIS/OEIS incorporates the following changes and associated environmental analysis as presented in the Supplement to the Draft EIS/OEIS:

- Modifications to the analytical methodology used to evaluate the effects of mid-frequency active (MFA) and high-frequency active (HFA) sonar on marine mammals;
- Changes to the amount and types of sonar allocated to each of the alternatives; and,
- Development of a new alternative.

This document also responds to public comments received on both the Draft EIS/OEIS and the Supplement to the Draft EIS/OEIS.

The Proposed Action would support and maintain U.S. Pacific Fleet training and assessments of current capabilities, and research, development, test, and evaluation (RDT&E) activities, and associated range capabilities (including hardware and infrastructure improvements in the HRC). Training and RDT&E do not include combat operations, operations in direct support of combat, or other activities conducted primarily for purposes other than training. The Assistant Secretary of the Navy (Installations & Environment) will determine which alternative (or combination of proposed activities) analyzed in the EIS/OEIS satisfies both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that will best meet the needs of the Navy given that all reasonably foreseeable environmental impacts have been considered.

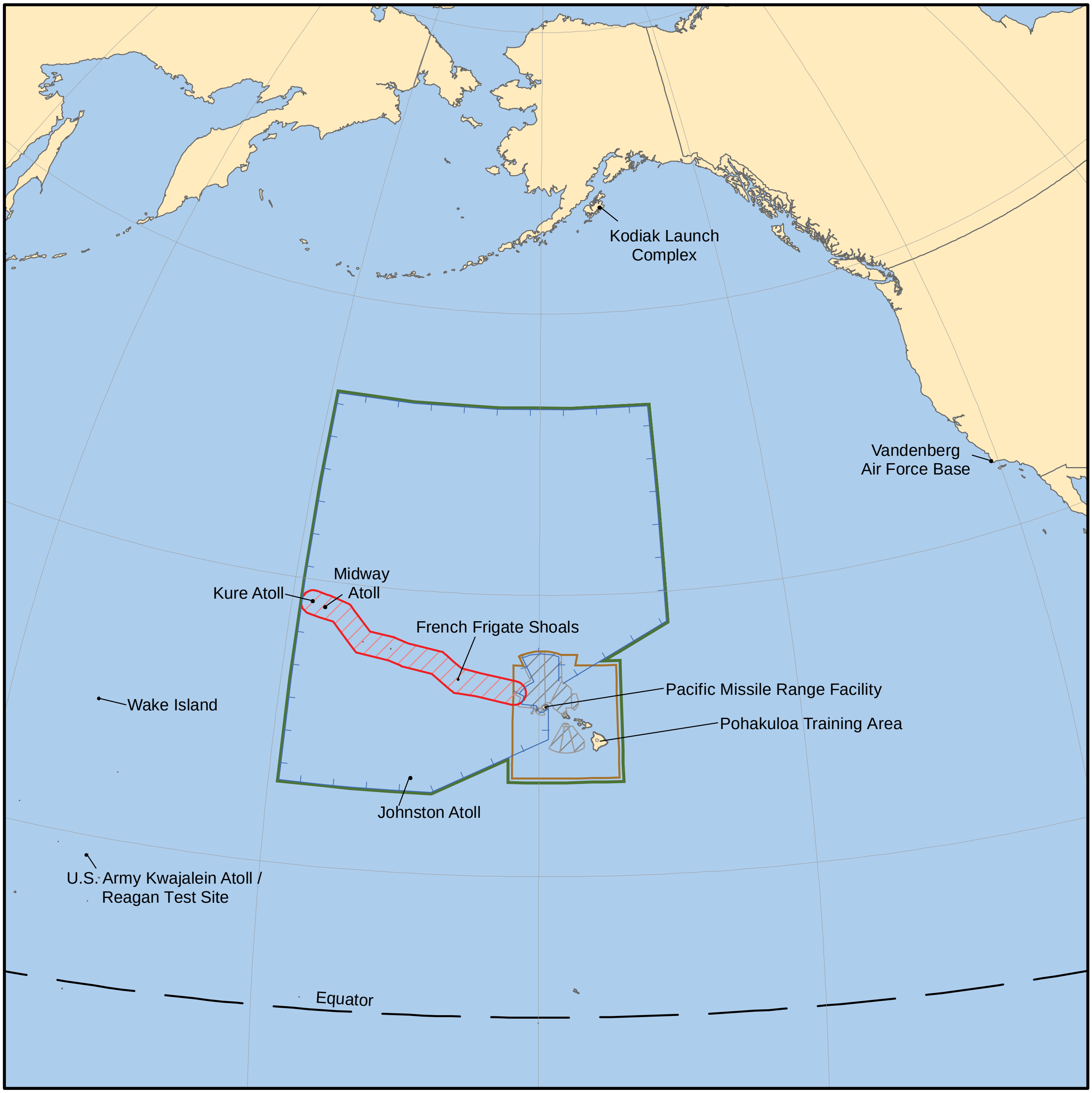
1.2 OVERVIEW OF THE HAWAII RANGE COMPLEX

A range complex is an organized and designated set of specifically bounded geographic areas which can encompass a landmass, body of water (above or below the surface), and airspace used to conduct training of naval and other military forces and personnel, and RDT&E of military systems and equipment. A range complex can consist of several ranges, operating areas (OPAREAs), and special use airspace. These areas can be under strict control of the Department of Defense (DoD) or its agencies, or can be shared among several agencies. The Hawaiian Islands are located close to the middle of the Pacific Ocean. San Francisco lies 2,400 miles to the east, while Asia is 4,000 miles west of the islands. The entire Hawaiian Islands chain extends 2,050 miles from the main island of Hawaii to the Kure Atoll. The entire chain, except for Federal property of Midway Atoll, is part of the State of Hawaii (Figure 1.2-1).

The HRC geographically encompasses open ocean (outside 12 nautical miles [nm] from land), offshore (within 12 nm from land), and onshore areas located on or around the major islands of the Hawaiian Islands chain. The offshore areas extend from 16 degrees north latitude to 43 degrees north latitude and from 150 degrees west longitude to 179 degrees west longitude, forming an area approximately 1,700 nm by 1,600 nm. The component areas of the HRC include:

- The Hawaii OPAREA consisting of 235,000 square nautical miles [nm^2]) of surface and subsurface ocean areas and special use airspace for military training and RDT&E activities. In addition, various Navy land ranges and other Services' land for military training and RDT&E activities are also considered part of the Hawaii OPAREA (Figure 1.2-2) and
- The Temporary Operating Area (TOA) consisting of 2.1 million nm^2 of sea and airspace for RDT&E activities (Figure 1.2-3).

The Hawaii OPAREA includes the Pacific Missile Range Facility (PMRF) on Kauai, which is both a Fleet training range and a Fleet and DoD RDT&E range. PMRF includes 1,020 nm^2 of instrumented ocean area at depths between 1,800 feet and 15,000 feet. Also included in the Hawaii OPAREA are designated warning and training areas, airspace, water ranges, land ranges, airfields, the Pearl Harbor Naval Defensive Sea Area, and open ocean areas. The Hawaii OPAREA also includes the southern tip of the Papahānaumokuākea Marine National Monument (Monument) where part of the 50-nm buffer around the islands within the Monument extends into the traditionally used exercise area and adjacent ranges at PMRF. The Monument's buffer area within the Hawaii OPAREA encompasses about 4,300 nm^2 of the entire Monument's approximately 140,000 nm^2. As provided in Presidential Proclamation 8031, "Activities and exercises of the Armed Forces of the United States" are allowed within the Monument by the terms of the Presidential Proclamation which created the Monument.



EXPLANATION

- Temporary Operating Area (TOA)
- Hawaii Operating Area (OPAREA)
- Hawaii Range Complex (HRC)
- Papahānaumokuākea Marine National Monument
- Existing Warning Area
- Land

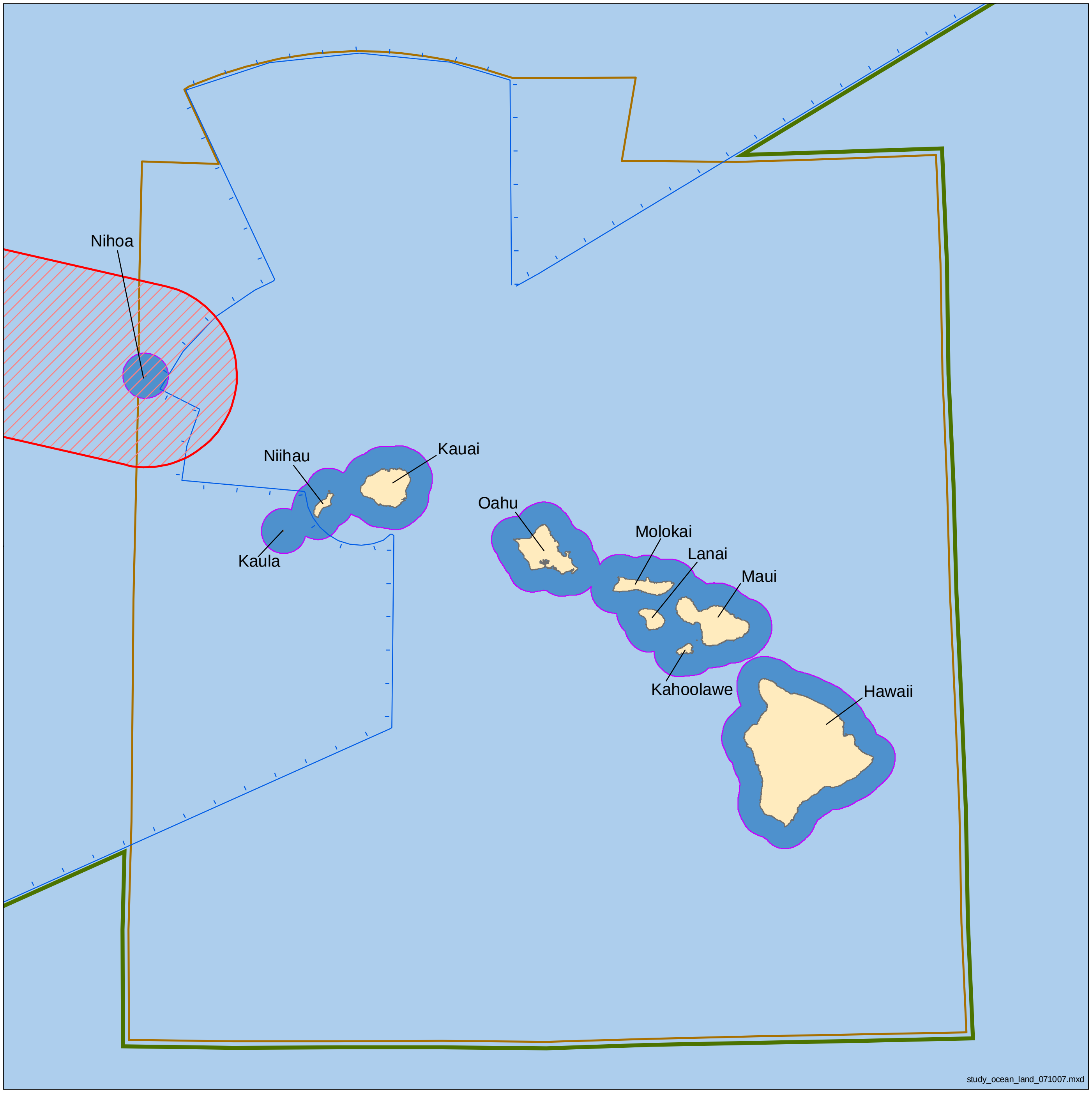
NORTH

0 300 600 1,200 Nautical Miles

Hawaii Range Complex Overview

Pacific Ocean

Figure 1.2-1



EXPLANATION

12-Nautical Mile Line
Temporary Operating Area (TOA)
Hawaii Operating Area (OPAREA)
Hawaii Range Complex (HRC)
Papahānaumokuākea Marine National Monument
Offshore
Open Ocean
Land

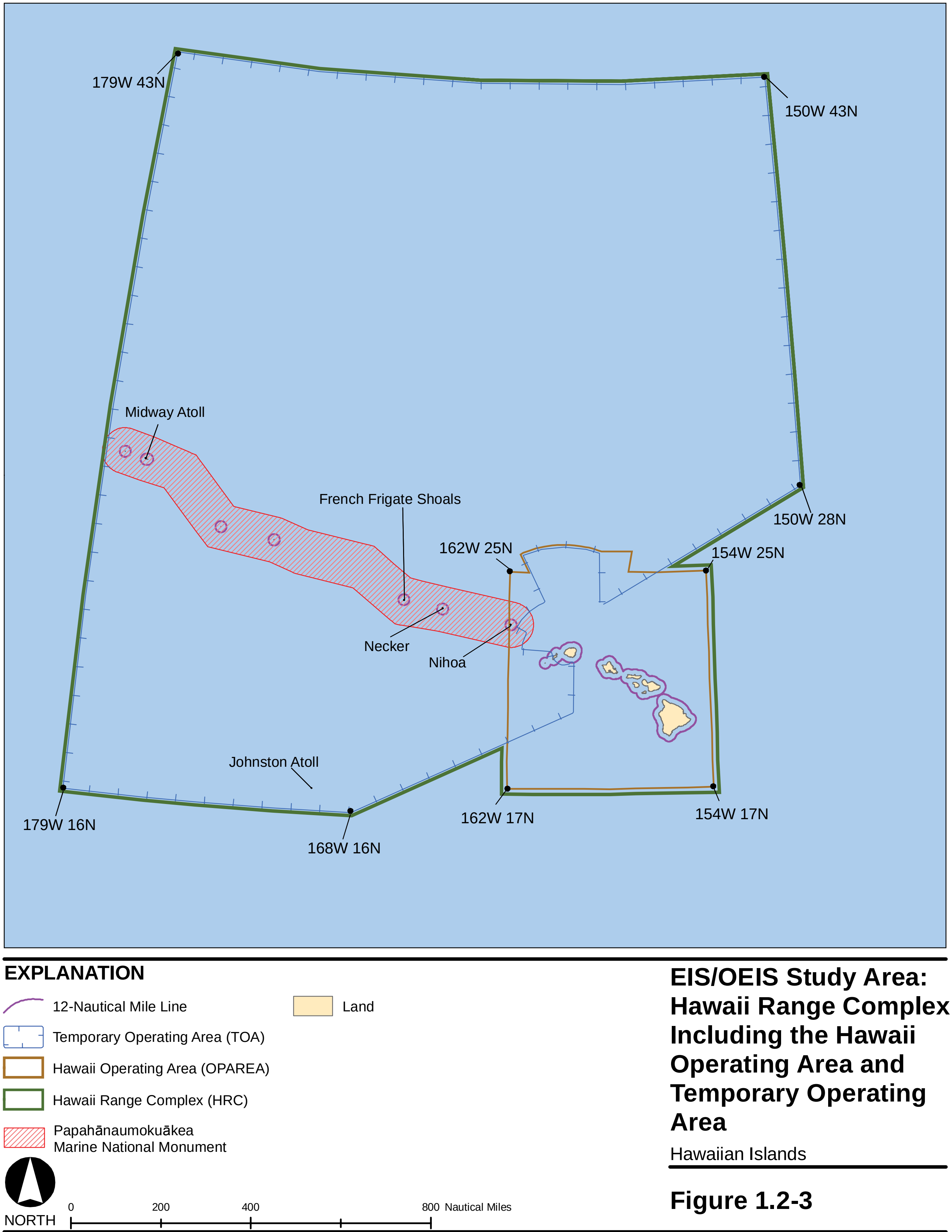
NORTH

0 50 100 200 Nautical Miles

EIS/OEIS Study Area: Hawaii Range Complex Open Ocean, Offshore and Land Areas

Hawaiian Islands

Figure 1.2-2



EIS/OEIS Study Area: Hawaii Range Complex Including the Hawaii Operating Area and Temporary Operating Area

Hawaiian Islands

Figure 1.2-3

For range management and scheduling purposes, the Hawaii OPAREA is divided into numerous sub-component ranges or training areas used to conduct training events and RDT&E of military hardware, personnel, tactics, munitions, explosives, and electronic combat systems, as described in detail in Chapter 2.0.

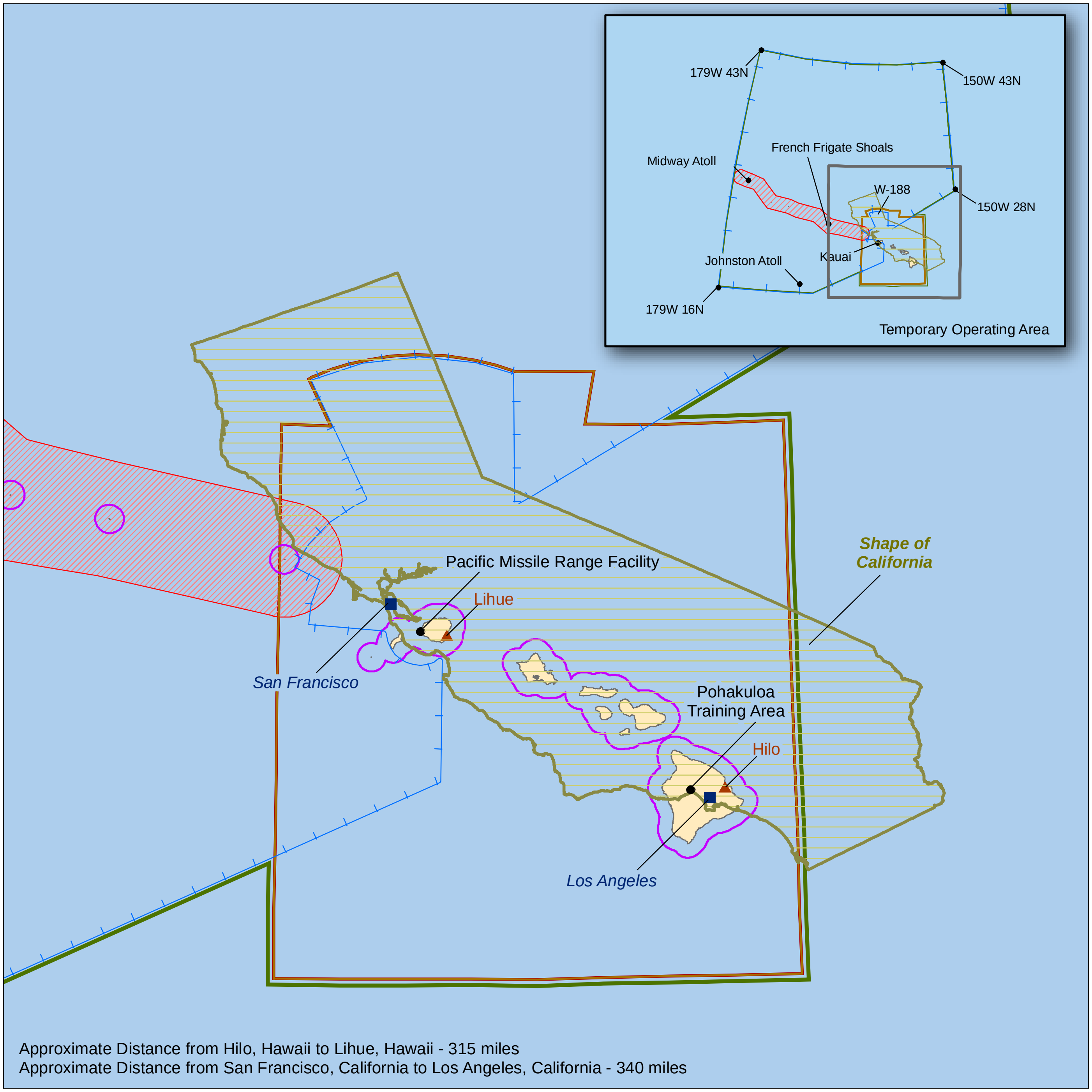
Because of the vast size of the HRC and Hawaii OPAREA, multiple training and RDT&E activities can occur at the same time, without interfering with each other. For reference purposes Figure 1.2-4 illustrates the size and extent of the Hawaii OPAREA by superimposing the State of California across the major Hawaiian Islands. Individual Fleet training and RDT&E activities can occur up to 200 to 300 nm apart and 100 to 200 nm offshore of any island.

The Hawaii OPAREA provides the geography, infrastructure, space, and location necessary to accomplish complex military training and RDT&E activities. The large size of the Hawaii OPAREA allows training that involves complicated scenarios and large numbers of training participants within a complex geographic setting (i.e., channels between islands, varying bathymetry, etc.). The presence of the underwater instrumented tracking ranges offshore of PMRF as well as DoD-controlled warning areas and special use airspace also enable training to proceed in a safe and structured manner while retaining the flexibility for training controllers to interject tactical challenges that enhance realism for training participants. In the Hawaii OPAREA, forces can engage in training involving events at PMRF on Kauai simultaneously with Anti-Submarine Warfare (ASW) events offshore and in the open ocean. Submarines homeported at Pearl Harbor are available as opposition forces during training events without having to undertake long transits to participate in those events. Maritime patrol aircraft based at Marine Corps Base Hawaii (MCBH) also contribute additional training and assessment capabilities.

1.3 BACKGROUND

As its highest priority, the HRC will support the Fleet Response Training Plan (FRTP) readiness processes as revised in 2006 in the Fleet Response Plan (Commander, U.S. Fleet Forces Command, 2006). One of the obligations of the Navy, pursuant to Title 10 of the U.S.C., is to ensure that the men and women, Sailors and officers, sent to sea on behalf of the United States are fully trained and ready for deployment on short notice, as a combat-ready naval force and for other non-combat missions assigned to them. In addition, combat forces must have available to them the changes and improvements that new technologies can provide. These emerging technologies must be researched, developed, tested, and evaluated before being made widely available for use. The Navy meets these training and testing responsibilities across the open oceans and on its range complexes.

For more than a century, Hawaii has been a place where the Navy has trained its Sailors and repaired and replenished the ships of the United States at Pearl Harbor. In the 1920s, a submarine base was established at Pearl Harbor, creating a need for the training of Sailors and officers serving in the undersea environment. As world tensions increased in the 1930s and early 1940s, the Navy rapidly increased its presence and number of facilities in Hawaii. The Pacific Fleet established its headquarters at Pearl Harbor on February 1, 1941. Ten months later, on December 7, 1941, the Fleet was attacked at Pearl Harbor, propelling America into World War II. The Pacific was the site of World War II’s most decisive naval battles. Naval



EXPLANATION

- Hawaii City
- California City
- 12-Nautical Mile Line
- Temporary Operating Area (TOA)
- Hawaii Operating Area (OPAREA)
- Hawaii Range Complex (HRC)
- Papahānaumokuākea Marine National Monument
- Shape of California
- Land

0 50 100 200 Miles

0 50 100 200 Nautical Miles

NORTH

Distance Relationship Between Major Hawaiian Islands

Hawaiian Islands

Figure 1.2-4

forces in Hawaii remained vital to U.S. interests throughout the mid-century, as control of the seas provided advantages to allied forces during the Korean and Vietnam Wars. Since 1968, a multinational sea-power exercise given the name “Rim of the Pacific” (RIMPAC) has been conducted within the Hawaii OPAREA, testing the abilities of a number of the navies of the Pacific Rim to function together. Participating Pacific Rim nations have included Australia, Japan, Republic of Korea, Indonesia, Malaysia, Singapore, Chile, Peru, and Canada. Today, the Navy’s presence in Hawaii remains of essential strategic and operational importance to U.S. national interests.

Over 20 years ago, acoustic monitoring devices were placed at PMRF on the ocean floor off the west coast of Kauai to detect and track underwater activity. These acoustic systems, known as Barking Sands Tactical Underwater Range (BARSTUR) and Barking Sands Underwater Range Expansion (BSURE), provide a unique evaluative tool that offers specific information in tracking participants’ movements and responses during naval training. PMRF is now the world’s largest military test and training range capable of supporting subsurface, surface, air, and space training events, as well as RDT&E and marine mammal research. It consists of instrumented underwater ranges, controlled airspace, and a TOA covering 2.1 million nm^2 of ocean. Since its establishment, PMRF has provided major range services for training, tactics development, and RDT&E of air, surface, and subsurface weapons systems for the Navy, other DoD agencies, allies, and private industry.

Today, more than 20 surface ships and submarines are homeported in Hawaii. Specialty forces, including Navy divers and explosive ordnance disposal technicians, also conduct vital training within the Hawaii OPAREA. The Sailors and officers assigned to these homeported ships and submarines, those awaiting sea duty, and Strike Groups (a naval force comprising one or more capital ships, several combatant ships and one or more attack submarines) transiting through the Pacific, as well as naval forces of foreign allies, must maintain their proficiencies to allow them to be ready and qualified to be deployed when ordered to do so at short notice. The HRC, including the Hawaii OPAREA, provides extensive, remote, and strategic training areas and facilities that enable Navy personnel to maintain and strengthen these required proficiencies.

1.3.1 NAVY’S AT SEA POLICY

In December of 2000, the Under Secretary of the Navy issued a memorandum for the Chief of Naval Operations and the Commandant of the Marine Corps entitled “Compliance with Environmental Requirements in the Conduct of Naval Exercises or Training at Sea” that has come to be known as the “At Sea Policy.” The Navy’s At Sea Policy sets forth how the Navy would update and upgrade its compliance with the body of environmental law which applies to these exercises and training—at sea and at the Navy’s range complexes. The policy applies to training at sea, including the conduct of joint (multi-service) and combined (multi-nation) exercises, which are also known as military readiness activities, as that term is defined in Section 315(f) of Public Law 107-314. Training, including joint and combined exercises, does not include combat operations, operations in direct support of combat, or other activities conducted primarily for purposes other than training.

The memorandum directed the Navy’s Fleet commanders to develop an approach to environmental compliance for the Fleet training ranges and training areas within their respective areas of responsibility, including ranges used for RDT&E activities. Major Exercises and training occurring within a range or OPAREA could be included with the compliance effort for the applicable range or OPAREA. The approach would involve a “comprehensive analysis of the environmental impacts of a class of undertakings repetitive in nature or of similar effect and recurring within the same geographical area, so as to avoid or mitigate adverse effects on the extent practicable consistent with the accomplishment of the military training and exercise activities under review.” Fleet commanders were similarly directed to review RDT&E ranges to the extent they are used for Fleet training.

For the HRC, the Commander, U.S. Pacific Fleet is conducting a programmatic geography-based approach to environmental analysis, complying with NEPA and EO 12114, reviewing the present and reasonably foreseeable activities at each range complex. In accordance with the At Sea Policy, this analysis provides a description of existing training and RDT&E activities and reasonably foreseeable alternative levels of activity within the HRC, and an analysis of the environmental consequences of training and RDT&E activities and alternative levels of activity. Included are Major Exercises, routine training, and RDT&E activities conducted within or projected to be conducted within the HRC, as well as planned upgrades to the HRC to ensure its sustainability. This document builds upon the *Pacific Missile Range Facility Enhanced Capability Final Environmental Impact Statement* prepared and completed in 1998 for the facilities at PMRF and training and RDT&E activities under PMRF’s control.

1.3.2 WHY THE NAVY TRAINS

The U.S. military is maintained to ensure the freedom and safety of all Americans both at home and abroad. In order to do so, Title 10 of the U.S.C. requires the Navy to “maintain, train and equip combat-ready naval forces capable of winning wars, deterring aggression and maintaining freedom of the seas.” Modern war and security operations are complex. Modern weaponry has brought both unprecedented opportunity and innumerable challenges to the Navy. Smart weapons, used properly, are very accurate and actually allow the military services to accomplish their missions with greater precision and far less destruction than in past conflicts. But these modern smart weapons are very complex to use. U.S. military personnel must train regularly with them to understand their capabilities, limitations, and operation. Modern military actions require teamwork between hundreds or thousands of people, and their various equipment, vehicles, ships, and aircraft, all working individually and as a coordinated unit to achieve success. These teams must be prepared to conduct activities in multiple warfare areas simultaneously in an integrated and effective manner. Navy training addresses all aspects of the team, from the individual to joint and coalition teamwork. To do this, the Navy employs a building-block approach to training. Training doctrine and procedures are based on operational requirements for deployment of naval forces. Training proceeds on a continuum, from teaching basic and specialized individual military skills, to intermediate skills or small unit training, to advanced, integrated training events, culminating in multi-service (Joint) exercises or pre-deployment certification events.

To provide the experience so important to success and survival, training must be as realistic as possible. The Navy often employs simulators and synthetic training to provide early skill repetition and to enhance teamwork, but live training in a realistic environment is vital to success. Live training is the only vehicle available to ensure naval forces develop and maintain the ability to conduct integrated warfare across a wide spectrum of situations. This requires sufficient sea and airspace to maneuver tactically, realistic targets and objectives, opposition that creates a realistic enemy, and instrumentation to objectively monitor the events and learn to correct errors.

Range complexes provide a controlled and safe environment with threat representative targets that enable Navy forces to conduct realistic combat-like training as they undergo all phases of the graduated buildup needed for combat-ready deployment. Navy's ranges and OPAREAs provide the space necessary to conduct controlled and safe training scenarios representative of those that Navy men and women would have to face in actual combat. The range complexes are designed to provide the most realistic training in the most relevant environments, replicating to the best extent possible the operational stresses of warfare. The integration of undersea ranges and OPAREAs with land training ranges, safety landing fields, and amphibious landing sites are critical to this realism, allowing execution of multi-dimensional exercises in complex scenarios. They also provide instrumentation that captures the performance of Navy tactics and equipment in order to provide the feedback and assessment that is essential for constructive criticism of personnel and equipment. The live-fire training facilitates assessment of the Navy's ability to place weapons on target with the required level of precision while under a stressful environment. Live training, most of it accomplished in the waters off the United States' coasts, will remain the cornerstone of readiness as the Navy transforms its military forces for a security environment characterized by uncertainty and surprise.

Navy training activities focus on achieving proficiency in eight functional areas encompassed by Navy operations. These functional areas, known as Primary Mission Areas (PMARs), are: Anti-Air Warfare (AAW), Amphibious Warfare (AMW), Anti-Surface Warfare (ASUW), ASW, Mine Warfare (MIW), Strike Warfare (STW), Electronic Combat (EC), and Naval Special Warfare (NSW). Each training event addressed in the EIS/OEIS is categorized under one of the PMARs.

The HRC is used for training of operational forces, RDT&E of military equipment, and other military activities. As with each Navy range complex, the primary mission of the HRC is to provide a realistic training environment for naval forces to ensure that they have the capabilities and high state of readiness required to accomplish assigned missions.

Training is focused on preparing for worldwide deployment. Naval forces generally deploy in specially organized units called Strike Groups. A Strike Group may be organized around one or more aircraft carriers, together with several surface combatant ships and submarines, collectively known as a Carrier Strike Group (CSG). A naval force known as a Surface Strike Group (SSG) consists of three or more surface combatant ships. A Strike Group may also be organized around a Marine Expeditionary Unit (MEU)[1] embarked on amphibious ships accompanied by surface combatant ships and submarines, known as an Expeditionary Strike Group (ESG). The Navy and Marine Corps deploy CSGs, SSGs, and ESGs on a continuous basis. The number and composition of Strike Groups deployed, and the schedule for deployment, are determined based on the worldwide requirements and commitments.

Pre-deployment training is governed by the Navy's FRTP. The FRTP sets a deployment cycle for the Strike Groups that includes three phases: (1) basic, intermediate, and advanced pre-

[1] The MEU is a battalion-sized (1,500 Marines) Marine Air Ground Task Force or MAGTF. MAGTFs consist of ground combat, aviation combat, combat logistics, and command and control elements, and vary in size depending on the nature of the intended mission.

deployment training and certification, (2) deployment, and (3) post-deployment sustainment, training, and maintenance. While several Strike Groups are always deployed to provide a global naval presence, Strike Groups must also be ready to “surge” on short notice in response to directives from the National Command Authority. One objective of the FRTP is to provide this surge capability. The FRTP calls for the ability to train and deploy six CSGs in a very short period, and two more in stages soon thereafter. Established in 2003, the FRTP calls for changes in the Fleet training cycle, including acceleration of the cycle and near-simultaneous execution of similar training events. Deployment schedules are not fixed, but must remain flexible and responsive to the Nation’s security needs. The capability and capacity of ranges such as the HRC to support the entire training continuum must be available as needed.

The deployment of naval forces, including those that train in the HRC, is determined by the combatant commanders (a senior military commander with a large, geographically demarked area of responsibility) based on worldwide requirements and commitments. In order to meet these requirements, naval forces are geographically apportioned. The dynamic requirements of national security affect the deployment of naval forces. As a result, deployment schedules are not fixed, but remain flexible, often changing to meet the Nation’s security needs. Real world contingencies drive the training schedule in relation to when and where the naval forces are required. The support necessary to conduct required pre-deployment training, particularly training range support, must therefore be available as needed.

Specific to ASW, continued training and use of active sonar systems is vital. Modern diesel-electric submarines are designed to suppress emitted noise levels specifically to counter and defeat passive sonar technology. Passive sonar involves listening for any sounds inadvertently emitted by a potentially hostile submarine, which are then used to detect, localize and track it. As a result, modern diesel-electric submarines have been designed to be quieter through the use of improved technology and to “hide” in the naturally occurring noise levels of the shallow waters of coastal environments. The result is that a modern diesel-electric submarine operating on battery power is nearly undetectable to naval forces using only passive sonar. Accordingly, sonar, initially developed during World War I, has been improved and deployed on U.S. naval vessels since the mid-1920s. Although the Navy continues evaluating technologies to locate and track submarines, active sonar remains the most viable means of locating and tracking submarines.

1.3.3 TACTICAL TRAINING THEATER ASSESSMENT AND PLANNING PROGRAM

The Tactical Training Theater Assessment and Planning (TAP) Program serves as the Navy’s range sustainment program. The purpose of TAP is to support Navy objectives that: (1) promote use and management of ranges (such as the HRC) in a manner that supports national security objectives and a high state of combat readiness, and (2) ensures the long-term viability of range assets while protecting human health and the environment. The TAP Program focuses specifically on the sustainability of ranges, OPAREAs, and airspace areas that support the FRTP.

The Navy’s Required Capabilities Document (RCD) is a product of the TAP Program. The purpose of the RCD is to quantitatively define the required range capabilities that would allow Navy ranges to support mission-essential training. The RCD provides guidelines for range requirements, but is not range-specific. The Navy, therefore, has developed an analysis of its requirements for each range complex (U.S. Department of Defense, 2006). These analyses:

- Provide comprehensive descriptions of ranges, OPAREAs and training areas within a given range complex;
- Assess training activities currently conducted within the range complex;
- Identify investment needs and strategy for maintenance, range improvement and modernization;
- Develop a strategic vision for range operations with a long-term planning horizon;
- Provide range complex sustainable management principles and practices, to include environmental stewardship and community outreach; and
- Identify encroachments on ranges, and evaluate the potential impacts of encroachments on training and RDT&E.

Also of note is that the Base Realignment and Closure Commission 2005 process, leading to the decisions of the Congress and the President, examined availability of ranges to support closure recommendations. HRC is specifically retained as a needed range.

1.3.4 MISSION OF THE HAWAII RANGE COMPLEX

The strategic mission of the HRC is to support naval operational readiness by providing a realistic, live training environment for forces assigned to the Pacific Fleet, the Fleet Marine Force, and other users. As its highest priority, the HRC will support the FRTP readiness processes as revised in 2006 in the Fleet Response Plan (Commander, U.S. Fleet Forces Command, 2006) and Commander, Fleet Forces Command (CFFC) Instruction 3501.3, Fleet Training Strategy. The strategic mission implements the strategic vision and includes management objectives and the HRC concept of training events.

The Commander, U.S. Pacific Fleet and CFFC strategic vision for this complex is for it to remain the principal Navy training venue in the middle Pacific with the capability and capacity to support current, emerging, and future training requirements. The capabilities of the HRC must be sustained, upgraded, modernized, and transformed as new weapons systems achieve initial operational capability, new threat capabilities emerge, and new technologies offer improved training opportunities. More specifically, the range complex must be capable of providing:

- Advanced-level training of Strike Groups pursuant to the FRTP, including realistic opposing force and electronic threat replication to support training of integrated and joint forces
- Joint training events as a compatible and interoperable component of the emerging Joint National Training Capability (JNTC)
- Intermediate-level and basic-level training of Navy forces across all primary mission areas pursuant to the requirements of the FRTP

- Sustainment training as a "backyard" range[2] for surface ships, submarines, aviation squadrons, special warfare, and explosive ordnance disposal units based in Hawaii, and specialized support for units based elsewhere on the West Coast and in the western Pacific
- Sophisticated instrumented range facilities for ASW and MIW training for ships, aircraft, and submarines
- Alignment of the HRC infrastructure with Naval Force structure, including accommodating new weapons, systems, and platforms (vessels and aircraft) as they are introduced into the Fleet
- Sustainable range management and planning that provides for consolidated range communications and scheduling; institutionalizes standardized data management practices; and protects and conserves range resources for current and future training requirements
- Support for allies' military training and RDT&E activities.

1.3.5 STRATEGIC IMPORTANCE OF THE EXISTING HAWAII RANGE COMPLEX

The existing HRC is the only range complex in the mid-Pacific Region and is used for training and assessment of operational forces, missile training, RDT&E of military systems and equipment, and other military activities. The HRC is characterized by a unique combination of attributes that make it a strategically important range complex for the Navy. These attributes include:

Proximity to the Homeport of Pearl Harbor. The Hawaii OPAREA surrounds the major homeport of Pearl Harbor where a large number of ships and submarines are based. Hawaii is also the home for Navy aircraft from five operational squadrons and encompasses seven major Navy commands. Training and assessment events, such as the Undersea Warfare Exercise (USWEX), occur in the Hawaii OPAREA, before the deployed forces report to Commander, U.S. SEVENTH Fleet in the Western Pacific and/or Commander, U.S. FIFTH Fleet in the Middle East. The USWEX simulates a real-world submarine threat and gives an ESG or CSG the opportunity to conduct realistic ASW training. It also provides the U.S. Pacific Fleet an opportunity to assess the Navy's ASW capabilities using a fully certified Strike Group.

Proximity to the Western Pacific. Hawaii serves as an ideal en route training location for units deploying to the western Pacific Ocean or Middle East from the U.S. west coast. Maritime Patrol aircraft are located at Marine Corps Base, Hawaii (MCBH), and submarines are based at Pearl Harbor. Both play an important role in ASW training. The co-location of these assets assists in conducting ASW training in Hawaii in support of naval forces that are being deployed to the Western Pacific and Middle East. Much of this training is managed by Commander, U.S. Pacific Fleet's ASW experts who are located in Pearl Harbor.

Proximity to Military Families. Hawaii is home to thousands of military families. The Navy and Marine Corps strive, and in many cases are required by law, to track and where possible limit

[2]A "backyard range" is a range facility located in close proximity to homeports and stations, and it is a critical component of naval readiness.

"personnel tempo," meaning the amount of time Sailors and Marines spend deployed away from home. Personnel tempo is an important factor in family readiness, morale, and retention. The availability of the HRC as a "backyard" training range is critical to Navy efforts in these areas.

Training Terrain. Since most west coast based naval forces have been training in the continental United States for a period as long as 18 months prior to deployment, the Hawaii area provides an opportunity to work in an unfamiliar environment, and to make real-time adjustments just as Sailors and Marines will have to do when they reach the SEVENTH or FIFTH Fleet areas of responsibility.

The large training area available to deploy forces within the HRC allows training to take place on a geographic scale that replicates possible real world events, with the channels between islands serving as strategic choke-points to ocean commerce. The presence of the instrumented tracking ranges at PMRF as well as DoD-controlled warning areas and special use airspace also enable training to proceed in a safe and structured manner while retaining the flexibility for controllers to interject tactical challenges to enhance realism for training participants. Exercise participants at sea can conduct air strike sorties to Pohakuloa Training Area, and an ESG can conduct amphibious landings on DoD beaches, both while simultaneously conducting ASW. Finally, the presence of submarines homeported at Pearl Harbor provides access to these submarines, which can then serve as an opposition force during USWEX without having to transit to participate in the exercise training events. Sites outside of Hawaii do not provide a reasonable alternative for satisfying the Navy's required training purposes or its obligations under the Quadrennial Defense Review (QDR) to increase its presence in the Pacific.

The QDR sets forth a specific series of recommendations for implementing the goals and objectives of national defense and security strategies. The 2001 QDR noted that the Pacific and Asian regions have become increasingly important to regional and U.S. security in recent years. In response, the DoD's new planning construct calls for maintaining regionally tailored forces, forward stationed and deployed in the Pacific and Asian theaters. It requires enhancing the future capability of forward deployed and stationed forces, coupled with global intelligence, strike, and information assets, in order to deter aggression or coercion with only modest reinforcement from outside the theater. The 2006 QDR continued to emphasize the need for the Navy to provide more flexible and sustainable locations from which to operate globally. Pursuant to the QDR, the naval fleet must have greater presence in the Pacific Ocean, consistent with the global shift of trade and transport. Accordingly, the Navy plans to adjust its force posture and basing to provide at least six operationally available and sustainable carriers and 60 percent of its submarines in the Pacific to support engagement, presence and deterrence. The HRC provides the geography, infrastructure, space, and location necessary to accomplish these 2001 and 2006 QDR requirements.

1.4 PURPOSE AND NEED FOR THE PROPOSED ACTION

Given the strategic importance of the HRC to the readiness of naval forces and the unique training environment provided by the HRC, the Navy proposes to take actions for the purposes of:

- Achieving and maintaining Fleet readiness using the HRC to support and conduct current, emerging, future training, assessment events[3], and RDT&E activities;
- Conducting missions supported by the HRC, consistent with the requirements of the FRTP, and;
- Upgrading/modernizing existing range capabilities to enhance and ensure the sustainability of Navy and other DoD training and testing.

The Proposed Action is needed to provide a training environment consisting of ranges, training areas, and range instrumentation with the capacity and capabilities to fully support required training tasks for operational units and military schools. To accomplish this purpose and need and execute its Title 10 responsibilities, the Navy must:

- Maintain current levels of military readiness by training in the HRC;
- Accommodate future increases in training tempo in the HRC and support the rapid deployment of naval units and/or Strike Groups;
- Achieve and sustain readiness of ships and squadrons consistent with the FRTP so that the Navy can rapidly increase significant combat power in the event of a crisis or contingency operation;
- Support the acquisition and implementation into the Fleet of advanced military technology. The HRC must adequately support the testing and training needed for new platforms and weapons systems (e.g., the Littoral Combat Ship and the MH-60R Seahawk helicopter); and,
- Maintain the long-term viability of the HRC while protecting human health and the environment (including the implementation of marine mammal mitigation measures), and enhancing the quality and communication capability and safety of the range complex.

Conduct of current and emerging training and RDT&E training events, and implementation of range capabilities enhancements, includes a collection of actions which will be evaluated in this EIS/OEIS.

1.5 THE ENVIRONMENTAL REVIEW PROCESS

1.5.1 SCOPE AND CONTENT OF THE EIS/OEIS

The scope (Study Area) for this EIS/OEIS is the HRC (Figure 1.2-3), which includes the open ocean, offshore, and onshore areas. This EIS/OEIS will address current and proposed activities associated with the following three categories: (1) Navy units (ships, submarines, aircraft, personnel) conducting unit-level activities on any military's range within the HRC; (2) any U.S. or foreign military unit conducting activities on Navy-operated ranges; and, (3) any U.S. or foreign

3 An assessment event is an assessment of a program to determine if systems and tactics are capable of addressing an estimated threat.

military unit conducting activities on any military's range in Hawaii as part of a Navy-sponsored exercise.

To assist the reader, Sections 3.1 and 4.1 of Chapters 3.0 and 4.0 present the affected open ocean environment and associated impact analysis relative to EO 12114. The remaining sections of Chapters 3.0 and 4.0 present the affected environment and impact analysis relative to NEPA for offshore and onshore areas. Chapters 3.0 and 4.0 are further arranged according to islands from west to east: Northwestern Hawaiian Islands, Kauai, Oahu, Maui, and Hawaii. For organizational purposes in this document, discussions about Niihau and Kaula are included under the Kauai heading, because although they are separate islands, they are part of Kauai County. In addition, discussions about Molokai are included under the Maui heading, because although it is a separate island, it is part of Maui County.

1.5.2 COOPERATING AGENCIES

The following Federal agencies are cooperating agencies in the preparation of this EIS/OEIS:

- U.S. Department of Energy
- Missile Defense Agency
- U.S. Army
- National Marine Fisheries Service

1.5.3 NATIONAL ENVIRONMENTAL POLICY ACT

In 1969, Congress enacted NEPA, which provides for the consideration of environmental issues in Federal agency planning and decision-making. Regulations for Federal agency implementation of the act were established by the President's CEQ. NEPA requires that Federal agencies prepare an EIS if an Environmental Assessment (EA) determines a proposed action might significantly affect the quality of the human environment. The EIS must disclose significant environmental impacts and inform decision makers and the public of the reasonable alternatives to the Proposed Action. Presidential Proclamation 5928, issued December 27, 1988, extended the exercise of United States sovereignty and jurisdiction under international law to 12 nm; however, the Proclamation expressly provides that it does not extend or otherwise alter existing Federal law or any associated jurisdiction, rights, legal interests, or obligations. As a result, the Navy analyzes environmental effects and actions within 12 nm under NEPA and those effects occurring beyond 12 nm under the provisions of EO 12114.

This EIS/OEIS provides an assessment of the potential environmental impacts associated with sustainable range usage and enhancements within the Navy's HRC. The Navy completed the Supplement to the 2002 Rim of the Pacific (RIMPAC) Programmatic Environmental Assessment in May 2006 and the Undersea Warfare Exercise (USWEX) Programmatic Environmental Assessment in January 2007. This EIS/OEIS analyzes the continuation of these exercises in the baseline analysis. It also analyzes Navy training that currently occurs or is proposed to occur in open ocean, offshore, and onshore areas of the HRC.

1.5.3.1 PUBLIC SCOPING PROCESS

The first step in the NEPA process is the publication of a Notice of Intent (NOI) to prepare an EIS. The NOI provides an overview of the proposed action and the scope of the EIS. The NOI for this project was published in the *Federal Register* on August 29, 2006, and in five local newspapers (i.e., the *Maui News*, the *Honolulu Star Bulletin*, the *Hawaii Tribune Herald*, the *Garden Island*, and the *Honolulu Advertiser*) on September 2, 4, and 5, 2006.

Scoping is an early and open process for developing the "scope" of issues to be addressed in the EIS and for identifying significant issues related to a proposed action. During scoping, the public helps define and prioritize issues and convey these issues to the agency through both oral and written comments. The scoping period for the HRC EIS/OEIS began with the publication of an NOI. The scoping period lasted 46 days, concluding on October 13, 2006. Four scoping meetings were held on September 13, 14, 16, and 18, 2006 on the islands of Maui, Oahu, Hawaii, and Kauai, respectively. The scoping meetings were held in an open house format, presenting informational posters and written information, and making Navy staff and project experts available to answer participants' questions. Additionally, a court reporter was available to record participants' oral comments. This format allowed the public to interact informally, one-on-one, with project representatives or comment formally, on the record, to representatives of the Navy. Table 1.5.3.1-1 lists location, date, and number of attendees at the scoping meetings.

Table 1.5.3.1-1. Meeting Locations, Dates, and Attendees–Scoping

Location	Date	Public Attendees
Maui Arts and Cultural Center, Kahului, Maui, Hawaii	13 September 2006	9
Disabled American Veterans Hall, Honolulu, Oahu, Hawaii	14 September 2006	31
Hilo Hawaiian Hotel, Hilo, Hawaii, Hawaii	16 September 2006	39
Kauai Civil Defense Agency, Lihue, Kauai, Hawaii	18 September 2006	47

In addition to the scoping meetings, the public could make comments through a toll-free telephone number, by sending an email, or by mailing a written comment. Issues identified by the public were provided to resource specialists working on the EIS/OEIS to ensure that all comments were considered during the preparation of the document. Table 1.5.3.1-2 presents a summary of the number of issues identified for each resource area.

1.5.3.2 PUBLIC REVIEW PROCESS

After scoping, the Draft EIS/OEIS was prepared to provide an assessment of the potential impacts of the Proposed Action and alternatives on the environment. It was then provided to U.S. Environmental Protection Agency for review and comment in accordance with their responsibilities under Section 309 of the Clean Air Act and to have a Notice of Availability published in the *Federal Register*. The Navy also placed notices in the aforementioned newspapers announcing the availability of the Draft EIS/OEIS. The Draft EIS/OEIS was circulated for review, and the comment period ended September 17, 2007. Table 1.5.3.2-1 lists location, date, and number of attendees at the public hearings.

Table 1.5.3.1-2. Number of Comments by Resource Area–Scoping

Resource Area	Number of Comments	Percent of Total
Program	114	32.1%
Policy/National Environmental Policy Act Process	47	13.2%
Cumulative Impacts	5	1.4%
Socioeconomics	14	3.9%
Cultural Resources	12	3.4%
Hazardous Materials & Hazardous Waste	2	0.6%
Biological Resources—Marine	83	23.4%
Air Quality	4	1.1%
Health and Safety	28	7.9%
Environmental Justice	2	0.6%
Biological Resources—Terrestrial	4	1.1%
Miscellaneous	7	2.0%
Mitigation Measures	3	0.8%
Alternatives	6	1.7%
Utilities	2	0.6%
Noise	1	0.3%
Land Use	10	2.8%
Transportation	3	0.8%
Water Resources	1	0.3%
Airspace	7	2.0%
Total	**355**	

Table 1.5.3.2-1. Public Hearing Locations, Dates, and Attendees–HRC Draft EIS/OEIS

Location	Date	Public Attendees
Kauai War Memorial Convention Hall, Lihue, Kauai, Hawaii	21 August 2007	55
McKinley High School, Honolulu, Oahu, Hawaii	23 August 2007	29
Baldwin High School, Wailuku, Maui, Hawaii	27 August 2007	76
Waiakea High School, Hilo, Hawaii, Hawaii	29 August 2007	51

In addition to the public hearings, the public was able to provide comments through the Navy's NEPA Programs in Hawaii website, by sending an email, or by mailing a written comment. Table 1.5.3.2-2 presents a summary of the number of issues identified for each resource area. Chapter 13.0 provides a more-detailed summary of public comments on the Draft EIS/OEIS.

**Table 1.5.3.2-2. Number of Comments by Resource Area–
HRC Draft EIS/OEIS**

Resource Area	Number of Comments	Percent of Total
Air Quality	10	0.4%
Airspace	10	0.4%
Biological Resources - Marine	492	19.1%
Biological Resources - Terrestrial	69	2.7%
Cultural Resources	299	11.6%
Geology and Soils	2	0.1%
Hazardous Materials and Waste	372	14.4%
Health and Safety	26	1.0%
Land Use	20	0.8%
Noise	5	0.2%
Socioeconomics	29	1.1%
Transportation	3	0.1%
Utilities	8	0.3%
Water Resources	15	0.6%
Environmental Justice	24	0.9%
Alternatives	524	20.4%
Program	439	17.0%
Policy/NEPA Process	87	3.4%
Mitigation Measures - Marine Mammal	59	2.3%
Cumulative Impacts	36	1.4%
Miscellaneous	46	1.8%
Total	**2,575**	

The Draft EIS/OEIS distribution list is presented in Chapter 10.0. The Draft EIS/OEIS was made available for general review in public libraries and other publicly accessible locations to include those listed in Chapter 10.0. Public meetings were held to accept public comments. The locations of public meetings were announced in local newspapers.

The Draft EIS/OEIS analyzed potential impacts on marine mammals from Navy actions that involve the use of acoustic sources. Following publication of the Draft EIS/OEIS in July 2007, the Navy, in coordination with the NMFS, conducted a re-evaluation of the analysis in that document. This re-evaluation and subsequent identification of new information led the Navy to prepare a Supplement to the Draft EIS/OEIS which was released to the public in February 2008.

The NOI for the Supplement to the Draft EIS/OEIS was published in the *Federal Register* on January 17, 2008. The Supplement was filed with U.S. Environmental Protection Agency for release to the public on February 22, 2008 and a Notice of Public Meeting was published in the *Federal Register* on February 26, 2008. The Navy also placed notices in the aforementioned newspapers announcing the availability of the Supplement to the Draft EIS/OEIS. The Supplement to the Draft EIS/OEIS was circulated for public review, and the comment period ended April 7, 2008. Table 1.5.3.2-3 lists location, date, and number of attendees at the public hearings.

Table 1.5.3.2-3. Public Informational Sessions Locations, Dates, and Attendees– HRC Supplement to the Draft EIS/OEIS

Location	Date	Public Attendees
Kauai Community College, Lihue, Kauai, Hawaii	13 March 2008	40
Maui Waena Intermediate School, Kahului, Maui, Hawaii	14 March 2008	19
Disabled American Veterans Memorial Hall Honolulu, Oahu, Hawaii	17 March 2008	16
Hilo Hawaiian Hotel, Hilo, Hawaii, Hawaii	18 March 2008	24

Table 1.5.3.2-4 presents a summary of the number of issues identified for each resource area. Chapter 14.0 provides a more-detailed summary of public comments on the Supplement to the Draft EIS/OEIS.

Table 1.5.3.2-4. Number of Comments by Resource Area HRC Supplement to the Draft EIS/OEIS

Resource Area	Number of Comments	Percent of Total
Air Quality	1	0.1%
Airspace	0	0%
Biological Resources - Marine	34	2.1%
Biological Resources - Terrestrial	0	0%
Cultural Resources	0	0%
Geology and Soils	0	0%
Hazardous Materials and Waste	15	0.9%
Health and Safety	0	0%
Land Use	1,135	71.2%
Noise	0	0%
Socioeconomics	1	0.1%
Transportation	0	0%
Utilities	0	0%
Water Resources	8	0.5%
Environmental Justice	1	0.1%
Alternatives	163	10.2%
Program	181	11.3%
Policy/NEPA Process	17	1.1%
Mitigation Measures	25	1.6%
Cumulative Impacts	4	0.3%
Miscellaneous	10	0.6%
Total	**1,595**	

There is a 30-day wait period following the publication of the NOA of the Final EIS/OEIS in the Federal Register. At the conclusion of this wait period, the Navy will make its Record of Decision (ROD), which will be published in the Federal Register. The ROD will summarize the final decision and identify the selected alternative, describe the public involvement and agency decision-making processes, and present commitments to specific mitigation measures. The selected alternative can then be implemented. The ROD will be published in the *Federal Register*.

1.5.4 EXECUTIVE ORDER 12114

EO 12114, *Environmental Effects Abroad of Major Federal Actions*, directs Federal agencies to provide for informed decision-making for major Federal actions outside the United States, including the global commons, the environment of a non-participating foreign nation, or impacts on protected global resources. An OEIS is required when an action has the potential to significantly harm the environment of the global commons. Global commons are defined as "geographical areas that are outside of the jurisdiction of any nation, and include the oceans outside territorial limits (outside 12 nm from the coast) and Antarctica. Global commons do not include contiguous zones and fisheries zones of foreign nations." (32 CFR Part 187.3)

Effects on areas within the HRC that lie outside 12 nm (shown as Open Ocean on Figure 1.2-2) are analyzed using the procedures set out in EO 12114 and associated implementing regulations.

1.5.5 MARINE MAMMAL PROTECTION ACT COMPLIANCE

The Marine Mammal Protection Act (MMPA) established, with limited exceptions, a moratorium on the "taking" of marine mammals in waters or on lands under U.S. jurisdiction (MMPA, 1972). The Act further regulates "takes" of marine mammals on the high seas by vessels or persons under U.S. jurisdiction. The term "take," as defined in Section 3 of the MMPA (16 U.S.C. 1362), means "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." "Harassment" was further defined in the 1994 and 2004 amendments to the MMPA. The 1994 amendments provided two levels of harassment, Level A (potential injury) and Level B (potential disturbance).

As applied to military readiness activities, the National Defense Authorization Act for Fiscal Year 2004 (FY04 NDAA) (Public Law [PL] 108-136) amended the MMPA to (1) clarify the applicable definition of harassment; (2) exempt such activities from the "specified geographical region" and "small numbers" requirements of Section 101(1)(5)(A) of the Act; (3) require consideration of personnel safety, practicality of implementation, and impact on effectiveness of military readiness activities by NMFS in making its determination regarding least practicable adverse impact; and (4) establish a national defense exemption. PL 107-314, Section 315(f), defines "military readiness activities" to include "all training and operations of the Armed Forces that relate to combat; and the adequate and realistic testing of military equipment, vehicles, weapons and sensors for proper operation and suitability for combat use." The testing and training with active sonar constitutes a military readiness activity under this definition.

The definition of "harassment" as applied to military readiness activities is any act that:

- Injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild ("Level A harassment"), or
- Disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behavioral patterns are abandoned or significantly altered ("Level B harassment") (16 U.S.C. 1362 [18][B][i],[ii]).

Section 101(a)(5) of the MMPA directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of marine mammals by U.S. citizens who engage in a specified activity (exclusive of commercial fishing). These incidental takes are allowed only if NMFS issues regulations governing the permissible methods of taking. In order to issue regulations, NMFS must make a determination that (1) the taking will have a negligible impact on the species or stock, and (2) the taking will not have an unmitigable adverse impact on the availability of such species or stock for taking for subsistence uses.

In addition, the MMPA requires NMFS to develop regulations governing the issuance of a LOA and to publish these regulations in the Federal Register. Specifically, the regulations for each allowed activity establish:

- Permissible methods of taking, and other means of affecting the least practicable adverse impact on such species or stock and its habitat, and on the availability of such species or stock for subsistence (as clarified above).
- Requirements for monitoring and reporting of such taking. For military readiness activities (as described in the NDAA), a determination of "least practicable adverse impacts" on a species or stock includes consideration, in consultation with the DoD, of personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

In support of the Proposed Action, the Navy applied for an authorization pursuant to Section 101(a) (5) (A) of the MMPA. After the application was reviewed by NMFS, a Notice of Receipt of Application was published in the Federal Register. Publication of the Notice of Receipt of Application initiated the 30-day public comment period, during which time anyone could obtain a copy of the application by contacting NMFS. NMFS intends to publish a proposed rule for public comment coincident with the publication of this EIS/OEIS. The public will be afforded 30 days to comment on this proposed rulemaking. NMFS will consider and address all comment received during the public comment period, and anticipates issuing the final rule, if appropriate, toward the end of Calendar Year (CY) 2008.

On January 23, 2007, the Deputy Secretary of Defense exempted all military readiness activities employing MFA sonar or Improved Extended Echo Ranging (IEER) sonobuoys from compliance with the requirements of the MMPA for a period of 2 years. This exemption is limited to Major Exercises or training and RDT&E activities within established operating areas or established DoD maritime ranges. This National Defense Exemption (NDE) remains in effect until January 23, 2009 or authorization under the MMPA, whichever is earliest.

The NDE will cover MFA sonar and IEER sonobuoy activities on the HRC until an MMPA authorization is issued for these activities or the NDE expires whichever is earliest. While the NDE remains applicable (until an MMPA authorization is issued), the Navy will continue to employ the marine mammal mitigation measures outlined in Chapter 6.0 of this EIS/OEIS to protect marine mammals while training with the use of MFA sonar. These measures include safety zones around ships and trained lookouts based on coordination of science-based measures with NMFS. Additional measures that may be required as a result of the MMPA authorization would be implemented once authorization is received.

1.5.6 ENDANGERED SPECIES ACT COMPLIANCE

The Endangered Species Act (ESA) (16 U.S.C. 1531 to 1543) applies to federal actions in two separate respects. First, the ESA requires that federal agencies, in consultation with the responsible wildlife agency (e.g., NMFS), ensure that proposed actions are not likely to jeopardize the continued existence of any endangered species or threatened species, or result in the destruction or adverse modification of a critical habitat (16 U.S.C. 1536 [a][2]). Regulations implementing the ESA consultation requirement also include those actions that “may affect” a listed species or adversely modify critical habitat.

If an agency’s Proposed Action would take a listed species, the agency must obtain an incidental take statement from the responsible wildlife agency. The ESA defines the term “take” to mean “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt any such conduct” (16 U.S.C. 1532[19]).

As part of the environmental documentation for this EIS/OEIS, and as an MMPA permit applicant, the Navy entered into early consultation procedures with NMFS, endangered species division. The Navy has been actively engaged in consultation with NMFS regarding the potential effects on ESA-listed species from the conduct of the activities outlined in this EIS/OEIS. In accordance with 50 CFR §402.11, prior to the issuance of the ROD, NMFS will issue a Preliminary Biological Opinion documenting its determination as to whether the activities conducted in the HRC are likely to jeopardize the continued existence of ESA-listed species, or result in the destruction or adverse modification of critical habitat. Additionally, a preliminary Incidental Take Statement will accompany the preliminary Biological Opinion. Because the Section 7 consultation is simultaneously conducted internally to address NMFS” issuance of an MMPA authorization, an Incidental Take Statement for marine mammals cannot be issued until an MMPA authorization is issued.

The Preliminary Biological Opinion and Preliminary Incidental Take Statement do not exempt the Navy from the prohibitions of Section 9 of the Endangered Species Act. Further, the Navy has determined that activities occurring in the HRC prior to the issuance of an MMPA authorization (e.g., RIMPAC, USWEX, etc.) may affect endangered species in the HRC, and may incidentally take ESA-listed species, thus requiring consultation under the ESA and an associated Incidental Take Statement. As such, the Navy and NMFS are engaged in a separate Section 7 consultation on these specified activities. A separate Biological Opinion and Incidental Take Statement will be issued, as appropriate, for this subset of specified activities, which will occur prior to the issuance of the MMPA authorization and be covered by the NDE.

1.5.7 OTHER ENVIRONMENTAL REQUIREMENTS CONSIDERED

The Navy must comply with a variety of other Federal environmental laws, regulations, and EOs. These include (among other applicable laws and regulations):

- Migratory Bird Treaty Act;
- Coastal Zone Management Act;
- Rivers and Harbors Act;
- Magnuson-Stevens Fishery Conservation and Management Act;
- Clean Air Act;
- Federal Water Pollution Control Act (Clean Water Act);
- National Historic Preservation Act;
- EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations;*
- EO 13045, *Environmental Health and Safety Risks to Children*;
- EO 13423, *Strengthening Federal Environmental, Energy and Transportation Management;*
- EO 13089, *Coral Reef Protection;* and
- National Marine Sanctuaries Act.

In addition, laws and regulations of the State of Hawaii appropriate to Navy actions are identified and addressed in this EIS/OEIS. To the extent practicable, this document will be used as the basis for any required consultation and coordination. Appendix C includes a brief description of the laws, regulations, and EOs that apply to events and activities in the HRC.

1.6 RELATED ENVIRONMENTAL DOCUMENTS

Environmental documents for some of the programs, projects, and installations within the geographical scope of this EIS/OEIS that have undergone environmental review to ensure NEPA and EO 12114 compliance include:

- *Barking Sands Underwater Range Expansion (BSURE) Refurbishment Overseas Environmental Assessment,* March 2008
- *Flexible Target Family Environmental Assessment,* December 2007
- *Undersea Warfare Exercise (USWEX) Programmatic Environmental Assessment,* October 2007
- *Overseas Environmental Assessment for Valiant Shield,* July 2007

- *Construction of a Mock Airfield on Pohakuloa Training Area, Hawaii Environmental Assessment, July 2007*
- *Permanent Stationing of the 2/25th Stryker Brigade Combat Team Draft Environmental Impact Statement,* June 2007
- *Environmental Assessment (EA) for MK-48 Mod 6 Torpedo Exercises in Hawaiian Waters,* June 2007
- *Programmatic Overseas Environmental Assessment for MK-48 Advanced Capability Torpedo Service Weapons Test and Sinking Exercises in Four Pacific Ocean Locations,* May 2007
- *Supplemental Overseas Environmental Impact Statement and Environmental Impact Statement for Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar*, April 2007
- *Composite Training Unit Exercises and Joint Task Force Training Exercises Environmental Assessment/Overseas Environmental Assessment,* February 2007
- *Ballistic Missile Defense System Programmatic Final Environmental Impact Statement*, February, 2007
- *2006 Exercise Valiant Shield Overseas Environmental Assessment,* June 2006
- *2006 Supplement to the 2002 Rim of the Pacific (RIMPAC) Programmatic Environmental Assessment,* May 2006
- *Draft Environmental Impact Statement Military Training Activities at Makua Military Reservation, Hawaii*, May 2005
- *Final Environmental Assessment for Construction and Operation of a C-17 Short Austere Airfield (SAAF) Within the State of Hawaii,* November 2004
- *Mobile Sensors Environmental Assessment*, October 2004
- *Ballistic Missile Defense System Programmatic Draft Environmental Impact Statement*, September 2004
- *2004 Supplement to the 2002 Rim of the Pacific Programmatic Environmental Assessment,* June 2004
- *Mobile Launch Platform Environmental Assessment*, June 2004
- *Final Environmental Impact Statement Transformation of the 2nd Brigade, 25th Infantry Division (L) to a Stryker Brigade Combat Team in Hawaii*, May 2004
- *Hickam Air Force Base C-17 Globemaster III Beddown Environmental Assessment,* September 2003
- *Ground-Based Midcourse Defense (GMD) Extended Test Range (ETR) Environmental Impact Statement*, July 2003
- *Theater High Altitude Area Defense (THAAD) Pacific Test Flights Environmental Assessment*, December 2002
- *Development and Demonstration of the Long Range Air Launch Target System Environmental Assessment*, October 2002

- *Rim of the Pacific (RIMPAC) 2002 Programmatic Environmental Assessment*, June 2002
- *North Pacific Targets Program Environmental Assessment*, April 2001
- *Mountaintop Surveillance Sensor Test Integration Center (MSSTIC) Facility Kauai, Hawaii Environmental Assessment*, May 2000
- *Rim of the Pacific (RIMPAC) 2000 Environmental Assessment*, May 2000
- *Pacific Missile Range Facility Enhanced Capability Final Environmental Impact Statement,* December 1998
- *Hawaiian Islands Humpback Whale National Marine Sanctuary Final Environmental Impact Statement/Management Plan*, February 1997
- *Final Environmental Assessment for Temporary Hawaiian Area Tracking System*, June 1994
- *Advanced Radar Detection Laboratory Environmental Assessment (in process)*

2.0 Description of the Proposed Action and Alternatives

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter provides detailed information on the Proposed Action and alternatives analyzed in this Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) and incorporates changes from the Draft and Supplement to the Draft EIS/OEIS. The United States (U.S.) Department of the Navy (Navy) proposes to implement actions within the Hawaii Range Complex (HRC) to:

- Maintain current levels of military readiness by training in the HRC;
- Accommodate future increases in training tempo in the HRC and support the rapid deployment of naval units and/or Strike Groups;
- Achieve and sustain readiness of ships and squadrons consistent with the Fleet Response Training Plan (FRTP) so that the Navy can rapidly increase significant combat power in the event of a crisis or contingency operation;
- Support the acquisition and implementation into the Fleet of advanced military technology. The HRC must adequately support the testing and training needed for new platforms and weapons systems that will be introduced and used by the Fleet before the summer of 2013 (e.g., the Littoral Combat Ship and the MH-60R Seahawk helicopter); and,
- Maintain the long-term viability of the HRC while protecting human health and the environment, and enhancing the quality and communication capability and safety of the range complex.

Conducting current and emerging training and research, development, test, and evaluation (RDT&E) activities and implementation of HRC enhancements includes a collection of actions which will be evaluated in this EIS/OEIS. Alternative implementation scenarios (described in detail in this chapter) involve combinations of the following elements:

- Increase training to support the FRTP and necessary force structure changes;
- Support three transient Strike Group training and assessment exercises at the same time;
- Support an additional carrier during Rim of the Pacific (RIMPAC) Exercises;
- Operate a Portable Undersea Tracking Range;
- Construct and operate an Acoustic Test Facility;
- Enhance RDT&E activities and training at the Pacific Missile Range Facility (PMRF),
- Relocate and operate the simulated underwater minefield training area; and
- Use the 2.1-million square nautical miles (nm^2) Temporary Operating Area (TOA) to support RDT&E and training.

2.1 DESCRIPTION OF THE HAWAII RANGE COMPLEX

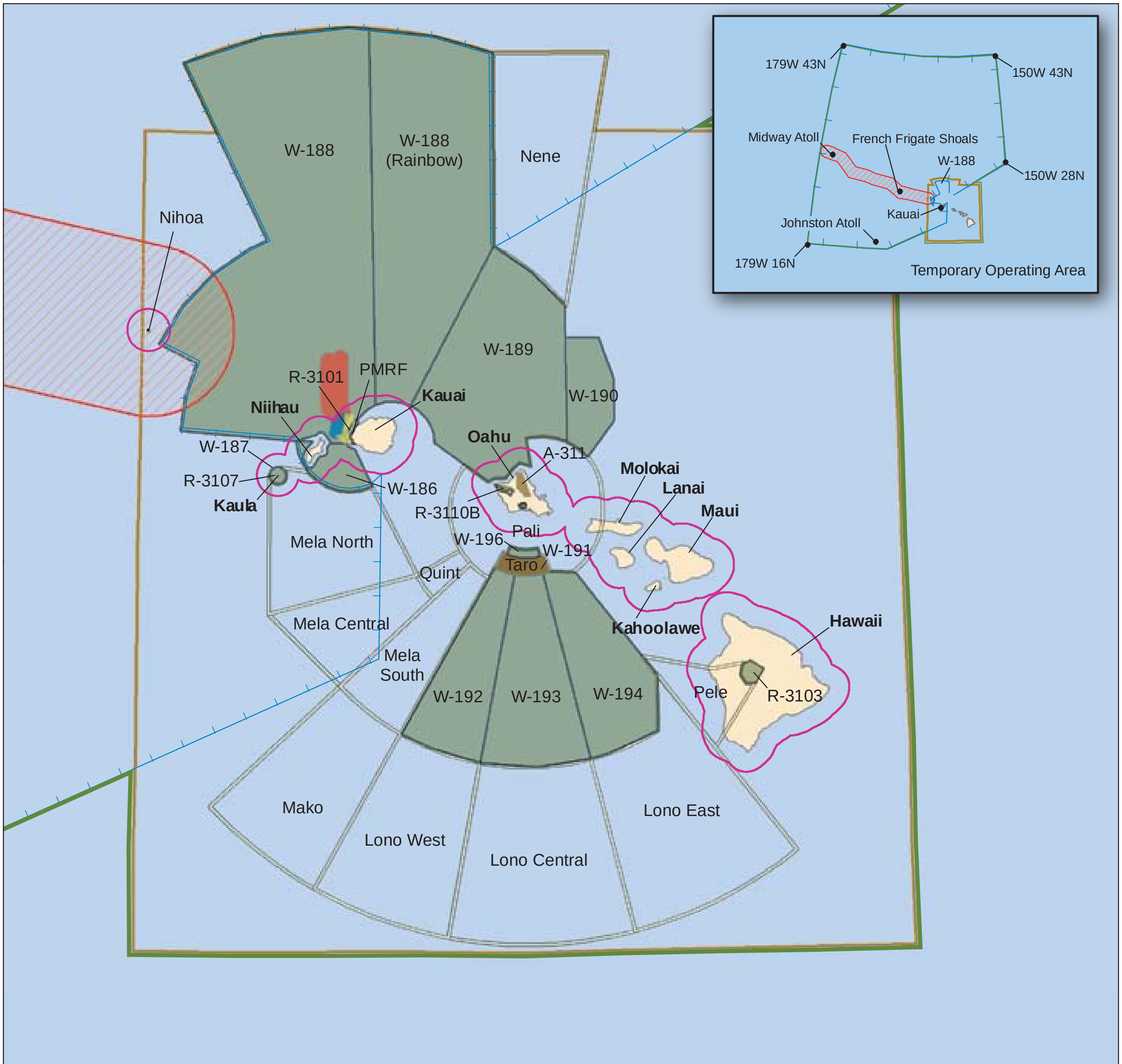
As described in Chapter 1.0, the HRC consists of open ocean areas (outside 12 nautical miles [nm] from land), offshore areas (within 12 nm from land), and onshore areas geographically situated on and around the Hawaiian Islands. The offshore areas extend from 16 degrees north latitude to 43 degrees north latitude and from 150 degrees west longitude to 179 degrees west longitude, forming an area approximately 1,700 nautical miles (nm) by 1,600 nm (Figure 1.2-3). The component areas of the HRC include:

- The Hawaii operating area (OPAREA) consisting of 235,000 square nautical miles [nm^2]) of surface and subsurface ocean areas and special use airspace for military training and RDT&E activities. In addition, various Navy land ranges and other Services' land for military training and RDT&E activities are also considered part of the Hawaii OPAREA (Figure 1.2-2) and
- The TOA consisting of 2.1 million nm^2 of sea and airspace for RDT&E activities (Figure 1.2-3).

Within the Hawaii OPAREA, there are a number of open ocean, offshore, and underwater ranges and training areas, Air Traffic Control Assigned Airspace (ATCAA), and Special Use Airspace (Figure 2.1-1).

The TOA was established to support missile defense testing and extends primarily north and west of Kauai (Figure 1.2-3). For safety purposes, PMRF requests use of the airspace within the TOA from the Federal Aviation Administration (FAA) during times of missile defense testing. During testing, PMRF will control the airspace and the FAA will temporarily restrict an area of airspace within the TOA (typically not the entire area) until testing is complete. Due to the range and speed of weapons and missiles, this large area is required to ensure a safety area in which debris and/or expended materials could fall with minimal risk of damage or injury to humans.

Onshore areas include air and land space associated with various Navy controlled land areas on Kauai, Niihau, Kaula, and Oahu where the Navy and other Department of Defense (DoD) services conduct military training and RDT&E activities. In addition, onshore areas include other military service's land and airspace on Oahu and Hawaii where Navy training is conducted (Figures 2.1-2 through 2.1-5 and Table 2.1-1).



Open Ocean = The air, surface, and subsurface areas of the HRC that lie 12 nautical miles or more from land.
Offshore Area = The air, surface, and subsurface areas within 12 nautical miles of the Hawaiian Islands.

EXPLANATION

- 12-Nautical Mile Line
- Temporary Operating Area (TOA)
- Hawaii Operating Area (OPAREA)
- Barking Sands Tactical Underwater Range (BARSTUR) Hydrophones
- Barking Sands Underwater Range Expansion (BSURE) Hydrophones
- Air Traffic Control Assigned Airspace (ATCAA)
- Special Use Airspace
- Special Use Airspace and ATCAA
- Shallow Water Training Range (SWTR)
- Papahānaumokuākea Marine National Monument
- Hawaii Range Complex (HRC)
- Land

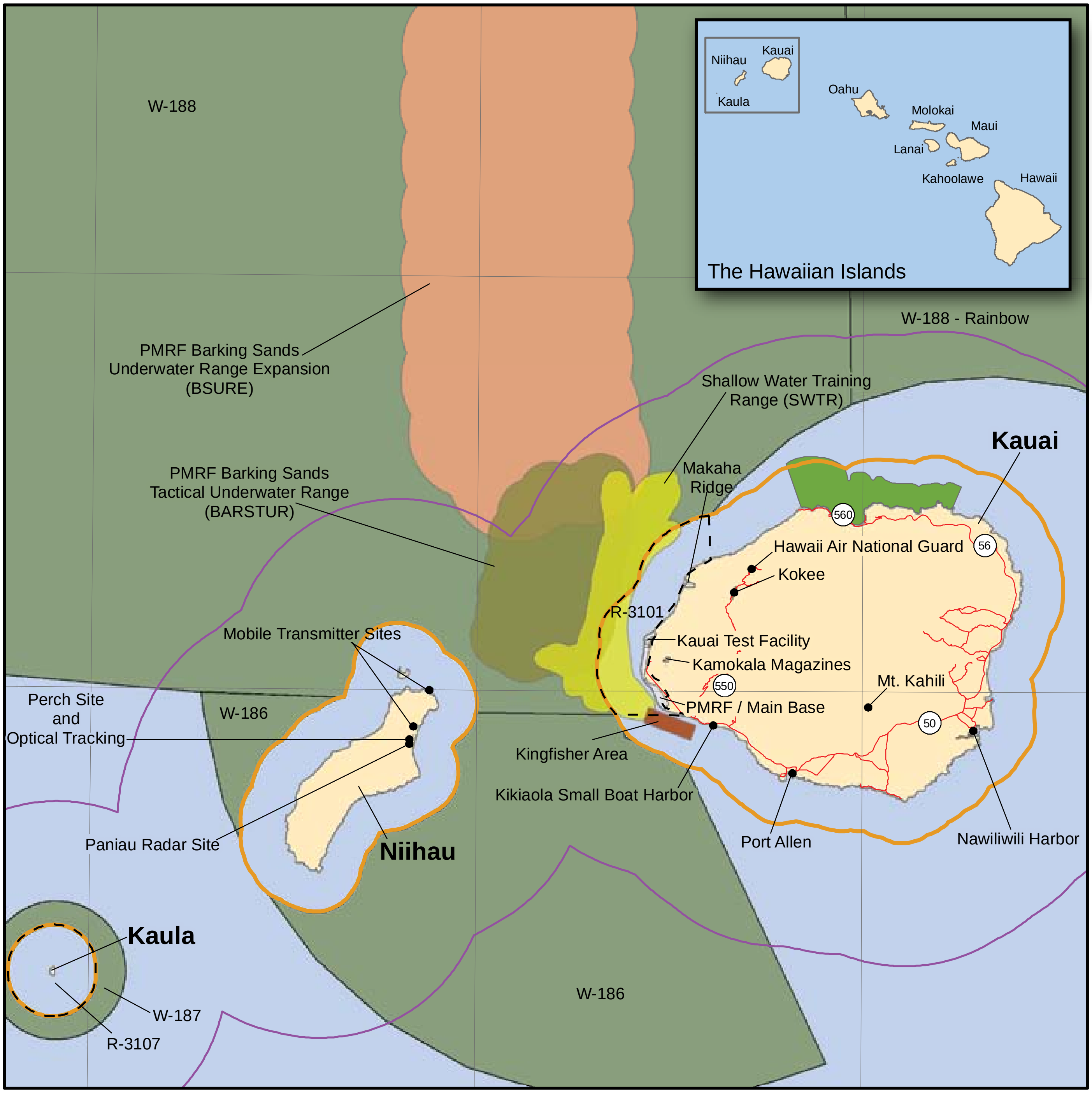
NORTH

0 50 100 200 Nautical Miles

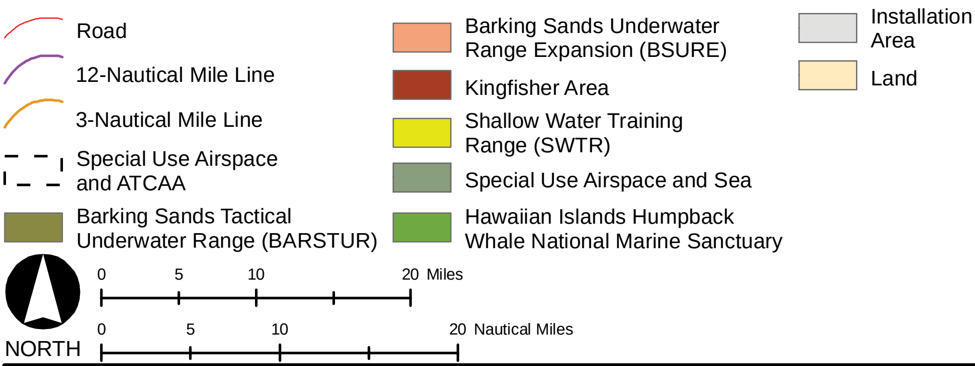
EIS/OEIS Study Area: Hawaii Range Complex Including Temporary Operating Area

Hawaiian Islands

Figure 2.1-1



EXPLANATION



Hawaii Range Complex Study Area and Support Locations

Kauai, Niihau, and Kaula, Hawaii

Figure 2.1-2

EXPLANATION

- Road
- 12-Nautical Mile Line
- 3-Nautical Mile Line
- Pearl Harbor Naval Base Area
- Ewa Training Minefield
- Barbers Point Underwater Range
- Special Use Airspace and Sea
- Puuloa Underwater Range
- Fleet Operational Readiness Accuracy Check Site (FORACS) Range
- Shipboard Electronic Systems Evaluation Facility (SESEF) Hawaii Range
- Naval Defensive Sea Area
- Hawaiian Islands Humpback Whale National Marine Sanctuary
- Installation Area
- Land

NORTH

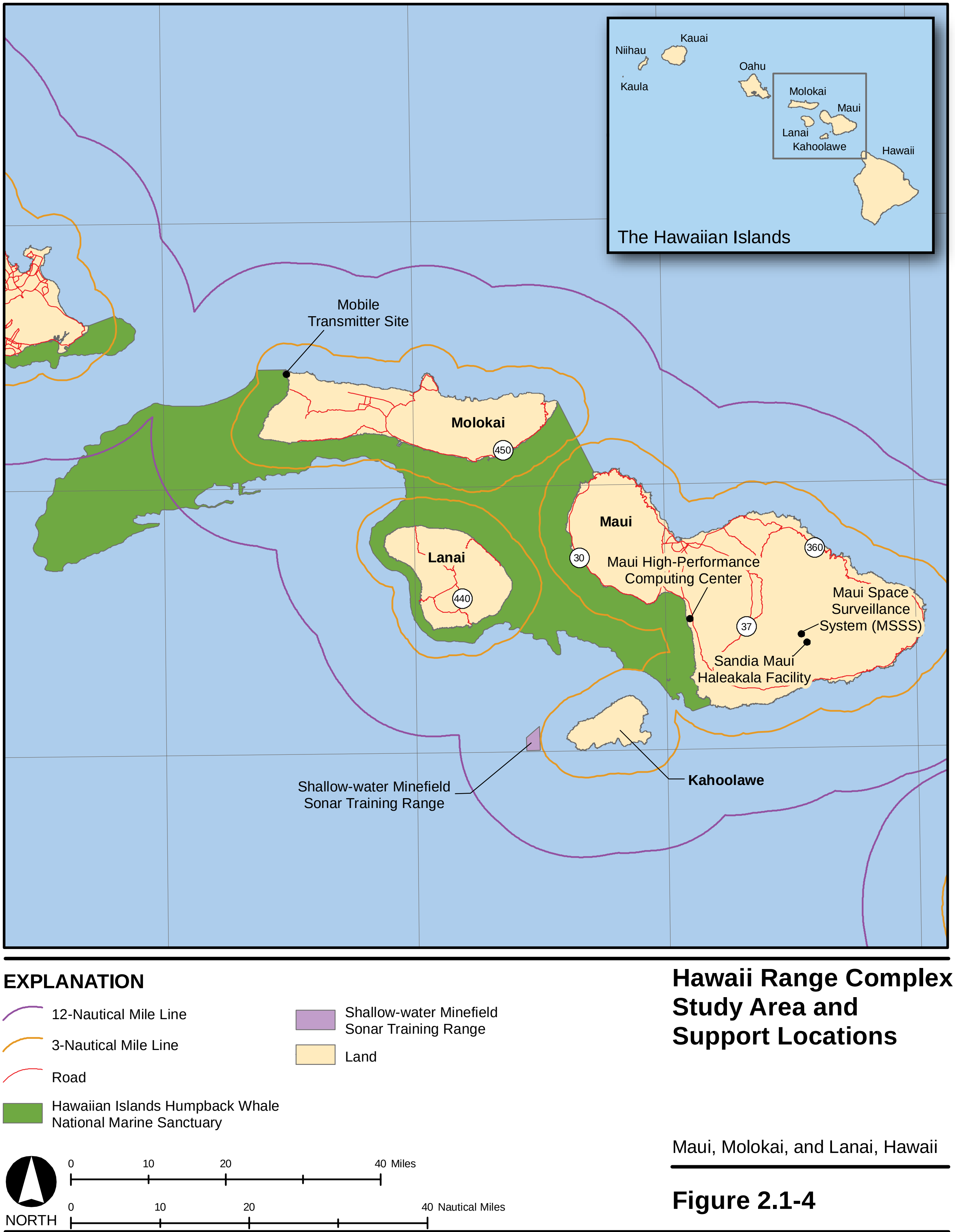
0 5 10 20 Miles

0 5 10 20 Nautical Miles

Hawaii Range Complex Study Area and Support Locations

Oahu, Hawaii

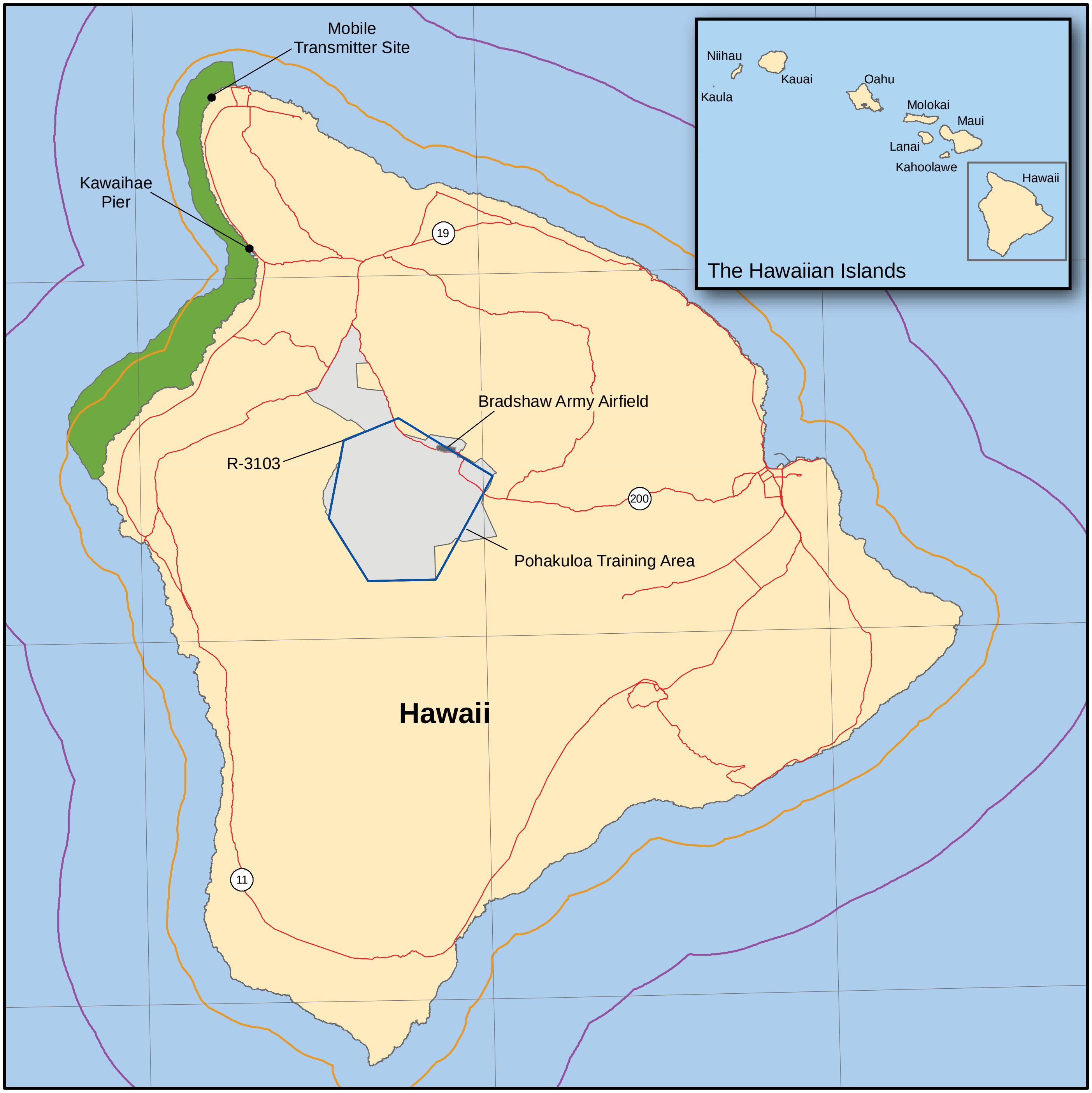
Figure 2.1-3



Hawaii Range Complex Study Area and Support Locations

Maui, Molokai, and Lanai, Hawaii

Figure 2.1-4



EXPLANATION

- 3-Nautical Mile Line
- 12-Nautical Mile Line
- Road
- Restricted Airspace (R-3103)
- Hawaiian Islands Humpback Whale National Marine Sanctuary
- Bradshaw Army Airfield
- Installation Area
- Land

NORTH

0 5 10 20 Miles

0 5 10 20 Nautical Miles

Hawaii Range Complex Study Area and Support Locations

Island of Hawaii

Figure 2.1-5

Table 2.1-1. Onshore Locations Where Navy Training is Conducted

Service	Location	Island
Navy	Pacific Missile Range Facility (Main Base)	Kauai
	Niihau	Niihau
	Kaula	Kaula
	Pearl Harbor	Oahu
	Coast Guard Air Station Barbers Point/Kalaeloa Airport	Oahu
Marines	Marine Corps Base Hawaii	Oahu
	Marine Corps Training Area Bellows	Oahu
Air Force	Hickam Air Force Base	Oahu
Army	Kahuku Training Area	Oahu
	Makua Military Reservation	Oahu
	Dillingham Military Reservation	Oahu
	Wheeler Army Airfield	Oahu
	K-Pier, Kawaihae	Hawaii
	Bradshaw Army Airfield	Hawaii
	Pohakuloa Training Area	Hawaii

Note: A description of the training events and RDT&E activities that occur at these locations is listed in Tables 2.2.2.3-1 and 2.2.2.5-1.

2.2 PROPOSED ACTION AND ALTERNATIVES

National Environmental Policy Act (NEPA) implementing regulations (40 Code of Federal Regulations [CFR] § 1502.14) and Navy procedures (32 CFR Part 775) provide direction on the consideration of alternatives in an EIS and promote rigorous exploration and objective evaluation of all reasonable alternatives. Alternatives were developed giving due consideration to the purpose and need of the Proposed Action, and factors such as the capability to support current and emerging Fleet tactical training and RDT&E requirements; the capability to support realistic, essential training at the level and frequency sufficient to support the FRTP and Tactical Training Theater Assessment and Planning (TAP) program recommendations; and the capability to support training requirements without impacting Navy guidelines governing the amount of time a unit may be deployed away from its homeport.

Guidance for the development of alternatives is provided in Council on Environmental Quality (CEQ) regulations (40 CFR § 1502.14) and Navy procedures described in 32 CFR § 775. The analysis of alternatives is the heart of an EIS and is intended to provide the decision-maker and the public with a clear understanding of relevant issues and the basis for choice among identified options. NEPA requires that an EIS be prepared to evaluate the environmental consequences of a range of reasonable alternatives. Reasonable alternatives must meet the stated purpose and need of the Proposed Action.

Alternatives that are outside the scope of what Congress has approved or funded must still be evaluated in the EIS/OEIS if they are reasonable, because the EIS/OEIS may serve as the basis for modifying congressional approval or funding in light of NEPA's goals and policies.

As described in the first paragraph, alternatives were selected based on their ability to meet the following criteria:

- Use existing Navy ranges and facilities in and around Hawaii;
- Be consistent with the stated current and emerging requirements for the range complex;
- Achieve training tempo requirements based on Fleet deployment schedules;
- Meet the requirements of DoD Directive 3200.15, Sustainment of Ranges and Operating Areas;
- Implement new training requirements and RDT&E activities; and
- Support realistic training that replicates expected operating environments for naval forces.

2.2.1 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

2.2.1.1 REDUCTION OR ELIMINATION OF TRAINING IN THE HAWAII RANGE COMPLEX

During scoping the alternative to reduce the level of training or eliminate training in the HRC was suggested. A reduction in levels of or complete elimination of training within the HRC would not support the Navy's ability to meet United States Code (U.S.C.) Title 10 obligations, which at Section 5062 requires the Navy to be "organized, trained, and equipped primarily for prompt and sustained combat incident to operations at sea." Reduced or eliminated training would jeopardize the ability of specialty forces, transient units, and Strike Groups using the HRC for training purposes to be ready and qualified for deployment. Lastly, a reduction or termination of training in the HRC would require local units/users to routinely travel to other range complexes to fulfill training requirements and result in an unacceptable increase in time away from the homeport (that is, time away from home and families). For these reasons, an alternative that would decrease military training from current levels or eliminate training altogether would not meet the purpose and need of the Proposed Action. The CEQ requires an EIS to include an alternative of No-action. The CEQ defines "No-action" as no change from current activities. This alternative has been eliminated from further consideration in the EIS/OEIS.

2.2.1.2 ALTERNATIVE LOCATIONS FOR TRAINING CONDUCTED IN THE HAWAII RANGE COMPLEX

The HRC has the infrastructure to support a large number of forces, has extensive existing range assets, and accommodates Navy training and testing responsibilities both geographically and strategically, in a location under U.S. control. The strategic importance of the HRC is discussed in Section 1.3.5. The Navy's physical presence and training capabilities are critical in providing stability to the Pacific region. Centrally located in the North Pacific, the HRC is co-located with the naval command units of Commander U.S. Pacific Fleet; Commander Submarine Force, U.S. Pacific Fleet; and the U.S. Marine Corps Forces, Pacific. The HRC is also home to the joint armed services command units of U.S. Pacific Command, U.S. Army Pacific, and Commander, Pacific Air Forces. With a unified presence of Army, Marine Corps, Navy, Air Force, National Guard, and Coast Guard elements, the HRC provides the training area for large multi-force (air, land, and sea components) and multinational training exercises. One example of this is the biennial RIMPAC Exercise. The HRC is the only central location in the Pacific for numerous allied nations from North America, South America, and Asia to converge for valuable training that help strengthen ties with our many allies, partners, and friends. Other critical HRC capabilities include:

- The relative isolation of the HRC's broad open ocean area offers an invaluable facility on which to conduct missile testing and training.
- The HRC provides a superior joint training environment for all the services as well as advanced missile testing capability because of its ability to utilize the Army's Pohakuloa Training Area, Air Force, and Marine Corps bases where aircraft basing and amphibious training may occur.
- The open ocean of the HRC presents a realistic environment for strike warfare training, including amphibious, offshore, and Anti-submarine Warfare (ASW). There is room and space to operate within proximity of land but at safe distances from other simultaneous training. This allows both training of local units and the necessary build-up of capability through training that culminates in multi-force training in Hawaii as naval forces transit the Pacific. Training may be conducted that takes advantage of the proximity of the islands and military facilities/ranges to create realistic battle problems. The relatively large area of the HRC coupled with different islands and military facilities/ranges provides a safe, flexible, and diverse training environment for Multiple Strike Groups or units to operate simultaneously.
- The HRC is the most capable and time-efficient en route training location in the eastern pacific for U.S. west coast naval forces and units deploying to or returning from regions in the western Pacific and Indian Ocean from homeports on the U.S. west coast. Recent changes in the Navy's FRTP require ships and squadrons returning from overseas deployment to remain fully trained and ready to redeploy on short notice. The HRC is the training location for those units returning to homeports on the west coast of the United States after operational deployments.
- One of the HRC's premier capabilities is PMRF. PMRF is the world's largest military test and training range capable of supporting subsurface, surface, air, and space training. It consists of underwater ranges, controlled airspace, and a TOA covering 2.1 million nm^2 of ocean. PMRF provides major range services for training, tactics

development, and RDT&E of air, surface, and subsurface weapons systems for the Navy, other DoD agencies, allies, and private industry.

The specific value of the HRC and its superiority to alternative ranges is defined by its location in the Pacific Ocean, its proximity to Hawaii-based forces, its presence on the route of transiting forces, and its central location for nations around the rim of the Pacific. The HRC contains distinctive individual capabilities that require the continuation of specific in-place training and RDT&E activities. Further, the HRC is just one of many naval ranges in current operation that will require separate environmental analyses for mandated achievement of sustainable on-site training and testing. For the above reasons and those discussed in Section 1.3.5, it is neither reasonable, practicable, nor appropriate to seek alternative locations for training conducted in the HRC. Therefore, this alternative has been eliminated from further consideration in the EIS/OEIS.

2.2.1.3 COMPUTER SIMULATION TRAINING

Navy and Marine Corps training includes extensive use of computer-simulated virtual training environments, and conducts command and control exercises without operational forces (constructive training) where possible. These training methods have substantial value in achieving limited training objectives. Computer technologies provide excellent tools for implementing a successful, integrated training program while reducing the risk and expense typically associated with live military training. However, virtual and constructive training are an adjunct to, not a substitute for, live training, including live-fire training. Unlike live training, these methods do not provide the requisite level of realism necessary to attain combat readiness, and cannot replicate the high-stress environment encountered during an actual contingency situation.

The Navy and Marine Corps continue to research new ways to provide realistic training through simulation, but there are limits to realism that simulation can provide, most notably in dynamic environments involving numerous forces, and where the training media is too complex to accurately model, such as sound behavior in the ocean.

Current simulation technology does not permit ASW training with the degree of fidelity required to maintain proficiency. Basic training of sonar technicians does take place using simulators, but beyond basic levels, simulation is of limited utility. A simulator cannot match the dynamic nature of the environment, either in bathymetry, sound propagation properties, or oceanography. Specifically, coordinated unit-level and Strike Group Training activities require multiple crews to interact in a variety of acoustic environments that cannot be simulated. Moreover, it is a training imperative that crews actually utilize the equipment they will be called upon to operate. In addition, the majority of RDT&E activities also must be conducted in a variety of acoustic environments to ensure the safe and effective use of the active sonar system.

Sonar operators and crews must train regularly and frequently to develop the skills necessary to master the process of identifying underwater threats in the complex subsurface environment. They cannot reliably simulate this training through current computer technology because the actual marine environment is too complex. Sole reliance on simulation would deny Navy Strike

Groups the training benefit and opportunity to derive critical lessons learned in the employment of active sonar in the following specific areas:

- Bottom bounce and other environmental conditions;
- Mutual sonar interference;
- Interplay between ship and submarine target; and
- Interplay between ASW teams in the Strike Group.

Currently, these factors cannot be adequately simulated to provide the fidelity and level of training necessary in the employment of active sonar. Further, like any combat skill, employment of active sonar is a perishable skill that must be exercised—in a realistic and integrated manner—in order to maintain proficiency. Eliminating the use of active sonar during the training cycle would cause ASW skills to atrophy and thus put Navy forces at risk during real world operations.

Consequently, conducting all naval training by simulation is deemed inadequate and fails to meet the purpose and need of the Proposed Action. Therefore, this alternative has been eliminated from further consideration in the EIS/OEIS.

2.2.2 NO-ACTION ALTERNATIVE

The purpose of including a No-action Alternative in environmental impact analyses is to ensure that agencies compare the potential impacts of the proposed Federal action to the known impacts of maintaining the status quo. The No-action Alternative presented here comprises a baseline of current, ongoing training and RDT&E activities and support of existing range capabilities. This alternative represents what is in essence a continuation of the Navy's present course of action, that is, the regular and historic level of activity present within the HRC. The analysis of this alternative is a snapshot of the status quo, a description of the continuing and current use of the HRC. The Navy considered a reduced level of training and the elimination of training in the HRC as alternatives. However, as discussed in Section 2.2.1.1, these alternatives were eliminated and not carried forward for evaluation. As a part of the Navy's long-standing and ongoing commitment to the environment, and as a part of the No-action Alternative, the Navy will ensure compliance with applicable environmental laws and regulations. An integral part of this EIS/OEIS process is to take a hard look at all applicable environmental laws and regulations and to ensure that actions associated with each proposed alternative are in compliance with applicable laws and regulations.

The No-action Alternative stands as no change from current levels of training usage. The existing level of activity is used as a benchmark with which to compare the outputs and effects of differing alternatives. If the No-action Alternative is selected, the Navy would continue its current activities at the HRC. Alternatives 1, 2, and 3 analyze greater use of range assets to support training by combining activities together to maximize training opportunities. By using the status quo as the No-action Alternative, the Navy compares the impacts of current training and RDT&E activities to the impacts of enhanced training and RDT&E activities presented in Alternatives 1, 2, and 3.

Under the No-action Alternative, the current baseline of training and RDT&E activities includes over 9,300 events and activities being conducted in the HRC annually. Training, including Major Exercises (such as RIMPAC and Undersea Warfare Exercise [USWEX]), and RDT&E activities will continue at the baseline levels. The No-action Alternative includes the training and RDT&E activities discussed in the following sections as well as those described in the 1998 PMRF Enhanced Capability Final EIS, the additional PMRF programs analyzed since December 1998, the training described in the RIMPAC 2002 Programmatic Environmental Assessment (EA) and the supplements to that document in 2004 and 2006, and training described in the 2007 USWEX Programmatic EA.

Some confusion involving terminology is possible given that individual training events traditionally have names that include the word "exercise," but these events are very different in scale from a Major Exercise such as RIMPAC. For example, a "Torpedo Exercise" in this EIS/OEIS refers to an event that can take place as a stand-alone training event (exercising use of the weapon by a ship to meet qualifications) or as an event taking place in coordination with other events as part of an exercise such as RIMPAC. In short and as used in this document, an exercise (e.g., RIMPAC, USWEX) involves more than one participant and consists of a series of events that might include a Tracking Exercise (TRACKEX),Torpedo Exercise (TORPEX), and ASW.

2.2.2.1 HAWAII RANGE COMPLEX TRAINING FOR THE NO-ACTION ALTERNATIVE

Table 2.2.2.1-1 includes a brief description of current Navy training events within the HRC (Figure 1.2-3), and Appendix D includes a detailed description. Training events occur throughout the year based on training schedules. Section 2.2.2.3 presents the number of training events that occur within the HRC on an annual basis.

Table 2.2.2.1-1. Current Navy Training Events in the HRC

Mission Area	Training Event	Training Event Description
Anti-air Warfare (AAW)	Air Combat Maneuver (ACM)	Two to eight fighter aircraft engage in aerial combat, typically at high altitudes, far from land. No live ordnance used, only chaff and flares.
	Air-to-Air Missile Exercise (A-A MISSILEX)	In scripted scenarios, aircraft fire air-to-air guided missiles at aerial targets. Live and inert missiles fired.
	Surface-to-Air Gunnery Exercise (S-A GUNEX)	Surface ships fire guns at an aircraft towed target. Live and inert missiles fired.
	Surface-to-Air Missile Exercise (S-A MISSILEX)	Surface ships fire missiles at target drones. Live missiles fired at target.
	Chaff Exercise (CHAFFEX)	Ship and aircraft crews practice defensive maneuvering while expending chaff to evade radar targeting by a simulated missile threat. Chaff consists of thin metallic strips that reflect radio frequency energy, confusing radar. No ordnance used, only chaff.
Amphibious Warfare (AMW)	Naval Surface Fire Support (NSFS) Exercise	Navy ships fire main guns at a simulated target located west of Kauai. Live gunnery rounds fired into ocean.
	Expeditionary Assault	Ship, aircraft, and boat crews; and Marine expeditionary forces train to launch from ships at sea and safely move ashore. No ordnance used.

Table 2.2.2.1-1. Current Navy Training Events in the HRC (Continued)

Mission Area	Training Event	Training Event Description
Anti-Surface Warfare (ASUW)	Visit, Board, Search, and Seizure (VBSS)	Helicopter and boat crews train to transport teams to board vessels and inspect the ship's cargo and personnel. No ordnance used.
	Surface-to-Surface Gunnery Exercise (S-S GUNEX)	Surface ships fire guns against stationary or moving targets for live fire target practice. Live gunnery rounds fired at surface targets.
	Surface-to-Surface Missile Exercise (S-S MISSILEX)	Surface ships fire missiles against moving or stationary surface targets. Live and inert missiles fired against surface targets.
	Air-to-Surface Gunnery Exercise (A-S GUNEX)	Helicopter crews fire guns against stationary or moving targets for live fire target practice. Live gunnery rounds fired at surface targets.
	Air-to-Surface Missile Exercise (A-S MISSILEX)	Helicopter crews fire guided missiles or simulate firing missiles at stationary or moving targets. Inert Hellfire missiles fired at targets.
	Bombing Exercise (BOMBEX) (Sea)	Fixed-wing aircraft drop bombs against a stationary target on the surface of the ocean. Live and inert bombs dropped on surface targets.
	Sinking Exercise (SINKEX)	Multiple aircraft, ships, and submarines fire live weapons at a hulk (a surface ship, usually a former Navy ship that has been decommissioned). Multiple types of live ordnance fired on hulk.
	Anti-Surface Warfare Torpedo Exercise (ASUW TORPEX) (Submarine-Surface)	A submarine fires an inert exercise torpedo at a surface target. Target could be a Navy ship or a range support boat. Inert exercise torpedoes fired.
	Flare Exercise	Aircraft crews practice defensive maneuvering while expending flares to evade infrared (IR) targeting by a simulated surface-to-air missile (SAM) system.
Anti-Submarine Warfare (ASW)	Anti-Submarine Warfare Tracking Exercise (ASW TRACKEX)	Aircraft, ship and submarine crews train in locating and tracking a maneuvering submerged target using active or passive sonar. No ordnance. Sonobuoys are released from aircraft. Active and passive sonar used.
	Anti-Submarine Warfare Torpedo Exercise (ASW TORPEX)	Aircraft, ship and submarine crews track and fire an inert practice torpedo against a maneuvering submerged target. Inert exercise torpedoes fired. Active and passive sonar used.
	Major Exercise (Rim of the Pacific [RIMPAC], Undersea Warfare Exercise [USWEX], Three Strike Groups)	Elements of the ASW Tracking Exercise combine in this exercise of multiple air, surface and subsurface units, over a period of several days. No ordnance. Sonobuoys released from aircraft. Active and passive sonar used.
	Extended Echo Ranging/Improved Extended Echo Ranging (EER/IEER) Training Exercise	The EER/IEER Systems are airborne ASW systems used in conducting searches for submarines in large areas. Sonobuoys are released from aircraft. Active and passive sonar used.
Electronic Combat (EC)	Electronic Combat (EC) Operations	Air and land based systems emit electronic signals, designed to simulate threat radars. Ship and aircraft crews train to respond to these signals as appropriate. No ordnance used.

Table 2.2.2.1-1. Current Navy Training Events in the HRC (Continued)

Mission Area	Training Event	Training Event Description
Mine Warfare (MIW)	Mine Countermeasures (MCM) Exercise	Aircraft, ships, and submarines train to detect, then avoid or disable in-water mines. Active sonar used. No ordnance used.
	Mine Neutralization	Personnel train to detect and destroy or disable in-water mines. Underwater detonations occur.
	Mine Laying	Offensive mining where aircraft and submarines deploy mines into the water. Inert mine shapes released into the ocean.
	Land Demolitions	Explosive Ordnance Disposal personnel train to locate, excavate, identify and render land mines and other unexploded ordnance safe, which typically involves destroying the ordnance with an explosive charge. Land detonations occur.
Naval Special Warfare (NSW)	Swimmer Insertion/Extraction	Underwater training involving a Sea, Air, and Land (SEAL) Delivery Vehicle that transports SEALs between a submerged submarine and shore. No ordnance or sonar used.
	Special Warfare Operations (SPECWAROPS)	SPECWAROPS are performed by Navy SEALs and U.S. Marines. Activities include special reconnaissance, reconnaissance and surveillance, combat search and rescue, and direct action. No ordnance or sonar used.
Strike Warfare (STW)	Bombing Exercise (BOMBEX) (Land)	Fixed-wing aircraft drop inert bombs against a land target. Inert and live bombs dropped from aircraft.
	Air-to-Ground Gunnery Exercise (A-G GUNEX)	Helicopter crews fire guns at stationary land targets. Live gunnery rounds fired at land targets.
Other	Salvage Operations	Navy divers train to tow disabled ships, repair damaged ships, remove sunken ships, and conduct deep ocean recovery. No ordnance or sonar used.
	Live Fire Exercise (LFX)	Ground forces conduct live fire weapons training while maneuvering. Live fire includes small arms, artillery, and aerial gunnery. Live rounds fired at Pohakuloa Training Area; inert rounds (blanks) fired at Makua Military Reservation.
	Humanitarian Assistance Operations/Non-combatant Evacuation Operations (HAO/NEO)	HAO/NEO training events involve approximately 150 personnel and troops and specialists who initially provide assistance to civilians and then evacuate the civilians when necessary. No ordnance used.
	Humanitarian Assistance / Disaster Relief Operations (HA/DR)	HA/DR training events involve approximately 125 to 250 military personnel and 125 to 200 simulated refugees. The training event consists of military forces providing critical services (water, food, etc.) to refugees. No ordnance used.

2.2.2.2 HAWAII RANGE COMPLEX SUPPORT EVENTS FOR THE NO-ACTION ALTERNATIVE

Numerous support events take place as an integral part of training occurring in the HRC. These support events can generally be described as either supporting the command and control (C2) events, or supporting ships, submarines, aircraft, or personnel.

Command and Control

The purpose of the C2 events is to provide continuous C2 support for Major Exercises. Each activity is monitored and coordinated for safety and on-time performance, to ensure training objectives are accomplished, and to identify lessons learned for future training and exercises. Overall command functions can be performed from a command ship or from land facilities at Pearl Harbor or PMRF. C2 is achieved through a network of communication devices, or nodes, strategically located at selected DoD installations around the islands (e.g., at range control offices and air traffic centers) to ensure positive communication with the training and exercise participants. Existing C2 nodes are located on the following islands:

- Kauai (Makaha Ridge, Kokee, and Mt. Kahili)
- Oahu (Kaena Point, Mt. Kaala, Wheeler Network Segment Control, Mauna Kapu Communication Site, and Makua Radio/Repeater/Cable Head)
- Molokai (Molokai Mobile Transmitter Site)
- Maui (Maui Space Surveillance System, Maui High Performance Computing Center, and Sandia Maui Haleakala Facility)
- Hawaii (Big Island Mobile Transmitter Site)

In-port Ship Support Operations

The purpose of the In-port Ship Operations is to provide major support for Navy ships and submarines. In-port support includes the typical activities that are carried out when foreign and U.S. warships and submarines are berthed at Pearl Harbor. This includes in-port briefings and debriefings and in-port training activities, including oil spill response training. Once berthed, ships would re-supply, plan for refueling, load ammunition, and conduct other maintenance activities, including the off loading of solid wastes and wastewater (black and gray water). In addition, the Fleet and Industrial Supply Center at Pearl Harbor processes non-typical orders to acquire country unique items that are not normally handled by the U.S. Fleet.

Shore facilities management activities include berthing space and utility hookups, harbor coordination and control, and space management for equipment and personnel. Pearl Harbor has contained more than 60 warships during Major Exercises and on other occasions.

Pearl Harbor is a restricted area. No vessels are allowed into Pearl Harbor without permission of Commander Navy Region Hawaii. The restricted area extends outward from the mouth of the harbor and is defined by a rectangular boundary known as the Pearl Harbor Naval Defensive Sea Area.

Aircraft Support Operations

Aircraft Support Operations are necessary to ensure safe air activities. Aircraft support includes space for the various types of aircraft, equipment for refueling and maintenance.

U.S. and foreign aircraft (fixed wing, rotary, and airship) are supported from Hickam Air Force Base (AFB), Marine Corps Base Hawaii (MCBH), U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport, and Wheeler Army Airfield on Oahu; Bradshaw Army Airfield on Hawaii; and PMRF (Main Base) airfield on Kauai.

Personnel Support Operations

The purpose of the Personnel Support Operations is to meet the housing and facilities needs of the personnel that support range activities. This includes in-port briefings and debriefings and in-port training activities. In addition, some exercises conclude with receptions, athletic events, and other social activities.

Housing is provided both on and off installation as necessary to house transient aircraft crews and temporary support personnel. Off-installation housing requirements can range from 700 to 1,500 units.

Air Operations

Air Operations are a part of daily activities and Major Exercises. Air Operations are supported at the following facilities: Hickam AFB, MCBH, U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport, and Wheeler Army Airfield on Oahu; Bradshaw Army Airfield on Hawaii; and PMRF (Main Base) airfield on Kauai.

2.2.2.3 CURRENT TRAINING EVENTS WITHIN THE HAWAII RANGE COMPLEX FOR THE NO-ACTION ALTERNATIVE

Table 2.2.2.3-1 presents current Navy training events (No-action Alternative) that are conducted per year within the HRC. For purpose of comparison, Table 2.2.2.3-1 also presents proposed Navy training events under Alternative 1, Alternative 2, and Alternative 3. Detailed descriptions of these alternatives are described in Sections 2.2.3, 2.2.4, and 2.2.5, respectively. Appendix D provides additional description of these events.

Table 2.2.2.3-1. No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 Proposed Navy Training

Mission Area	Training Event	Area	Open Ocean	Offshore	Onshore	Training Events Per Year			
						No-action Alternative	Alternative 1	Alternative 2	Alternative 3
Anti-Air Warfare (AAW)	Air Combat Maneuver (ACM)	W-188, 189, 190, 192, 193, 194	X			738	774	814	814
	Air-to-Air Missile Exercise (A-A MISSILEX)	W-188	X			12	16	24	24
	Surface-to-Air Gunnery Exercise (S-A GUNEX)	W-188, 192, Mela South	X			86	108	108	108
	Surface-to-Air Missile Exercise (S-A MISSILEX)	W-188	X			17	26	26	26
	Chaff Exercise (CHAFFEX)	Hawaii Operating Area (OPAREA)	X			34	34	37	37
Amphibious Warfare) (AMW)	Naval Surface Fire Support (NSFS) Exercise	W-188 (including Barking Sands Underwater Range Expansion [BSURE], Barking Sands Tactical Underwater Range [BARSTUR])	X	X		22	28	28	28
	Expeditionary Assault	Pacific Missile Range Facility (PMRF) (Main Base), Marine Corps Base Hawaii (MCBH), Marine Corps Training Area–Bellows (MCTAB), Kawaihae Pier		X	X	11	11	12	12
Anti-Surface Warfare (ASUW)	Visit, Board, Search, and Seizure (VBSS)	Hawaii OPAREA	X			60	60	66	66
	Surface-to-Surface Gunnery Exercise (S-S GUNEX)	W-188, 191, 192, 193, 194, 196, Mela South	X			69	91	91	91
	Surface-to-Surface Missile Exercise (S-S MISSILEX)	W-188	X			7	12	12	12
	Flare Exercise	W-188 (PMRF [Main Base], Niihau)		X		6	6	7	7
	Air-to-Surface Gunnery Exercise (A-S GUNEX)	Hawaii OPAREA	X			128	152	152	152
	Air-to-Surface Missile Exercise (A-S MISSILEX)	W-188	X			36	50	50	50

Table 2.2.2.3-1. No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 Proposed Navy Training (Continued)

Mission Area	Training Event	Area	Open Ocean	Offshore	Onshore	Training Events Per Year			
						No-action Alternative	Alternative 1(1)	Alternative 2(1)	Alternative 3(1)
	Bombing Exercise (BOMBEX) (Sea)	Hawaii OPAREA	X			35	35	38	38
	Sinking Exercise (SINKEX)	Hawaii OPAREA	X			6	6	6	6
	Anti-Surface Warfare Torpedo Exercise (Submarine-Surface) (ASUW TORPEX)	Hawaii OPAREA	X			35	35	38	35
Anti-submarine Warfare (ASW)	Anti-Submarine Warfare Tracking Exercise (ASW TRACKEX)	Hawaii OPAREA (including BSURE, BARSTUR, Shallow Water Training Range [SWTR])	X	X		372	372	414	372
	Anti-submarine Warfare Torpedo Exercise (ASW TORPEX)	Hawaii OPAREA (including BSURE, BARSTUR, SWTR)	X	X		500	500	650	500
	Major Exercise	Hawaii OPAREA (including BSURE, BARSTUR, SWTR)	X	X		5	6	6	5
	Extended Echo Ranging/Improved Extended Echo Ranging (EER/IEER) Training Exercise	Hawaii OPAREA	X			4	10	10	4
Electronic Combat (EC)	Electronic Combat Operations	Hawaii OPAREA	X	X		50	88	100	100
Mine Warfare (MIW)	Mine Countermeasures Exercise (MCM)	Hawaii OPAREA, Kingfisher, Shallow-water Minefield Sonar Training Area	X	X		32	62	62	62
	Mine Neutralization	Puuloa Underwater Range, MCBH, MCTAB, Barbers Point Underwater Range, Naval Inactive Ship Maintenance Facility, Lima Landing, Ewa Training Minefield		X		62	62	68	68
	Mine Laying	R-3101 (PMRF [Main Base])		X		22	32	32	32
	Land Demolitions	Explosive Ordnance Disposal Land Range			X	85	85	93	93

Table 2.2.2.3-1. No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 Proposed Navy Training (Continued)

Mission Area	Training Event	Area	Open Ocean	Offshore	Onshore	Training Events Per Year			
						No-action Alternative	Alternative 1(1)	Alternative 2(1)	Alternative 3(1)
Naval Special Warfare (NSW)	Swimmer Insertion/Extraction	Hawaii OPAREA, MCTAB, PMRF (Main Base)	X	X	X	132	132	145	145
	Special Warfare Operations (SPECWAROPS)	PMRF (Main Base, Makaha Ridge), Niihau, Puuloa Underwater Range, MCBH, MCTAB, Makua Military Reservation, Dillingham Military Reservation, Barbers Point Underwater Range, Naval Station Pearl Harbor, Naval Inactive Ship Maintenance Facility, Lima Landing, U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport, Hickam Air Force Base (AFB), Wheeler Army Airfield (AAF), Kahuku Training Area, Kawaihae Pier, Pohakuloa Training Area (PTA), Bradshaw Army Airfield, Ewa Training Minefield		X	X	30	30	30	30
Strike Warfare (STW)	Bombing Exercise (BOMBEX) (Land)	Kaula, PTA			X	165	216	250	250
	Air-to-Ground Gunnery Exercise	Kaula, PTA		X	X	16	18	18	18
Other	Command and Control (C2)	Hawaii OPAREA, PMRF (Main Base) MCBH, Naval Station Pearl Harbor, Hickam AFB, Wheeler AAF, Bradshaw AAF	X	X	X	1	1	2	2
	Salvage Operations	Puuloa Underwater Range, Naval Defensive Sea Area, Keehi Lagoon, Naval Station Pearl Harbor		X	X	3	3	3	3
	In Port Ship Support Operations	Naval Station Pearl Harbor			X	1	1	1	1
	Aircraft Support Operations	PMRF (Main Base), MCBH, U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport, Hickam AFB, Wheeler AAF, Bradshaw AAF			X	1	1	2	2

Table 2.2.2.3-1. No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 Proposed Navy Training (Continued)

Mission Area	Training Event	Area	Open Ocean	Offshore	Onshore	Training Events Per Year			
						No-action Alternative	Alternative 1(1)	Alternative 2(1)	Alternative 3(1)
Other (Continued)	Personnel Support Operations	Oahu, Kauai			X	1	1	2	2
	Air Operations	PMRF (Main Base), MCBH, U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport, Hickam AFB, Wheeler AAF, Bradshaw AAF			X	2,600	2,600	2,600	2,600
	Field Carrier Landing Practice (FCLP)	PMRF (Main Base), MCBH			X	0	12	16	16
	Live Fire Exercise (LFX)	Makua Military Reservation, PTA			X	3	3	3	3
	Humanitarian Assistance / Non-combatant Evacuation Operations (HAO/NEO)	PMRF (Main Base), Niihau, MCBH, MCTAB, Kahuku Training Area			X	1	1	1	1
	Humanitarian Assistance Operation / Disaster Relief Operation (HA/DR)	MCBH, MCTAB, Kahuku Training Area			X	1	1	1	1

Notes:
Open Ocean includes the air, surface and subsurface ocean areas of the HRC that lie outside 12 nautical miles (nm) of land.
Offshore includes the air, surface, and subsurface ocean areas of the HRC within 12 nm of land.
Onshore includes the air and land areas of the HRC that are shoreward of the high-water mark.
(1)Alternative 1 training is discussed in Section 2.2.3, Alternative 2 training is discussed in Section 2.2.4, and Alternative 3 training is discussed in Section 2.2.5

2.2.2.4 MID-FREQUENCY ACTIVE/HIGH-FREQUENCY ACTIVE SONAR USAGE FOR THE NO-ACTION ALTERNATIVE

Mid-frequency active (MFA) sonar operates between 1 and 10 kilohertz (kHz). MFA sonar hours are based on data available from the Sonar Positional Reporting System (SPORTS). SPORTS is a database tool established by Commander, U.S. Fleet Forces Command in mid-2006. All commands employing MFA sonar and sonobuoys are required to populate the SPORTS database by reporting MFA sonar use. A review by senior officers determined that SPORTS data would be used in this EIS/OEIS in conjunction with previous planning data to assist in determining the amount of MFA sonar use for purposes of modeling potential effects on marine mammals.

The type of sonar sources used as part of ASW activities within the HRC are listed below. Table 2.2.2.4-1 lists MFA and HFA sonar usage analyzed for the No-action Alternative:

- Surface ship sonar (AN/SQS-53 and AN/SQS-56)
- Helicopter dipping sonar (AN/AQS-22)
- Aircraft deployed sonobuoys (AN/SSQ-62)

- Submarine sonar (BQQ-10, BQQ-5, BSY-1)
- MK-48 torpedo (HFA)

Table 2.2.2.4-1. Sonar Usage for the No-action Alternative

Supplement to the Draft EIS/OEIS Hours/Events Modeled		
Other HRC ASW Training		
	Source	**Modeled**
	53	360 hours
	56	75 hours
	Dipping	110 dips
	Sonobuoy	1,278 buoys
	MK-48	309 runs
	Submarine	200 hours
RIMPAC (1 Carrier)		
	Source	**Modeled**
	53	399 hours
	56	133 hours
	Dipping	400 dips
	Sonobuoy	497 buoys
	MK-48	4 runs
USWEX (5 Exercises)		
	Source	**Modeled**
	53	525 hours
	56	175 hours
	Dipping	500 dips
	Sonobuoy	648 buoys
No-action Alternative Totals		
	Source	**Modeled**
	53	1,284 hours
	56	383 hours
	Dipping	1,010 dips
	Sonobuoy	2,423 buoys
	MK-48	313 runs
	Submarine	200 hours

2.2.2.5 HAWAII RANGE COMPLEX RDT&E ACTIVITIES FOR THE NO-ACTION ALTERNATIVE

Navy RDT&E activities occur primarily at one of two locations in Hawaii: PMRF and the Naval Undersea Warfare Center (NUWC) Detachment Pacific ranges. The current RDT&E activities (No-action Alternative) conducted in the HRC are described below and summarized in Table 2.2.2.5-1. For purpose of comparison, Table 2.2.2.5-1 also presents proposed RDT&E events under Alternative 1, Alternative 2, and Alternative 3. Detailed descriptions of these alternatives are described in Sections 2.2.3, 2.2.4, and 2.2.5, respectively.

Table 2.2.2.5-1. No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 Proposed RDT&E Activities

RDT&E Activity	Area	Open Ocean	Offshore	Onshore	RDT&E Activities Per Year			
					No-action Alternative	Alternative 1(1)	Alternative 2(1)	Alternative 3(1)
CURRENT RDT&E ACTIVITIES								
Anti-air Warfare RDT&E	Hawaii Operating Area (OPAREA), Pacific Missile Range Facility (PMRF) (Main Base)	X	X	X	35	40	44	44
Anti-submarine Warfare	Hawaii OPAREA, PMRF (Main Base)	X	X		19	21	23	23
Combat System Ship Qualification Trial	Hawaii OPAREA	X			7	8	9	9
Electronic Combat/Electronic Warfare (EC/EW)	Hawaii OPAREA, PMRF (Main Base), Niihau	X	X	X	65	72	80	80
High-Frequency Radio Signals	Hawaii OPAREA, PMRF (Main Base)	X	X	X	9	10	11	11
Missile Defense	Temporary Operating Area (TOA), Hawaii OPAREA, PMRF (Main Base)	X	X	X	46	46	50	50
Joint Task Force Wide Area Relay Network	PMRF (Main Base)			X	2	3	4	4
Shipboard Electronic Systems Evaluation Facility (SESEF) Quick Look Tests	SESEF Range		X		3,842	4,225	4,225	4,225
SESEF System Performance Tests	SESEF Range		X		67	74	74	74
Fleet Operational Readiness Accuracy Check Site (FORACS) Tests	FORACS Range		X		5	5	6	6

Table 2.2.2.5-1. No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 Proposed RDT&E Activities (Continued)

RDT&E Activity	Area	Open Ocean	Offshore	Onshore	RDT&E Activities Per Year			
					No-action Alternative	Alternative 1(1)	Alternative 2(1)	Alternative 3(1)
PLANNED RDT&E ACTIVITIES								
Additional Chemical Simulant	TOA, Hawaii OPAREA, PMRF (Main Base)	X	X	X	–	Upgrade	Upgrade	Upgrade
Intercept Targets launched into PMRF Controlled Area	TOA, Hawaii OPAREA	X			–	3	3	3
Launched SM-6 from Sea-Based Platform (AEGIS)	TOA, Hawaii OPAREA, PMRF (Main Base)	X	X		–	Upgrade	Upgrade	Upgrade
Micro-Satellites Launch	TOA, Hawaii OPAREA, PMRF (Main Base)	X	X	X	–	Upgrade	Upgrade	Upgrade
Test Unmanned Surface Vehicles	TOA, Hawaii OPAREA	X	X		–	Upgrade	Upgrade	Upgrade
Test Unmanned Aerial Vehicles	TOA, Hawaii OPAREA, PMRF (Main Base)	X	X	X	–	Upgrade	Upgrade	Upgrade
Test Hypersonic Vehicles	TOA, Hawaii OPAREA, PMRF (Main Base)	X	X	X	–	Upgrade	Upgrade	Upgrade
PLANNED ENHANCEMENTS								
Portable Undersea Tracking Range	Hawaii OPAREA (various islands)	X	X		–	Upgrade	Upgrade	Upgrade
Large Area Tracking Range Upgrade	Hawaii OPAREA; locations on Kauai, Oahu, Maui, Hawaii	X	X	X	–	Upgrade	Upgrade	Upgrade
Enhanced Electronic Warfare Training	Hawaii OPAREA; locations on Kauai, Maui, Hawaii, Niihau	X	X	X	–	Upgrade, Construction	Upgrade, Construction	Upgrade, Construction
Expanded Training Capability for Transient Air Wings	Hawaii OPAREA, locations on Kauai, Maui, Hawaii	X	X	X	–	Upgrade, Construction	Upgrade, Construction	Upgrade, Construction
MK-84/MK-72 Pinger Acoustic Test Facility	Pearl Harbor (Ford Island)		X		–	Upgrade Training Area	Upgrade Training Area	Upgrade Training Area
Mobile Diving and Salvage Unit Training Area	Puuloa Underwater Range, Naval Defensive Sea Area		X		–	Upgrade	Upgrade	Upgrade
Kingfisher Underwater Training Area	Offshore Niihau, PMRF (Main Base)		X		1	Upgrade, Construction	Upgrade, Construction	Upgrade, Construction
FORCEnet Antenna	PMRF (Makaha Ridge or Kokee)			X	–	Upgrade, Construction	Upgrade, Construction	Upgrade, Construction
Enhanced Auto Identification System and Force Protection Capability	PMRF (Makaha Ridge)			X	–	Construction	Construction	Construction
Construct Range Operations Control Building	PMRF (Main Base)			X	–	Construction	Construction	Construction
Improve Fiber Optics Infrastructure	PMRF (Main Base, Kokee)			X	–	Construction	Construction	Construction
FUTURE RDT&E ACTIVITIES								
Directed Energy	Hawaii OPAREA, PMRF (Main Base)	X	X	X	0	0	Range Upgrade	Range Upgrade
Advanced Hypersonic Weapon	Hawaii OPAREA, PMRF (Main Base)	X	X	X	0	0	1	1

Notes:
Open Ocean includes the air, surface and subsurface ocean areas of the HRC that lie outside 12 nm of land.
Offshore includes the air, surface, and subsurface ocean areas of the HRC within 12 nm of land.
Onshore includes the air and land areas of the HRC that are shoreward of the high-water mark.
Upgrade indicates that existing facilities and/or equipment would be modified
Construction indicates that additional facilities or infrastructure would be required
(1)Alternative 1 RDT&E activities are discussed in Section 2.2.3, Alternative 2 RDT&E activities are discussed in Section 2.2.4, and Alternative 3 RDT&E activities are discussed in Section 2.2.5

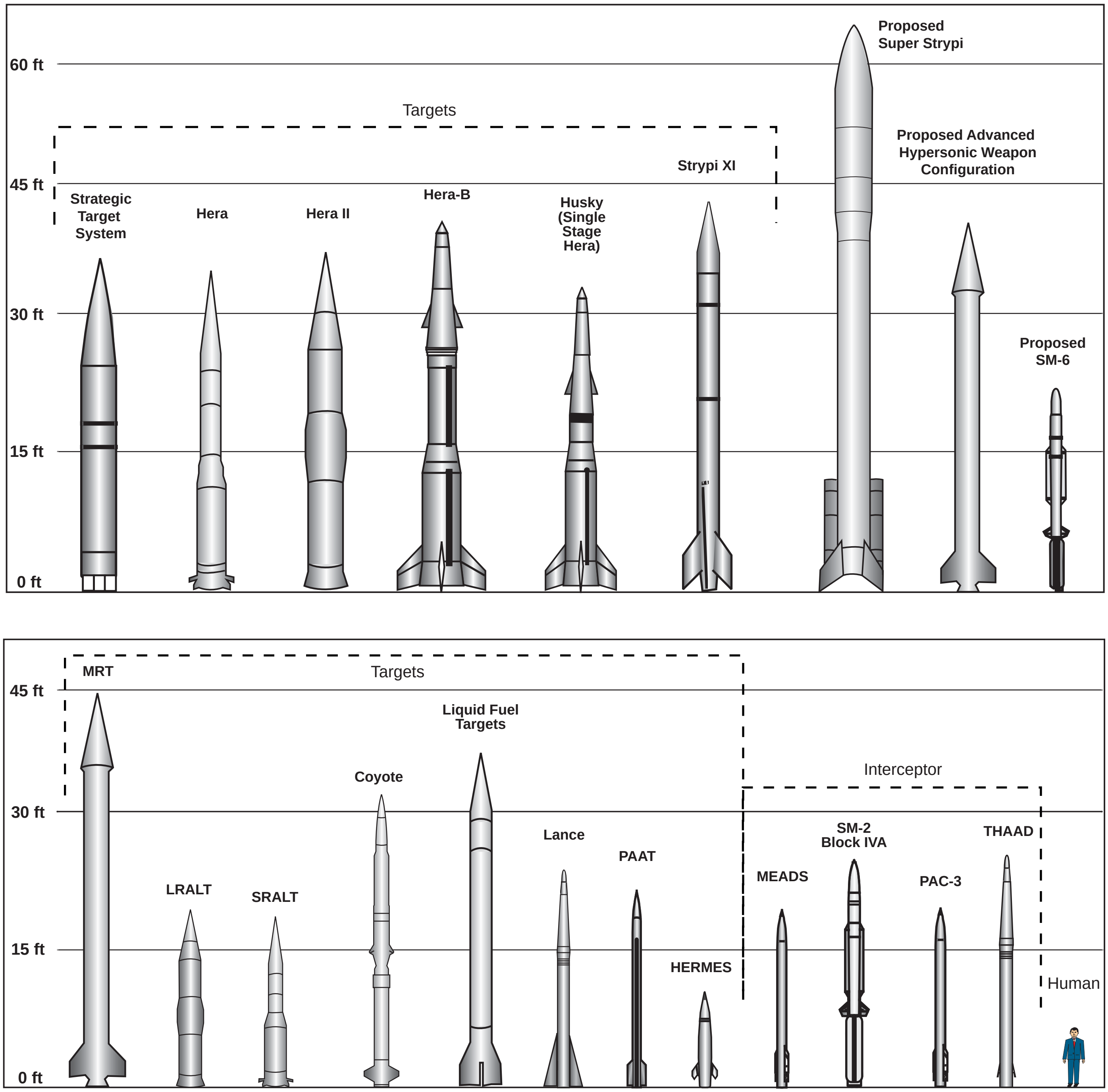
2.2.2.5.1 Pacific Missile Range Facility

PMRF is the world's largest military test range capable of supporting subsurface, surface, air, and space activities (Figure 2.1-2). PMRF consists of 1,000 nm^2 of underwater ranges, 42,000 nm^2 of controlled airspace, and a TOA covering 2.1-million nm^2 of ocean area. PMRF provides major range services for training, tactics development, and evaluation of air, surface, and subsurface weapons systems for the Navy, other DoD agencies, foreign military forces, and private industry. It also maintains facilities and provides services to support naval operations, and other activities and units designated by the Chief of Naval Operations (CNO).

PMRF's additional mission is supporting RDT&E projects. Current ongoing programs at PMRF include CNO designated activities, torpedo, torpedo defense, submarine and periscope detection, ship-defense systems, missile defense, and other miscellaneous programs (such as gunnery/special weapons tests). These programs involve the testing and evaluation of enhancements on systems already used in training conducted at PMRF. These are described briefly below:

- Navy projects are usually related to test and evaluation research, some involving tactical responses to potential underwater, surface, airborne, and ballistic missile threats. Other Navy projects study proposed or new hardware and software designs.
- Torpedo RDT&E programs include a torpedo development testing program involving deep and shallow-water testing of aircraft, helicopter, and surface ship-launched Anti-submarine torpedo sensors to enhance their operational performance.
- Torpedo defense RDT&E programs include a surface-ship torpedo-defense program, involving the testing of new systems to counter incoming torpedoes.
- Submarine detection RDT&E programs include an advanced sensor application program for locating submarines. Periscope detection programs include radar, optical, and laser testing from airborne, ground, and surface ship platforms.
- Ship defense system RDT&E programs include chaff and flare countermeasures testing.
- Missile defense RDT&E programs include missile launches from PMRF and offshore platforms and ships, with intercepts over the broad ocean area within the TOA and operation of radars at PMRF.
- Gunnery/special weapons tests include the usually one-of-a-kind adaptation of an existing weapon to meet a unique threat situation. The weapon is either mounted to or fired from a boat offshore of PMRF/Main Base or set up west of the PMRF launch facility. Targets include surface targets and small radio-controlled planes.

Missile training events conducted at PMRF include general Air-to-Air, Air-to-Surface, Surface-to-Air, and Surface-to-Surface Missile Exercises; specific Anti-surface Missile Exercises; and Anti-air Warfare (AAW) exercises. Each missile training activity must obtain PMRF safety approval before proceeding, covering the type of weapon, type of target, speed, altitude, debris corridor, ground hazard area, and water surface and undersea hazard areas. Figure 2.2.2.5.1-1 shows relative heights of missiles launched as part of PMRF activities. Appendix E lists the existing



EXPLANATION

SM - Standard Missile
MRT - Medium-Range Target
LRALT - Long-Range Air Launched Target
SRALT - Short-Range Air Launched Target
PAAT - Patriot as a Target
PAC-3 - Patriot Advanced Capability-3
THAAD - Terminal High Altitude Area Defense
MEADS - Medium Extended Air Defense System

Relative Missile Heights

Figure 2.2.2.5.1-1

missile defense systems at PMRF. These systems use both solid and liquid propellants. Defensive missile payloads may be equipped with divert and attitude control propulsion systems that control the payload after separation from the launch vehicle. Divert and attitude control systems may use small liquid hypergolic propellant systems or consist of miniature solid-propellant rocket motors.

Anti-Air Warfare RDT&E

AAW RDT&E activities involve testing and training on Aegis-capable ships after refurbishment or overhaul. Aegis Ballistic Missile Defense (BMD) activities involve testing and evaluating the ship's missile system and associated hardware in support of the ship's missile defense mission. An additional RDT&E activity for Aegis ships is the waterfront integration test (WIT), which simulates events that take place during the on range Aegis BMD activities. WIT ensures that all shipboard systems are operable. AAW RDT&E activities may include missile and gunnery ordnance and active sonar.

Anti-Submarine Warfare Test and Evaluation

ASW test and evaluation activities at PMRF include sensor, fire control, and weapon testing. PMRF Submarine Tracking Systems involve using this system to evaluate MK-30 system upgrades. The MK-30 target is a self-propelled underwater vehicle capable of simulating the dynamic, acoustic, and magnetic characteristics of a submarine. The Navy uses in-water submarine simulators such as the MK-30 ASW target. The MK-30 target fulfills the need for a convenient, cost-effective means for operational training of Fleet units. Submarine system evaluation activities conducted in submarine training areas near Maui are also part of ASW test and evaluation activities. The submarine's main active sonar system is not used; however, tracking pingers are a source of underwater sound during ASW test and evaluation activities.

Combat System Ship Qualification Trial

Combat System Ship Qualification Trial (CSSQT) activities are performed at PMRF and are categorized as test and evaluation activities. CSSQT is an at-sea test conducted for new ships and for ships that have undergone modification and/or overhaul of their combat systems. Although CSSQT can vary from ship to ship as requirements dictate, the primary goals are to ensure that the ship's equipment and combat systems are in top operational condition, and that the ship's crew is proficient at operating these systems. Therefore, CSSQT can include operating any or all of a ship's combat systems and may include firing missiles and conducting gunnery exercises.

Electronic Combat/Electronic Warfare

Electronic Combat/Electronic Warfare (EC/EW) activities include tests designed to assess how well EC/EW training events are performed. The EC/EW activities, which occur typically in W-188, are monitored at PMRF shore sites. No ordnance is used during these RDT&E activities.

High-Frequency Radio Signals

High-frequency test and evaluation activities include the use of high-frequency radio signals and the evaluation of their effectiveness. High frequency in the radio spectrum refers to frequencies between 3 megahertz (MHz) and 30 MHz. This frequency range is commonly used for maritime and amateur short-wave radio transmissions. These activities can take place both at PMRF shore sites and within W-188. No ordnance is used during these test and evaluation activities.

Joint Task Force Wide Area Relay Network

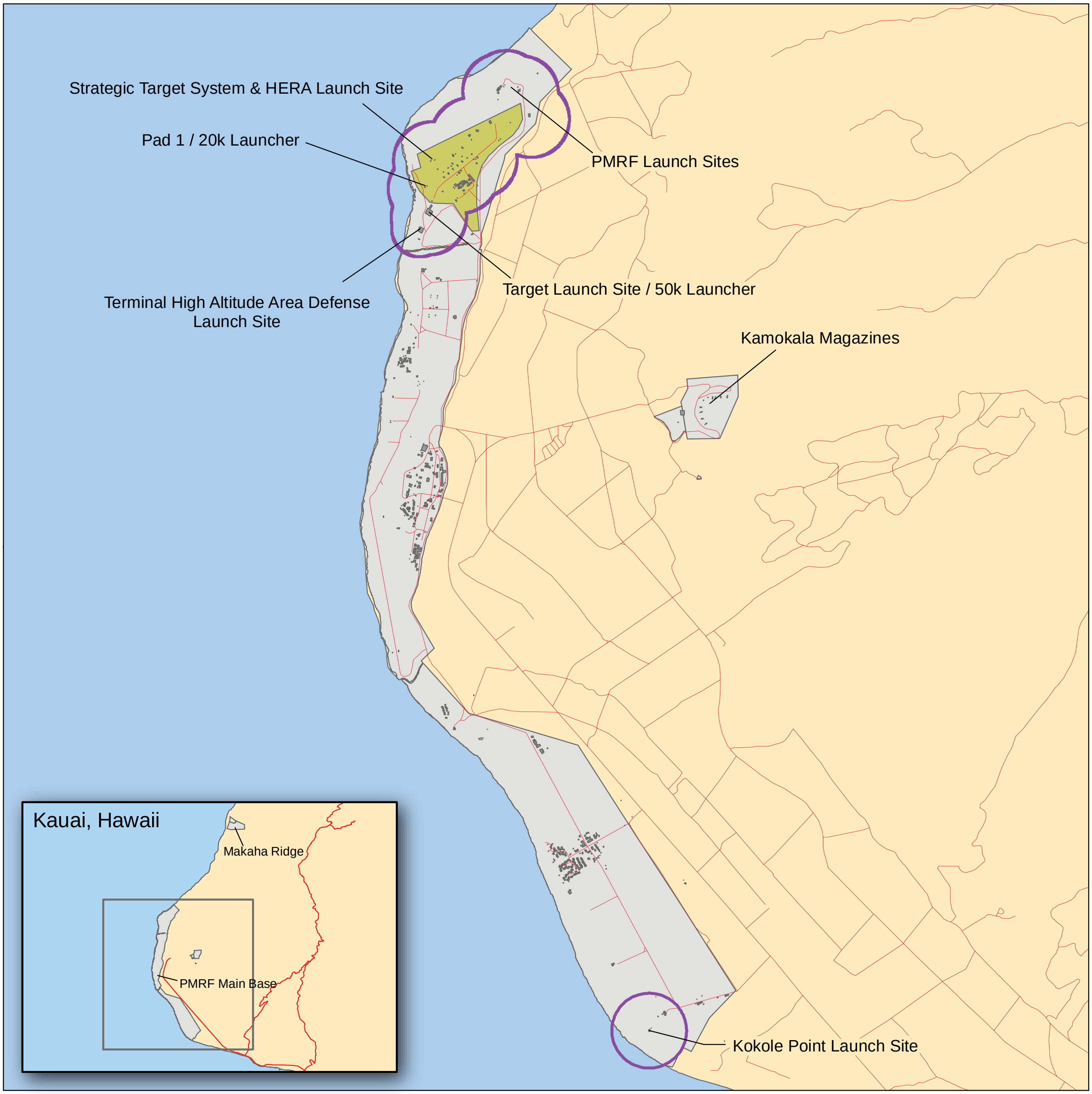
Joint Task Force Wide Area Relay Network (JTF WARNET) is a demonstration of advanced Command, Control and Communications (C3) technologies in a highly mobile, wireless, wide-area relay network in support of tactical forces. The objective of a network of this type is to link tactical forces, providing a common operating picture. Although similar in function to a common internet setting, JTF WARNET demonstrates this capability in a very austere battlefield environment, without the luxury of existing communication systems. In addition, the network must be capable of transmitting classified information. JTF WARNET testing evaluates joint and allied C3 decision-making, planning and execution, and tactical capability. These tests are monitored at PMRF shore facilities. No ordnance is used.

Missile Defense

Figure 2.2.2.5.1-2 shows the existing launch facilities at PMRF and the Kauai Test Facility (KTF). Figure 2.2.2.5.1-3 shows the existing missile flight corridors. Aerial targets are launched from PMRF, mobile sea-based platforms, or military cargo aircraft. During missile defense RDT&E activities, a ballistic missile target vehicle is launched from PMRF and intercepted by a ship-launched missile (Figure 2.2.2.5.1-4). No ordnance is used during these events. The test activities can involve:

- Aegis equipped classes of ships (destroyers and cruisers)
- Use of the mobile and airborne range safety systems
- On-load and off-load of aircraft
- Long-Range and Short-Range Air Launched Targets
- Smart Test Vehicle
- Light Detection and Ranging
- Mobile At-Sea Sensor System
- Use of the Battle Management Interoperability Center
- Transportation of liquid propellants to PMRF
- Flight Termination System preparations for an operation
- Dry runs and dress rehearsals for specific missile defense activities

The Army's Terminal High Altitude Area Defense (THAAD) is part of the DoD Ballistic Missile Defense System. THAAD is the antimissile system designed to intercept and destroy missiles in the final phase of their trajectories. THAAD PMRF test activities include midcourse tracking of ballistic missiles using the THAAD radar (two THAAD radars may be operated concurrently at PMRF during interceptor testing), Coherent Signal Processing radar, telemetry, C-Band precision radars, and Mobile At-Sea Sensor System. THAAD differs from other missile defense testing in that THAAD scenarios involve the target vehicle being launched outside of PMRF from a mobile launch platform, with the THAAD interceptor launched from an existing launch pad at PMRF (Figure 2.2.2.5.1-2). The intercept occurs in the TOA.



EXPLANATION

- Road
- Kauai Test Facility (KTF)
- Existing Explosive Safety Quantity-Distance (ESQD) Arc
- Existing Structure
- Pacific Missile Range Facility (PMRF) Installation Area
- Land

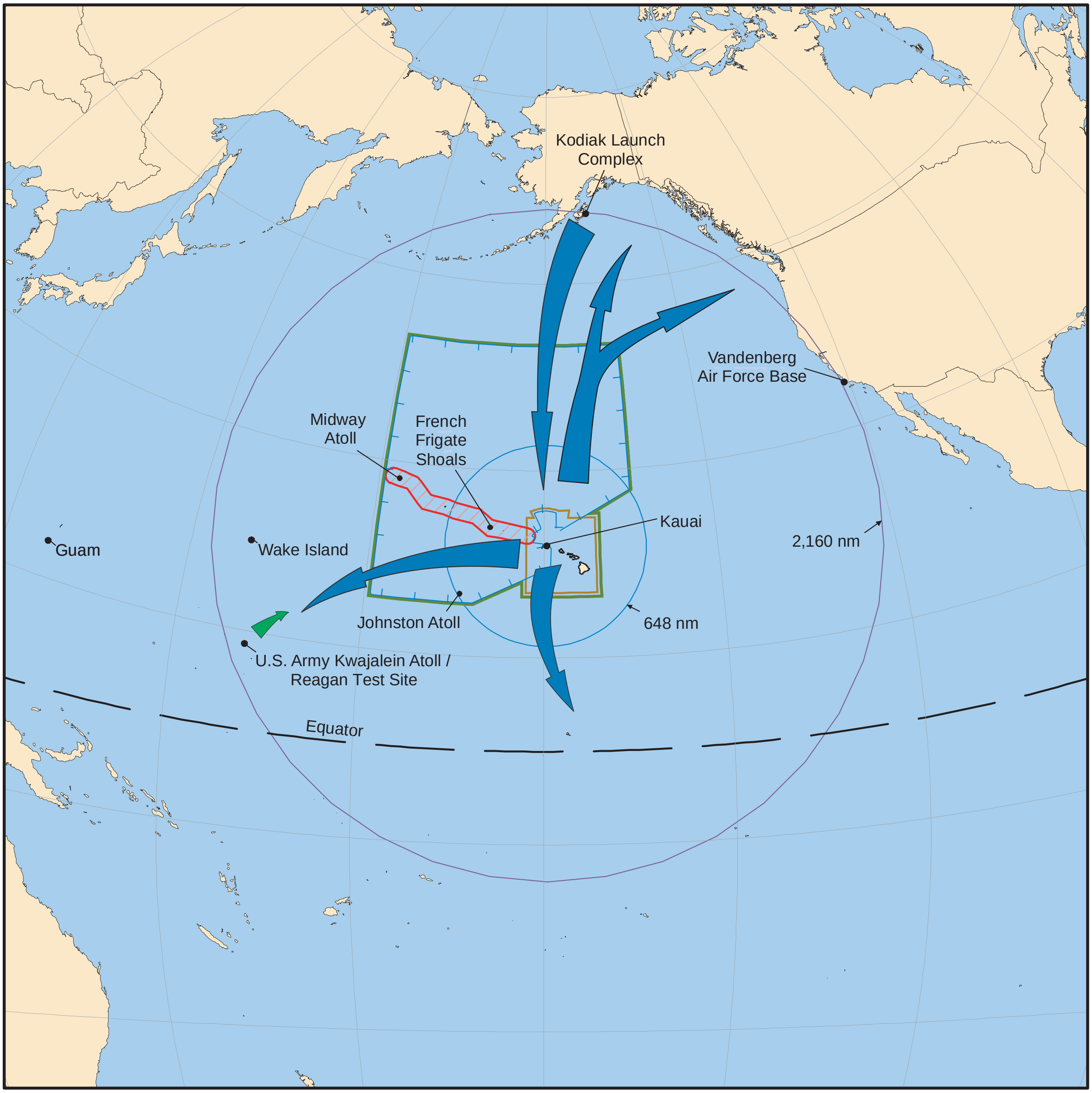
NORTH

0 2,500 5,000 10,000 Feet

Existing Pacific Missile Range Facility and Kauai Test Facility Launch Facilities

Kauai, Hawaii

Figure 2.2.2.5.1-2

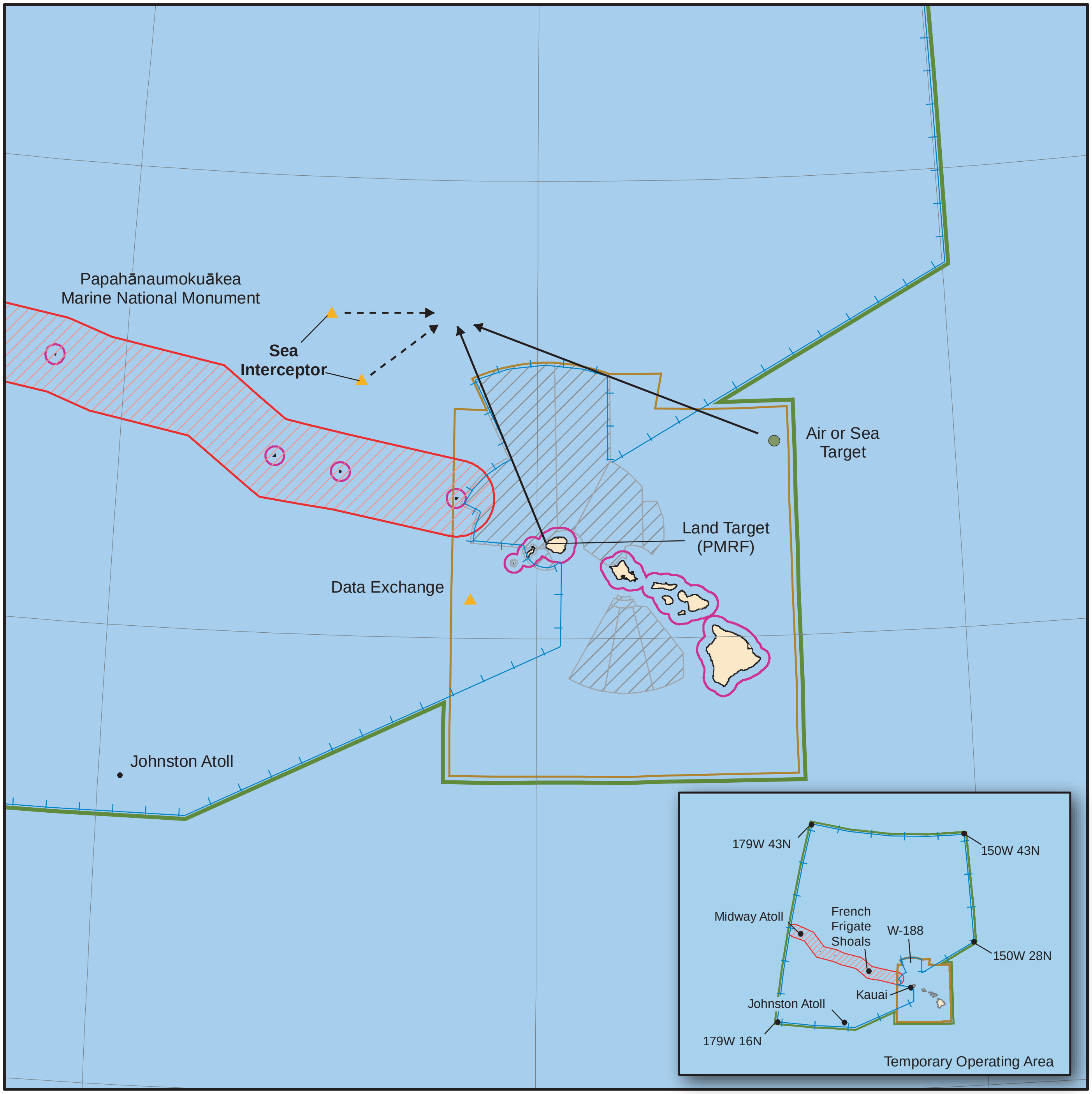


EXPLANATION

Existing Missile Flight Corridors at Pacific Missile Range Facility

Open Ocean

Figure 2.2.2.5.1-3



EXPLANATION

12-Nautical Mile Line

Sea Interceptor / Data Exchange

Air or Sea Target

Temporary Operating Area (TOA)

Hawaii Range Complex (HRC)

Papahānaumokuākea
Marine National Monument

Land

Warning Area

Hawaii Operating Area (OPAREA)

PMRF - Pacific Missile Range Facility

NORTH

0 100 200 400 Nautical Miles

Pacific Missile Range Facility Open Ocean Conceptual Intercept Scenarios - Sea

Hawaiian Islands

Figure 2.2.2.5.1-4

Other RDT&E associated missile defense activities include preparing security, range instrumentation and communications checks, radar calibrations, and range surveillance/ clearance.

As part of the required clearance before an activity, the target area must be inspected visually and determined to be clear. Range Control is charged with hazard area surveillance and clearance and the control of all range operational areas. Figures 2.2.2.5.1-4 and 2.2.2.5.1-5 depict the range areas associated with two conceptual missile defense scenarios. The PMRF Range Control Officer is solely responsible for determining range status and setting RED (no firing) and GREEN (range is clear and support units are ready to begin the event) range firing conditions. The Range Control Officer coordinates the control of PMRF airspace, with the FAA and other military users, often on a real-time basis.

The Range Control Officer communicates with the training events conductors and all participants entering and leaving the range areas. The Range Control Officer also communicates with other agencies such as the FAA Air Route Traffic Control Center in Honolulu, the PMRF/Main Base airfield control tower, the 154th Air Control Squadron at Kokee, and the Fleet Area Control and Surveillance Facility at Ford Island, Pearl Harbor.

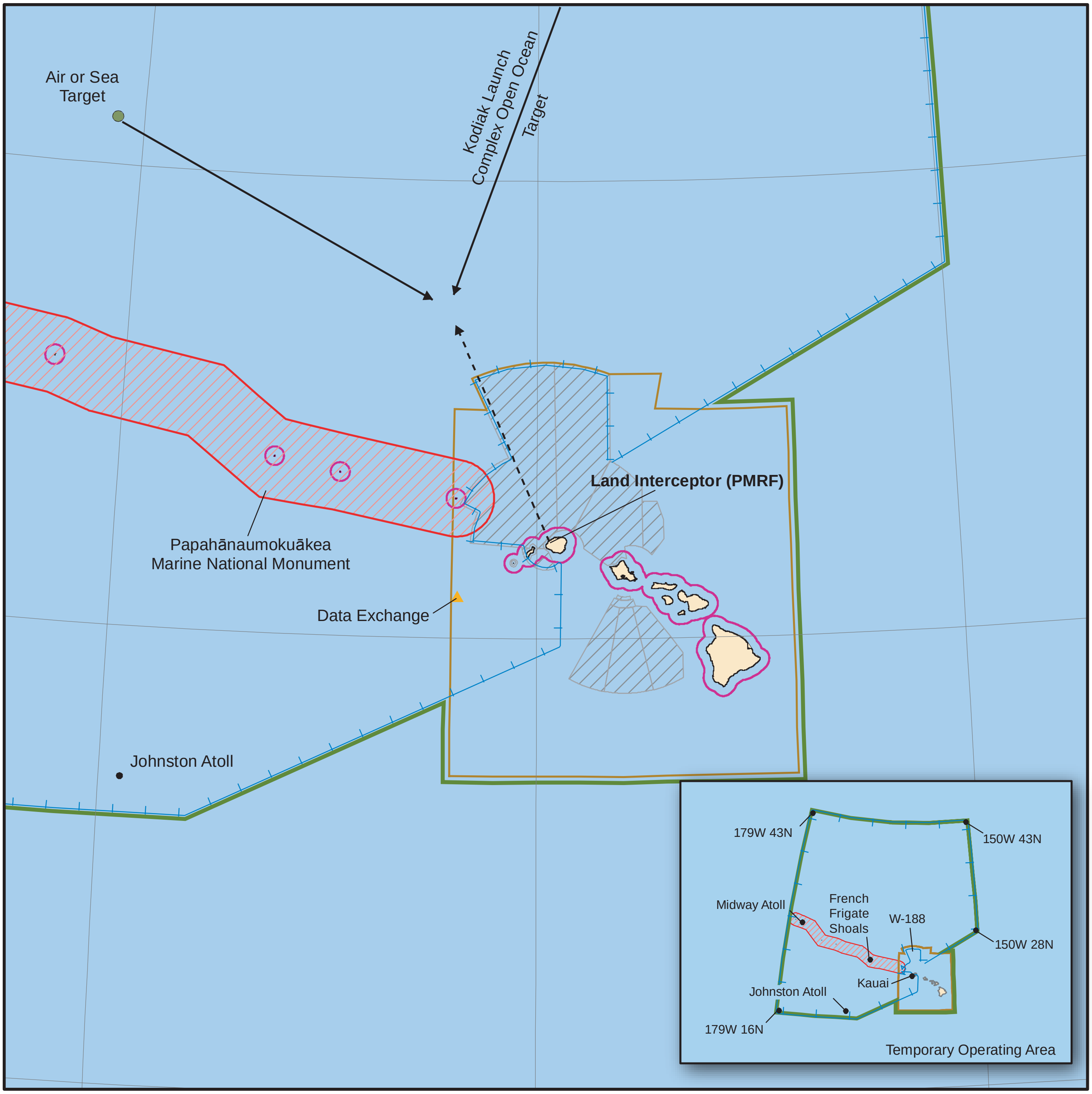
2.2.2.5.2 Naval Undersea Warfare Center Ranges

RDT&E activities take place at the NUWC ranges in Hawaii (Figure 2.2.2.5.2-1). The Shipboard Electronic Systems Evaluation Facilities (SESEF) range, located off Barbers Point on Oahu, provides state-of-the-art test and evaluation of combat systems that radiate or receive electromagnetic energy. The SESEF range includes land based test facilities established to provide electromagnetic system test and evaluation services to afloat and shore commands. SESEF services can be used for the development of new and upgraded systems, and provide a real-time evaluation of a system in an operational environment.

The Fleet Operational Readiness Accuracy Check Site (FORACS) range control is located near Nanakuli, Oahu. The electronic equipment at this site checks range and bearing accuracy for Navy and Coast Guard ships to ensure equipment function and calibration.

SESEF Tests

SESEF tests are conducted to evaluate ship, shore, and aircraft systems that emit or detect electronic emissions. These systems include those used for radio communications, data transfer, navigation, radar, and systems that identify friend and foe. Depending on the system being evaluated, either the tested site, the SESEF, or both will transmit electronic signals in or near the radio frequency band of the electromagnetic spectrum. Specific frequencies and power settings are dependent on the type of test being conducted. The test equipment operated by SESEF allows for a performance evaluation of the ship, shore, or aircraft system. Tests conducted by SESEF fall into one of two broad categories: Quick Look and System Performance tests. Neither SESEF test uses ordnance or sonar.



EXPLANATION

- Temporary Operating Area (TOA)
- 12-Nautical Mile Line
- Data Exchange
- Air or Sea Target
- Hawaii Operating Area (OPAREA)
- Hawaii Range Complex (HRC)
- Papahānaumokuākea Marine National Monument
- Land
- Warning Area

PMRF - Pacific Missile Range Facility

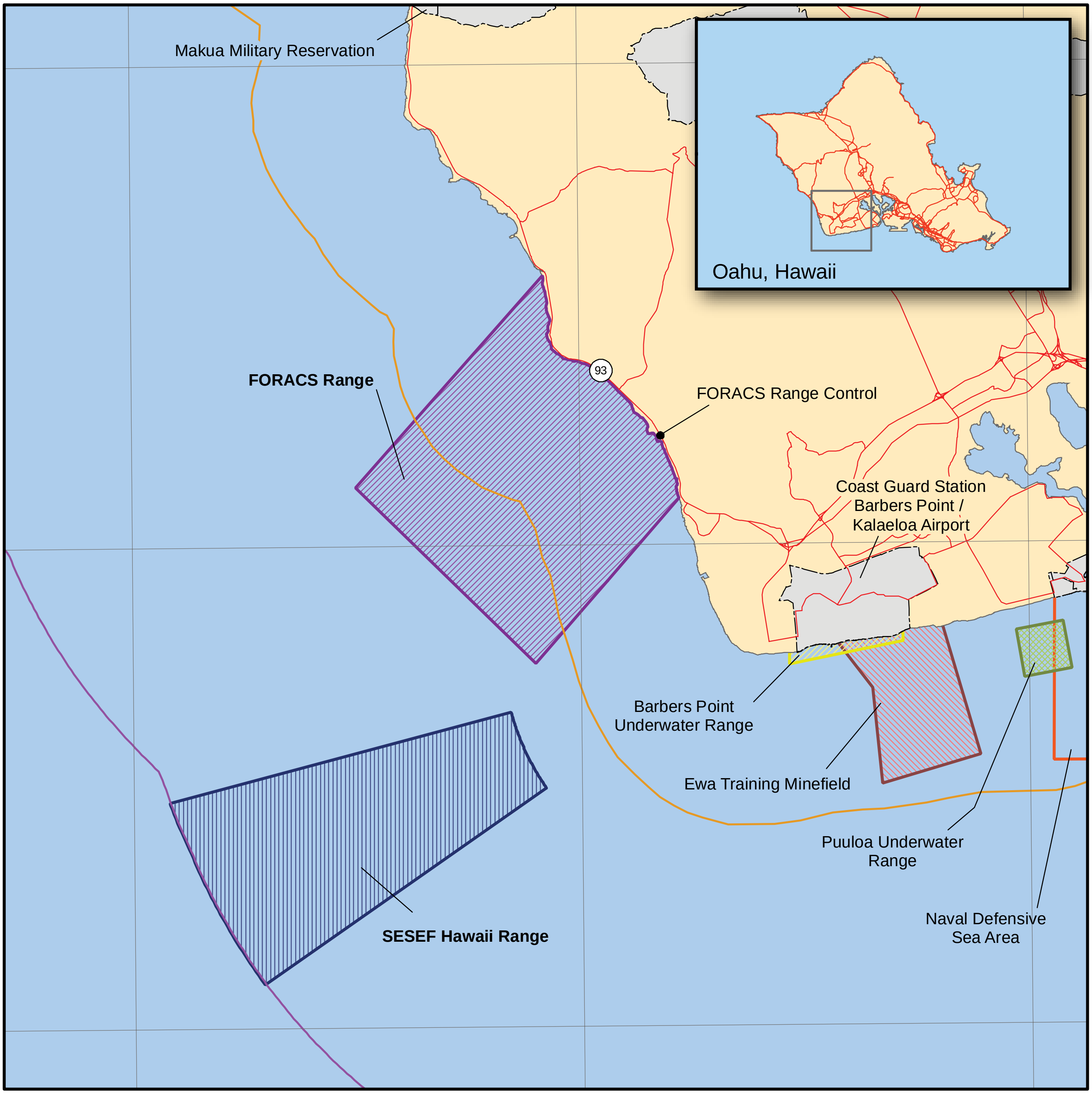
NORTH

0 100 200 400 Nautical Miles

Pacific Missile Range Facility Open Ocean Conceptual Intercept Scenarios - Land

Hawaiian Islands

Figure 2.2.2.5.1-5



EXPLANATION

- Road
- 3-Nautical Mile Line
- 12-Nautical Mile Line
- Fleet Operational Readiness Accuracy Check Site (FORACS) Range
- Shipboard Electronic Systems Evaluation Facility (SESEF) Hawaii Range
- Ewa Training Minefield
- Barbers Point Underwater Range
- Puuloa Underwater Range
- Naval Defensive Sea Area
- Installation Area
- Land

NORTH

0 1 2 4 Nautical Miles

Naval Undersea Warfare Center Ranges

Oahu, Hawaii

Figure 2.2.2.5.2-1

Quick Look tests are generally conducted during transit to and from port, or while pier side at Pearl Harbor. These tests provide the ship a quick operational evaluation of the system(s) being tested with a simple “SAT or UNSAT” grade along with any detected system anomalies or problems. An example is a radio check that confirms that a ship’s radio can both transmit and receive voice communications. Quick Look tests have the following characteristics:

- Generally short in duration
- Require little or no advance scheduling
- Require little or no shipboard maneuvering
- May be accomplished pier side (Communications, LINK-4A and LINK-11 only)
- Require minimal internal shipboard coordination

System performance testing provides the ship with a more-detailed analysis and evaluation of the system(s) under test. The testing requirements and the desired measurement precision dictate a higher degree of control on the ship and coordination of its personnel. System performance tests are characterized as tests which:

- Generally require longer periods of dedicated testing
- Require advance scheduling and coordination with SESEF
- Require the ship to maneuver in pre-defined geometries within a certain geographic area; and
- Require internal shipboard coordination

FORACS Tests

The purpose of the FORACS tests is to provide accuracy checks of ship and submarine sonar, both in active and passive modes, and to evaluate the accuracy of a ship’s radar. The ship will conduct a series of “runs” on the range, each taking approximately 1.5 hours. Both active and passive sonar can be checked on a single run. During a run, the ship will approach the target, a stationary underwater acoustic transducer located offshore, making a slow turn to eventually track outbound from the target, establishing a bearing to the target in use. This information is compared with the known bearing by FORACS range technicians stationed onboard the ship. During active sonar testing, range-to-target information is also evaluated. No ordnance is used. Active sonar is used. Examples of specific FORACS tests are:

- Surface Weapons System Accuracy Trial (SURFSAT)—both an acoustic and a Radio Frequency accuracy evaluation for a surface ship’s radar.
- At-Sea Bearing Accuracy Test—a test of a ship’s radar alone.
- Submarine Warfare System Assessment (SWSA)—an assessment of a submarine’s radar and sonar. The SWSA is similar to the SURFSAT, but is only for submarines.
- Undersea Warfare Readiness Evaluation Facility (USWREF)—a test of a ship’s radar and sonar. The USWREF is similar to, but less involved than, the SURFSAT or SWSA.

2.2.2.6 MAJOR EXERCISES FOR THE NO-ACTION ALTERNATIVE

Types of Major Exercises that occur within the HRC include RIMPAC and USWEX. Table 2.2.2.6-1 shows the matrix of individual training events and RDT&E activities that could be included in a Major Exercise. Figure 2.2.2.6-1 shows the HRC OPAREA where these training events occur. The training and RDT&E activities that make up a Major Exercise are typically unit-level training, conducted under the umbrella of a large, coordinated event. These are the same training and RDT&E activities conducted throughout the year in Hawaii. During a Major Exercise, an additional C2 element is introduced which requires that units conduct and demonstrate multiple warfare capabilities (e.g., ASW).

Each of these exercises has at least one Strike Group at its center. A Strike Group is a naval force comprising one or more capital ships, such as an aircraft carrier. Several surface combatant ships such as cruisers, frigates, and destroyers; and one or more attack submarines, usually accompany the capital ship to complete the Strike Group.

Although multiple ships and aircraft may be participating in a simultaneous event, they commonly operate at significant distances from one another, usually not in sight of other participants. The vastness of the HRC allows multiple ships to operate, without creating a high density footprint in any discrete area.

ASW training conducted during RIMPAC and USWEX utilizes ships, submarines, aircraft, non-explosive exercise weapons, and other training systems and devices. The ASW training described here and in Table 2.2.2.1-1 includes both passive and active sonar use. This EIS/OEIS includes an acoustic exposure effects-analysis on marine mammals that may be affected by the RIMPAC and USWEX ASW training events and use of MFA tactical sonar.

Nearly all ASW training would occur in the eight sonar modeling areas delineated in Figure 2.2.2.6-1. ASW events could occur throughout the approximate 235,000 nm^2 of the Hawaii OPAREA; however, the approximately 55,000 nm^2 of these eight areas, were used for analysis as being representative of the marine mammal habitats and the bathymetric, seabed, wind speed, and sound velocity profile conditions within the entire Hawaiian Islands OPAREA. Sonar modeling included the AN/SQS-53 and AN/SQS-56 surface ship sonar, the AN/AQS-22 helicopter dipping sonar, the AN/SSQ-62 sonobuoy sonar, and the MK-48 torpedo sonar. Submarine sonar was not modeled for RIMPAC and USWEX because it is not used during these events.

2.2.2.6.1 Rim of the Pacific

The RIMPAC Exercise, dating back to 1968, is conducted biennially in the Hawaiian OPAREA. Consisting of the Navy, Army, Marine Corps and Air Force with Pacific Rim armed forces, RIMPAC enhances the ability of Pacific Rim armed forces to communicate effectively, understand the capabilities and limitations of each others' forces, and be able to execute the employment of forces quickly and precisely. This promotes stability in the region to the benefit of all participating nations.

Table 2.2.2.6-1. Current Training Events Included in Major Exercises

Service	Location	Island	Training Events																							
					AAW				ASUW / ASW		MIW				ASUW											
												MCM														
			IN-PORT/ SUPPORTEX	C2	AIROPS	S-A MISSILEX	A-A MISSILEX/ ACM	A-S MISSILEX	S-S MISSILEX	ASW	MINEX	SMWEX	Air MIWEX	UMWEX	STW, CASEX	GUNEX	SINKEX	LFX	HAO/NEO	HA/DR	SPECWAROPS	DEMO	SALVAGE OPS	Expeditionary Assault	SUBOPS	Seaglider
Navy	Pacific Missile Range Facility (Main Base)*	Kauai		■	■	■	■		■			■			■				■		■	■		■		
	Niihau	Niihau																	■		■					
	Kaula	Kaula													■	■										
	Pearl Harbor**	Oahu	■	■	■																■	■	■			
	Lima Landing	Oahu																			■	■				
	Puuloa Underwater Range – Pearl Harbor	Oahu																			■	■	■			
	Barbers Point Underwater Range	Oahu																			■	■				
	Coast Guard AS Barbers Point/ Kalaeloa Airport	Oahu			■																■					
	PMRF Warning Areas[#]	Ocean Areas				■	■	■	■	■	■				■	■	■				■	■			■	
	Oahu Warning Areas[#]	Ocean Areas				■	■			■						■					■	■			■	
	Open Ocean Areas[#]	Ocean Areas								■		■	■	■							■	■			■	■
	U.S. Command Ship	Ocean Areas		■																						
Marines	Marine Corps Base Hawaii	Oahu		■	■									■					■	■	■			■		
	Marine Corps Training Area Bellows	Oahu																	■	■	■			■		
Air Force	Hickam Air Force Base	Oahu		■	■																■					
Army	Kahuku Training Area	Oahu																	■	■	■					
	Makua Military Reservation	Oahu																■			■					
	Dillingham Military Reservation	Oahu																			■					
	Wheeler Army Airfield	Oahu		■	■																■					
	K-Pier, Kawaihae	Hawaii																			■			■		
	Bradshaw Army Airfield	Hawaii		■	■																■					
	Pohakuloa Training Area	Hawaii		■											■			■			■					
State	Keehi Lagoon	Oahu																					■			

* Includes Port Allen and Makaha Ridge ** Includes Ford Island and all other areas within the harbor.

[#] These areas are included in the HRC. The HRC is now used to define the outer limits of the ocean areas used during Major Exercises.

■ Locations where training can occur

Training Events:

A-A MISSILEX	Air-to-Air Missile Exercise (formerly AAMEX)
AAW[1]	Anti-air Warfare
AIROPS	Aircraft Operations
AMPHIBEX	Amphibious Landing Exercise (now Expeditionary Assault)
Air MIWEX	Air Mine Warfare Exercise (formerly AMWEX)
A-S MISSILEX	Air-to-Surface Missile Exercise (formerly ASMEX)
ASUW[2]/ASW[3]	Anti-Surface Warfare/ Anti-Submarine Warfare Exercise
ASW	Anti-Submarine Warfare Exercise (formerly ASWEX)
CASEX	Close Air Support
C2	Command and Control
DEMO	Demolition Exercise
GUNEX	Gunnery Exercise
HA/DR	Humanitarian Assistance/Disaster Relief
HAO/NEO	Humanitarian Assistance Operation/ Non-Combatant Evacuation Operation
IN-PORT	In-port Briefings and Operations
LFX	Live Fire Exercise
MCM	Mine Countermeasures
MINEX	Mine Exercise
MIW[4]	Mine Warfare
SALVAGE OPS	Salvage Operations
S-A MISSILEX	Surface-to-Air Missile Exercise (formerly SAMEX)
SINKEX	Sinking Exercise
SMWEX	Ship Mine Warfare Exercise
SPECWAROPS	Special Warfare Operations (NSW Operations)
S-S MISSILEX	Surface-to-Surface Missile (formerly SSMEX)
STW	Strike Warfare Exercise (formerly STWEX)
SUBOPS	Submarine Operations
SUPPORTEX	In-Port Support Exercise
UMWEX	Underwater Mine Warfare Exercise

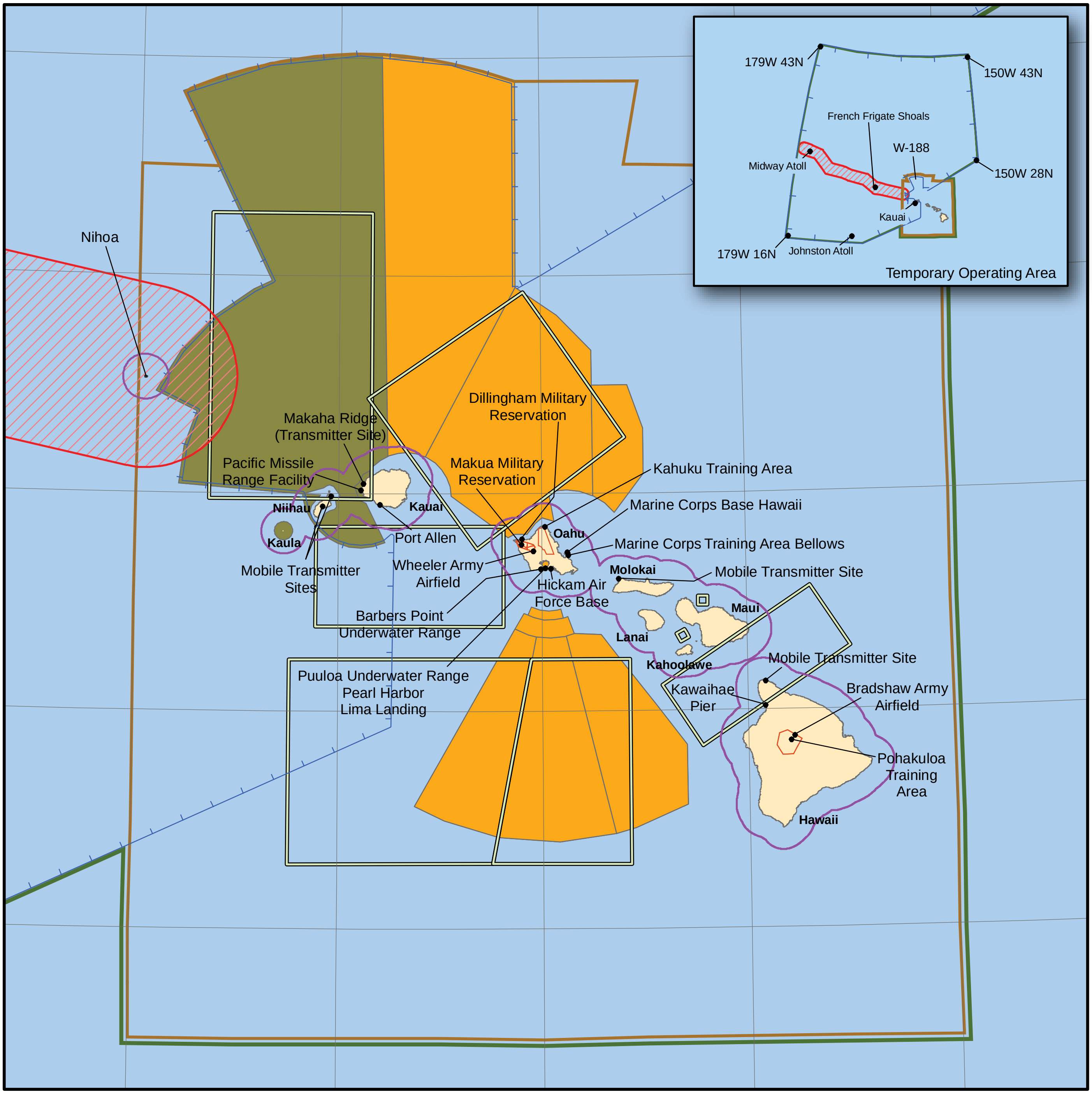
Note: Since the publication of the RIMPAC PEA, new terminology and/or categories of exercises have come into use. They are as follows:

[1] AAW includes AIROPS, S-A MISSILEX, A-A MISSILEX, and A-S MISSILEX

[2] ASUW includes GUNEX, S-S MISSILEX, and ASW

[3] ASW includes S-S MISSILEX and ASW

[4] MIW encompasses two subsets, MINEX and MCM. MINEX is the act of laying mines. MCM is the act of locating and countering mining by others and includes SMWEX, AMWEX, and UMWEX.



EXPLANATION

12-Nautical Mile Line
Temporary Operating Area (TOA)
Hawaii Range Complex (HRC)
Hawaii Operating Area (OPAREA)
Restricted Airspace
Sonar Modeling Area
Oahu Warning Area
Pacific Missile Range Facility Warning Area
Papahānaumokuākea
Marine National Monument
Land

NORTH

0 50 100 200 Nautical Miles

Existing Exercise Area for Rim of the Pacific and Undersea Warfare Exercise

Hawaiian Islands

Figure 2.2.2.6-1

Conducted on existing Army, Marine Corps, Army PMRF ranges, open ocean, and offshore, the month-long RIMPAC Exercise is different from exercises conducted offshore of southern California in several important ways. RIMPAC's focus on multi-national training is very different from other exercises conducted to certify U.S. Strike Groups for deployment. RIMPAC offers the only opportunity for military forces from both the Western and Eastern Pacific to train together in scripted, but realistic, scenarios, and in that regard is a vital training exercise.

A Programmatic EA for RIMPAC was completed in 2002, and supplemental EAs were prepared in 2004 and 2006. The 2004 Supplement to the RIMPAC Programmatic EA was prepared to evaluate the additional RIMPAC training proposed for 2004 not covered by the RIMPAC Programmatic EA. The 2004 Supplement examined new installations or facilities proposed for use, whether significantly different training levels or types of equipment were proposed, and whether environmental conditions had changed. The following events were evaluated in the 2004 Supplement:

- Gunnery Exercises (GUNEX) at PMRF Barking Sands Tactical Underwater Range (BARSTUR)
- Mine Countermeasures (MCM) at Marine Corps Training Area/Bellows (MCTAB), Oahu; Open Ocean Areas, Hawaiian Islands between Molokai, Lanai, and Maui, (including Penguin Bank and the Navy's shallow water training area south of Maui)
- Demolition at Land/Underwater Demolition Range, Naval Magazine Pearl Harbor, West Loch Branch, Oahu; Naval Inactive Ship Maintenance Facility, Middle Loch, Pearl Harbor, Oahu

The 2006 Supplement to the RIMPAC Programmatic EA also included an assessment of a Non-combatant Evacuation Operation (NEO) training event at PMRF and on Niihau and additional analysis related to MFA sonar. The training analyzed was the same as previously analyzed and had taken place with no significant changes over the previous 19 RIMPAC Exercises. Appendix D shows the matrix of training events used during previous RIMPAC Exercises by location.

For RIMPAC under the No-action Alternative, the marine mammal exposure modeling included 532 hours of AN/SQS-53 and AN/SQS-56 surface ship sonar and associated dipping sonar, sonobuoys, and MK-48 torpedoes.

2.2.2.6.2 Undersea Warfare Exercise

The USWEX is an assessment-based ASW exercise conducted by the Strike Groups while in transit from the west coast of the United States to the Western Pacific Ocean. USWEX is considered a "graduate" level assessment focused on ASW warfare and composed of more complex ASW scenarios that can be magnified in scale by adding increased numbers of adversary submarine threats to the training scenario. USWEX is invaluable to Strike Groups as they prepare to execute existing war plans, if necessary. In preparing for these missions, USWEX provides an extremely valuable opportunity to conduct ASW in a very realistic environment, against the level of threat expected in order to effect changes in both training and capabilities, such as tactics, equipment, size and manning of the Strike Group. Since the ability to operate MFA sonar as part of ASW is a highly perishable skill, losing the opportunities a USWEX provides will cause ASW personnel to suffer in the proficiency level and skills they have acquired right before they face real world events on deployment. USWEXs are designed to enable a Strike Group to maintain proficiency of its ASW skills during deployment. USWEX also allows the Navy to separately "assess" the ASW capabilities of a fully ready Strike Group to improve all future ASW training exercises.

A Programmatic Environmental Assessment/Overseas Environmental Assessment (EA/OEA) for USWEX in Hawaii was completed in January 2007.

For USWEX under the No-action Alternative, the marine mammal exposure modeling included 700 hours of AN/SQS-53 and AN/SQS-56 surface ship sonar plus associated dipping sonar, and sonobuoys.

2.2.2.7 MITIGATION MEASURES FOR THE NO-ACTION ALTERNATIVE

Under the No-action Alternative, the Navy's marine mammal mitigation measures will continue to be implemented. Chapter 6.0 presents these mitigation measures, outlining steps that are currently implemented to protect marine mammals and federally-listed species.

2.2.3 ALTERNATIVE 1

2.2.3.1 TRAINING EVENTS FOR ALTERNATIVE 1

Alternative 1 includes all ongoing Navy training associated with the No-action Alternative (as described in Section 2.2.2), and proposes an increased number of such training events. Table 2.2.2.3-1 includes the number of Navy training events associated with the No-action Alternative and the proposed number of events under Alternative 1.

2.2.3.2 MFA/HFA SONAR USAGE FOR ALTERNATIVE 1

Table 2.2.3.2-1 lists MFA/HFA sonar usage analyzed for Alternative 1. Sonar usage is based on SPORTS data and operator input.

Table 2.2.3.2-1. Sonar Usage for Alternative 1

Supplement to the Draft EIS/OEIS Hours/ Events Modeled		
Other HRC ASW Training		
	Source	**Modeled**
	53	360 hours
	56	75 hours
	Dipping	117 dips
	Sonobuoy	1,355 buoys
	MK-48	309 runs
	Submarine	200 hours

Table 2.2.3.2-1. Sonar Usage for Alternative 1 (Continued)

Supplement to the Draft EIS/OEIS Hours/ Events Modeled		
RIMPAC (2 Carrier)		
	Source	**Modeled**
	53	798 hours
	56	266 hours
	Dipping	800 dips
	Sonobuoy	994 buoys
	MK-48	8 runs
USWEX (6 Exercises)		
	Source	**Modeled**
	53	630 hours
	56	210 hours
	Dipping	600 dips
	Sonobuoy	778 buoys
Alternative 1 Totals		
	Source	**Modeled**
	53	1,788 hours
	56	551 hours
	Dipping	1,517 dips
	Sonobuoy	3,127 buoys
	MK-48	317 runs
	Submarine	200 hours

2.2.3.3 INCREASED TEMPO AND FREQUENCY OF TRAINING AND NEW TRAINING FOR ALTERNATIVE 1

Under Alternative 1, the Navy proposes to increase the tempo and frequency of training in the HRC (Table 2.2.2.3-1). In this setting, tempo means intensity and could include more forces or shorter/longer duration of activities. An increase in frequency means the number of training events in a given period would increase.

New Training: Field Carrier Landing Practice

Under Alternative 1, the Navy is also proposing to conduct Field Carrier Landing Practice (FCLP) for three pilots each year in Hawaii. An FCLP is a series of touch-and-go landings conducted to train and field qualify pilots for aircraft carrier landings. Only carrier-based, fixed-wing aircraft pilots (both jet and propeller aircraft) are required to conduct FCLPs. FCLPs involve pilots from an aircraft carrier air wing using carrier planes to practice at a land runway. For each pilot, the FCLP would include 8 to 10 touch-and-go landings at the PMRF runway during both daytime and at night (see Table 2.2.2.3-1). FCLPs would occur in association with transiting Strike Groups participating in Major Exercises. The landings will take place on airport runways at PMRF airfield on Kauai and Marine Corps Base Hawaii (MCBH) on Oahu.

2.2.3.4 ENHANCED RDT&E ACTIVITIES FOR ALTERNATIVE 1

The Navy proposes to enhance its RDT&E activities from current levels as necessary as shown in Table 2.2.2.5-1. Enhanced RDT&E could include activities such as additional AAW RDT&E activities involving Aegis-capable ships, EC/EW activities, and SESEF tests to evaluate ship, shore, and aircraft systems.

2.2.3.5 FUTURE RDT&E ACTIVITIES FOR ALTERNATIVE 1

Additional Chemical Simulant

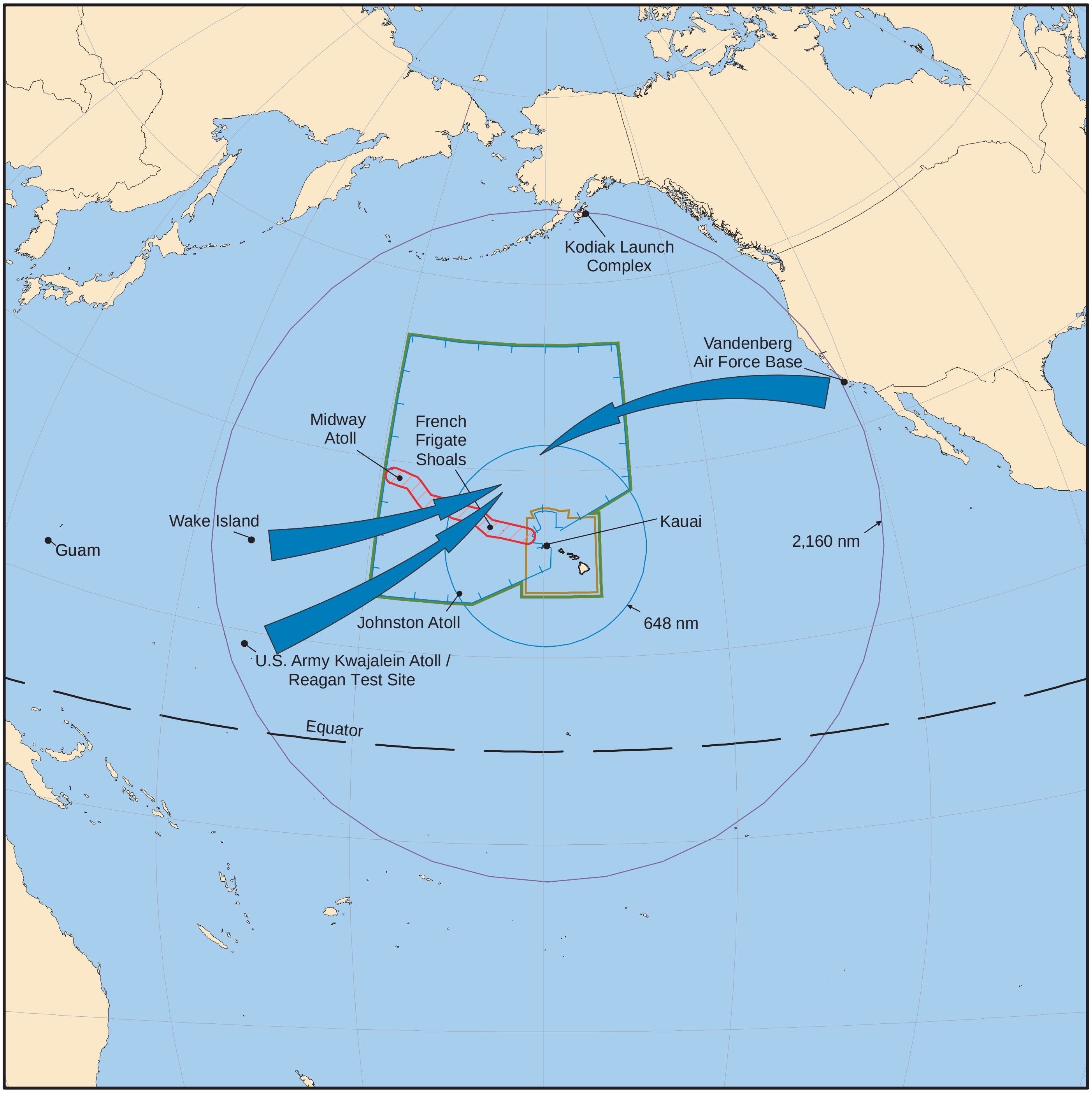
The purpose of using chemical simulants in ballistic missile target vehicles is to assess the effectiveness of defensive missiles against threat missiles carrying chemical agents as payloads. To adequately emulate this threat in testing, it is necessary to use materials that are similar to the physical characteristics of actual chemical agents, but without the toxic effects. Use of actual chemical agents in testing would present the potential for unacceptable hazards, thus the need for simulants.

Target launches from PMRF would incorporate additional chemical simulants to include larger quantities of tributyl phosphate (TBP) and various glycols. The list of potential glycols would include glyceryl tributyrate, propylene glycol, diethyl phthalate, polyethylene glycol, triethylene glycol, diethyl decanedioate, dibenzyl ether, dibutyl phthalate, di(2-ethylhexyl) phthalate, diethylene glycol, and polypropylene glycol 425. The top three preferred simulants would be TBP, glyceryl tributyrate, and propylene glycol. TBP is typically used as a solvent for lacquers and natural gums, as a primary plasticizer in the manufacture of plastics and vinyl resins and as an antifoam agent. Primary uses for glyceryl tributyrate are a synthetic flavoring substance and a plasticizer. Propylene glycol is a substance used in foods, cosmetic products, and pharmaceutical creams to help retain moisture.

Approximately 120 gallons (gal) of simulant would be used in target vehicles launched from PMRF. The simulant would be transported from the continental United States to PMRF with the target vehicle and would be loaded into the target vehicle payload as part of the payload processing activities.

Intercept Targets Launched Into the TOA

Individual launches from Wake Island, the Reagan Test Site at U.S. Army Kwajalein Atoll, or Vandenberg AFB would be intercepted in the TOA (Figure 2.2.3.5-1). PMRF Range Control would manage these interceptor activities. Launches from those sites would be from existing launch facilities, and no new boosters from these sites are proposed. Targets would also continue to be launched from sea-based and air-based platforms as analyzed in previous environmental documents.



EXPLANATION

Temporary Operating Area (TOA)
648-Nautical Mile (nm) Buffer
2,160-Nautical Mile (nm) Buffer
Papahānaumokuākea Marine National Monument
Hawaii Operating Area (OPAREA)
Land
Hawaii Range Complex (HRC)
Proposed Flight Corridor

NORTH

0 500 1,000 2,000 Nautical Miles

Proposed Target Flight Corridors into the Temporary Operating Area

Open Ocean

Figure 2.2.3.5-1

Launch SM-6 from Sea-Based Platform

Under Alternative 1, PMRF would also develop the capability to launch the Extended Range Active Missile, tentatively designated SM-6, from a sea-based platform. This testing would be similar to ongoing launches of the current version of the Standard Missile from Aegis ships. The SM-6 would consist of the SM-2 Block IV booster system and an active Advanced Medium Range Air-to-Air Missile seeker to provide enhanced capabilities. Testing would occur in the TOA.

Micro-Satellites Launch

The Super Strypi system is proposed as a joint venture between PMRF, the Department of Energy at KTF, and the University of Hawaii to launch micro-satellites into space. The 50K launcher (i.e. a 50,000-pound [lb] maximum design load) at Launch Area 2 would be modified with a 25-foot (ft) extension.

The Super Strypi system consists of three stages. The proposed first stage boosters would be a Graphite Epoxy Motor (GEM)-46 and two Terrier MK-70 strap-on boosters. The GEM-46 consists of 37,180 lb of solid propellant and each Terrier booster consists of 1,500 lb of solid propellant. The proposed second stage would be an Orbus-7 booster with a propellant weight of 7,290 lb. A STAR-30 rocket motor would be used to insert the satellite into orbit. The STAR-30 contains 1,114 lb of solid propellant.

The Super Strypi would require a 1,500-ft radius circle ground hazard area around the launcher. The launch hazard area would be within the existing launch hazard areas for PMRF. Launch azimuths would be within the existing launch azimuths for Launch Area 2.

Test Unmanned Surface Vehicles

Future testing of Unmanned Surface Vehicles (USVs) is proposed to occur within the HRC, and would be similar to current, ongoing training. These remote-controlled boats could be equipped with modular packages to potentially support surveillance and reconnaissance activities, mine warfare, anti-terrorism/force protection, port protection, Special Forces training, and possibly ASW.

USVs generally represent small boats up to approximately 40 ft in length, with either rigid hulls and/or inflatable pontoons. Inboard or outboard diesel or gasoline engines up to several hundred horsepower would likely be used for propulsion. Test packages carried on the USVs may include radars; HFA sonar; multi-functional camera suites; autonomous equipment packages; and required communications, testing, and support equipment. HFA sonar associated with USVs does not represent a significant sound source and its minimal use would not affect marine mammals. Onboard electrical power for equipment operations and engine starting would come from a series of batteries (lead-acid, lithium, etc.), and possibly an electrical generator run off the main engine.

For testing just off the coast of PMRF, the USV would be launched from either Port Allen or the Kikiaola Small Boat Harbor. For safety purposes, the USV would be towed by a manned vessel out of the harbor and up the coast to PMRF before operating remotely under its own power. Testing would only occur in areas cleared of non-mission essential vessels. Using computers, personnel would remotely operate the USV from a transportable command post in a trailer or located within an existing building at PMRF. The types of tests may include low-speed surveillance activities using cameras, radar, and/or sonar; maneuvering through obstacles; and high-speed runs in excess of 40 knots. Individual test activities could occur day or night and last for up to 24 hours, depending on test requirements. Following each test, the USV would be towed back to harbor. Depending on test schedules, the USV might be temporarily docked, or taken out of the water on a trailer for storage at the harbor or at PMRF. No new storage or docking facilities would be required.

The testing of USVs could also occur in open waters within the TOA. In this case, the USV would be towed out to sea or launched directly from a surface ship. Remote control of the USV would occur from a command center on a vessel. Again, testing would only occur in areas cleared of non-mission essential vessels.

Test Unmanned Aerial Vehicles

A variety of Unmanned Aerial Vehicles (UAVs) may also be tested in the future at PMRF and would be similar to current, ongoing training. UAVs are remotely piloted or self-piloted aircraft that include fixed-wing, rotary-wing, and other vertical takeoff vehicles. They can carry cameras, sensors, communications equipment, weapons, or other payloads. At PMRF, UAV testing could support one or more of the following mission areas: intelligence, surveillance, and reconnaissance; suppression of enemy air defenses; electronic attack; anti-surface ship and ASW; mine warfare; communications relay; and derivations of these themes.

UAVs can vary in size up to approximately 45 ft in length, with gross vehicle weights ranging from several hundred pounds to approximately 45,000 lb. Forms of propulsion for UAVs can range from traditional turbofans, turboprops, and piston engine-driven propellers; to electric motor-driven propellers powered by rechargeable batteries (lead-acid, nickel-cadmium, lithium ion), photovoltaic cells, and/or hydrogen fuel cells.

Prior to testing at PMRF, each UAV would be ground-checked at existing facilities to ensure proper system operations. Depending on engine propulsion, the vehicle would be fueled most likely with gasoline or diesel fuel (approximately 50 to 700 lb); or jet fuel (approximately 50 to 17,000 lb of JP-5 or JP-8). Takeoff procedures would vary by UAV system, using a traditional runway takeoff, small solid rocket-assisted takeoff, or a portable catapult launcher. Personnel would use computers to remotely operate the UAV from a transportable command post in a trailer or located within an existing building at PMRF.

Depending on the UAV system being tested, individual flights could extend just a few nautical miles off the PMRF coast, or well over 100 nm into the TOA. Maximum altitudes for flights could range from a few thousand feet for the smallest UAVs to over 30,000 ft for the largest jet-powered vehicles. Maximum velocities attained would range from approximately 100 to 500 knots. Testing would only occur in areas cleared of non-mission essential aircraft and away from populated areas. The types of tests conducted could include demonstration of aircraft flight worthiness and endurance, surveillance activities using onboard cameras and other sensors, and over-the-horizon targeting. Individual test flights could last from a few hours to more than a day. At the completion of each flight test, vehicle landing would occur via traditional runway landing or using retrieval nets for smaller UAVs. The storage and ground-support for UAVs would occur within existing facilities at PMRF. No new facilities are planned.

In some cases, UAV flight tests, including takeoff and landing procedures, may be conducted from surface ships in the TOA. Remote control of the UAV would occur from a command center on a vessel. Again, testing would only occur in areas cleared of non-mission essential aircraft.

Test Hypersonic Vehicles

The Navy and the DoD are working toward development of air-breathing hypersonic vehicles that are capable of maximum sustainable cruising speeds in excess of Mach 4. As potential ordnance delivery systems, such vehicles could significantly decrease the launch to target engagement timeline.

Hypersonic vehicles, such as those being developed under the Hypersonic Flight Demonstration program, could be flight-tested at PMRF from within and beyond the TOA. The missile-like test vehicle would be fueled at PMRF using JP-10 (exo-tetrahydrocyclo-pentadiene) or a similar turbine liquid fuel. On-board fuel weights are currently undetermined, but are expected to not exceed 500 lb. Because the hypersonic vehicles use a scramjet technology, engine operation requires a high-speed boost on a rocket or from a jet aircraft.

Rocket launching a hypersonic test vehicle could occur from the Vandal launch site at PMRF and follow a similar flight trajectory as other missiles launched from PMRF. For example, a two-stage Terrier-Orion sounding rocket could be used to boost the hypersonic vehicle. Following launch and booster motor separation, the spent motor casings would impact in the open ocean. Upon reaching hypersonic velocities at altitudes in excess of 50,000 ft, the test vehicle would continue on a pre-designated flight trajectory under its own scramjet power, before making a controlled splashdown into the open ocean.

For flight insertion using a jet aircraft, such as an F-15, the test vehicle would be attached under the aircraft at PMRF. Following takeoff, and upon reaching an appropriate altitude and velocity over the TOA, the test vehicle would be released from the aircraft. With engine ignition, the hypersonic test vehicle would climb to an appropriate cruising altitude before making a controlled splashdown into the open ocean.

The hypersonic vehicle flight tests would demonstrate flight performance and flight worthiness. Testing would only occur in areas cleared of non-mission essential aircraft and vessels, and away from populated areas. In support of test activities at PMRF, no new facilities would be needed.

2.2.3.6 HAWAII RANGE COMPLEX ENHANCEMENTS FOR ALTERNATIVE 1

As part of the Tactical Training Theater Assessment and Planning (TAP) Program, specific enhancements and recommendations to optimize range capabilities to adequately support training for all missions and roles were identified for the HRC (U.S. Department of Defense, 2006).

2.2.3.6.1 EOD Range Enhancements

Naval Special Warfare and Explosive Ordnance Disposal (EOD) Targets

Hawaii-based Sea, Air, and Land (SEAL) and EOD forces have target requirements not currently met in Hawaii. The Navy proposes to develop targets and support target maintenance for exposed beach obstacles and fortified beach or offshore defenses, at least some of which must be cleared for live Naval Special Warfare (NSW) weapons and explosives. NSW targets are steel frames and shapes that can be lowered into the water to simulate hulls of ships, or amphibious obstacles. EOD targets would be inert mine and bomb shapes. Some targets would be removed following the training. Others, including NSW obstacles and EOD targets, would be destroyed in place and are not recoverable. All the targets would be used at the EOD Land Range (Figure 2.2.3.6.1-1) or the Puuloa Underwater Range (Figure 2.1-3).

2.2.3.6.2 Pearl Harbor Enhancements

MK-84/MK-72 Pinger Acoustic Test Facility

MK-84 and MK-72 acoustic pingers are critical to the underwater tracking of targets on ASW ranges throughout the HRC. Each of these two models of pingers is a small acoustic transmitter that emits HFA sonar at regular intervals at low power. The pinger is attached internally or externally to submarines, simulated submarine targets, and exercise torpedoes. Undersea tracking ranges, such as the BARSTUR and Barking Sands Underwater Range Expansion (BSURE) at PMRF rely on this signal to track these underwater objects during training on the range. MK-84 and MK-72 pingers are serviced and tested in an in-ground tank at NUWC Detachment Pacific’s Acoustic Test Facility at the Lualualei location. However, due to Base Realignment and Closure, NUWC is vacating the Lualualei location, and there are no plans to move or rebuild the testing tank at the Acoustic Test Facility.

The Navy proposes to install new equipment to support a new open-water Acoustic Test Facility capability near NUWC’s Ford Island facility in Pearl Harbor, shown in Figure 2.2.3.6.2-1. Testing would take place in the water to the west of Ford Island, between Middle Loch and East Loch. The pinger (noise source) could be located in one of several sites. Possible locations include pier S291 on Ford Island, Beckoning Point piers, or a mobile test site that could operate within the test area. Pinger training events typically run for an 8-hour period once a week. Development of the Acoustic Test Facility would require minor modification to the pier to provide electrical cabling and pinger attach points.

Mobile Diving and Salvage Unit Training Area

The Navy would establish an underwater training area in which Mobile Diving and Salvage Unit ONE can conduct military diving and salvage training, including submerging a 100-ft by 50-ft vessel. Figure 2.2.3.6.2-2 shows three proposed locations (Sites A, B, and C) with Site B being the preferred location. The vessel would be placed within a 328- by 328-ft area. The type of training to be conducted would consist of various underwater projects designed to develop mission critical skills, such as hot tapping, welding, cutting, patching, plugging, drilling, tapping, and grinding.

EXPLANATION

- Explosive Ordnance Disposal (EOD) Demolition Pit
- Road
- EOD Land Range
- Hickam Air Force Base
- Existing Structure
- Mobile Naval Undersea Warfare Center (NUWC) Acoustic Test Facility Range
- Installation Area
- Land

NORTH

0 2,000 4,000 8,000 Feet

Explosive Ordnance Disposal Land Range at Pearl Harbor

Oahu, Hawaii

Figure 2.2.3.6.1-1

EXPLANATION

- Road
- Mobile Naval Undersea Warfare Center (NUWC) Acoustic Test Facility Range
- Existing Structure
- Land Area

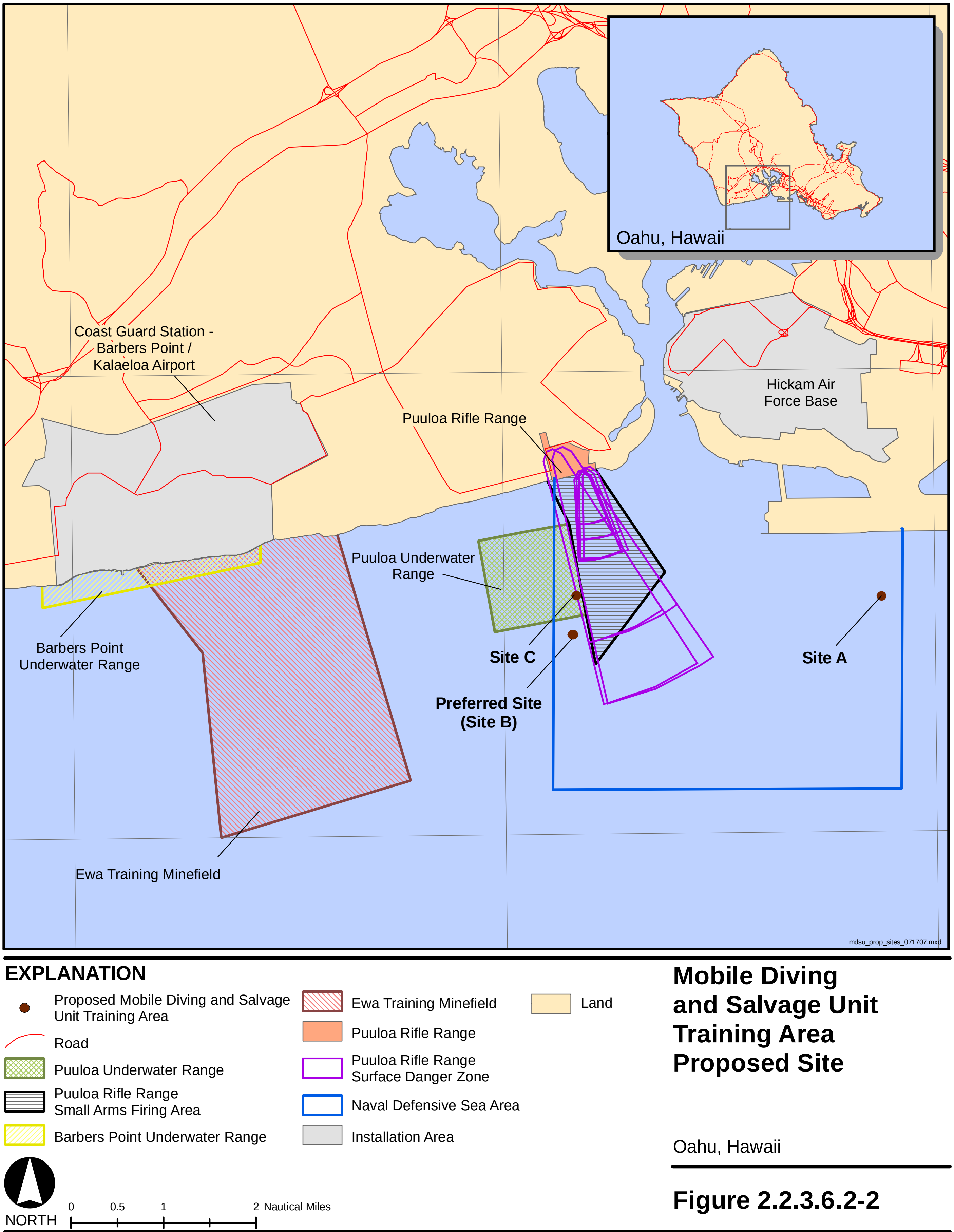
NORTH

0 500 1,000 2,000 Feet

Ford Island

Oahu, Hawaii

Figure 2.2.3.6.2-1



Mobile Diving and Salvage Unit Training Area Proposed Site

Oahu, Hawaii

Figure 2.2.3.6.2-2

2.2.3.6.3 Offshore Enhancements

Portable Undersea Tracking Range

The Portable Undersea Tracking Range would be developed to support ASW training and provide submarine training in areas where the ocean depth is between 300 ft and 12,000 ft and at least 3 nm from land. This proposed project would temporarily instrument 25-square-mile or smaller areas on the seafloor within the area depicted on Figure 2.2.3.6.3-1. Flat areas with no known coral concentration would be selected when possible. In areas that have not been mapped for coral presence, the Navy would develop appropriate habitat data and any necessary mitigations in coordination with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). When training is complete, the Portable Undersea Tracking Range equipment would be recovered and moved to another location. This tracking system is a modification of the previously used Portable Acoustic Range system. All of these areas have been used for submarine training since World War II. This project allows for better crew feedback and scoring of crew performance during the time allocated for training.

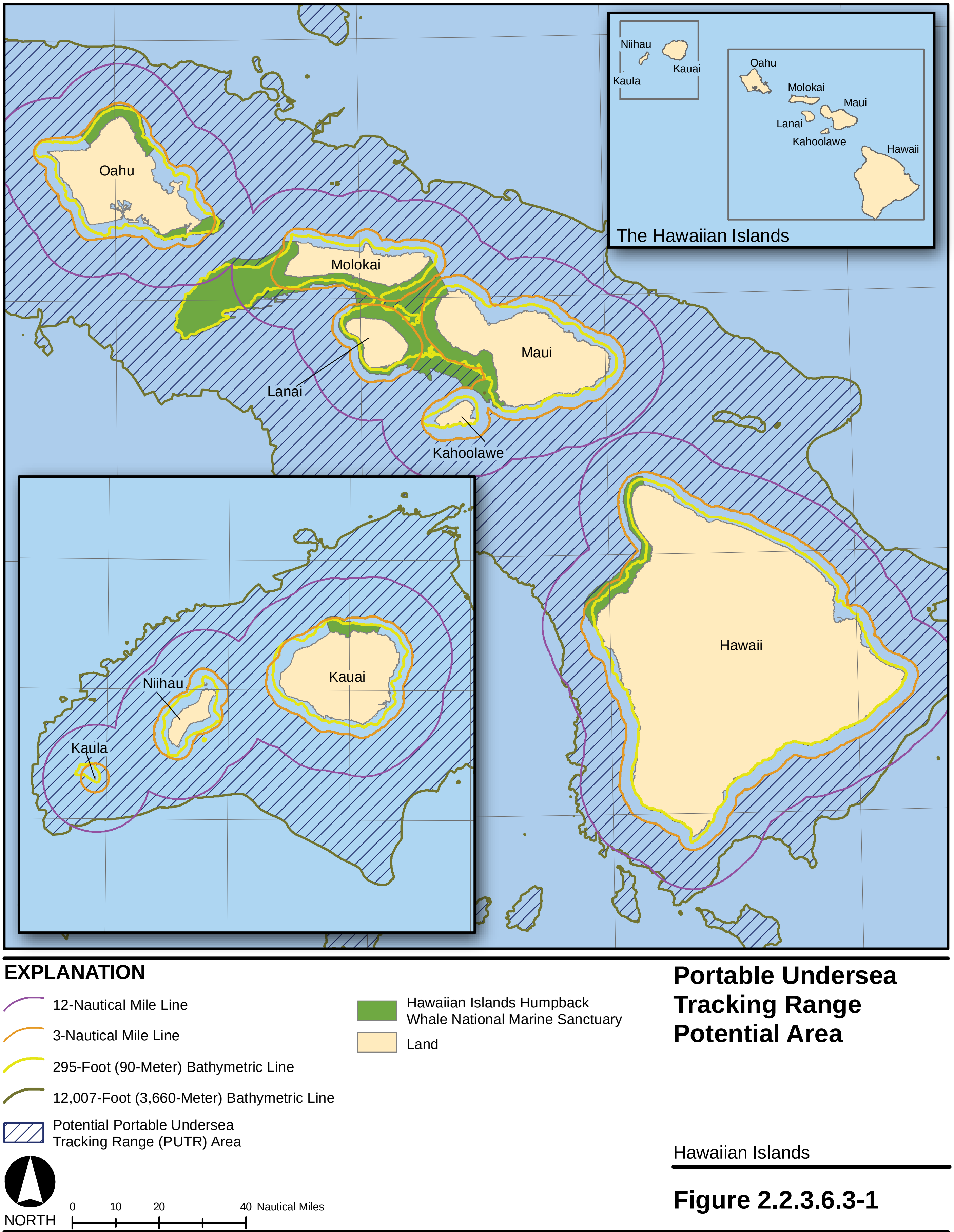
No on-shore construction would take place. Seven electronics packages, each approximately 3 ft long by 2 ft in diameter, would be temporarily installed on the seafloor by a range boat, in water depths greater than 600 ft. The anchors used to keep the electronics packages on the seafloor would be either concrete or sand bags, which would be approximately 1.5 ft-by-1.5 ft and would weigh approximately 300 pounds. Operation of this range requires that underwater participants transmit their locations via pingers. Each package consists of a hydrophone that receives pinger signals, and a transducer that sends an acoustic “uplink” of locating data to the range boat. The uplink signal is transmitted at 8.8 kilohertz (kHz), 17 kHz, or 40 kHz, at a source level of 190 decibels (dB). The Portable Undersea Tracking Range system also incorporates an underwater voice capability that transmits at 8-11 kHz and a source level of 190 dB. Each of these packages is powered by a D cell alkaline battery. After the end of the battery life, the electronic packages would be recovered and the anchors with 25 ft of 0.25-inch stainless steel wire (depending on the environmental and seabed data) would remain on the

seafloor. The Navy proposes to use this portable instrumentation system for only 2 days per month in an area beyond 3 nm from shore. Fishermen would not be denied use of this area. Prior to training in the area, the Coast Guard would be notified and a Notice to Mariners would be issued. If fishermen, boaters, or whales are observed in the area, training involving weapons training would be stopped or moved to another area. The Notice to Mariners would also advise fishermen of the underwater buoys and cables and the risk they could pose to fishing gear entanglement. If necessary, additional environmental documentation and coordination with USFWS and NMFS would be completed prior to use of the Portable Undersea Tracking Range.

2.2.3.6.4 PMRF Enhancements

Large Area Tracking Range Upgrade

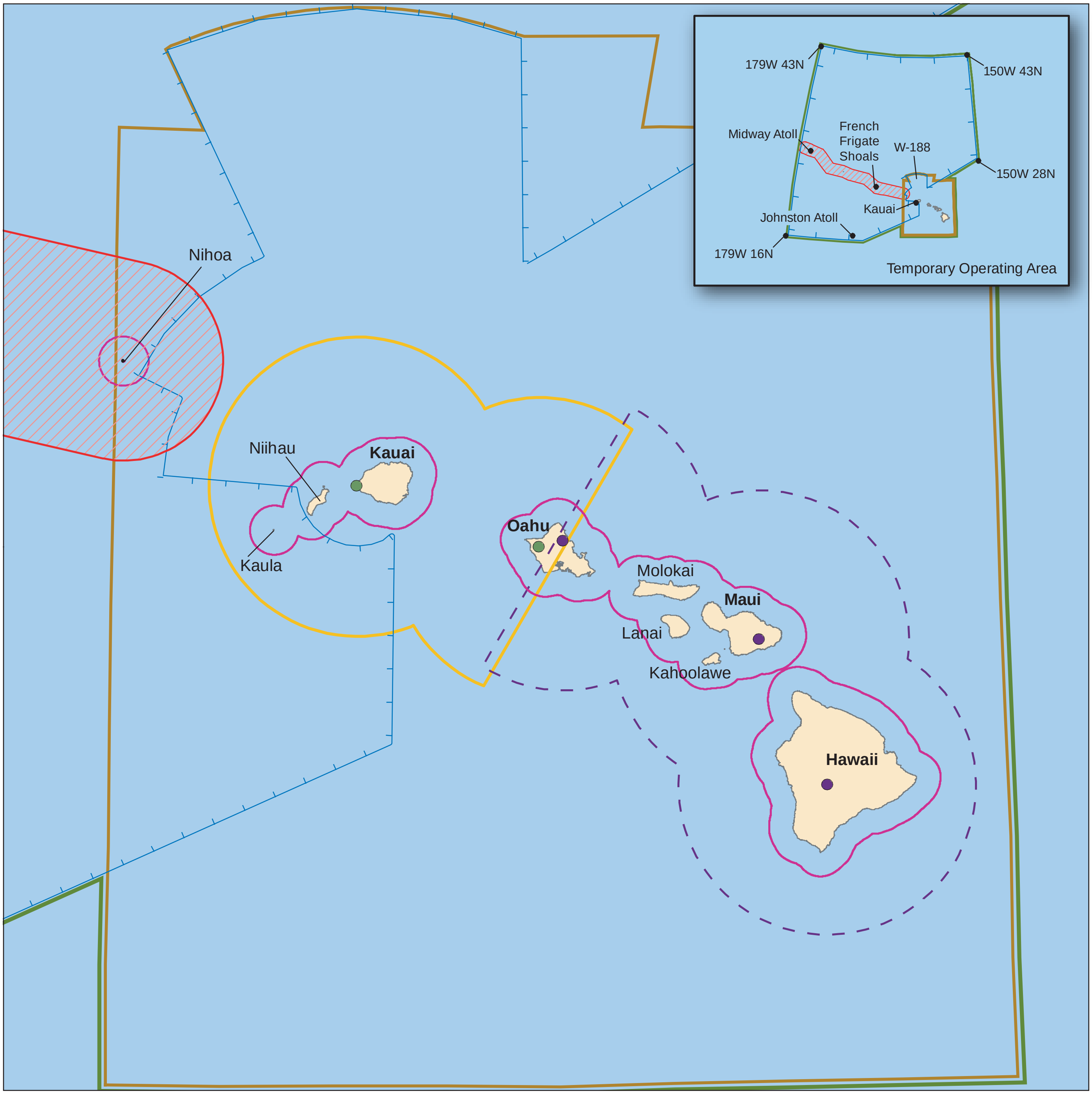
The Large Area Tracking Range (LATR) provides high fidelity time, space, and position information capability at PMRF (see Figure 2.2.3.6.4-1). Ground antenna stations detect participating ships and aircraft, relaying this information to PMRF. Each ground station comprises a Global Positioning System-based beacon and associated hardware, and a whip antenna. The stations transmit an ultra-high-frequency signal at approximately 150 watts of



Portable Undersea Tracking Range Potential Area

Hawaiian Islands

Figure 2.2.3.6.3-1



EXPLANATION

- Existing Ground Relay Stations
- Proposed Ground Relay Stations
- 12-Nautical Mile Line
- Hawaii Range Complex (HRC)
- Temporary Operating Area (TOA)
- Hawaii Operating Area (OPAREA)
- Proposed Large Area Tracking Range Enhancements
- Existing Large Area Tracking Range
- Papahānaumokuākea Marine National Monument
- Land

NORTH

0 50 100 200 Nautical Miles

Large Area Tracking Range Upgrade

Hawaiian Islands

Figure 2.2.3.6.4-1

power. Currently, only a small portion of the HRC is within range of the existing system. This capability is proposed to be upgraded with ground relay stations to cover training throughout much of the HRC. This upgrade would include Pohakuloa Training Area and the Warning Areas south of Oahu to provide seamless tracking within all Warning Areas, the Island of Hawaii, and surrounding each of the main islands (out to 75 nm). Under Alternative 1, three ground relay stations are proposed in order to enhance LATR capabilities. Proposed relay stations would consist of antennas placed on existing facilities, and no new construction is proposed. By establishing new ground relay stations, LATR detection capabilities would be enhanced by providing expanded relay capabilities to PMRF for training purposes.

Kingfisher Underwater Training Area

PMRF would also locate a new simulated underwater minefield to exercise the Kingfisher mine detection system closer to Niihau (Figure 2.2.3.6.4-2). This underwater training area would be approximately 2 miles (mi) off the southeast coast of Niihau at a depth of between 300 and 1,200 ft in flat areas that are typically covered by sand and silt and free of high-relief features such as cliffs. This training area had previously been located off the southwest coast of Kauai.

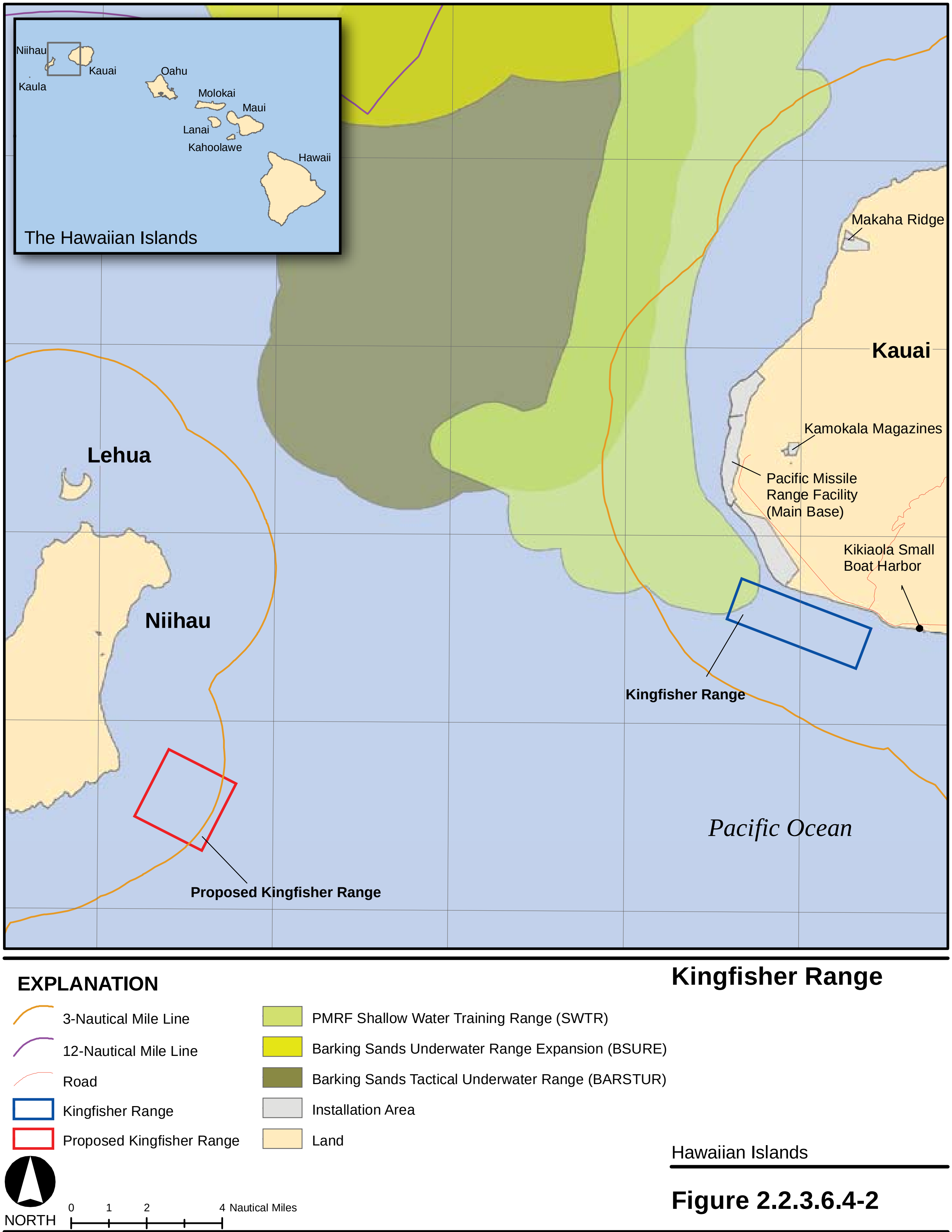
The Kingfisher system would consist of fewer than 20 steel sphere-shaped buoys that are approximately 37 inches in diameter. The buoys would be anchored to the ocean floor by a clump of welded chains weighing approximately 2,000 lb. A wire rope would be woven through the chain to attach to each buoy, suspending it between 60 and 120 ft from the ocean surface. The clump of chain would occupy an area of approximately 3 ft by 3 ft wide and 1.5 ft high. The chain may eventually bury itself, depending on the current and the softness of the ocean floor. Each buoy would be deployed from a ship in a grid determined by the Navy. There would be no electronics and no emitters on the buoys. If necessary, additional environmental documentation and coordination with USFWS and NMFS would be completed prior to establishment of the new Kingfisher underwater training area.

FORCEnet Antenna

An existing site would be chosen at Makaha Ridge (Figure 2.2.3.6.4-3) or Kokee (Figure 2.2.3.6.4-4) to be the location of a FORCEnet integration laboratory. FORCEnet is an effort to integrate military personnel, sensors, networks, command and control, platforms, and weapons into a fully netted, combat force. The site chosen would be an existing building or portable trailer. This new laboratory would bring a Cooperative Engagement Capability to PMRF and would consist primarily of software and minimal hardware upgrades. The purpose of the laboratory would be to demonstrate, experiment with, and evaluate emerging hardware and software technologies that support the FORCEnet architecture and standards as part of the Navy's SEA POWER 21, enhancing the United States' ability to project offensive power, defensive assurance, and operational independence around the globe. No ground disturbance or vegetation clearing would be required.

Enhanced Electronic Warfare Training

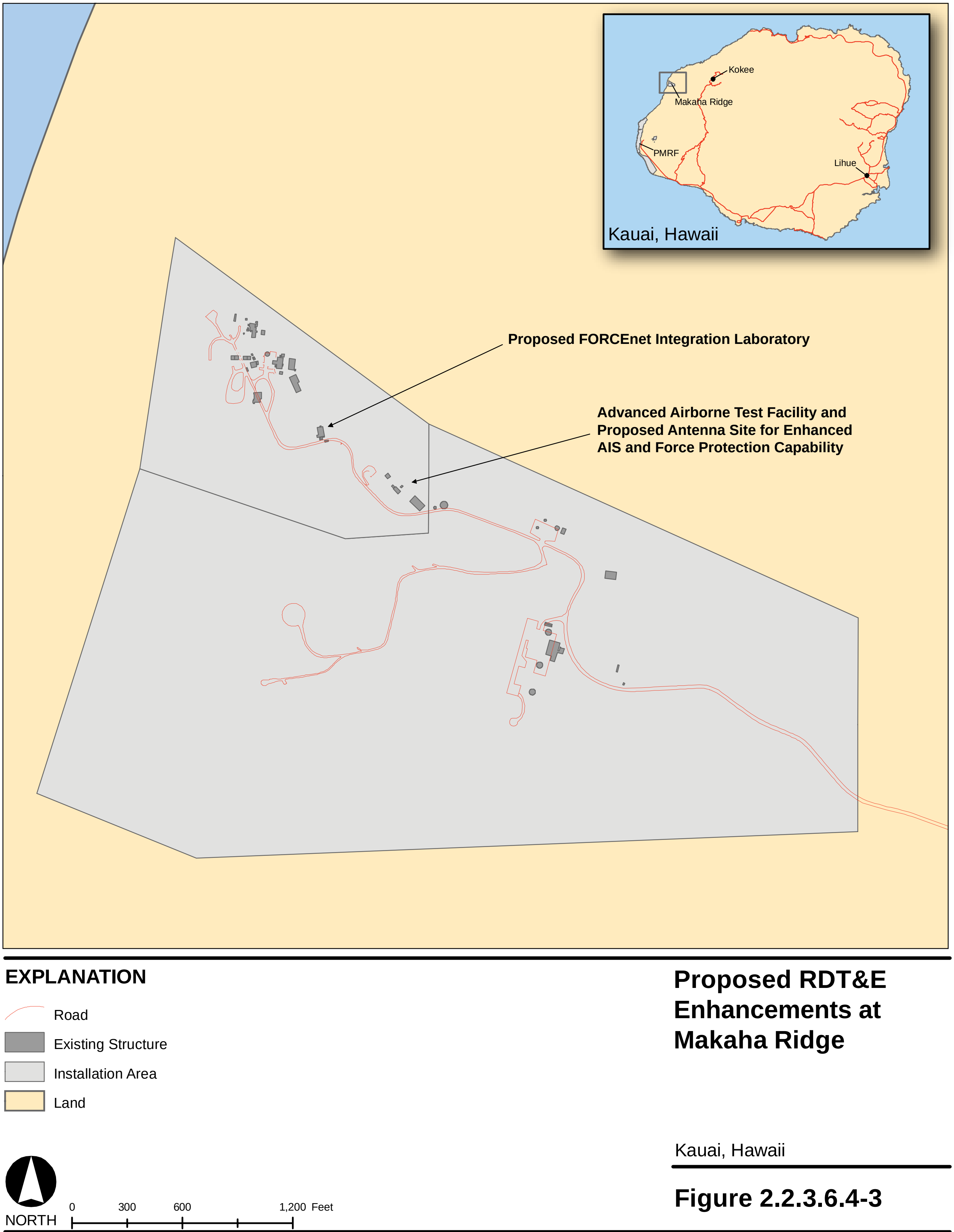
The PMRF capability for EW training would be enhanced to include sites on other islands (e.g., Maui and Hawaii). Pohakuloa Training Area will receive two Joint Threat Emitters and PMRF will upgrade from its present Mobile Remote Emitter Simulator system. EW training is accomplished when EW emitters transmit signals that replicate hostile radars and weapon systems. Ship and aircraft crews attempt to identify the electronic signals, and react defensively



Kingfisher Range

Hawaiian Islands

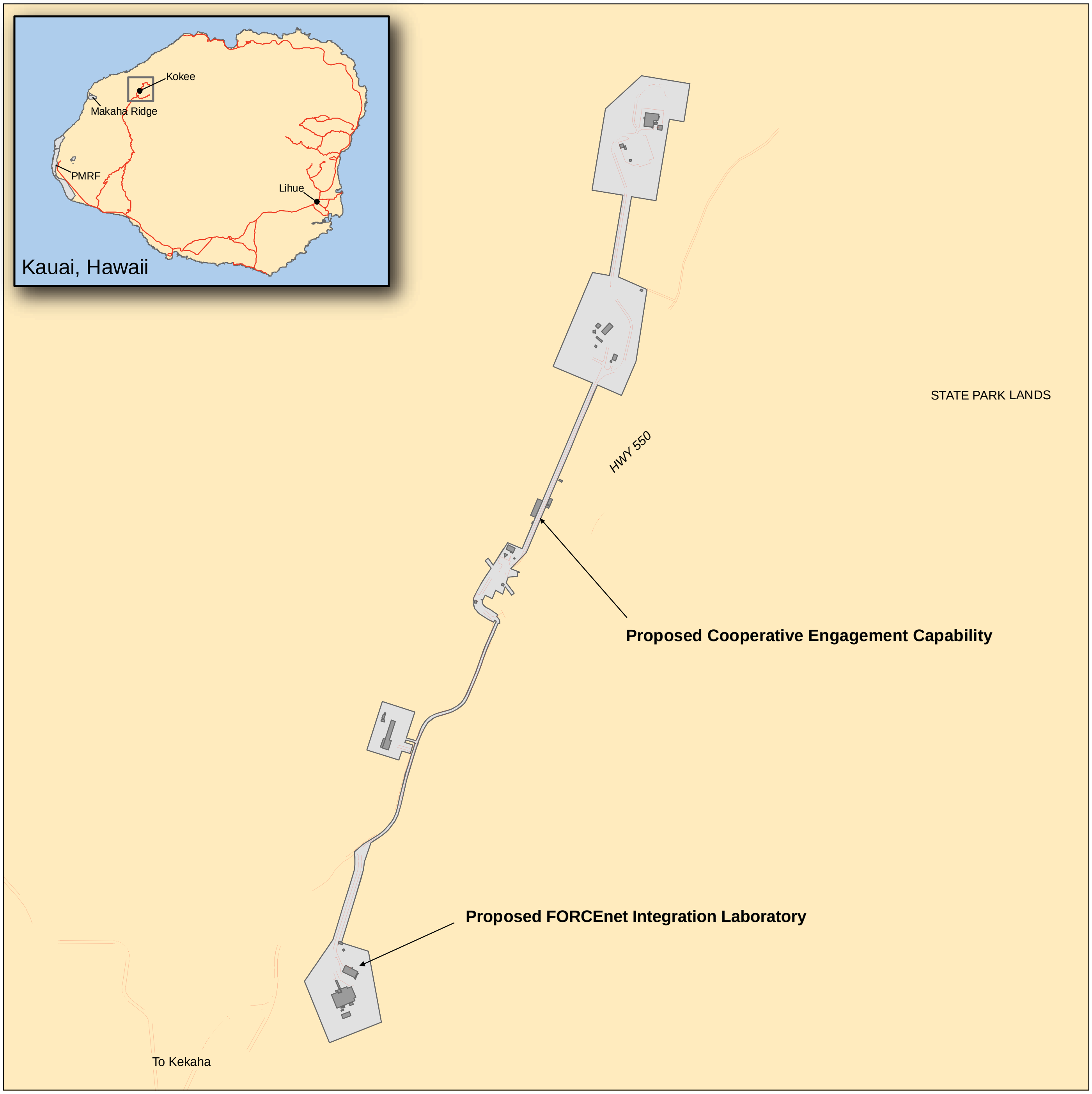
Figure 2.2.3.6.4-2



Proposed RDT&E Enhancements at Makaha Ridge

Kauai, Hawaii

Figure 2.2.3.6.4-3



EXPLANATION

Road
Existing Structure
Installation Area
Land

NORTH

0 500 1,000 2,000 Feet

Proposed RDT&E Enhancements at Kokee Park Radar Facility

Kauai, Hawaii

Figure 2.2.3.6.4-4

if appropriate. Transmitters could be antennas or mobile vehicles. Where possible, existing towers would be chosen to incorporate new equipment with minimal modifications needed. The new equipment would primarily include software and minimal hardware upgrades. If new towers were to be built and operated, locations would be selected by personnel familiar with local environmental constraints, including the presence of threatened or endangered species and follow-on environmental analyses beyond this EIS/OEIS would be required before such activities could occur.

Expanded Training Capability for Transient Strike Groups

As part of the Joint National Training Capability, PMRF would provide dedicated equipment to enable deployed mid-Pacific forces, transiting Strike Groups, and vessels in-port at various locations to train in a virtual environment. The dedicated equipment would consist of a new communications node in an existing building at PMRF to enhance the capabilities of existing command and control facilities.

Enhanced Automatic Identification System and Force Protection Capability

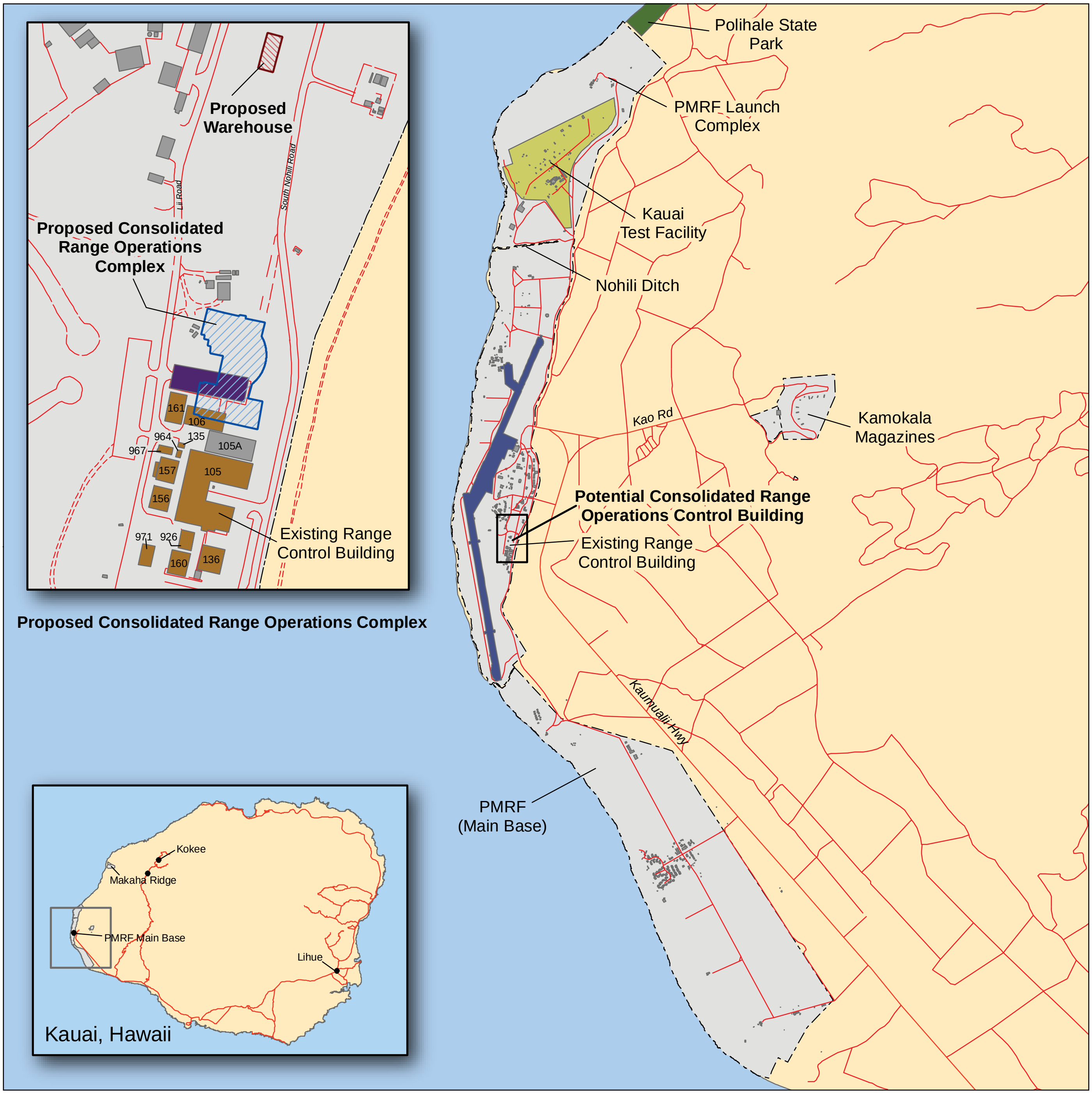
The Automatic Identification System (AIS), (recommended by the Navy in 2001 for Homeland Security) is similar to Identification Friend or Foe that aircraft use, except that AIS is designed for use on commercial vessels for Force Protection purposes. These systems automatically report identification, origin, destination, current location, course and speed, intermediate stops, and cargo. AIS equipment would be installed on each island so each ship would have sensor connectivity and communication connections. Antennas would be added to existing structures, building 720 on Makaha Ridge and to building 282 on PMRF/Main Base as part of Alternative 1. No ground disturbance or vegetation clearing would be required.

Construct Range Operations Control Building

PMRF would build a new range operations building to consolidate the activities currently in 13 buildings. The facility would be almost 90,000 square feet (ft^2), and its proposed location on PMRF Main Base, shown in Figure 2.2.3.6.4-5, is within the previously disturbed administrative area. The proposed building height is 36 to 42 ft above finish grade. Roof-mounted antennas would be installed to replace those currently installed on buildings to be demolished. Full cutoff exterior lighting would be installed to protect the Newell's shearwater and Laysan albatross. The existing beacon (bore site) tower that is approximately 85 ft tall would be raised to approximately 105 ft above the surrounding existing grade in accordance with all applicable rules and regulations.

The project also would include the following:

- Construction of a 4,200 ft^2 dehumidified warehouse to replace building 106, which would be displaced by the proposed Range Operations building
- Construction of a new bore site tower for the Q-1 radar
- Conversion of building 105 annex into an electrical and electronic system laboratory
- Demolition of 13 buildings (some are trailers) with a combined floor area of over 55,000 ft^2, as shown in Figure 2.2.3.6.4-5
- Construction of antenna supports
- Installation of utilities and parking lots



EXPLANATION

- Road
- Proposed Consolidated Range Operations Complex
- Proposed Warehouse
- Polihale State Park
- Kauai Test Facility
- Airfield
- Proposed Facilities for Demolition
- Proposed Parking Area for Demolition
- Pacific Missile Range Facility (PMRF) Installation Area
- Existing Structure
- Land

NORTH

0 2,500 5,000 10,000 Feet

Proposed Consolidated Range Operations Complex

Kauai, Hawaii

Figure 2.2.3.6.4-5

Improve Fiber Optics Infrastructure

To improve communications and data transmission, PMRF would install fiber optic cable between the Main Base and the sites at Kokee, shown in Figure 2.1-2. This project would involve the installation of approximately 23 mi of fiber optic cable, which would be hung on existing Kauai Island Utility Cooperative poles between PMRF/Main Base and Kokee. The existing poles run from Kekaha Mill, up a ridge, and intersect Kokee Road at an existing substation. If exceptionally long spans are encountered, additional poles might need to be installed in some areas. It is expected that all equipment and installation activities would occur along existing public and Kauai Island Utility Cooperative access roads. Prior to implementation, PMRF would coordinate with Kauai Island Utility Cooperative and the local Department of Transportation for approvals.

2.2.3.7 MAJOR EXERCISES FOR ALTERNATIVE 1

The Navy proposes to continue Major Exercises such as RIMPAC and USWEX described in the No-action Alternative. Under Alternative 1, RIMPAC would include two Strike Groups (which could include up to two carriers), and FCLPs would occur in association with transiting Strike Groups participating in Major Exercises. The training events associated with Major Exercises would be chosen from the appropriate matrix of training events in Appendix D.

For RIMPAC under Alternative 1, the marine mammal exposure modeling included 1,064 hours of AN/SQS-53 and AN/SQS-56 surface ship sonar and associated dipping sonar, sonobuoys, and MK-48 torpedoes. For USWEX under Alternative 1, the marine mammal exposure modeling included six USWEXs for a total of 840 hours of AN/SQS-53 and AN/SQS-56 surface ship sonar and associated dipping sonar, sonobuoys, and MK-48 torpedoes (Table 2.2.3.2-1).

2.2.3.8 MITIGATION MEASURES FOR ALTERNATIVE 1

Under Alternative 1, the Navy's marine mammal mitigation measures would continue to be implemented. Chapter 6.0 presents these mitigation measures, outlining steps that are currently implemented to protect marine mammals and federally-listed species.

2.2.4 ALTERNATIVE 2

2.2.4.1 TRAINING EVENTS FOR ALTERNATIVE 2

Alternative 2 would include all of the training described in Alternative 1 plus a further increased tempo and frequency of training events, future RDT&E programs at PMRF and the addition of Major Exercises, such as supporting three carrier Strike Groups training at the same time. Table 2.2.2.3-1 shows the number of Navy training events proposed for Alternative 2, compared to No-action Alternative and the number of events proposed under Alternative 1.

For RIMPAC under Alternative 2, the marine mammal exposure modeling included 1,064 hours of AN/SQS-53 and AN/SQS-56 surface ship sonar and associated dipping sonar, sonobuoys, and MK-48 torpedoes. For USWEX under Alternative 2, the marine mammal exposure modeling included six USWEXs for a total of 840 hours of AN/SQS-53 and AN/SQS-56 surface ship sonar and associated dipping sonar, and sonobuoys (refer to Section 2.2.4.2).

2.2.4.2 MFA/HFA SONAR USAGE FOR ALTERNATIVE 2

Table 2.2.4.2-1 lists MFA/HFA sonar usage analyzed for Alternative 2. Sonar usage is based on SPORTS data and operator input.

Table 2.2.4.2-1. Sonar Usage for Alternative 2

Supplement to the Draft EIS/OEIS Hours/ Events Modeled		
Other HRC ASW Training		
	Source	**Modeled**
	53	360 hours
	56	75 hours
	Dipping	123 dips
	Sonobuoy	1,431 buoys
	MK-48	365 runs
	Submarine	200 hours
RIMPAC (2 Carrier)		
	Source	**Modeled**
	53	798 hours
	56	266 hours
	Dipping	800 dips
	Sonobuoy	994 buoys
	MK-48	8 runs
USWEX (6 Exercises)		
	Source	**Modeled**
	53	630 hours
	56	210 hours
	Dipping	600 dips
	Sonobuoy	778 buoys
Multiple Strike Group		
	Source	**Modeled**
	53	708 hours
	56	236 hours
	Dipping	240 dips
	Sonobuoy	325 buoys
	MK-48	1 run
Alternative 2 Totals		
	Source	**Modeled**
	53	2,496 hours
	56	787 hours
	Dipping	1,763 dips
	Sonobuoy	3,528 buoys
	MK-48	374 runs
	Submarine	200 hours

2.2.4.3 INCREASED TEMPO AND FREQUENCY OF TRAINING FOR ALTERNATIVE 2

Under Alternative 2, the Navy proposes to increase the tempo and frequency of training events (above Alternative 1 levels) and compress the tempo of training events in the HRC. In this setting, tempo means intensity and could include more forces or shorter/longer duration of activities. For example, instead of a training event lasting 5 days, the same training events would be completed in 3 days. The frequency of training would also be increased. An increase in frequency means the number of training events in a given time period would increase.

2.2.4.4 ENHANCED RDT&E ACTIVITIES FOR ALTERNATIVE 2

The Navy proposes to enhance RDT&E activities from Alternative 1 levels as shown in Table 2.2.2.5-1. Enhanced RDT&E could include activities such as additional missile defense RDT&E (including an increase in THAAD interceptor activities), CSSQT at-sea tests, and FORACS accuracy checks.

2.2.4.5 FUTURE RDT&E ACTIVITIES FOR ALTERNATIVE 2

PMRF would develop the capability to support the Directed Energy and Advanced Hypersonic Weapon programs.

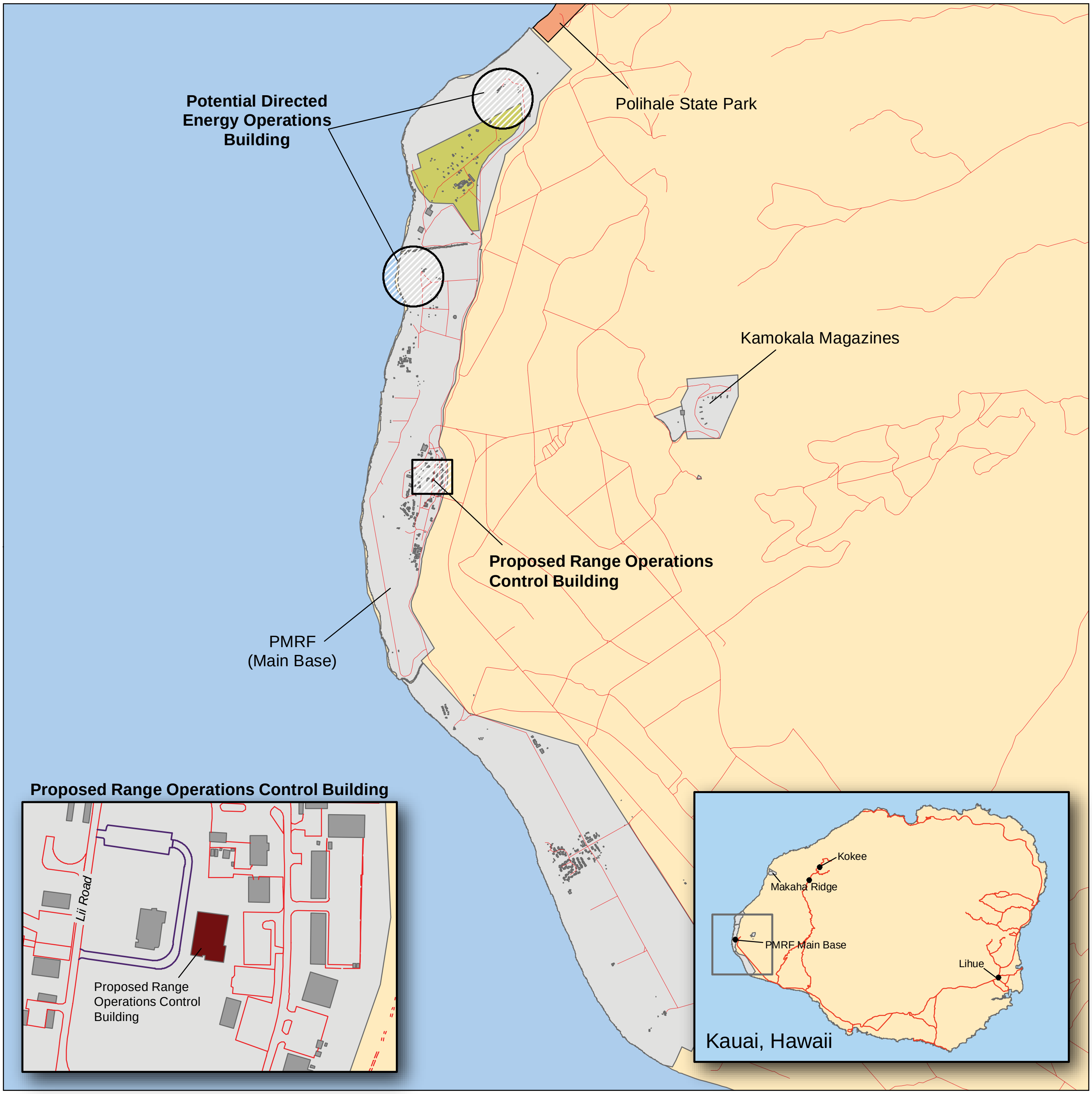
Directed Energy

The Navy proposes to establish a long-term support facility, the Maritime Directed Energy Test Center, at PMRF for directed energy programs, such as the High-Energy Laser.

The high-energy laser would require a permanent operations building with approximately 25,000 ft^2. Figure 2.2.4.5-1 shows the proposed location. The actual footprint of the proposed center would be smaller than the circles shown on Figure 2.2.4.5-1 and would avoid designated critical habitat. During testing, the range would need to be cleared. Up to four air targets and up to four surface targets would be used for testing. The laser would require 30 megawatts of power. Up to 100 personnel would support this program. Construction of the Maritime Directed Energy Test Center would require separate/additional environmental documentation.

PMRF would develop the necessary standard operating procedures and range safety requirements necessary to provide safe operations associated with future high-energy laser tests.

PMRF would add the capability to test non-eye-safe lasers. The range could also be used to support Airborne Laser program testing. The Airborne Laser aircraft would stage out of Hickam AFB on Oahu. The chemicals for operating the laser onboard the aircraft would be transported to Oahu by ship and would be stored at Hickam AFB. Should the Airborne Laser program decide to perform testing at PMRF, separate environmental documentation would be required to analyze potential impacts.



EXPLANATION

- Road
- Proposed Road
- Kauai Test Facility
- Proposed Range Operations Control Building
- Polihale State Park
- Existing Structure
- Pacific Missile Range Facility (PMRF) Installation Area
- Land

NORTH

0 2,500 5,000 10,000 Feet

Proposed Directed Energy Facilities at Pacific Missile Range Facility

Kauai, Hawaii

Figure 2.2.4.5-1

The following PMRF assets would be used to support any future laser testing:

- Numerous tracking sensors at Makaha Ridge
- Fleet assets (air, surface, subsurface, strategic) for open range testing
- Hawaiian Surveillance Network programs on Kauai, Maui, Hawaii, and Niihau
- Supercomputer center at Kihei, Maui, to support operational analyses

Advanced Hypersonic Weapon

The Advanced Hypersonic Weapon is a U.S. Army Space and Missile Defense Command RDT&E program that would eventually involve launches of long range (greater than 3,400 mi) missiles deploying an unpowered payload. This is proposed to be a four-missile launch program, with the first two tests using a Strategic Target System booster launched from KTF at PMRF (Figure 2.2.2.5.1-2). The payload would travel a distance of approximately 2,500 mi from PMRF to Illeginni Island in U.S. Army Kwajalein Atoll. The first test is scheduled in the spring of 2010, and the second test would occur between 6 and 12 months later, again using a Strategic Target System following the same flight path. The third test would be approximately 1 year later and would use a two-stage system containing approximately 42,000 lb of solid propellant launched from the same pad. The fourth test from the same launch site would again use the same two-stage system. Launches would average one per year. There are no fuels or oxidizers on the payloads themselves, and they would all impact on land. The modified 10,000-ft ground hazard area would be used for both systems.

2.2.4.6 HAWAII RANGE COMPLEX ENHANCEMENTS FOR ALTERNATIVE 2

Under Alternative 2, all HRC enhancements would be the same as those described under Alternative 1, Section 2.2.3.6.

2.2.4.7 ADDITIONAL MAJOR EXERCISES—MULTIPLE STRIKE GROUP TRAINING FOR ALTERNATIVE 2

Up to three Strike Groups would conduct training exercises simultaneously in the HRC (Figure 1.2-3). The Strike Groups would not be homeported in Hawaii, but would stop in Hawaii en route to a final destination. The Strike Groups would be in Hawaii for up to 10 days per exercise.

The exercise would involve Navy assets engaging in a “free play” battle scenario, with U.S. forces pitted against a replicated opposition force. The exercise provides realistic training on in-theater training. Proposed training would be similar to current training for the RIMPAC and USWEX Exercises. Also included in the training events would be FCLP conducted at the following airfields: Marine Corps Base Hawaii and PMRF. With the increased Strike Group training required of this alternative, the potential for requiring FCLPs increases. Therefore, this alternative includes FCLPs for an additional Strike Group each year, increasing the total number of FCLPs to 16 per year.

The proposed exercise would provide Navy personnel realistic maritime training in a complex scenario that replicates the types of challenges that could be faced during real-world operations. Training would be provided to submarine, ship, and aircraft crews in tactics, techniques, and procedures for ASW, Defensive Counter Air, Maritime Interdiction, and operational level C2 of maritime forces. The three Strike Group marine mammal exposure modeling included 944 hours of AN/SQS-53 and AN/SQS-56 surface ship sonar and associated dipping sonar, sonobuoys, and MK-48 torpedoes (refer to Section 2.2.4.2).

2.2.4.8 MITIGATION MEASURES FOR ALTERNATIVE 2

Under Alternative 2, the Navy's marine mammal mitigation measures would continue to be implemented. Chapter 6.0 presents these mitigation measures, outlining steps that are currently implemented to protect marine mammals and federally-listed species.

2.2.5 ALTERNATIVE 3 (PREFERRED)

The only difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training and RDT&E activities associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT& E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Sonar hours for Alternative 3 and effects associated with ASW training would be identical to that presented under the No-action Alternative. Table 2.2.5-1 lists MFA/HFA sonar usage analyzed for the No-action Alternative and Alternative 3. Sonar usage is based on SPORTS data and operator input.

Table 2.2.5-1. Sonar Usage for Alternative 3

Supplement to the Draft EIS/OEIS Hours/Events Modeled		
Other HRC ASW Training		
	Source	**Modeled**
	53	360 hours
	56	75 hours
	Dipping	110 dips
	Sonobuoy	1,278 buoys
	MK-48	309 runs
	Submarine	200 hours
RIMPAC		
	Source	**Modeled**
	53	399 hours
	56	133 hours
	Dipping	400 dips
	Sonobuoy	497 buoys
	MK-48	4 runs

Table 2.2.5-1. Sonar Usage for Alternative 3 (Continued)

Supplement to the Draft EIS/OEIS Hours/Events Modeled		
USWEX (5 Exercises)		
	Source	**Modeled**
	53	525 hours
	56	175 hours
	Dipping	500 dips
	Sonobuoy	648 buoys
Alternative 3 Totals		
	Source	**Modeled**
	53	1,284 hours
	56	383 hours
	Dipping	1,010 dips
	Sonobuoy	2,423 buoys
	MK-48	313 runs
	Submarine	200 hours

Alternative 3 is the preferred alternative because it allows the Navy to meet its future non-ASW training and RDT&E mission objectives while maintaining historic levels of ASW training to avoid increases in potential effects on marine species in the HRC. At this time, the Navy believes that its ASW requirements will be met on the No-action Alternative sonar hours.

2.2.5.1 MITIGATION MEASURES FOR ALTERNATIVE 3

Under Alternative 3, the Navy's marine mammal mitigation measures would continue to be implemented. Chapter 6.0 presents these mitigation measures, outlining steps that are currently implemented to protect marine mammals and federally-listed species.

3.0 Affected Environment

3.0 AFFECTED ENVIRONMENT

This chapter describes the environmental characteristics that may be affected by the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3. Points of reference for understanding any potential impacts are based on the activities that have been historically conducted in the Hawaii Range Complex (HRC). Available reference materials including prior Environmental Assessments (EAs) and Environmental Impact Statements (EISs) were reviewed. Questions were directed to installation and facility personnel, and private individuals. Site visits were also conducted where necessary to gather the baseline data presented herein.

Environmental characteristics are discussed according to location; the Open Ocean Area (outside 12 nautical miles [nm] from land) is discussed first, followed by offshore (within 12 nm from land) and onshore discussion organized by island location from west to east: Northwestern Hawaiian Islands, Kauai, Oahu, Maui, and Hawaii. For organizational purposes, discussions about Niihau and Kaula are included under the Kauai heading, because although they are separate islands, they are part of Kauai County. In addition, discussions about Molokai, Lanai, and Kahoolawe are included under the Maui heading, because although they are separate islands, they are part of Maui County. The last section discusses the Hawaiian Islands Humpback Whale National Marine Sanctuary. The page headers in this chapter identify which location is discussed.

Thirteen environmental resource areas were evaluated to provide a context for understanding the potential effects of ongoing and proposed activities. These areas include air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources. Each resource area is discussed for each proposed location unless the proposed activities at that location would not foreseeably result in an impact, as explained for each location in Chapter 4.0. Table 3-1 lists each location and the section number within this chapter where each of the resources is addressed.

3.1 OPEN OCEAN AREA

The Open Ocean Area is the area within the HRC that is greater than 12 nm offshore of the Hawaiian Islands. The Open Ocean Area also includes the Pacific Missile Range Facility (PMRF) Warning Areas, Oahu Warning Areas (Figure 2.1-1), and the Temporary Operating Area (Figure 1.2-3). The Open Ocean Area, as part of the high seas (outside 12 nm from land), is subject to Executive Order (EO) 12114. Both sea and air operations are covered in this section. Of the 13 environmental resources considered for analysis, air quality, geology and soils, land use, socioeconomics, transportation, and utilities are not addressed.

Table 3-1. Chapter 3.0 Locations and Resources

Location	Air Quality	Airspace	Biological Resources	Cultural Resources	Geology & Soils	Hazardous Materials & Waste	Health & Safety	Land Use	Noise	Socioeconomics	Transportation	Utilities	Water Resources
Open Ocean		3.1.1	3.1.2	3.1.3		3.1.4	3.1.5		3.1.6				3.1.7
Northwestern Hawaiian Islands Offshore			3.2.1.1										
Northwestern Hawaiian Islands Onshore			3.2.2.1	3.2.2.2									
Kauai Offshore													
PMRF-Offshore			3.3.1.1.1	3.3.1.1.2						3.3.1.1.3	3.3.1.1.4		
Niihau-Offshore			3.3.1.2.1										
Kaula-Offshore			3.3.1.3.1	3.3.1.3.2									
Kauai Onshore													
PMRF/Main Base	3.3.2.1.1	3.3.2.1.2	3.3.2.1.3	3.3.2.1.4	3.3.2.1.5	3.3.2.1.6	3.3.2.1.7	3.3.2.1.8	3.3.2.1.9	3.3.2.1.10	3.3.2.1.11	3.3.2.1.12	3.3.2.1.13
Makaha Ridge	3.3.2.2.1		3.3.2.2.2	3.3.2.2.3		3.3.2.2.4	3.3.2.2.5						
Kokee	3.3.2.3.1		3.3.2.3.2			3.3.2.3.3	3.3.2.3.4						
HIANG Kokee			3.3.2.4.1										
Kamokala Magazines						3.3.2.5.1	3.3.2.5.2						
Port Allen*													
Kikiaola Small Boat Harbor*													
Mt. Kahili*													
Niihau			3.3.2.9.1			3.3.2.9.2	3.3.2.9.3						
Kaula		3.3.2.10.1	3.3.2.10.2	3.3.2.10.3	3.3.2.10.4		3.3.2.10.5	3.3.2.10.6					
Oahu Offshore													
Puuloa Underwater Range-Offshore			3.4.1.1.1	3.4.1.1.2		3.4.1.1.3	3.4.1.1.4						
Naval Defensive Sea Area-Offshore			3.4.1.2.1	3.4.1.2.2			3.4.1.2.3						
Marine Corps Base Hawaii-Offshore			3.4.1.3.1	3.4.1.3.2									
Marine Corps Training Area/Bellows-Offshore			3.4.1.4.1	3.4.1.4.2									
Makua Military Reservation-Offshore			3.4.1.5.1	3.4.1.5.2									
Dillingham Military Reservation-Offshore			3.4.1.6.1	3.4.1.6.2									
Ewa Training Minefield-Offshore			3.4.1.7.1			3.4.1.7.2	3.4.1.7.3						
Barbers Point Underwater Range-Offshore			3.4.1.8.1			3.4.1.8.2	3.4.1.8.3						
NUWC SESEF-Offshore			3.4.1.9.1				3.4.1.9.2						
NUWC FORACS-Offshore			3.4.1.10.1				3.4.1.10.2						
Oahu Onshore													
Naval Station Pearl Harbor			3.4.2.1.1	3.4.2.1.2						3.4.2.1.3			
Ford Island			3.4.2.2.1	3.4.2.2.2									3.4.2.2.3
Naval Inactive Ship Maintenance Facility, Pearl Harbor			3.4.2.3.1			3.4.2.3.2							3.4.2.3.3
EOD Land Range NAVMAG Pearl Harbor West Loch			3.4.2.4.1	3.4.2.4.2	3.4.2.4.3		3.4.2.4.4						3.4.2.4.5
Lima Landing			3.4.2.5.1	3.4.2.5.2		3.4.2.5.3	3.4.2.5.4						
USCG Station Barbers Point/Kalaeola Airport		3.4.2.6.1	3.4.2.6.2										
Marine Corps Base Hawaii		3.4.2.7.1	3.4.2.7.2	3.4.2.7.3					3.4.2.7.4	3.4.2.7.5			
Marine Corps Training Area/Bellows			3.4.2.8.1	3.4.2.8.2									
Hickam Air Force Base		3.4.2.9.1	3.4.2.9.2										
Wheeler Army Airfield		3.4.2.10.1	3.4.2.10.2										
Makua Military Reservation			3.4.2.11.1	3.4.2.11.2			3.4.2.11.3		3.4.2.11.4				
Kahuku Training Area			3.4.2.12.1	3.4.2.12.2									
Dillingham Military Reservation			3.4.2.13.1	3.4.2.13.2									
Keehi Lagoon*													
Kaena Point*													
Mt. Kaala*													
Wheeler Network Segment Control/PMRF Communication Site*													
Mauna Kapu Communication Site*													
Makua Radio/Repeater/Cable Head*													
Maui Offshore													
Maui Offshore			3.5.1.1.1										
Shallow-water Minefield Sonar Training Area-Offshore*													
Maui Onshore													
Maui Space Surveillance Site*													
Maui High Performance Computing Center*													
Sandia Maui Haleakala Facility*													
Molokai Mobile Transmitter Site*													
Hawaii Offshore													
Kawaihae Pier			3.6.1.1.1										
Hawaii Onshore													
Pohakuloa Training Area		3.6.2.1.1	3.6.2.1.2	3.6.2.1.3			3.6.2.1.4		3.6.2.1.5				
Bradshaw Army Airfield		3.6.2.2.1	3.6.2.2.2	3.6.2.2.3									
Kawaihae Pier			3.6.2.3.1										
Hawaiian Islands Humpback Whale National Marine Sanctuary			3.7.1										

*A review of the 13 environmental resources against program activities determined there would be no impacts from site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3.

3.1.1 AIRSPACE—OPEN OCEAN AREA

Airspace, or that space which lies above a nation and comes under its jurisdiction, is generally viewed as being unlimited. However, it is a finite resource that can be defined vertically and horizontally, as well as temporally, when describing its use for aviation purposes. The time dimension is a very important factor in airspace management and air traffic control.

Under Public Law (PL) 85-725, *Federal Aviation Act of 1958*, the Federal Aviation Administration (FAA) is charged with the safe and efficient use of our nation's airspace, and has established certain criteria for and limits to its use. The method used to provide this service is the National Airspace System. This system is "…a common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information and manpower and material." Appendix C includes a detailed definition of airspace.

Region of Influence

For this EIS/Overseas EIS (OEIS), the region of influence for the Open Ocean Area airspace is defined as those areas beyond the territorial limit which is otherwise known as international airspace.

Affected Environment

The affected airspace environment in the Open Ocean Area region of influence is described below in terms of its principal attributes: controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, airports and airfields, and air traffic control. There are no military training routes in the region of influence.

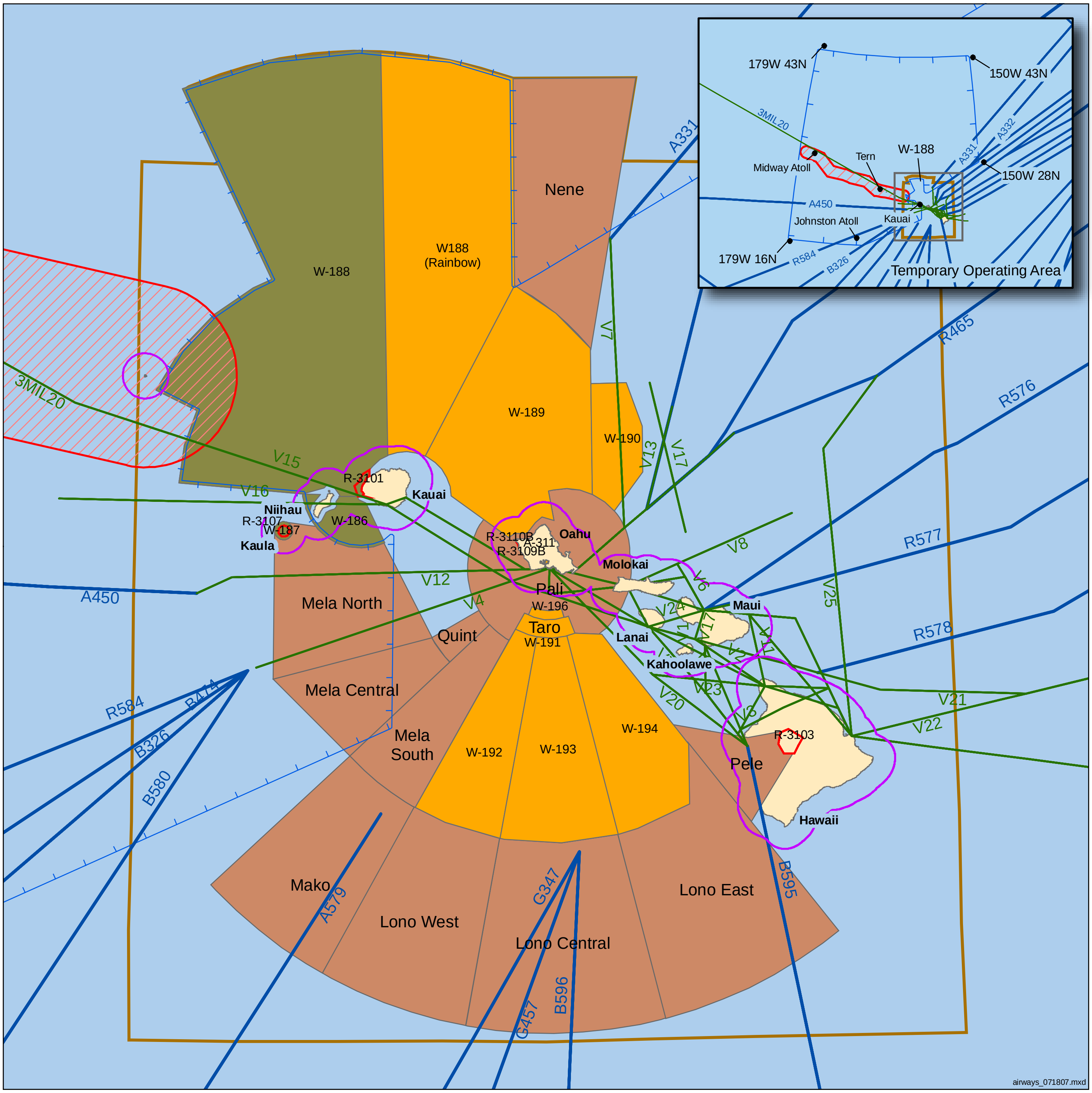
Controlled and Uncontrolled Airspace

Most of the airspace within the region of influence is in international airspace, and air traffic is managed by the Hawaii Combined Facility. The Honolulu Combined Facility includes the Air Route Traffic Control Center (ARTCC), the Honolulu Control Tower, and the Combined Radar Approach Control collocated in a single facility. Airspace outside that managed by the Hawaii Combined Facility is managed by the Oakland ARTCC.

Special Use Airspace

The special use airspace in the region of influence (Figure 3.1.1-1) consists of Warning Area W-188 north of Kauai, and Warning Area W-186 southwest of Kauai, controlled by PMRF. Warning Areas W-188 Rainbow, W-189 and W-190 north of Oahu, W-187 surrounding Kaula, and W-191, W-192, W-193, W-194, and W-196 south of Oahu are scheduled through the Navy Fleet Area Control and Surveillance Facility (FACSFAC) Pearl Harbor which then coordinates with the Honolulu Combined Facility. There are also 12 Air Traffic Control Assigned Airspace (ATCAA) areas within the region of influence. These ATCAA areas provide additional controlled airspace adjacent to and between the Warning Areas.

Table 3.1.1-1 lists the affected Warning Areas and ATCAA areas and their effective altitudes, times used, and their manager or scheduler. There are no prohibited or alert special use airspace areas in the Open Ocean Area airspace use region of influence.



EXPLANATION

Air Traffic Services (ATS) Route	Papahānaumokuākea Marine National Monument
Oceanic Route	Air Traffic Control Assigned Airspace (ATCAA)
Temporary Operating Area (TOA)	Oahu Warning Area
Hawaii Operating Area (OPAREA)	Pacific Missile Range Facility (PMRF) Warning Area
Restricted Airspace	Land

NORTH

0 50 100 200 Nautical Miles

Airways and Special Use Airspace

Hawaiian Islands

Figure 3.1.1-1

Table 3.1.1-1. Special Use Airspace in the Open Ocean Area Airspace Use Region of Influence

Warning/ATCAA Number/Name	Location	Altitude (Feet)	Time of Use: Days	Time of Use: Hours	Controlling Agency
W-186	Northern Warning Areas	To 9,000	Cont[1]	Cont[1]	PMRF
W-187	Northern Warning Areas	To 18,000	M-F S-Su	0700-2200 0800-1600	PMRF
W-188	Northern Warning Areas	To unlimited	Cont[1]	Cont[1]	PMRF/ HCF
W-189	Northern Warning Areas	To unlimited	M-F S-Su	0700-2200 0800-1600	HCF
W-190	Southern Warning Areas	To unlimited	M-F S-Su	0700-2200 0800-1600	HCF
W-191	Southern Warning Areas	To 3,000	M-F S-Su	0700-2200 0800-1600	HCF
W-192	Southern Warning Areas	To unlimited	M-F S-Su	0700-2200 0800-1600	HCF
W-193	Southern Warning Areas	To unlimited	M-F S-Su	0700-2200 0800-1600	HCF
W-194	Southern Warning Areas	To unlimited	M-F S-Su	0700-2200 0800-1600	HCF
W-196	Southern Warning Areas	To 2,000	M-F S-Su	0700-2200 0800-1600	HCF
Nene	Northern Warning Areas	1,200 to unlimited		By request	HCF
Pali	Above Oahu	FL 250 to unlimited		By request	HCF
Taro	Above W-191	3,000 to 16,000		By request	HCF
Quint		FL 250 to unlimited		By request	HCF
Mela North	Between W-192 and W-186	1,200 to 15,000		By request	HCF
Mela Central	Between W-192 and W-186	to unlimited		By request	HCF
Mela South	Between W-192 and W-186	1,200 to unlimited		By request	HCF
Mako	Southern Area	1,200 to unlimited		By request	HCF
Lono West	Southern Area	1,200 to unlimited		By request	HCF
Lono Central	Southern Area	1,200 to unlimited		By request	HCF
Lono East	Southern Area	1,200 to unlimited		By request	HCF
Pele	Between W-194 and R-3101	16,000 to FL 290		By request	HCF
Kapu/Quickdraw, Wela Hot Areas	Within W-192			By request	HCF

Source: National Aeronautical Charting Office, 2007

Notes: [1]Cont = Continuous
W = Warning Area
ATCAA = Air Traffic Control Assigned Airspace
FL = Flight Level (FL 180 = 18,000 ft)
HCF = Honolulu Combined Facility (Air Route Traffic Control Center, Combined Radar Approach Control, and Honolulu Control Tower)
PMRF = Pacific Missile Range Facility

En Route Airways and Jet Routes

The Open Ocean Area airspace use region of influence has several en route high-altitude jet routes, as shown on Figure 3.1.1-1. Most of the oceanic routes enter the region of influence from the northeast and southwest and are generally outside the special use airspace warning areas described above. The Air Traffic Services routes are concentrated along the Hawaiian Islands chain. Most of the Open Ocean Area region of influence is well-removed from the jet routes that crisscross the North Pacific Ocean.

As an alternative to aircraft flying above 29,000 feet (ft) following published, preferred Instrument Flight Rules (IFR) routes (shown in Figure 3.1.1-1), the FAA is gradually permitting aircraft to select their own routes. This “Free Flight” program is an innovative concept designed to enhance the safety and efficiency of the National Airspace System. The concept moves the National Airspace System from a centralized command-and-control system between pilots and air traffic controllers to a distributed system that allows pilots, whenever practical, to choose their own route and file a flight plan that follows the most efficient and economical route.

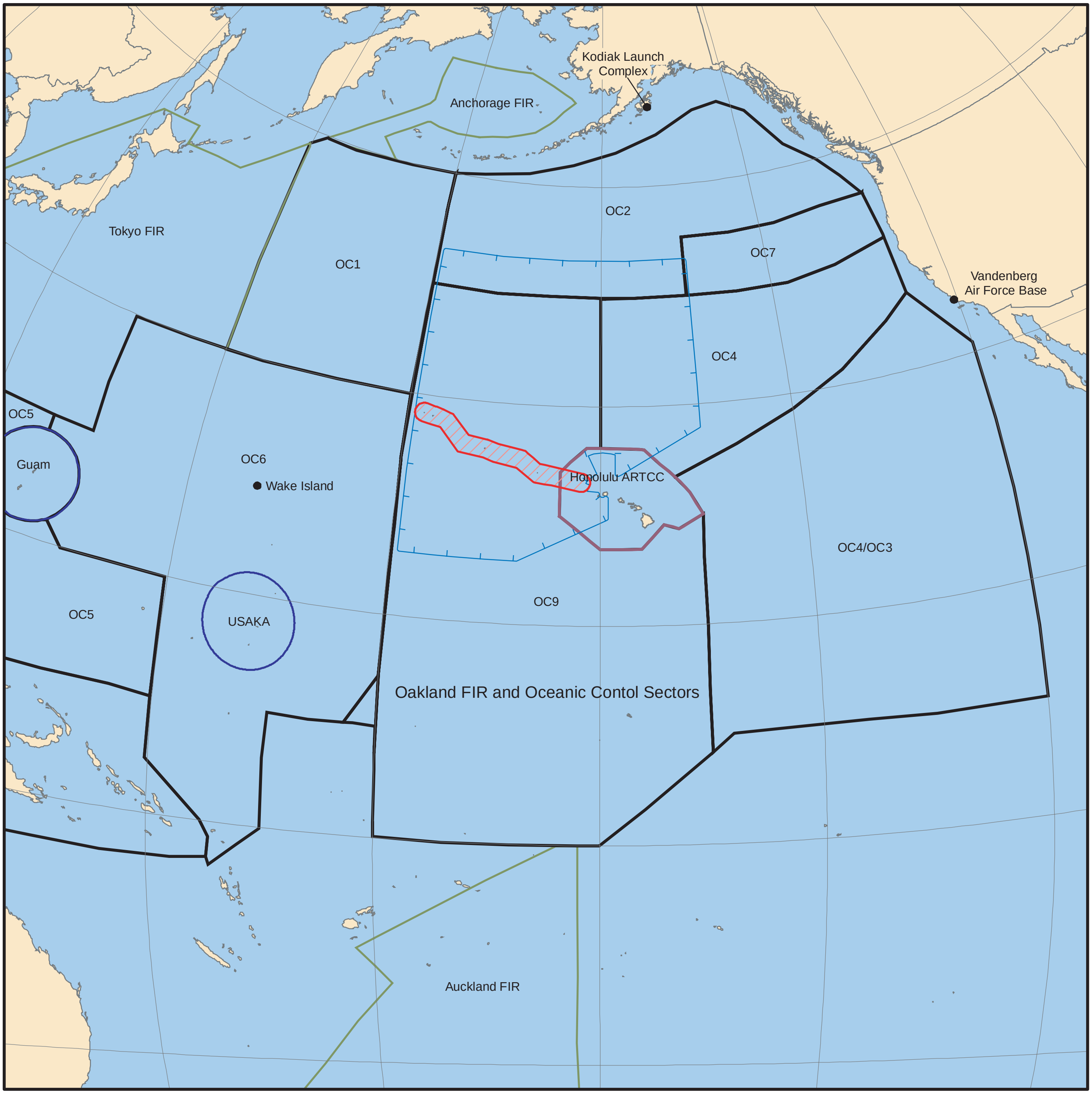
The Central Pacific Oceanic Program is one of the Free Flight programs underway. In the airspace over the Central Pacific Ocean, advanced satellite voice and data communications are being used to provide faster and more reliable transmission to enable reductions in vertical, lateral, and longitudinal separation, more direct flights and tracks, and faster altitude clearances. With the full implementation of this program, the amount of airspace in the region of influence that is likely to be clear of traffic may decrease as pilots, whenever practical, choose their own route and file a flight plan that follows the most efficient and economical route.

Airports and Airfields

There are no airports or airfields in the Open Ocean Area airspace use region of influence. However, a small portion of the Honolulu Class B airspace extends beyond the territorial limit into the region of influence.

Air Traffic Control

Air traffic in the region of influence is managed by the Oakland and Honolulu ARTCCs (see Figure 3.1.1-2).



EXPLANATION

- Temporary Operating Area (TOA)
- Radar Control Area
- Flight Information Region (FIR)
- Papahānaumokuākea Marine National Monument
- Oakland FIR and Oceanic Control (OC) Sector
- Honolulu Air Route Traffic Control Center Area
- Land

Note:
USAKA = U.S. Army Kwajalein Atoll
ARTCC = Air Route Traffic Control Center

NORTH

0 300 600 1,200 Nautical Miles

Airspace Managed by Oakland and Honolulu Air Route Traffic Control Centers

Pacific Ocean

Figure 3.1.1-2

3.1.2 BIOLOGICAL RESOURCES—OPEN OCEAN AREA

Native or naturalized vegetation, wildlife, and the habitats in which they occur are collectively referred to as biological resources. Existing information on plant and animal species and habitat types in the vicinity of the proposed sites was reviewed, with special emphasis on the presence of any species listed as threatened or endangered by Federal or State agencies, to assess their sensitivity to the effects of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Appendix C includes a definition of biological resources and the main regulations and laws that govern their protection.

Region of Influence

The region of influence for open ocean species includes the areas of the Pacific Ocean within the HRC beyond 12 nm from the shore.

Affected Environment

The affected biological resources environment in the Open Ocean Area region of influence is described below.

3.1.2.1 CORAL

The Hawaiian Islands have 6,764.5 square miles (mi^2) of coral reef area, representing 84 percent of the coral reef area in the United States (Maragos, 1977). Due to the motion of the Pacific Plate, the Hawaiian Islands have been transported in a north to northwest direction away from their original location of formation over the hot spot at a rate of about 4 inches per year (Grigg, 1988; 1997b). The youngest island in the archipelago is Hawaii, where the youngest fringing reefs and barrier reefs are found. Fringing reefs on the western coast of Hawaii are from 100 to 1,000 years old.

Precious coral are corals of the genus Corallium and the pink, gold, bamboo and black corals. Precious coral resources in Hawaii and the Western Pacific are managed by the State of Hawaii and the U.S. Federal government per regulation. The State has jurisdiction over coral resources out to 3 nm but also claims authority over inter-island waters the Makapuu Coral Bed, 6 mi off Makapuu in the channel between Oahu and Molokai. Federal jurisdiction extends from 3 nm beyond the coast of Hawaii to 200 nm and from the shoreline of all U.S. possessions in the Western Pacific to 200 nm. This area is defined as the U.S. Exclusive Economic Zone (EEZ). (Grigg, 1993; United Nations Convention On The Law Of The Sea, 1982)

To the degree authorized by law, black corals in Hawaiian waters are managed by the State of Hawaii. Fishermen are required to have commercial fishing licenses and report their catch monthly to the Hawaii Division of Aquatic Resources. A state regulation sets a minimum size of 48 inches in colony height or a minimum stem diameter of 1 inch for the harvest of live black coral (U.S. Fish and Wildlife Service, 2007b). Currently, black coral divers in Hawaii comply voluntarily with this draft regulation (Grigg, 1993).

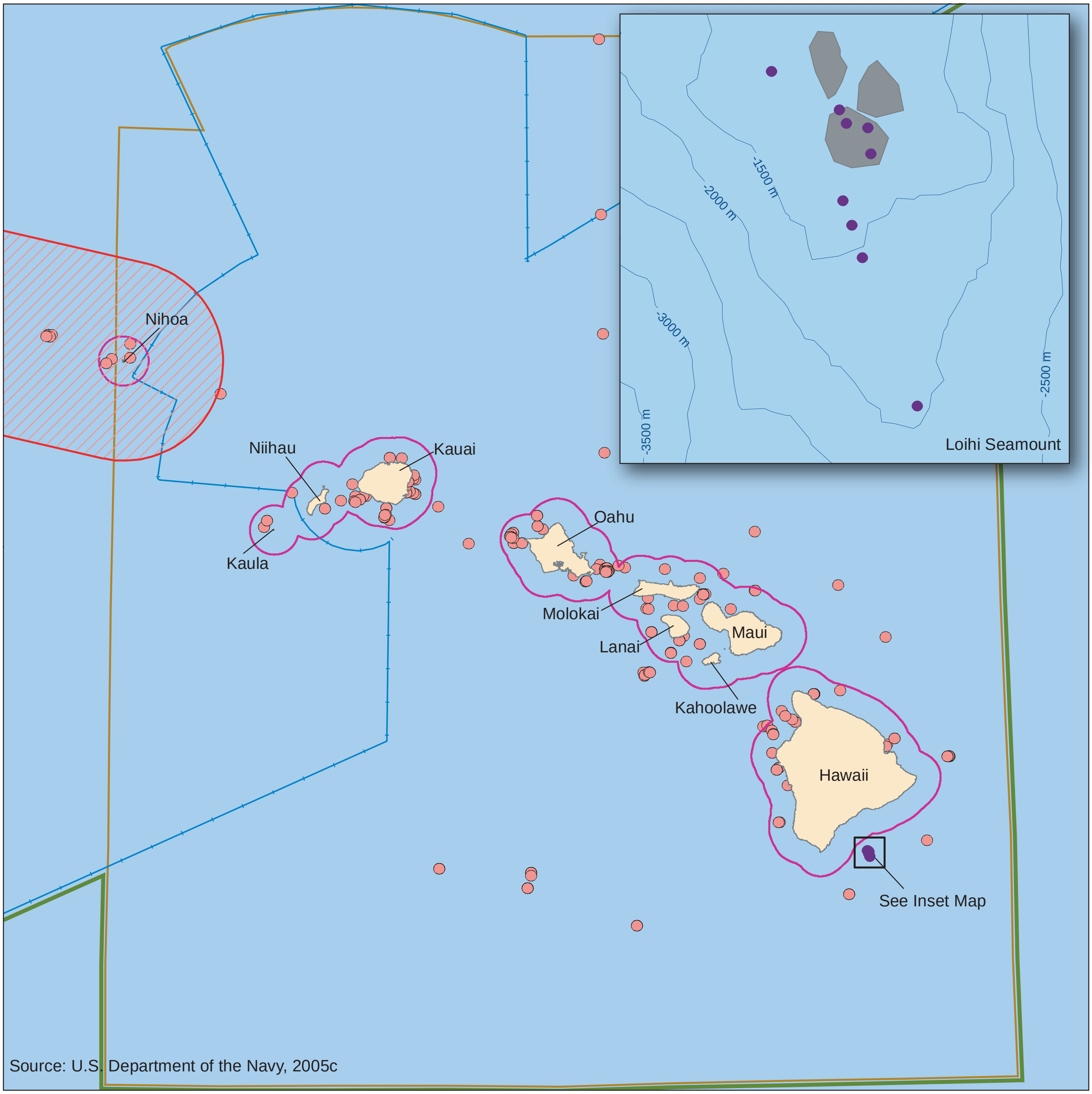
Precious coral resources within the U.S. EEZ are managed by the Western Pacific Regional Fishery Management Council, under a Fishery Management Plan (FMP) for precious coral. The FMP allows for domestic and foreign fishing by regular or experimental permits and requires logbooks. Specific weight quotas and size limits have been determined based on estimates of maximum sustainable yields and optimum yields (Grigg, 1993).

The FMP and regulations outline and classify the known beds of precious corals within the Western Pacific Region, and designate harvesting method and the amount of corals that can be harvested. There are four bed classifications:

- Established Beds—history of harvest and optimum yields have been established on the basis of biological stock assessment techniques and selective harvesting gear is required. Makapuu is the only designated Established Bed.
- Conditional Beds—yields have been estimated on the basis of bed size relative to established beds assuming that ecological conditions at established beds are representative of conditions at all other beds. Keahole Point, Kaena Point, Brooks Banks, and 180 Fathom Bank are Conditional Beds. Nonselective harvesting is permitted only in the two conditional beds in the Northwestern Hawaiian Islands (Brooks and the 180 Fathom Banks).
- Refugia Beds—one set aside to serve as a baseline study area and possibly reproductive reserve. No harvesting of any kind is permitted in Refugia. The Western Pacific bed, between Nihoa and Necker Islands, is the only designated Refugia Bed.
- Exploratory Permit Areas—unexplored portions of the EEZ in which coral beds are almost certain to exist, but no beds have yet been located. There are four exploratory permit areas, including one surrounding the Hawaiian Islands. Either selective or nonselective harvest gear is permitted in exploratory permit areas except in the Hawaii exploratory area around the Main Hawaiian Islands (Grigg, 1993).

Deep-sea coral communities are prevalent throughout the Hawaiian archipelago (Figure 3.1.2.1-1). They often form offshore reefs that surround all of the Main Hawaiian Islands at depths between 27 and 109 fathoms (Maragos, 1998). Although light penetrates to these depths, it is normally insufficient for photosynthesis. The term “deep-sea corals” may be misleading because substrate (surface for growth), currents, temperature, salinity, and nutrient supply are more important factors in determining the distribution of growth rather than depth (Chave and Malahoff, 1998).

Deep-sea coral communities provide habitat, feeding grounds, recruitment, and nursery grounds for a range of deep-water organisms including epibenthic invertebrates (e.g., echinoderms, sponges, polychaetes, crustaceans, and mollusks), fishes, solitary precious corals (e.g., black corals), and marine mammals (e.g., monk seals) (Maragos, 1998; Midson, 1999; Coral Reef Information System, 2003; Roberts and Hirshfield, 2003; Freiwald et al., 2004). Deep-sea corals live in complete darkness, in temperatures as low as 39 degrees Fahrenheit (°F), and in waters as deep as 19,685 ft (Coral Reef Information System, 2003).



EXPLANATION

- Deep-Sea Coral
- Hydrothermal Vent
- Hawaii Operating Area (OPAREA)
- Hawaii Range Complex (HRC)
- 12-Nautical Mile Line
- Temporary Operating Area (TOA)
- Papahānaumokuākea Marine National Monument
- Crater
- Land

NORTH

0 50 100 200 Nautical Miles

Distribution of Deep-Sea Corals and Hydrothermal Vents

Hawaiian Islands

Figure 3.1.2.1-1

Deep-sea corals can form large communities ranging in size from patches of small solitary colonies to massive reef structures (mounds, banks, and forests) spanning an estimated total spatial coverage of about of 772 square miles (mi^2) (Cairns, 1994; Freiwald et al., 2004). Much like shallow-water corals, deep-sea corals are fragile, slow growing, and can survive for hundreds of years (Roberts and Hirshfield, 2003). Deep-sea corals can be of two basic types: (1) the hard or stony corals which are related to those found on tropical coral reefs; and (2) the soft corals which include the familiar gorgonians of tropical shallow seas, as well as a broad diversity of other fleshy or tree-like forms. Some of the stony corals are small, but they can grow to be very massive. The soft corals may be small and delicate or very large and tree-like (Watling, 2003). In the Hawaiian Islands, gorgonians are the most common group of deep-sea corals. Of the gorgonians, primnoids are the most abundant group in the Hawaiian archipelago and are dominant off Molokai (Chave and Malahoff, 1998). Potential threats to deep-sea corals include fishing (e.g., bottom trawling), oil- and gas-related activities, cable laying, seabed aggregate extraction, shipping activities, the disposal of waste in deep waters, coral exploitation, other mineral exploration, and increased atmospheric carbon dioxide (Gass, 2003; Freiwald et al., 2004).

3.1.2.2 FISH

Distribution and abundance of fisheries, as well as the individual species, depend greatly on the physical and biological factors associated with an ecosystem. Physical parameters include habitat quality variables such as salinity, temperature, dissolved oxygen, and large-scale environmental disturbances (e.g., El Niño Southern Oscillation [ENSO]). Biological factors affecting distribution are complex and include variables such as population dynamics, predator/prey oscillations, seasonal movements, reproductive/life cycles, and recruitment success (Helfman et al., 1997). A single factor is rarely responsible for the distribution of fishery species; more often, a combination of factors is accountable. For example, pelagic or open ocean species optimize their growth, reproduction, and survival by tracking gradients of temperature, oxygen, or salinity (Helfman et al., 1997). Additionally, the spatial distribution of food resources is variable and changes with prevailing physical habitat parameters. Another major component in understanding species distribution is the location of highly productive regions such as frontal zones.

The prevailing oceanographic current in the Hawaiian archipelago is the westward flowing North Equatorial Current. Due to the origin of the North Equatorial Current (cool waters and distance from Hawaii), it is not likely to have had a major impact on fish species occurring in the Hawaiian Islands archipelago. Based on the present current system, most fish larvae would probably arrive at the Northwestern Hawaiian Islands via an eddy of the warm Kuroshio Current that bathes southern Japan and heads northeast where it becomes the North Pacific Current (Randall, 1998).

Environmental variations, such as ENSO events, change the normal characteristics of water temperature, thereby changing the patterns of water flow. In the northern hemisphere, El Niño events typically result in tropical, warm-water species moving north (extending species range), and cold-water species moving north or into deeper water (restricting their range). Surface-oriented, schooling fish often disperse and move into deeper waters. ENSO events alter normal current patterns, alter productivity, and have dramatic effects on distribution, habitat range, and movement of pelagic species (National Marine Fisheries Service, 2002b). Fishes that remain in an affected region experience reduced growth, reproduction, and survival (National Marine

Fisheries Service, 2002b). El Niño events have caused fisheries such as that of the skipjack tuna (*Katsuwonus pelamis*) to shift over 621 miles (mi) (National Marine Fisheries Service-Pacific Islands Region, 2001).

The Hawaiian archipelago distinguishes itself as a subprovince of the spacious tropical and subtropical Indo-Pacific region, which extends from the Red Sea and coast of East Africa to the easternmost islands of Oceania (Hawaii and Easter Island). The composition of the Hawaiian marine life varies enough from the rest of the Indo-Pacific to be treated as a distinct faunal subregion. Hawaii's unique fish fauna can be explained by its geographical and hydrographical isolation (Randall, 1998). Pelagic fishes such as the larger tunas, the billfishes, and some sharks are able to traverse the great distance that separates the Hawaiian Islands from other islands or continents in the Pacific Ocean; however, shore fishes are dependent on passive transport as larvae in ocean currents for distribution. As would be expected, the fish families that have a high percentage of species in the Hawaiian Islands compared to elsewhere tend to be those with a long larval life stage, such as the moray eels and surgeonfishes (*Acanthurus* spp.). Families that contain mainly species with short larval life stages, such as the gobies, blennies, and cardinal fishes, are not as well represented in Hawaii as in the rest of the Indo-Pacific region (Randall, 1995).

3.1.2.2.1 Essential Fish Habitat

Pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the National Marine Fisheries Service (NMFS), eight regional fishery management councils (Councils), and other Federal agencies are mandated to identify and protect important marine and anadromous fish habitat. The Councils (with assistance from NMFS) are required to delineate Essential Fish Habitat (EFH) for all managed species. Federal agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding potential impacts on EFH.

The MSFCMA defines EFH means those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity (16 U.S.C.§ 1802). These waters include aquatic areas and their associated physical, chemical, and biological properties used by fish, and may include areas historically used by fish. Substrate types include sediment, hard bottom, structures underlying the waters, and associated biological communities.

EFH can consist of both the water column and the underlying surface (e.g., seafloor) of a particular area. Areas designated as EFH contain habitat essential to the long-term survival and health of our nation's fisheries. Certain properties of the water column such as temperature, nutrients, or salinity are essential to various species. Some species may require certain bottom types such as sandy or rocky bottoms, vegetation such as sea grasses or kelp, or structurally complex coral or oyster reefs. EFH also includes those habitats that support the different life stages of each managed species, as a single species may use many different habitats throughout its life to support breeding, spawning, nursery, feeding, and protection functions.

The Western Pacific Regional Fishery Management Council (WPRFMC) manages major fisheries within the EEZ around Hawaii and the territories and possessions of the United States in the Pacific Ocean (Western Pacific Regional Fishery Management Council, 1998, 2001). The WPRFMC, in conjunction with the State of Hawaii, Division of Aquatic Resources (HDAR), manages the fishery resources in the study area. The WPRFMC focuses on the major fisheries in the study area that require regional management. EFH species, as designated by the WPRFMC (2004), have been divided into management units according to their ecological relationships and preferred habitats. Management units include bottom fish management unit species (BMUS), pelagic management unit species (PMUS), crustacean management unit species (CMUS), precious corals management unit species (PCMUS), and coral reef ecosystem management unit species. Currently, 22 species are managed as BMUS, 32 species and one genus are managed as PMUS, five species and one genus are managed as CMUS, and 13 species are managed under the PCMUS.

Specific information on EFH within the HRC can be found in a separate document, *Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007a).

Additionally, a potential squid group consisting of three flying squids (neon flying squid [*Ommastrephes bartramii*], diamondback squid [*Thysanoteuthis rhombus*], and purpleback flying squid [*Sthenoteuthis oualaniensis*]) has been proposed by the WPRFMC for incorporation into the existing PMUS (National Marine Fisheries Service, 2004c). Currently, no data are available to determine if the pelagic species are approaching an overfished situation (National Marine Fisheries Service, 2004b), except for the bigeye tuna (*Thunnus obesus)*. The National Marine Fisheries Service (2004d) determined that overfishing was occurring Pacific-wide for this species. In addition, shark species are afforded protection under the *Shark Finning Prohibition Act* (National Marine Fisheries Service, 2002c).

The broadbill swordfish (*Xiphias gladius)*, albacore tuna (*Thunnus alalunga)*, common thresher shark (*Alopias vulpinus*), and salmon shark (*Lamna ditropis*) have been listed as data deficient on the International Union for Conservation of Nature and Natural Resources (IUCN) Red List due to inadequate information to make a direct, or indirect assessment of its risk of extinction based on its distribution and/or population status (Safina, 1996; Uozumi, 1996a; Goldman and Human, 2000; Goldman et al., 2001). The shortfin mako shark (*Isurus oxyrinchus*), oceanic whitetip shark (*Carcharhinus longimanus*), crocodile shark (*Pseudocarcharius kamoharai*), blacktip shark (*C. limbatus*), and blue shark (*Prionace glauca*) have been listed as near threatened (Compagno and Musick, 2000; Shark Specialist Group, 2000; Smale, 2000; Stevens, 2000a; 2000b). The bigeye tuna and the great white shark (*Carcharadon carcharias*) are listed as vulnerable on the IUCN Red List (Uozumi, 1996b; Fergusson et al., 2000).

3.1.2.2.2 Offshore Ocean or Pelagic Species

Pelagic species occur in tropical and temperate waters of the western Pacific Ocean (National Marine Fisheries Service-Pacific Islands Region, 2001). Geographical distribution among these species is governed by seasonal changes in ocean temperature. These species range from as far north as Japan, to as far south as New Zealand. Albacore tuna, striped marlin (*Tetrapurus audax*), and broadbill swordfish have broader ranges and occur from 50°N to 50°S (Western Pacific Regional Fishery Management Council, 1998). Some species of tuna may aggregate near sea mounts (Yasui, 1986; Itano and Holland, 2000). Temperate species includes those that are found in greater abundance outside tropical waters at higher latitudes (e.g., broadbill swordfish, bigeye tuna, northern bluefin tuna [*Thunnus thynnus*], and albacore tuna). Pelagic species are typically found in epipelagic to pelagic waters; however, shark species can be found in inshore benthic, neritic to epipelagic, and mesopelagic (ocean zone from 109.3 to 546.7 fathoms) waters. Factors such as gradients in temperature, oxygen, or salinity can affect the suitability of a habitat for pelagic fishes. Skipjack tuna, yellowfin tuna (*T. albacares*), and Indo-Pacific blue marlin (*Makaira nigricans*) prefer warm surface layers where the water is well-mixed and relatively uniform in temperature (Western Pacific Regional Fishery Management Council, 1998). Species such as albacore tuna, bigeye tuna, striped marlin, and broadbill swordfish prefer temperate waters associated with higher latitudes and greater depths (Western Pacific Regional Fishery Management Council, 1998). Certain species, such as broadbill swordfish and bigeye tuna, are known to aggregate near the surface at night. During the day broadbill swordfish can be found at depths of about 437 fathoms and bigeye tuna around 150 to 301 fathoms (Table 3.1.2.2.2-1; Western Pacific Regional Fishery Management Council, 1998). Juvenile albacore tuna generally concentrate above 49 fathoms, with adults found in deeper waters (about 49 to 150 fathoms) (Western Pacific Regional Fishery Management Council, 1998).

3.1.2.2.3 Fish Acoustics

Fishes, like other vertebrates, have a variety of different sensory systems that enable them to glean information from the world around them (see volumes by Atema et al., 1988 and by Collin and Marshall, 2003 for thorough reviews of fish sensory systems). While each of the sensory systems may have some overlap in providing a fish with information about a particular stimulus (e.g., an animal might see and hear a predator), different sensory systems may be most appropriate to serve an animal in a particular situation. Thus, vision is often most useful when a fish is close to the source of the signal, in daylight, and when the water is clear. However, vision does not work well at night, or in deep waters. Chemical signals can be highly specific (e.g., a particular pheromone used to indicate danger). However, chemical signals travel slowly in still water, and diffusion of the chemicals depends upon currents and so chemical signals are not directional and, in many cases, they may diffuse quickly to a non-detectable level. As a consequence, chemical signals may not be effective over long distances.

In contrast, acoustic signals in water travel very rapidly, travel great distances without substantially attenuating (declining in level) in open water, and they are highly directional. Thus, acoustic signals provide the potential for two animals that are some distance apart to communicate quickly (reviewed in Zelick et al., 1999; Popper et al., 2003).

Since sound is potentially such a good source of information, fishes have evolved two sensory systems to detect acoustic signals, and many species use sound for communication (e.g., mating, territorial behavior—see Zelick et al., 1999 for review). The two systems are the ear, for detection of sound above perhaps 20 hertz (Hz) to 1 kilohertz (kHz) or more, and the lateral line for detection of hydrodynamic signals (water motion) from less than 1 Hz to perhaps 100 or 200 Hz. The inner ear in fish functions very much like the ear found in all other vertebrates, including mammals. The lateral line, in contrast, is only found in fish and a few amphibian (frogs) species. It consists of a series of receptors along the body of the fish. Together, the ear and lateral line are often referred to as the octavolateralis system.

Table 3.1.2.2.2-1. Summary of Pelagic or Open Water Species and Depth Distribution

Species	Depth Distribution
Temperate Species	
Striped marlin, *Tetrapurus audax*	Governed by temperature stratification
Broadbill swordfish, *Xiphias gladius*	Surface to 547 fathoms
Northern bluefin tuna, *Thunnus thynnus*	No data
Albacore tuna, *Thunnus alalunga*	Surface to 208 fathoms
Bigeye tuna, *Thunnus obesus*	Surface to 328 fathoms
Mackerel, *Scomber* spp.	No data
Sickle pomfret, *Tatactichthys steindachneri*	Surface to 164 fathoms
Lustrous pomfret, *Eumegistus illustris*	Surface to 300 fathoms
Tropical Species	
Yellowfin tuna, *Thunnus albacares*	Upper 55 fathoms with marked oxyclines
Kawakawa, *Euthynnus affinis*	20 to 109 fathoms
Skipjack tuna, *Katsuwonus pelamis*	Surface to 144 fathoms
Frigate tuna, *Auxis thazard*	No data
Bullet tuna, *Auxis rochei*	No data
Indo-Pacific blue marlin, *Makaira nigricans*	44 to 55 fathoms
Black marlin, *Makaira indica*	250 to 500 fathoms
Shortbill spearfish, *Tetrapturus angustirostris*	22 to 1,000 fathoms
Sailfish, *Istiophorus platypterus*	6-11 to 109-137 fathoms
Dolphinfish, *Coryphaena hippurus*	No data
Pompano dolphinfish, *Coryphaena equiselas*	No data
Wahoo, *Acanthocybium solandri*	Adult depth <109 fathoms
Moonfish, *Lampris guttatus*	Surface to 273 fathoms
Escolar, *Lepidocybium flavobrunneum*	Surface to 109 fathoms
Oilfish, *Ruvettus pretiosus*	Surface to 383 fathoms
Shark Species	
Crocodile shark, *Pseudocarcharias kamoharai*	Surface to 164 fathoms
Common thresher shark, *Alopias vulpinus*	Surface to 200 fathoms
Pelagic thresher shark, *Alopias pelagicus*	Surface to 83 fathoms
Bigeye thresher shark, *Alopias superciliosus*	Surface to 273 fathoms
Shortfin mako shark, *Isurus oxyrinchus*	Surface to 273 fathoms
Longfin mako shark, *Isurus paucus*	No data
Salmon shark, *Lamna ditropis*	Surface to 83 fathoms
Silky shark, *Carcharhinus falcirormis*	Adult depth of 10 to 273 fathoms
Oceanic whitetip shark, *Carcharhinus longimanus*	Adult depth of 20 to 83 fathoms
Blue shark, *Prionace glauca*	Surface to 83 fathoms

Source: Western Pacific Regional Fishery Management Council 1998, 2006

3.1.2.2.3.1 Sound in Water

The basic physical principles of sound in water are the same as sound in air (see Rogers and Cox, 1988; Kalmijn, 1988; 1989). Any sound source produces both pressure waves and actual motion of the medium particles. However, whereas in air the actual particle motion attenuates very rapidly and is often inconsequential even a few centimeters from a sound source, particle motion travels (propagates) much further in water due to the much greater density of water than air. One therefore often sees reference to the "acoustic near field" and the "acoustic far field" in the literature on fish hearing. Acoustic near field refers to the particle motion component of the sound and acoustic far field refers to the pressure. Acoustic near field is often misconstrued as only present close to the source. Indeed, all propagating sound in water has both pressure and particle motion components, but after some distance, often defined as the point at a distance of wavelength of the sound divided by 2 pi ($\lambda/2\pi$), the pressure component of the signal dominates, though particle motion is still present and potentially important for fish (e.g., Rogers and Cox, 1988; Kalmijn, 1988; Kalmijn, 1989). For a 500 Hz signal, this point is about 0.5 m from the source.

Fish detect both pressure and particle motion, whereas terrestrial vertebrates generally only detect pressure. Fish directly detect particle motion using the inner ear (see below). Pressure signals, however, are initially detected by the gas-filled swim bladder or other bubble of air in the body. The air bubble then vibrates and serves as a small sound source which "reradiates" (or resends) the signal to the inner ear as a near field particle motion. The ear can only detect particle motion directly, and it needs the air bubble to produce particle motion from the pressure component of the signal.

If a fish is able to only detect particle motion, it is most sensitive to sounds when the source is nearby due to the substantial attenuation of the particle motion signal as it propagates away from the sound source. As the signal level gets lower (further from the source), the signal ultimately gets below the minimum level detectable by the ear (the threshold). Fish that detect both particle motion and pressure generally are more sensitive to sound than are fish that only detect particle motion. This is the case because the pressure component of the signal attenuates much less over distance than does the particle motion, although both particle motion and pressure are always present in the signal as it propagates from the source.

One very critical difference between particle motion and pressure is that fish pressure signals are not directional. Thus, for fish, as to any observer with a single pressure detector, pressure does not appear to come from any direction (e.g., Popper et al., 2003; Fay, 2005). In contrast, particle motion is highly directional, and this is detectable by the ear itself. Accordingly, fish appear to use the particle motion component of a sound field to glean information about sound source direction. This makes particle motion an extremely important signal to fish.

Since both pressure and particle motion are important to fish, it becomes critical that in design of experiments to test the effects of sound on fish (and fish hearing in general), the signal must be understood not only in terms of its pressure levels, but also in terms of the particle motion component. This has not been done in most experiments on effects of human-generated sound to date, with the exception of one study on effects of seismic airguns on fish (Popper et al., 2005).

3.1.2.2.3.1.1 What Do Fish Hear?

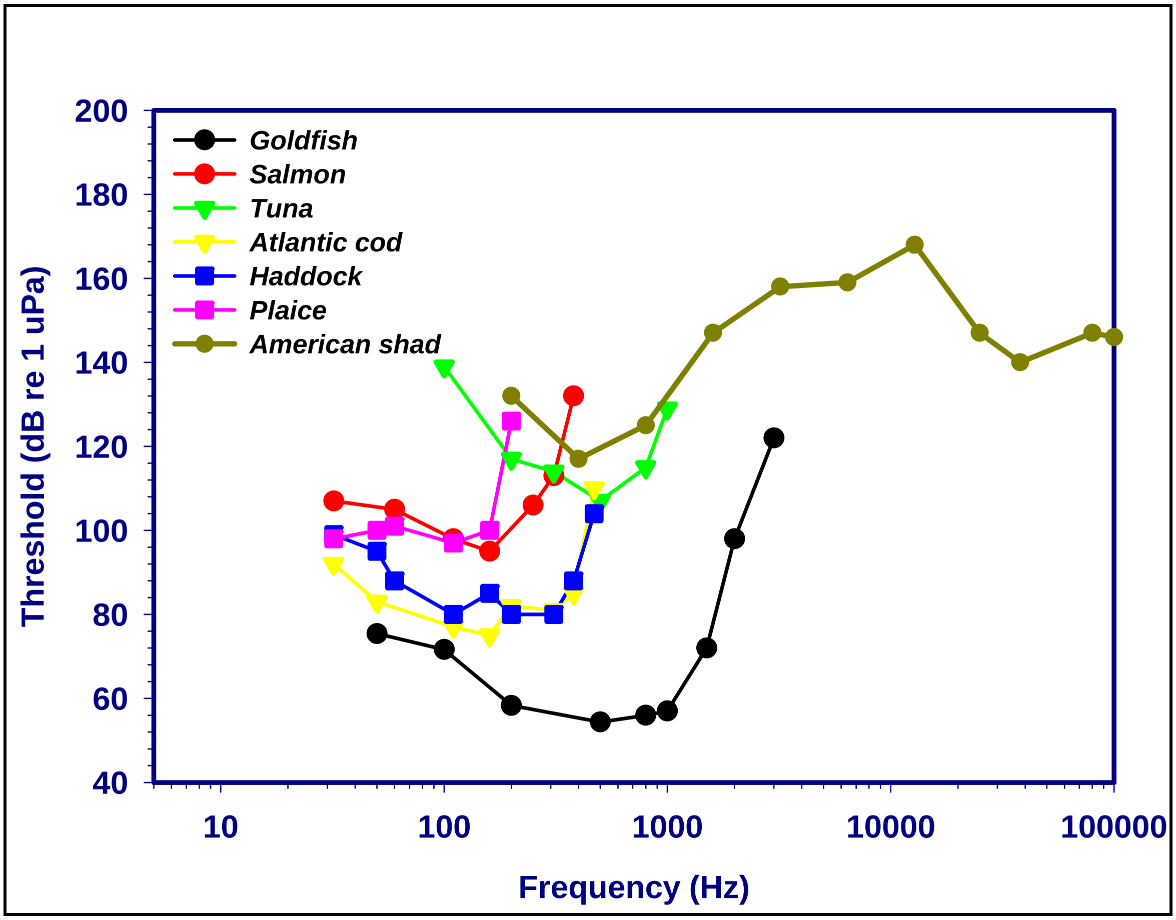
Basic data on hearing provides information about the range of frequencies that a fish can detect, and the lowest sound level that an animal is able to detect at a particular frequency. This level is often called the "threshold." Sounds that are above threshold are detectable by fish. It therefore follows that if a fish can hear a biologically irrelevant human-generated sound (e.g., sonar, ship noise), such sound might interfere with the ability of fish to detect other biologically relevant signals. In effect, anthropogenic sounds and explosions may affect behavior, and result in short and long-term tissue damage, but only at significantly high levels. Importantly, to date there has been not any experimental determination of an association of such effects from military mid-frequency active and high-frequency active (MFA/HFA) sonars.

Hearing thresholds have been determined for perhaps 100 of the more than 29,000 living fish species (Figure 3.1.2.2.3.1-1) (see Fay, 1988; Popper et al., 2003; Ladich and Popper, 2004; and Nedwell et al.; 2004 for data on hearing thresholds). These studies show that, with few exceptions, fish cannot hear sounds above about 3 to 4 kHz, and that the majority of species are only able to detect sounds to 1 kHz or even below. In contrast, a healthy young human can detect sounds to about 20 kHz, and dolphins and bats can detect sounds to well over 100 kHz. There have also been studies on a few species of cartilaginous fish, with results suggesting that they detect sounds to no more than 600 or 800 Hz (e.g., Fay, 1988; Casper et al., 2003).

Besides being able to detect sounds, a critical role for hearing is to be able to discriminate between different sounds (e.g., frequency and intensity), detect biologically relevant sounds in the presence of background noises, and determine the direction and location of a sound source in the space around the animal. While data are available on these tasks for only a few fish species, all species studied appear to be able to discriminate sounds of different intensities and frequencies (reviewed in Fay and Megela-Simmons, 1999; Popper et al., 2003) and perform sound source localization (reviewed in Popper et al., 2003; Fay, 2005).

Fish are also able to detect signals in the presence of background noise (reviewed in Fay and Megela-Simmons, 1999; Popper et al., 2003). The results of these studies show that fish hearing is affected by the presence of background noise that is in the same general frequency band as the biologically relevant signal. In other words, if a fish has a particular threshold for a biologically relevant sound in a quiet environment, and a background noise that contains energy in the same frequency range is introduced, this will decrease the ability of the fish to detect the biologically relevant signal. In effect, the threshold for the biologically relevant signal will become poorer.

The significance of this finding is that if background noise is increased, such as a result of human-generated sources, it may be harder for a fish to detect the biologically relevant sounds that it needs to survive.



Source: (see Fay, 1988 and Nedwell et al., 2004 for data)

Note: Goldfish and American shad are species with specializations that enhance hearing sensitivity and/or increase the range of sounds detectable by the animal. The other species are hearing generalists. Most of these data were obtained using methods where fish were conditioned to respond to a sound when it was present. Each data point represents the lowest sound level (threshold) the species could detect at a particular frequency. Data for American shad are truncated at 100 kHz to keep the size of the graph reasonable, but it should be noted that this species can hear sounds to at least 180 kHz (Mann et al., 1997). Note that these data represent pressure thresholds, despite the fact that some of the species (e.g., salmon, tuna) are primarily sensitive to the particle motion component of a sound field, something that was not generally measured at the time of the studies.

Figure 3.1.2.2.3.1-1. Hearing Curves (Audiograms) for Select Teleost Fishes

3.1.2.2.3.1.2 Sound Detection Mechanisms

While bony and cartilaginous fish have no external structures for hearing, such as the human pinna (outer ear), they do have an inner ear which is similar in structure and function to the inner ear of terrestrial vertebrates. The outer and middle ears of terrestrial vertebrates serve to change the impedance of sound traveling in air to that of the fluids of the inner ear. However, since fishes already live in a fluid environment, there is no need for impedance matching to stimulate the inner ear. At the same time, since the fish ear and body are the same density as water, they will move along with the sound field. While this might result in the fish not detecting the sound, the ear also contains very dense calcareous structures, the otoliths, which move at a different amplitude and phase from the rest of the body. This provides the mechanism by which fish hear.

The ear of a fish has three semicircular canals that are involved in determining the angular movements of the fish. The ear also has three otolith organs, the saccule, lagena, and utricle, that are involved in both determining the position of the fish relative to gravity and detection of sound and information about such sounds. Each of the otolith organs contains an otolith that lies in close proximity to a sensory epithelium.

The sensory epithelium (or macula) in each otolith organ of fish contains mechanoreceptive sensory hair cells that are virtually the same as found in the mechanoreceptive cells of the lateral line and in the inner ear of terrestrial vertebrates. All parts of the ear have the same kind of cell to detect movement, whether it be movement caused by sound or movements of the head relative to gravity.

3.1.2.2.3.1.3 Hearing Generalists and Specialists

Very often, fish are referred to as “hearing generalists” (or non-specialists) or “hearing specialists” (e.g., Fay, 1988; Popper et al., 2003; Ladich and Popper, 2004). Hearing generalists generally detect sound to no more than 1 to 1.5 kHz, whereas specialists are generally able to detect sounds to above 1.5 kHz (see Figure 3.1.2.2.3.1-1). And, in the frequency range of hearing that the specialists and generalists overlap, the specialists generally have lower thresholds than generalists, meaning that they can detect quieter (lower intensity) sounds. Furthermore, it has often been suggested that generalists only detect the particle motion component of the sound field, whereas the specialists detect both particle motion and pressure (see Popper et al., 2003).

However, while the terms hearing generalist and specialist have been useful, it is now becoming clear that the dichotomy between generalists and specialists is not very distinct. Instead, investigators are now coming to the realization that many species that do not hear particularly well still detect pressure as well as particle motion and pressure. However, these species often have poorer pressure detection than those fishes that have a wider hearing bandwidth and greater sensitivity (see Popper and Schilt, 2008).

It is important to note that hearing specialization is not limited to just a few fish taxa. Instead, there are hearing specialists that have evolved in many very diverse fish groups. Moreover, there are instances where one species hears very well while a very closely related species does not hear well. The only “generalizations” that one can make is that all cartilaginous fish are likely to be hearing generalists, while all otophysan fishes (goldfish, catfish, and relatives) are hearing specialists. It is also likely that bony fish without an air bubble such as a swim bladder (see below) are, like cartilaginous fishes, hearing generalists. These fish include all flatfish, some tuna, and a variety of other taxonomically diverse species.

3.1.2.2.3.1.4 Ancillary Structures for Hearing Specializations

All species of fish respond to sound by detecting relative motion between the otoliths and the sensory hair cells. However, many species, and most effectively the hearing specialists, also detect sounds using the air-filled swim bladder in the abdominal cavity. The swim bladder is used for a variety of different functions in fish. It probably evolved as a mechanism to maintain buoyancy in the water column, but later evolved to have multiple functions.

The other two roles of the swim bladder are in sound production and hearing (e.g., Zelick et al., 1999; Popper et al., 2003). In sound production, the air in the swim bladder is vibrated by the sound producing structures (often muscles that are integral to the swim bladder wall) and serves as a radiator of the sound into the water (see Zelick et al., 1999).

For hearing, the swim bladder serves to re-radiate sound energy to the ear. This happens since the air in the swim bladder is of a very different density than the rest of the fish body. Thus, in the presence of sound the air starts to vibrate. The vibrating gas re-radiates energy which then stimulates the inner ear by moving the otolith relative to the sensory epithelium. However, in species that have the swim bladder some distance from the ear, any re-radiated sound attenuates a great deal before it reaches the ear. Thus, these species probably do not detect the pressure component of the sound field as well as fish where the swim bladder comes closer to the ear.

In contrast, hearing specialists always have some kind of acoustic coupling between the swim bladder and the inner ear to reduce attenuation and ensure that the signal from the swim bladder gets to the ear. In the goldfish and its relatives, the otophysan fishes, there is a series of bones, the Weberian ossicles, which connect the swim bladder to the ear. When the walls of the swim bladder vibrate in a sound field, the ossicles move and carry the sound directly to the inner ear. Removal of the swim bladder in these fish results in a drastic loss of hearing range and sensitivity (reviewed in Popper et al., 2003).

Besides species with Weberian ossicles, other fishes have evolved a number of different strategies to enhance hearing. For example, the swim bladder may have one or two anterior projections that actually contact one of the otolith organs. In this way, the motion of the swim bladder walls directly couples to the inner ear of these species (see discussion in Popper et al., 2003).

3.1.2.2.3.1.5 Lateral Line

The lateral line system is a specialized sensory receptor found on the body that enables detection of the hydrodynamic component of a sound field or other water motions relative to the fish (reviewed in Coombs and Montgomery, 1999, Webb et al., 2008). The lateral line is most sensitive to stimuli that occur within a few body lengths of the animal and to signals that are from below 1 Hz to a few hundred hertz (Coombs and Montgomery, 1999; Webb et al., 2008). The lateral line is involved with schooling behavior, where fish swim in a cohesive formation with many other fish, and it is also involved with detecting the presence of near-by moving objects, such as food. Finally, the lateral line is an important determinant of current speed and direction, providing useful information to fishes that live in streams or where tidal flows dominate.

The only study on the effect of exposure to sound on the lateral line system suggests no effect on these sensory cells by very intense pure tone signals (Hastings et al., 1996). However, since this study was limited to one (freshwater) species and only to pure tones, extrapolation to other sounds is not warranted, and further work needs to be done on any potential lateral line effects on other species and with other types of sounds.

3.1.2.2.3.2 Overview of Fish Hearing Capabilities

Determination of hearing capability has only been done for fewer than 100 of the more than 29,000 fish species (Fay, 1988; Popper et al., 2003; Ladich and Popper, 2004; Nedwell et al., 2004). Much of this data is summarized in Table 3.1.2.2.3.2-1 for species of marine fish that have been studied and that could potentially be in areas where sonar or other Navy sound sources might be used. This data set, while very limited, suggests that the majority of marine species are hearing generalists, although it must be kept in mind that there are virtually no data for species that live at great ocean depths and it is possible that such species, living in a lightless environment, may have evolved excellent hearing to help them get an auditory “image” of their environment (e.g., Popper, 1980).

While it is hard to generalize as to which fish taxa are hearing generalists or specialists since specialists have evolved in a wide range of fish taxa (see, for example, Holocentridae and Sciaenidae in Table 3.1.2.2.3.2-1), there may be some broad generalizations as to hearing capabilities of different groups. For example, it is likely that all, or the vast majority of species in the following groups would have hearing capabilities that would include them as hearing generalists. These include cartilaginous fishes (Casper et al., 2003; Casper and Mann, 2006; Myrberg, 2001), scorpaeniforms (i.e., scorpionfishes, searobins, sculpins) (Tavolga and Wodinsky, 1963), scombrids (i.e., albacores, bonitos, mackerels, tunas) (Iversen, 1967, 1969; Song et al., 2006), and more specifically, midshipman fish (*Porichthys notatus*) (Sisneros and Bass, 2003), Atlantic salmon (*Salmo salar*) (Hawkins and Johnstone, 1978) and other salmonids (e.g., Popper et al., 2007), and all toadfish in the family Batrachoididae (see Table 3.1.2.2.3.2-1 for species).

Marine hearing specialists include some Holocentridae (“soldierfish” and “squirrelfish”) (Coombs and Popper, 1979) and some Sciaenidae (drums and croakers) (reviewed in Ramcharitar et al., 2006b) (see Table 3.1.2.2.3.2-1). In addition, all of the clupeids (herrings, shads, alewives, anchovies) are able to detect sounds to over 3 kHz. And, more specifically, members of the clupeid family Alosinae, which includes menhaden and shad, are able to detect sounds to well over 100 kHz (e.g., Enger, 1967; Mann et al., 2001; Mann et al., 2005).

3.1.2.2.3.2.1 Variability in Hearing Among Groups of Fish

Hearing capabilities vary considerably between different fish species (Figure 3.1.2.2.3.1-1), and there is no clear correlation between hearing capability and environment, even though some investigators (e.g., Amoser and Ladich, 2005) have argued that the level of ambient noise in a particular environment might have some impact on hearing capabilities of a species. However, the evidence for this suggestion is very limited, and there are species that live in close proximity to one another, and which are closely related taxonomically, that have different hearing capabilities. This is widely seen within the family Sciaenidae, where there is broad diversity in hearing capabilities and hearing structures (data reviewed in Ramcharitar et al., 2006b). This is also seen in the family Holocentridae. In this group, the shoulderbar soldierfish (*Myripristis kuntee*) and the Hawaiian squirrelfish (*Sargocentron xantherythrum*) live near one another on the same reefs, yet *Sargocentron* detects sounds from below 100 Hz to about 800 Hz, whereas *Myripristis* is able to detect sounds from 100 Hz to over 3 kHz, and it can hear much lower intensity sounds than can *Sargocentron* (Coombs and Popper, 1979; see also Tavolga and Wodinsky, 1963).

Table 3.1.2.2.3.2-1. Marine Fish Hearing Sensitivities

Family	Description of Family	Common Name	Scientific Name	Hearing Range (Hz) Low	Hearing Range (Hz) High	Best Sensitivity (Hz)	Reference
Albulidae	Bonefishes	Bonefish	*Albula vulpes*	100	700	300	Tavolga, 1974a
Anguillidae	Eels	European eel	*Anguilla anguilla*	10	300	40-100	Jerkø et al., 1989
Ariidae	Catfish	Hardhead sea catfish	*Ariopsis felis* [1]	50	1,000	100	Popper and Tavolga, 1981
Batrachoididae	Toadfishes	Midshipman[2]	*Porichthys notatus*	65	385		Sisneros, 2007
		Oyster toadfish	*Opsanus tau*	100	800	200	Fish and Offutt, 1972
		Gulf toadfish	*Opsanus beta*			<1,000	Remage-Healy et al., 2006
Clupeidae	Herrings, shads, menhaden, sardines	Alewife	*Alosa pseudoharengus*		120+		Dunning et al., 1992
		Blueback herring	*Alosa aestivalis*		120+		Dunning et al., 1992
		American shad	*Alosa sapidissima*	0.1	180	200-800 and 25-150	Mann et al., 1997
		Gulf menhaden	*Brevoortia patronus*		100+		Mann et al., 2001
		Bay anchovy	*Anchoa mitchilli*		4,000		Mann et al., 2001
		Scaled sardine	*Harengula jaguana*		4,000		Mann et al., 2001
		Spanish sardine	*Sardinella aurita*		4,000		Mann et al., 2001
		Pacific herring	*Clupea pallasii*	100	5,000		Mann et al., 2005
Chondrichthyes [Class]	Rays, sharks, skates	Data are for several different species		200	1,000		See Fay, 1988; Casper et al., 2003
Cottidae	Sculpins	Long-spined bullhead	*Taurulus bubalis*				Lovell et al., 2005
Gadidae	Cods, gadiforms, grenadiers, hakes	Atlantic Cod	*Gadus morhua*	2	500	20	Chapman and Hawkins, 1973; Sand and Karlsen, 1986
		Ling	*Molva molva*	60	550	200	Chapman, 1973
		Pollack	*Pollachius pollachius*	40	470	60	Chapman, 1973
		Haddock	*Melanogrammus aeglefinus*	40	470	110-300	Chapman, 1973
Gobidae	Gobies	Black goby	*Gobius niger*	100	800		Dijkgraaf, 1952

1 Formerly *Arius felis*
2 Data obtained using saccular potentials, a method that does not necessarily reveal the full bandwidth of hearing.

Table 3.1.2.2.3.2-1. Marine Fish Hearing Sensitivities (Continued)

Family	Description of Family	Common Name	Scientific Name	Hearing Range (Hz) Low	Hearing Range (Hz) High	Best Sensitivity (Hz)	Reference
Holocentridae	Squirrelfish and soldierfish	Shoulderbar soldierfish	*Myripristis kuntee*	100	3,000	400-500	Coombs and Popper, 1979
		Hawaiian squirrelfish	*Sargocentron xantherythrum*[*]	100	800		Coombs and Popper, 1979
		Squirrelfish	*Holocentrus adscensionis*[*]	100	2,800	600-1,000	Tavolga and Wodinsky, 1963
		Dusky squirrelfish	*Sargocentron vexillarium*[*]	100	1,200	600	Tavolga and Wodinsky, 1963
Labridae	Wrasses	Tautog	*Tautoga onitis*	10	500	37 - 50	Offutt, 1971
		Blue-head wrasse	*Thalassoma bifasciatum*	100	1,300	300 – 600	Tavolga and Wodinksy, 1963
Lutjanidae	Snappers	Schoolmaster snapper	*Lutjanus apodus*	100	1,000	300	Tavolga and Wodinksy, 1963
Myctophidae[3]	Lanternfishes	Warming's lanternfish	*Ceratoscopelus warmingii*	Specialist			Popper, 1977
Pleuronectidae	Flatfish[4]	Dab	*Limanda limanda*	30	270	100	Chapman and Sand, 1974
		European plaice	*Pleuronectes platessa*	30	200	110	
Pomadasyidae	Grunts	Blue striped grunt	*Haemulon sciurus*	100	1,000		Tavolga and Wodinsky, 1963
Pomacentridae	Damselfish[5]	Sergeant major damselfish	*Abudefduf saxatilis*	100	1,600	100-400	Egner and Mann, 2005
		Bicolor damselfish	*Stegastes partitus*	100	1,000	500	Myrberg and Spires, 1980
		Nagasaki damselfish	*Pomacentrus nagasakiensis*	100	2,000	<300	Wright et al. 2005, 2007
		Threespot damselfish	*Stegatus planifrons*[*]	100	1,200	500-600	Myrberg and Spires, 1980
		Longfish damselfish	*Stegatus diencaeus*[*]	100	1,200	500-600	Myrberg and Spires, 1980
		Honey gregory	*Stegatus diencaeus*[*]	100	1,200	500-600	Myrberg and Spires, 1980
		Cocoa damselfish	*Stegatus variabilis*[*]	100	1,200	500	Myrberg and Spires, 1980
		Beaugregory[6]	*Stegatus leucostictus*[*]	100	1,200	500-600	Myrberg and Spires, 1980
		Dusky damselfish	*Stegastes adustus*[*, 7]	100	1,200	400-600	Myrberg and Spires, 1980

3 Several other species in this family also showed saccular specializations suggesting that the fish would be a hearing specialist. However, no behavioral or physiological data are available.
4 Note, data for these species should be expressed in particle motion since it has no swim bladder. See Chapman and Sand, 1974 for discussion.
5 Formerly all members of this group were *Eupomocentrus*. Some have now been changed to *Stegatus* and are so indicated in this table (as per www.fishbase.org).
6 Similar results in Tavolga and Wodinsky 1963.
7 Formerly *Eupomacentrus dorsopunicans*.

Table 3.1.2.2.3.2-1. Marine Fish Hearing Sensitivities (Continued)

Family	Description of Family	Common Name	Scientific Name	Hearing Range (Hz) Low	Hearing Range (Hz) High	Best Sensitivity (Hz)	Reference
Salmonidae	Salmons	Atlantic salmon	*Salmo salar*	<100	580		Hawkins and Johnstone, 1978, Knudsen et al., 1994
Sciaenidae	Drums, weakfish, croakers	Atlantic croaker	*Micropogonias undulatus*	100	1,000	300	Ramcharitar and Popper, 2004
		Spotted seatrout	*Cynoscion nebulosus*	Generalist			Ramcharitar et al., 2001
		Southern kingcroaker	*Menticirrhus americanus*	Generalist			Ramcharitar et al., 2001
		Spot	*Leiostomus xanthurus*	200	700	400	Ramcharitar et al.,2006a
		Black drum	*Pogonias cromis*	100	800	100-500	Ramcharitar and Popper, 2004
		Weakfish	*Cynoscion regalis*	200	2,000	500	Ramcharitar et al., 2006a
		Silver perch	*Bairdiella chrysoura*	100	4,000	600-800	Ramcharitar et al., 2004
		Cubbyu	*Pareques acuminatus*	100	2,000	400-1,000	Tavolga and Wodinsky, 1963
Scombridae	Albacores, bonitos, mackerels, tunas	Bluefin tuna	*Thunnus thynnus*	Generalist			Song et al., 2006
		Yellowfin tuna	*Thunnus albacares*	500	1,100		Iversen, 1967
		Kawakawa	*Euthynnus affinis*	100	1,100	500	Iversen, 1969
		Skipjack tuna	*Katsuwonus pelamis*	Generalist			Popper, 1977
Serranidae	Seabasses, groupers	Red hind	*Epinephelus guttatus*	100	1,100	200	Tavolga and Wodinsky, 1963
Sparidae	Porgies	Pinfish	*Lagodon rhomboides*	100	1,000	300	Tavolga, 1974b
Triglidae	Scorpionfishes, searobins, sculpins	Leopard searobin	*Prionotus scitulus*	100	~800	390	Tavolga and Wodinsky, 1963

Among all fishes studied to date, perhaps the greatest variability has been found within the economically important family Sciaenidae (i.e., drumfish, weakfish, croaker) where there is extensive diversity in inner ear structure and the relationship between the swim bladder and the inner ear (all data on hearing and sound production in Sciaenidae is reviewed in Ramcharitar et al., 2006b) (see Table 3.1.2.2.3.2-1). Specifically, the Atlantic croaker's (*Micropogonias undulatus*) swim bladder comes near the ear but does not actually touch it. However, the swim bladders in the spot (*Leiostomus xanthurus*) and black drum (*Pogonias cromis*) are further from the ear and lack anterior horns or diverticulae. These differences are associated with variation in both sound production and hearing capabilities (Ramcharitar et al., 2006b). Ramcharitar and Popper (2004) found that the black drum detects sounds from 0.1 to 0.8 kHz and was most sensitive between 0.1 and 0.5 kHz, while the Atlantic croaker detects sounds from 0.1 to 1.0

kHz and was most sensitive at 0.3 kHz. Additionally, Ramcharitar et al. (2006a) found that weakfish (*Cynoscion regalis*) is able to detect frequencies up to 2.0 kHz, while spot can hear only up to 0.7 kHz.

The sciaenid with the greatest hearing sensitivity discovered thus far is the silver perch (*Bairdiella chrysoura*), a species which has auditory thresholds similar to goldfish and which is able to respond to sounds up to 4.0 kHz (Ramcharitar et al., 2004). Silver perch swim bladders have anterior horns that terminate close to the ear.

3.1.2.2.3.2.2 Marine Hearing Specialists

The majority of marine fish studied to date are hearing generalists. However, a few species have been shown to have a broad hearing range suggesting that they are specialists. These include some holocentrids and sciaenids, as discussed above. There is also evidence, based on structure of the ear and the relationship between the ear and the swim bladder that at least some deep-sea species, including myctophids, may be hearing specialists (Popper, 1977; Popper, 1980), although it has not been possible to do actual measures of hearing on these fish from great depths.

The most significant studies have shown that all herring like fishes (order Clupeiformes) are hearing specialists and able to detect sounds to at least 3 to 4 kHz, and that some members of this order, in the sub-family Alosinae, are able to detect sounds to over 180 kHz (Figure 3.1.2.2.3.1-1) (Mann et al., 1997, 1998, 2001, 2005; Gregory and Clabburn, 2003). Significantly, there is evidence that detection of ultrasound (defined by the investigators as sounds over 20 kHz) in these species is mediated through one of the otolithic organs of the inner ear, the utricle (Higgs et al., 2004, Plachta et al., 2004). While there is no evidence from field studies, laboratory data leads to the suggestion that detection of ultrasound probably arose to enable these fish to hear the echolocation sounds of odontocete predators and avoid capture (Mann et al., 1998; Plachta and Popper, 2003). This is supported by field studies showing that several Alosinae clupeids avoid ultrasonic sources. These include the alewife (*Alosa pseudoharengus*) (Dunning et al. 1992, Ross et al. 1996), blueback herring (*A. aestivalis*) (Nestler et al., 2002), Gulf menhaden (*Brevoortia patronus*) (Mann et al., 2001), and American shad (*A. sapidissima*) (Mann et al., 1997, 1998, 2001). Thus, masking of ultrasound by mid- or high-frequency sonar could potentially affect the ability of these species to avoid predation.

Although few non-clupeid species have been tested for ultrasound (Mann et al., 2001), the only non-clupeid species shown to possibly be able to detect ultrasound is the cod (*Gadus morhua*) (Astrup and Møhl, 1993). However, in Astrup and Møhl's (1993) study it is feasible that the cod was detecting the stimulus using touch receptors that were over driven by very intense fish-finding sonar emissions (Astrup, 1999; Ladich and Popper, 2004). Nevertheless, Astrup and Møhl (1993) indicated that cod have ultrasound thresholds of up to 38 kHz at 185 to 200 dB re 1 micropascal-meter (µPa-m), which likely only allows for detection of odontocete's clicks at distances no greater than 10 to 30 meters (m) (33 to 98 ft) (Astrup 1999).

Finally, while most otophysan species are freshwater, a few species inhabit marine waters. In the one study of such species, Popper and Tavolga (1981) determined that the hardhead sea catfish (*Ariopsis felis*) was able to detect sounds from 0.05 to 1.0 kHz, which is a narrower frequency range than that common to freshwater otophysans (i.e., above 3.0 kHz) (Popper et al., 2003). However, hearing sensitivity below about 500 Hz was much better in the hardhead sea catfish than in virtually all other hearing specialists studied to date (Table 3.1.2.2.3.2-1, Fay, 1988; Popper et al., 2003).

3.1.2.2.3.2.3 Marine Hearing Generalists

As mentioned above, investigations into the hearing ability of marine bony fishes have most often yielded results exhibiting a narrower hearing range and less sensitive hearing than specialists. This was first demonstrated in a variety of marine fishes by Tavolga and Wodinsky (1963), and later demonstrated in taxonomically and ecologically diverse marine species (reviews in Fay, 1988; Popper et al., 2003; Ladich and Popper, 2004).

By examining the morphology of the inner ear of bluefin tuna (*Thunnus thynnus*), Song et al. (2006) hypothesized that this species probably does not detect sounds to much over 1 kHz (if that high). This research concurred with the few other studies conducted on tuna species. Iversen (1967) found that yellowfin tuna (*T. albacares*) can detect sounds from 0.05 to 1.1 kHz, with best sensitivity of 89 dB (re 1 µPa) at 0.5 kHz. Kawakawa (*Euthynnus affinis*) appear to be able to detect sounds from 0.1 to 1.1 kHz but with best sensitivity of 107 dB (re 1 µPa) at 0.5 kHz (Iversen, 1969). Additionally, Popper (1981) looked at the inner ear structure of a skipjack tuna (*Katsuwonus pelamis*) and found it to be typical of a hearing generalist. While only a few species of tuna have been studied, and in a number of fish groups both generalists and specialists exist, it is reasonable to suggest that unless bluefin tuna are exposed to very high intensity sounds from which they cannot swim away, short- and long-term effects may be minimal or non-existent (Song et al., 2006).

Some damselfish have been shown to be able to hear frequencies of up to 2 kHz, with best sensitivity well below 1 kHz. Egner and Mann (2005) found that juvenile sergeant major damselfish (*Abudefduf saxatilis*) were most sensitive to lower frequencies (0.1 to 0.4 kHz); however, larger fish (greater than 50 millimeters) responded to sounds up to 1.6 kHz. Still, the sergeant major damselfish is considered to have poor sensitivity in comparison even to other hearing generalists (Egner and Mann, 2005). Kenyon (1996) studied another marine generalist, the bicolor damselfish (*Stegastes partitus*), and found responses to sounds up to 1.6 kHz with the most sensitive frequency at 0.5 kHz. Further, larval and juvenile Nagasaki damselfish (*Pomacentrus nagasakiensis*) have been found to hear at frequencies between 0.1 and 2 kHz; however, they are most sensitive to frequencies below 0.3 kHz (Wright et al., 2005, 2007). Thus, damselfish appear to be primarily generalists.

Female oyster toadfish (*Opsanus tau*) apparently use the auditory sense to detect and locate vocalizing males during the breeding season (e.g., Winn; 1967). Interestingly, female midshipman fish (*Porichthys notatus*) (in the same family as the oyster toadfish) go through a shift in hearing sensitivity depending on their reproductive status. Reproductive females showed temporal encoding up to 0.34 kHz, while non-reproductive females showed comparable encoding only up to 0.1 kHz (Sisneros and Bass, 2003).

The hearing capability of Atlantic salmon (*Salmo salar*) indicates relatively poor sensitivity to sound (Hawkins and Johnstone, 1978). Laboratory experiments yielded responses only to 580 Hz and only at high sound levels. The Atlantic salmon is considered to be a hearing generalist, and this is probably the case for all other salmonids studied to date based on studies of hearing (e.g., Popper et al., 2007, Wysocki et al., 2007) and inner ear morphology (e.g., Popper, 1976, 1977).

Furthermore, investigations into the inner ear structure of the long-spined bullhead (*Taurulus bubalis*, order Scorpaeniformes) have suggested that these fishes have generalist hearing abilities, and this is supported by their lack of a swim bladder (Lovell et al., 2005). While it is impossible to extrapolate from this species to all members of this large group of taxonomically diverse fishes, studies of hearing in another species in this group, the leopard robin (*Prionotus scitulus*), suggest that it is probably not able to detect sound to much above 800 Hz, indicating that it would be a hearing generalist (Tavolga and Wodinsky, 1963). However, since the leopard sea robin has a swim bladder, and the long-spined bullhead does not, this illustrates the diversity of species in this order and makes extrapolation on hearing from these two fishes to all members of the group very difficult to do.

A number of hearing generalists can detect very low frequencies of sound. Detection of very low frequencies, or infrasound, was not investigated until fairly recently since most laboratory sound sources were unable to produce undistorted tones below 20 to 30 Hz. In addition, most earlier measures of fish hearing indicated a steadily declining sensitivity towards lower frequencies (Fay, 1988), suggesting that fish would not detect low frequencies. However, as has been pointed out in the literature, often the problem with measuring lower frequency hearing (e.g., below 50 or 100 Hz) was simply that the sound sources available (underwater loud speakers) were not capable of producing lower frequency sounds, or the acoustics of the tanks in which the studies were conducted prevented lower frequency sounds from being effectively used.

Infrasound sensitivity in fish was first demonstrated in the Atlantic cod (*Gadus morhua*) (Sand and Karlsen, 1986). This species can detect sounds down to about 10 Hz and is sensitive to particle motion of the sound field and not to pressure. Other species shown to detect infrasound include the plaice flatfish (*Pleuronectes platessa*) (Karlsen, 1992), and the European eel (*Anguilla anguilla*) (Sand et al., 2000).

The sensitivity of at least some species of fish to infrasound may theoretically provide the animals with a wide range of information about the environment than detection of somewhat higher frequencies. An obvious potential use for this sensitivity is detection of moving objects in the surroundings, where infrasound could be important in, for instance, courtship and prey-predator interactions. Juvenile salmonids display strong avoidance reactions to near-by infrasound (Knudsen et al., 1992, 1994), and it is reasonable to suggest that such behavior has evolved as a protection against predators.

More recently, Sand and Karlsen (2000) proposed the hypothesis that fish may also use the ambient infrasounds in the ocean, which are produced by things like waves, tides, and other large scale motions, for orientation during migration. This would be in the form of an inertial guidance system where the fish detect surface waves and other large scale infrasound motions as part of their system to detect linear acceleration, and in this way migrate long distances.

An important issue with respect to infrasound relates to the distance at which such signals are detected. It is clear that fish can detect such sounds. However, behavioral responses only seem to occur when fish are well within the acoustic near field of the sound source. Thus, it is likely that the responses are to the particle motion component of the infrasound.

3.1.2.2.3.2.4 Hearing Capabilities of Elasmobranchs and Other "Fish"

Bony fishes are not the only species that may be impacted by environmental sounds. The two other groups to consider are the jawless fish (Agnatha – lamprey) and the cartilaginous fishes (i.e., elasmobranchs; the sharks and rays). While there are some lamprey in the marine environment, virtually nothing is known as to whether they hear or not. They do have ears, but these are relatively primitive compared to the ears of other vertebrates. No one has investigated whether the ear can detect sound (reviewed in Popper and Hoxter, 1987).

The cartilaginous fishes are important parts of the marine ecosystem, and many species are top predators. While there have been some studies on their hearing, these have not been extensive. However, available data suggests detection of sounds from 0.02 to 1 kHz, with best sensitivity at lower ranges (Myrberg, 2001; Casper et al., 2003, Casper and Mann, 2006). Though fewer than 10 elasmobranch species have been tested for hearing thresholds (reviewed in Fay, 1988), it is likely that all elasmobranchs only detect low frequency sounds because they lack a swim bladder or other pressure detector. At the same time, the ear in a number of elasmobranch species whose hearing has not been tested is very large with numerous sensory hair cells (e.g., Corwin, 1981, 1989). Thus, it is possible that future studies will demonstrate somewhat better hearing in those species than is now known.

There is also evidence that elasmobranchs can detect and respond to human-generated sounds. Myrberg and colleagues did experiments in which they played back sounds and attracted a number of different shark species to the sound source (e.g., Myrberg et al., 1969, 1972, 1976; Nelson and Johnson, 1972). The results of these studies showed that sharks were attracted to pulsed low-frequency sounds (below several hundred Hz), in the same frequency range of sounds that might be produced by struggling prey (or divers in the water). However, sharks are not known to be attracted by continuous signals or higher frequencies (which they cannot hear).

3.1.2.2.3.2.5 Data on Fish Hearing

Table 3.1.2.2.3.2-1 provides data on the hearing capabilities of all of the marine fish species that have been studied to date. However, before examining the data in the table, a number of important points must be made.

- In order to conform to the most recent taxonomic studies of the species, the table uses current scientific names for a number of species rather than the scientific names used at the time that the research paper was written (Fishbase, 2008).
- The data in the table were primarily compiled by two sources, Fay (1988) and Nedwell et al. (2004). Since the Nedwell et al. (2004) study was not published, the data were checked, where possible, against Fay (1988) or original sources.
- The data in the table for "best sensitivity" is only provided to give a sense of where the best hearing was for that species. However, since thresholds are often variable, this information should be used with utmost caution.
- It may generally be said that fish with a hearing range that only extends to 1.5 kHz are more likely to be hearing generalists, whereas fish with higher frequency hearing would be considered specialists.

- It is critical to note that comparison of the data in the table between species must be done with considerable caution. Most importantly, data were obtained in very different ways for the various species, and it is highly likely that different experimental methods yield different results in terms of range of hearing and in hearing sensitivity. Thus, data obtained using behavioral measures, such as those done by Tavolga and Wodinksy (1963) for a variety of marine fishes provide data in terms of what animals actually detected since the animals were required to do a behavioral task whenever they detected a sound.
- In contrast, studies performed using auditory evoked potentials (AEP), often called auditory brainstem response (ABR), a very effective general measure of hearing that is being widely used today, tends, in fishes, to generally provide results that indicate a somewhat narrower hearing range and possibly different sensitivity (thresholds) than obtained using behavioral methods. The difference is that ABR is a measure that does not involve any response on the part of the fish. Instead, ABR is a measure of the brainstem response and does not measure the integrated output of the auditory system (e.g. cortical process, decision-making, etc.). Examples of data from ABR studies include the work of Casper et al. (2003) and Ramcharitar et al. (2004, 2006a).
- Many of the species, as shown, are hearing generalists, and these species respond best primarily to particle motion rather than pressure, as discussed earlier. However, the vast majority of the species were tested with pressure signals, and the particle motion signal was not calibrated. Thus, hearing sensitivity data, and hearing range, may be somewhat different if particle motion had been calibrated. Accordingly, while the table gives a general sense of hearing of different species, caution must be taken in extrapolation to other species, and in interpretation of the data.

  Data were compiled from reviews in Fay (1988) and Nedwell et al. (2004). See the very important caveats about the data in the text. For a number of additional species, we can only surmise about hearing capabilities from morphological data. These data are shown in gray, with a suggestion as to hearing capabilities based only on morphology. Scientific names marked with an asterisk have a different name in the literature. (Fishbase, 2008).

As a consequence of these differences in techniques, as well as differences in sound fields used and differences in experimental paradigms, one must be extremely cautious in comparing data between different species when they were tested in different ways and/or in different laboratories. While general comparisons are possible (e.g., which species are generalists and which are specialists), more-detailed comparisons, such as of thresholds, should be done with utmost caution since one investigator may have been measuring pressure and another particle motion. At the same time, it should be noted that when different species were tested in the same lab, using the same experimental approach, it is possible to make comparative statements about hearing among the species used since all would have been subject to the same sound field.

3.1.2.3 SEA TURTLES

Sea turtles are long lived reptiles that can be found throughout the world's tropical, subtropical, and temperate seas (Caribbean Conservation Corporation and Sea Turtle Survival League, 2003). There are seven living species of sea turtles from two distinct families, the Cheloniidae (hard-shelled sea turtles; six species) and the Dermochelyidae (leatherback turtle [*Dermochelys* *coriacea]*; one species). These two families can be distinguished from one another on the basis of their carapace (upper shell) and other morphological features. Sea turtles are an important marine resource in that they provide economic, arid existence (non-use) value to humans (Witherington and Frazer, 2003). Over the last few centuries, sea turtle populations have declined dramatically due to anthropogenic (human-related) activities such as coastal development, oil exploration, commercial fishing, marine-based recreation, pollution, and over-harvesting (Natural Research Council, 1990; Eckert, 1995). As a result, all six species of sea turtles found in U.S. waters are currently listed as either threatened or endangered under the Endangered Species Act (ESA). Five of the seven living species of sea turtles are known to occur in the HRC: the green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*), olive ridley (*Lepidochelys olivacea*), and leatherback turtles.

Sea turtles are highly adapted for life in the marine environment. Unlike terrestrial and freshwater turtles, sea turtles possess powerful, modified forelimbs (or flippers) that enable them to swim continuously for extended periods of time (Wyneken, 1997). They also have compact and streamlined bodies that help to reduce drag. Additionally, sea turtles are among the longest and deepest diving of the air-breathing vertebrates, spending as little as 3 to 6 percent of their time at the water's surface (Lutcavage and Lutz, 1997). Sea turtles often travel thousands of miles between their nesting beaches and feeding grounds, which makes the aforementioned suite of adaptations very important (Ernst et al., 1994; Meylan, 1995). Sea turtle traits and behaviors also help protect them from predation. Sea turtles have a tough outer shell and grow to a large size as adults; mature leatherback turtles can weigh up to 2,091 pounds (lb) (Eckert and Luginbuhl, 1988). Sea turtles cannot withdraw their head or limbs into their shell, so growing to a large size as adults is important.

Although they are specialized for life at sea, sea turtles begin their lives on land. Aside from this brief terrestrial period, which lasts approximately 2 months as eggs and an additional few minutes to a few hours as hatchlings scrambling to the surf, most sea turtles are rarely encountered out of the water. Sexually mature females return to land in order to nest, while certain species in the Hawaiian Islands, Australia, and the Galapagos Islands haul out on land in order to bask (Carr, 1995; Spotila et al., 1997). Sea turtles bask to thermoregulate, elude predators, avoid harmful mating encounters, and possibly to accelerate the development of their eggs, accelerate their metabolism, and destroy aquatic algae growth on their carapaces (Whittow and Balazs, 1982; Spotila et al., 1997). On occasion, sea turtles can unintentionally end up on land if they are dead, sick, injured, or cold-stunned. These events, also known as strandings, can be caused by either biotic (e.g., predation and disease) or abiotic (e.g., water temperature) factors.

Female sea turtles nest in tropical, subtropical, and warm-temperate latitudes, often in the same region or on the same beach where they hatched (Miller, 1997). Upon selecting a suitable nesting beach, most sea turtles tend to re-nest in close proximity during subsequent nesting attempts. The leatherback turtle is a notable divergence from this pattern. This species nests primarily on beaches with little reef or rock offshore. On these types of beaches erosion reduces the probability of nest survival. To compensate, leatherbacks scatter their nests over larger geographic areas and lay on average two times as many clutches as other species (Eckert, 1987).

At times, sea turtles may fail to nest after emerging from the ocean. These non-nesting emergences, known as false crawls, can occur if sea turtles are obstructed from laying their eggs (by debris, rocks, roots, or other obstacles), are distracted by surrounding conditions (by noise, lighting, or human presence), or are uncomfortable with the consistency or moisture of the sand on the nesting beach. Turtles that are successful at nesting usually lay several clutches of eggs during a nesting season with each clutch containing between 50 and 200 eggs, depending on the species (Witzell, 1983; Dodd, 1988; Hirth, 1997). Most sea turtles, with the possible exception of Kemp's ridley turtles (*Lepidochelys kempii*), do not nest in consecutive years; instead, they will often skip 2 or 3 years before returning to the nesting grounds (Márquez-M., 1990; Ehrhart, 1995). Nesting success is vital to the long-term existence of sea turtles since it is estimated that only 1 out of every 1,000 hatchlings survives long enough to reproduce (Frazer, 1986).

During the nesting season, daytime temperatures can be lethal on tropical, subtropical, and warm-temperate beaches. As a result, adult sea turtles most often nest and hatchlings most often emerge from their nest at night (Miller, 1997). After emerging from the nest, sea turtle hatchlings use visual cues (e.g., light intensity or wavelengths) to orient themselves toward the sea (Lohmann et al., 1997).

Hatchlings that make it into the water will spend the first few years of their lives in offshore waters, drifting in convergence zones or amidst floating vegetation, where they find food (mostly pelagic invertebrates) and refuge in flotsam that accumulates in surface circulation features (Carr, 1987). Originally labeled the lost year, this stage in a sea turtle's life history is now known to be much longer in duration, possibly lasting a decade or more (Chaloupka and Musick, 1997; Bjorndal et al., 2000). Sea turtles will spend several years growing in the early juvenile "nursery habitat," which is usually pelagic and oceanic, before migrating to distant feeding grounds that comprise the later juvenile "developmental habitat," which is usually demersal and neritic (in shallow water) (Musick and Limpus, 1997; Frazier, 2001). Hard-shelled sea turtles most often utilize shallow offshore and inshore waters as later juvenile developmental habitats; whereas leatherback turtles, depending on the season, can utilize either coastal feeding areas in temperate waters or offshore feeding areas in tropical waters (Frazier, 2001).

Once in the later juvenile developmental habitat, most sea turtles change from surface to benthic feeding and begin to feed on larger items such as crustaceans, mollusks, sponges, coelenterates, fishes, macroalgae, and seagrasses (Bjorndal, 1997). A sea turtle's diet varies according to its feeding habitat and its preferred prey. Upon moving from the later juvenile developmental habitat to the adult foraging habitat, sea turtles may demonstrate further changes in prey preference, dietary composition, and feeding behavior (Bjorndal, 1997; Musick and Limpus, 1997).

Throughout their life cycles, sea turtles undergo complex seasonal movements. Sea turtle movement patterns are influenced by changes in ocean currents, turbidity, salinity, and food availability. In addition to these factors, the distribution of many sea turtle species is dependent upon and often restricted by water temperature (Epperly et al., 1995; Davenport, 1997; Coles and Musick, 2000). Most sea turtles become lethargic at temperatures below 50°F and above 104°F (Spotila et al., 1997).

Sea turtles do not have an auditory meatus or pinna that channels sound to the middle ear, nor do they have a specialized tympanum (eardrum). Instead, they have a cutaneous layer and underlying subcutaneous fatty layer that function as a tympanic membrane. The subcutaneous fatty layer receives and transmits sound to the extracolumella, a cartilaginous disk, located at the entrance to the columella, a long, thin bone that extends from the middle ear cavity to the entrance of the inner ear or otic cavity (Ridgway et al., 1969a). Sound arriving at the inner ear via the columella is transduced by the bones of the middle ear. Sound also arrives by bone conduction through the skull.

Sea turtle auditory sensitivity is not well studied, though a few preliminary investigations suggest that it is limited to low-frequency bandwidths, such as the sounds of waves breaking on a beach. The role of underwater low-frequency hearing in sea turtles is unclear. It has been suggested that sea turtles may use acoustic signals from their environment as guideposts during migration and as a cue to identify their natal beaches (Lenhardt et al., 1983). The range of maximum sensitivity for sea turtles is 100 to 800 Hz, with an upper limit of about 2,000 Hz (Lenhardt, 1994). Hearing below 80 Hz is less sensitive but still potentially usable to the animal (Lenhardt, 1994). Ridgway et al. (1969a) used aerial and mechanical stimulation to measure the cochlea in three specimens of green turtle, and concluded that they have a useful hearing span of perhaps 60 to 1,000 Hz, but hear best from about 200 Hz up to 700 Hz, with their sensitivity falling off considerably below 200 Hz. The maximum sensitivity for one animal was at 300 Hz, and for another was at 400 Hz. At the 400 Hz frequency, the turtle's hearing threshold was about 64 dB in air. At 70 Hz, it was about 70 dB in air. Bartol et al. (1999) reported that juvenile loggerhead sea turtles hear sounds between 250 and 1,000 Hz. Lenhardt et al. (1983) applied audio-frequency vibrations at 250 Hz and 500 Hz to the heads of loggerheads and Kemp's ridleys submerged in salt water to observe their behavior, measure the attenuation of the vibrations, and assess any neural-evoked response. These stimuli (250 Hz, 500 Hz) were chosen as representative of the lowest sensitivity area of marine turtle hearing (Wever, 1978). At the maximum upper limit of the vibratory delivery system, the turtles exhibited abrupt movements, slight retraction of the head, and extension of the limbs in the process of swimming. Lenhardt et al. (1983) concluded that bone-conducted hearing appears to be a reception mechanism for at least some of the sea turtle species, with the skull and shell acting as receiving surfaces. Finally, sensitivity even within the optimal hearing range is apparently low as threshold detection levels in water are relatively high at 160 to 200 dB re 1 µPa-m (Lenhardt, 1994).

Five of the seven living species of sea turtles are known to occur in the HRC: the green, hawksbill, loggerhead, olive ridley, and leatherback turtles. Each of these species is protected under the ESA. However, critical habitat has not yet been designated for any of these species in the U.S. Pacific. A draft proposed rule was prepared in 1980 to designate critical habitat for the green turtle in the Hawaiian Islands, American Samoa, and the Trust Territories of the United States, but it was never approved by the U.S. Fish and Wildlife Service (USFWS) (Eckert, 1993).

Green, hawksbill, loggerhead, olive ridley, and leatherback turtles are all regular inhabitants of the HRC (i.e., they occur as a regular or normal part of the fauna in the HRC, regardless of how abundant or common they are). Green and hawksbill turtles are most common in offshore waters around the Main Hawaiian Islands and Nihoa, as they prefer to reside in reef-type environments that are less than about 55 fathoms in depth (U.S. Department of the Navy, 2005b). The green turtle is by far the most common species occurring in the offshore waters around the Hawaiian Islands; this is highly evidenced by the available stranding data for the Main Hawaiian Islands. More than 90 percent of all green turtle breeding and nesting activity in Hawaiian waters occurs at French Frigate Shoals in the Northwestern Hawaiian Islands, yet a substantial foraging population resides in and returns to the shallow, coastal waters surrounding the Main Hawaiian Islands (especially around Maui and Kauai). Hawksbill turtles are the second most common species in the offshore waters of the Hawaiian Islands, as also reflected by the stranding records, yet they are far less abundant than green turtles. Hawksbills occur around and nest on several of the Main Hawaiian Islands. Hawksbill nesting occurs primarily on the southeastern end of Hawaii and on the eastern end of Molokai (Aki et al., 1994).

Further offshore (in waters beyond the 55-fathom isobath), juvenile loggerheads forage in or migrate through the HRC as they move between North American developmental habitats and Japan. The highest densities of loggerheads can be found just north of the HRC within the North Pacific transition zone (Polovina et al., 2000). The highest densities of olive ridleys, on the other hand, are likely found just south of the HRC. The distribution of the olive ridley in the central Pacific Ocean is primarily tropical; as a result, they are often found in warmer waters than loggerheads (Polovina et al., 2004). The primary migration corridor for leatherbacks moving west from U.S. west coast foraging areas to western Pacific nesting and foraging areas lies along the southern edge of the HRC, while an eastward return corridor appears to pass through the northern portion of the HRC (U.S. Department of the Navy, 2005b).

Due to the offshore habitat preferences of the green and hawksbill turtles and the oceanic habitat preferences of the loggerhead, olive ridley, and leatherback turtles, the entire HRC is recognized as an area of primary occurrence for sea turtles. Since the Hawaiian Islands are situated in tropical waters that are warm year-round, the area of primary occurrence is the same in fall and winter as it is in spring and summer. Sea turtles are also known to come ashore at several locations throughout the Main Hawaiian Islands, for terrestrial basking (green turtles only) or nesting (primarily green and hawksbill turtles). Nesting/basking sites for sea turtles occur on all eight of the Main Hawaiian Islands. Of note are green turtle nesting/basking beaches located at PMRF Barking Sands on Kauai and a green turtle basking beach located along Kiholo Bay off the northwestern shore of Hawaii (National Ocean Service, 2001; U.S. Department of the Navy, 2004a). These beaches are located in areas where the HRC runs right up to the shoreline.

3.1.2.3.1 Green Turtle (*Chelonia mydas*)

Status. Green turtles are listed as threatened under the ESA, except for breeding populations found in Florida and the Pacific coast of Mexico, which are both listed as endangered. Commercial exploitation and uncontrolled subsistence harvest of nesters and eggs has resulted in a dramatic decline of nesting females at the two main nesting beaches in Michoacan, Mexico. A conservative estimate of the total number of adult females at these locations is 4,238. This population is considered to be stable for now, and estimated extinction probabilities indicate very low risks of quasi-extinction over the next 100 years (Snover, 2005). Green turtle populations are in serious decline throughout most of the rest of the Pacific Ocean, except for the Hawaiian population. The Hawaiian population of green turtles is its own distinct genetic haplotype.

The Hawaiian population of green turtles appears to have increased gradually over the past 30 years and currently has population sizes sufficient to warrant a status review (Balazs, 1995; Balazs and Chaloupka, 2004). This is presumably due to effective protection at primary nesting areas in the Northwestern Hawaiian Islands and better enforcement of regulations prohibiting take of the species.

A herpes virus is involved in a complex etiology of sea turtle fibropapilloma that affects the skin with large tumors (Herbst, 1994; Herbst et al., 1995; Quackenbush et al., 1998). Fibropapilloma may be caused by exposure to marine areas impacted by pollution such as runoff from agricultural, industrial, or urban sources (Aguirre and Lutz, 2004). Growth rates of green turtles were significantly lower in those with fibropapilloma tumors (Chaloupka and Balazs, 2005). Despite the occurrence of fibropapillomatosis, and spirochidiasis, both of which are major causes of stranding of this species, nester abundance has continued to increase (Balazs and Chaloupka 2004). The size of the green turtle population in the Pacific Ocean was estimated at about 21,000 adults in 2001 (National Marine Fisheries Service, 2005b; Seminoff, 2004).

Abundance and Distribution. Green turtles occur in the coastal waters surrounding the Main Hawaiian Islands throughout the year and also migrate seasonally to the Northwestern Hawaiian Islands to reproduce. Genetic analyses conducted by NMFS suggest that about 57 percent of the green turtles that have been captured in the Hawaii-based longline fisheries have been members of the endangered Mexican (Pacific coast) nesting aggregation, while 43 percent have represented the threatened Hawaiian (French Frigate Shoals) nesting aggregations. This EIS/OEIS assumes that these results are generally representative of the relative abundance of green turtles found in open ocean areas off the Main Hawaiian Islands.

Adult green turtles that breed in the Northwestern Hawaiian Islands make regular reproductive migrations from their foraging grounds either around the Main Hawaiian Islands or around the westernmost atolls in the Northwestern Hawaiian Islands. This has been evidenced by mark-recapture and satellite-tracking studies on both adult male and female green turtles (Balazs, 1976; 1983; Balazs and Ellis, 1998; Balazs et al., 1994). Juvenile green turtles can also make long-range movements throughout the Hawaiian archipelago. From June 2002 to March 2003, a captive-reared green turtle released off northwestern Hawaii traveled over 2,983 mi around the Hawaiian Islands, swimming as far west as the waters between Nihoa and Necker Islands before turning around and heading back to the Main Hawaiian Islands (Thompson, 2003).

The largest nesting colony in the central Pacific Ocean occurs at French Frigate Shoals in the Northwestern Hawaiian Islands, where about 200 to 700 females nest each year. On occasion, green turtles also nest in the Main Hawaiian Islands. The most famous nesting green turtle in the Main Hawaiian Islands is turtle 5690, known by sea turtle biologists as “Maui Girl.” This turtle, which was raised to a year old at Oahu’s Sea Life Park and then tagged and released, has nested on beaches near Lahaina, Maui in 2000, 2002, and 2004 (Leone, 2004). Other sporadic nesting events in the Main Hawaiian Islands have occurred along the north shore of Molokai, the northwest shore of Lanai, and the south, northeast, and southwest shores of Kauai (U.S. Department of the Navy, 2001a, 2002a; National Ocean Service, 2001).

The area of year-round primary occurrence for green turtles is located in waters inshore of the 55-fathom isobath (bathymetric contour of equal depth) around all of the Main Hawaiian Islands and Nihoa. It is in these areas where reefs, their preferred habitats for foraging and resting, are most abundant. The area of secondary occurrence encompasses an oceanic zone surrounding the Hawaiian Islands. This area is frequently inhabited by adults that are migrating to the Northwestern Hawaiian Islands to reproduce and by pelagic stage individuals that have yet to settle into coastal feeding grounds of the Main Hawaiian Islands. Further offshore of this seasonal use zone, green turtles occur in much lower numbers and densities. The occurrence of East Pacific green turtles in this oceanic habitat is documented through by-catch in the Hawaii-based longline fishery. These turtles may represent late stage pelagic juveniles from this population, but the reasons for their presence are otherwise not well understood.

3.1.2.3.2 Hawksbill Turtle (*Eretmochelys imbricata*)

Status. The hawksbill turtle is listed as endangered under the ESA. A lack of regular quantitative surveys for hawksbill turtles in the Pacific Ocean and the discrete nature of this species' nesting have made it extremely difficult for scientists to assess the distribution and population status of hawksbills in the region (National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998a; Seminoff et al., 2003).

Abundance and Distribution. Around the Hawaiian Islands, hawksbills are only known to occur in the coastal waters of the eight main and inhabited islands of the archipelago. Hawksbills forage throughout the Main Hawaiian Islands, although in much fewer numbers than green turtles. Hawksbills have been captured at several locations including Kiholo Bay and Kau (Hawaii), Palaau (Molokai), and Makaha (Oahu) (Hawaii Department of Land and Natural Resources, 2002). Strandings have been reported in Kaneohe and Kahana Bays (Oahu) as well as in other locations throughout the Main Hawaiian Islands (Eckert, 1993; National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998a). No reliable reports are known from Niihau (U.S. Department of the Navy, 2001a). Hawksbills are much more abundant in the shallow, offshore waters of the Hawaiian Islands than they are in deeper, offshore waters of the central Pacific Ocean.

Throughout the year, the area of primary occurrence for hawksbill turtles can be found in HRC waters shoreward of the 55-fathom isobath. Beyond the 55-fathom isobath, hawksbill occurrence is apparently rare year-round. Pelagic stage individuals may occur in oceanic waters off the Main Hawaiian Islands and Nihoa, but these life stages are nearly impossible to sight during surveys and rarely, if ever, interact with the pelagic longline fishery. Of the five sea turtle species known to occur in the HRC, the hawksbill is the only one that is not taken by Hawaiian longliners (Kobayashi and Polovina, 2005).

Since 1991, 81 nesting female hawksbills have been tagged on the Island of Hawaii at various locations, 22 tagged in the last 3 years. These do not include nesting females from Maui or Molokai which would add a small number to the total. While this appears to be an encouraging trend, Seitz and Kagimoto (2007) report that there are insufficient data to confirm an increasing population as yet.

3.1.2.3.3 Leatherback Turtle (*Dermochelys coriacea*)

Status. Leatherback turtles are listed as endangered under the ESA and are critically endangered with extinction in the Pacific Ocean. There are few quantitative data available concerning the seasonality, abundance, or distribution of leatherbacks in the central North Pacific Ocean. The leatherback is not typically associated with insular habitats, such as those characterized by coral reefs, yet individuals are occasionally encountered in deep ocean waters near prominent archipelagos such as the Hawaiian Islands (Eckert, 1993).

Abundance and Distribution. Based on the genetic sampling of 18 leatherback turtles in Hawaiian waters, about 94 percent of the leatherback turtles sampled originated from western Pacific nesting beaches (National Marine Fisheries Service, 2004b, 2005b). These turtles could represent individuals from Indonesia (Jamursba-Medi or War-Mon), Papua New Guinea (Kamiali or other areas of the Huon Gulf), Malaysia (Terrenganu), the Solomon Islands, or Fiji, although satellite tracks from leatherback turtles tagged in Papua New Guinea suggest that leatherback turtles from these islands tend to migrate south instead of north, which would take them away from the action area. The remaining 6 percent of the leatherback turtles found off the Main Hawaiian Islands represent nesting aggregations from the eastern tropical Pacific Ocean (Mexico and Costa Rica).

Leatherback turtles are regularly sighted by fishermen in offshore waters surrounding the Hawaiian Islands, generally beyond the 647-fathom contour, and especially at the southeastern end of the island chain and off the north coast of Oahu (Nitta and Henderson, 1993; Balazs, 1995; 1998). Leatherbacks encountered in these waters, including those caught incidental to fishing operations, may represent individuals in transit from one part of the Pacific Ocean to another (National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998b). Leatherbacks apparently have a wide geographic distribution throughout the region where the Hawaiian longline fishery operates, with sightings and reported interactions commonly occurring around seamount habitats located above the Northwestern Hawaiian Islands (from 35° to 45°N and 175° to 180°W) (Skillman and Balazs, 1992; Skillman and Kleiber, 1998).

McCracken (2000) has also documented incidental captures of leatherbacks at several offshore locations around the Main Hawaiian Islands. Although leatherback bycatch events are common occurrences off the archipelago, leatherback stranding events on its beaches are not. Since 1982, only five leatherbacks have stranded in the Hawaiian Islands (National Marine Fisheries Service, 2004c).

Satellite-tracking studies, a lack of Hawaiian stranding records, and occasional incidental captures of the species in the Hawaii-based longline fishery indicate that deep, oceanic waters are the most preferred habitats of leatherback turtles in the central Pacific Ocean. As a result, the area of year-round primary occurrence for the leatherback turtle encompasses all HRC waters beyond the 55-fathom isobath. Inshore of the 55-fathom isobath is the area of rare leatherback occurrence, which is the same year-round. Leatherbacks were not sighted during any of the aerial surveys for which data were collected, all of which took place over waters lying close to the Hawaiian shoreline. Leatherbacks were not sighted during any of the NMFS shipboard surveys either, although their deep diving capabilities and long submergence times lessen the probability that observers would be able to spot them during marine surveys.

3.1.2.3.4 Loggerhead Turtle (*Caretta caretta*)

Status. The loggerhead turtle is listed as threatened under the ESA. On July 16, 2007, NMFS received a petition from the Center for Biological Diversity and the Turtle Island Restoration Network requesting that loggerhead turtles in the North Pacific Ocean be reclassified as a Distinct Population Segment with endangered status and that critical habitat be designated. In a Federal Register Notice dated November 16, 2007 (National Marine Fisheries Service, 2007q) NMFS initiated a review of the status of the species to determine whether the petitioned action is warranted and to determine whether any additional changes to the current listing of the loggerhead turtle are warranted. NMFS requested information and comments which were due by January 15, 2008.

Abundance and Distribution. Loggerhead turtles found off the Main Hawaiian Islands represent turtles that nest on beaches in southern Japan, which includes about 1,500 adult females. According to the 2005 status review conducted by NMFS and USFWS (National Marine Fisheries Service and Fish and Wildlife Service 2007) it is probable that fewer than 1,000 females breed annually in Japan (Kamezaki *et al*., 2003). While annual nest numbers increased gradually from 1998 through 2004, these data are insufficient to conclude a trend. Based on a review of census data collected from most of the Japanese beaches from the 1950s through the 1990s, Kamezaki *et al*. (2003) concluded that a substantial decline (50-90 percent) occurred in the annual loggerhead nesting population in Japan in recent decades.

National Marine Fisheries Service and U.S. Fish and Wildlife Service (1998b) listed four records of this species for the Hawaiian Islands: two from the southeastern end of the archipelago, one from Kure Atoll (recovered from the stomach of a tiger shark [*Galeocerdo cuvier*]), and a fourth from the coast of Oahu (seen just offshore of the Sheraton Waikiki hotel). All four individuals were identified as juvenile loggerheads and most likely drifted or traveled to the region from either Mexico or Japan. A single male loggerhead turtle has also been reported to visit Lehua Channel and Keamano Bay (located off the north coast of Niihau) every June through July (U.S. Department of the Navy, 2001a; National Ocean Service, 2001). Only one loggerhead stranding has been recorded in the Hawaiian Islands since researchers began documenting them in 1982. This event, which was recorded along the shores of Kaneohe Bay, Oahu, was determined to be the result of a shark attack (National Marine Fisheries Service, , 2004c).

Genetic analyses indicate that nearly all of the loggerheads found in the North Pacific Ocean are born on nesting beaches in Japan (Bowen et al., 1995; Resendiz et al., 1998). Pacific loggerheads appear to utilize the entire North Pacific Ocean during the course of development, much like Atlantic loggerheads use the North Atlantic Ocean. There is substantial evidence that both stocks make two separate transoceanic crossings. The first crossing (west to east) is made immediately after hatching from the nesting beach, while the second (east to west) is made upon reaching either the late juvenile or adult life stage.

The area of primary occurrence for the loggerhead turtle spans all ocean waters off the Main Hawaiian Islands and Nihoa beyond the 55-fathom isobath. Incidental catches of loggerheads in the Hawaii-based longline fishery provided evidence of their presence and use of these waters for migrations and development (Polovina, et al., 2000). This area, like the area of rare occurrence, which can be found between the Hawaiian Islands shoreline and the 55-fathom isobath, is the same throughout the year. Occurrence in offshore waters is believed to be rare due to a lack of sighting and stranding records in those waters. Except for the four sighting and one stranding records listed previously, loggerheads have not been recorded at all on the Hawaiian shelf.

3.1.2.3.5 Olive Ridley Turtle (*Lepidochelys olivacea*)

Status. Olive ridley turtles are listed as threatened under the ESA, except for the Mexican nesting population, which is listed as endangered. Until the advent of commercial exploitation, the olive ridley was highly abundant in the eastern tropical Pacific Ocean, probably outnumbering all other sea turtle species combined in the area (National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998d). Clifton et al. (1995) estimated that a minimum of 10 million olive ridleys were present in ocean waters off the Pacific coast of Mexico prior to 1950. Even though there are no current estimates of worldwide abundance, the olive ridley is still considered the most abundant of the world's sea turtles. However, the number of olive ridley turtles occurring in U.S. territorial waters is believed to be small (National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998c).

The largest nesting aggregation in the world now occurs in the Indian Ocean along the northeast coast of India (Orissa), where in 1991 over 600,000 turtles nested in a single week (Mrosovsky, 1993). The second most important nesting area occurs in the eastern Pacific, along the west coast of Mexico and Central America (National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998d). Although increasing numbers of nests and nesting females have been observed in Mexico in recent years, the decline of the species continues in the eastern Pacific countries of Costa Rica, Guatemala, and Nicaragua. Egg loss has occurred from both legal and illegal collection, as well as natural loss due to nesting turtles inadvertently digging up previously laid nests. Population growth rate parameters calculated for the primary nesting site of Escobilla Beach, Oaxaca, Mexico indicate a negligible risk of extinction over the next several decades, given that current conservation practices are continued (Snover, 2005).

Abundance and Distribution. Genetic analyses of 44 olive ridleys captured in the Hawaii-based longline fishery concluded that 75 percent of these turtles (n=33) originated from the eastern Pacific (Mexico and Costa Rica) and 25 percent of the turtles (n=11) were from the Indian and western Pacific rookeries (National Marine Fisheries Service, 2005h).

About 61 percent of the sea turtles that interact (that are captured, killed, or both) with Hawaii-based longline fisheries are olive ridley turtles; more olive ridley turtles have been captured in these fisheries than all other sea turtles combined (National Marine Fisheries Service, 2005h). In addition, about 26 olive ridley turtles have stranded in the Hawaiian Islands since 1982, making it the third most common species to strand after greens and hawksbills (Hawaii Department of Land and Natural Resources, 2002). Available information suggests that olive ridleys traverse through the oceanic waters surrounding the Hawaiian Islands during foraging and developmental migrations (Nitta and Henderson, 1993).

In the Hawaiian Islands, a single olive ridley nest was recorded along Paia Bay, Maui in September 1985; however, there was no successful hatching associated with this event (Balazs and Hau, 1986; National Ocean Service, 2001). Since there are no other known nesting records for the central Pacific Ocean, the above nesting attempt should be considered an anomaly (National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998c).

3.1.2.4 MARINE MAMMALS

Marine mammals addressed within this EIS/OEIS include members of two orders: Cetacea, which includes whales, dolphins, and porpoises; and Carnivora, which includes true seals (family Phocidae) and sea lions (family Otariidae). Cetaceans spend their lives entirely at sea. Pinnipeds (seals and sea lions) hunt and feed exclusively in the ocean, and one of the species occurring in the areas addressed in this EIS/OEIS comes ashore to rest, mate, and bear young. There are 27 species of marine mammals that occur in the Hawaiian Islands area (Table 3.1.2.4-1). Most of the marine mammal species found in the Hawaiian Islands area are cetaceans, including 7 mysticetes (baleen whales) and 18 odonocetes (tooth whales and dolphins) with 2 pinniped species, both phocids (true seals). No otariids (sea lions and fur seals) or sirenians (dugongs and manatees) are found in the Hawaiian Islands area. Of the 27 marine mammal species, 7 species are considered endangered under the ESA and are considered a depleted and strategic stock under the 1972 Marine Mammal Protection Act (MMPA).

Information on the density of marine mammals used for the acoustic exposures modeling for MFA/HFA sonar and underwater detonations was primarily collected from Barlow (2006) and Mobley (2004). Information from the Hawaii Marine Resource Assessment (U.S. Department of the Navy, 2005a; Barlow, 2003; and Carretta, et al., 2006) was also used in the analysis. Barlow (2006) did not give a density estimate for fin (*Balaenoptera physalus*) and sei (*Balaenoptera borealis*) whales in Hawaii because the survey (originally analyzed in Barlow 2003) was not conducted during the peak period of abundance. Therefore, for the analysis undertaken in support of this EIS/OEIS, it was assumed that the number and density of fin and sei whales did not exceed that of the small population of false killer whales (*Pseudorca crassidens*) (236 false killer whales in Hawaii). Marine mammals inhabit most marine environments from deep ocean canyons to shallow estuarine waters. They are not randomly distributed. Marine mammal distribution is affected by demographic, evolutionary, ecological, habitat-related, and anthropogenic factors (Bowen et al., 2002; Bjørge, 2002; Forcada, 2002; Stevick et al., 2002). Marine mammal movements are often related to feeding or breeding activity (Stevick et al., 2002). A migration is the periodic movement of all, or significant components of, an animal population from one habitat to one or more other habitats and back again. Some baleen whale species, such as humpback whales (*Megaptera novaeangliae*), make extensive annual migrations to low-latitude mating and calving grounds in the winter and to high-latitude feeding grounds in the summer (Corkeron and Connor, 1999).

The oceanic waters surrounding the Hawaiian Islands do not contain a true continental shelf, and therefore no true shelf break—the region in which there is a sharp break in the slope of the island shelf (Kennett, 1982; Thurman, 1997). Rather, the HRC and vicinity is composed of a series of volcanic seamounts, several of which have broken the surface to form the Hawaiian Islands. Seamount topography has been previously correlated with enhanced production due to the formation of vortices capable of mixing nutrients to the surface and entraining phytoplankton in the overlying waters (Rogers, 1994).

Table 3.1.2.4-1. Summary of Hawaiian Islands Stock or Population of Marine Mammals

Order Cetacea	Scientific Name	Status	Occurs[1]	Group Size[2]	Detection Probability[3] Group 1-20	Group >20	Hawaii Abundance
MYSTICETES (baleen whales)							
Family Balaenidae (right whales)							
North Pacific right whale	*Eubalaena japonica*	E	Rare				UNK
Family Balaenopteridae (rorquals)							
Humpback whale	*Megaptera novaeangliae*	E	Regular	1.7			4,491
Minke whale	*Balaenoptera acutorostrata*		Regular				UNK
Sei whale	*Balaenoptera borealis*	E	Rare	3.4	0.90	0.90	236 [6]
Fin whale	*Balaenoptera physalus*	E	Rare	2.6	0.90	0.90	236 [6]
Blue whale	*Balaenoptera musculus*	E	Rare				UNK
Bryde's whale	*Balaenoptera edeni/brydei**		Regular	1.5	0.90	0.90	469
ODONTOCETES (toothed whales)							
Family Physeteridae (sperm whale)							
Sperm whale	*Physeter macrocephalus*	E	Regular	7.3	0.87	0.87	6,919
Family Kogiidae (pygmy sperm whales)							
Pygmy sperm whale	*Kogia breviceps*		Regular	1.0	0.35	0.35	7,138
Dwarf sperm whale	*Kogia sima*		Regular	2.3	0.35	0.35	17,519
Family Ziphiidae (beaked whales)							
Cuvier's beaked whale	*Ziphius cavirostris*		Regular	2.0	0.23	0.23	15,242
Blainville's beaked whale	*Mesoplodon densirostris*		Regular	2.3	0.45	0.45	2,872
Longman's beaked whale	*Indopacetus pacificus*		Regular	17.8	0.76	1.00	1,007
Family Delphinidae (dolphins)							
Rough-toothed dolphin	*Steno bredanensis*		Regular	14.8	0.76	1.00	8,709
Bottlenose dolphin	*Tursiops truncatus*		Regular	9.0	0.76	1.00	3,215
Pantropical spotted dolphin	*Stenella attenuata*		Regular	60.0	0.76	1.00	8,978
Spinner dolphin	*Stenella longirostris*		Regular	31.7	0.76	1.00	3,351
Striped dolphin	*Stenella coeruleoalba*		Regular	37.3	0.76	1.00	13,143
Risso's dolphin	*Grampus griseus*		Regular	15.4	0.76	1.00	2,372
Melon-headed whale	*Peponocephala electra*		Regular	89.2	0.76	1.00	2,950
Fraser's dolphin	*Lagenodelphis hosei*		Rare	286.3	0.76	1.00	10,226
Pygmy killer whale	*Feresa attenuata*		Regular	14.4	0.76	1.00	956
False killer whale	*Pseudorca crassidens*		Regular	10.3	0.76	1.00	236
Killer whale	*Orcinus orca*		Regular	6.5	0.90	0.90	349
Short-finned pilot whale	*Globicephala macrorhynchus*		Regular	22.5	0.76	1.00	8,870
Total Number of Delphinids in Hawaiian Waters (from Barlow 2006)							63,354
Total Number of Beaked Whales in Hawaiian Waters (from Barlow 2006)							19,492
PINNIPEDS (seals, sea lions, walruses)							
Family Phocidae (true seals)							
Hawaiian monk seal	*Monachus schauinslandi*	E	Regular				1,252
Northern elephant seal	*Mirounga angustirostris*		Rare				

Source: U.S. Department of the Navy, 2005a; Barlow, 2003; Mobley, 2004; Barlow, 2006; Carretta et al., 2006
Notes: Taxonomy follows Rice (1998) for pinnipeds and sirenians and the International Whaling Commission (2007) for cetaceans.
[1] Occurrence: **Regular** = A species that occurs as a regular or normal part of the fauna of the area, regardless of how abundant or common it is; **Rare** = A species that only occurs in the area sporadically; *includes more than one species, but nomenclature is still unsettled.
[2] Mean group sizes are the geometric mean of best estimates from multiple observers and have not been corrected for bias.
[3] Barlow, 2006
[4] Central North Pacific Stock
[5] Carreta et al., 2006
[6] For analysis purposes, density was assumed to be the same as for the false killer whale
E = Endangered UNK = Unknown

In addition, the passage of the North Equatorial Current through the Hawaiian archipelago is capable of creating regions of enhanced turbulence. Passage of the current of the North Equatorial Current can initiate the formation of eddies on the lee side of the islands (Wolanski et al., 2003); these are capable of entraining phytoplankton and creating localized regions of enhanced primary production. In addition, passage of currents through a narrow channel (as found in the Alenuehaha Channel between Hawaii and Maui) can create localized zones of turbulent flow capable of mixing nutrients into the surface layer to fuel primary production (Gilmartin and Revelante, 1974; Simpson et al., 1982).

3.1.2.4.1 Marine Mammal Occurrence

Information on the abundance, behavior, distribution, and diving behavior of marine mammal species in the Hawaiian waters is based on peer reviewed literature including the most recent publications, the Navy Marine Resource Assessment, NMFS Stock Assessment Reports, marine mammals surveys using acoustics or visual observations from aircraft or ships, and previous environmental documents such as the Rim of the Pacific (RIMPAC) EA and supplements and the Undersea Warfare Exercise EA/Overseas EA and Incidental Harassment Authorization applications. Some specific definitions for terms used within this section of the document are required as they are not the same as used in other sections of the document. Information on each species is given relative to a specific definition of onshore (within 25 nm of shore) and offshore (beyond 25 nm from shore) habitats. A regular occurrence species is defined as a species that occurs as a regular or normal part of the fauna of the area, regardless of how abundant or common it is; a rare occurrence is a species that only occurs in the area sporadically; and an extralimital occurrence is a species that does not normally occur in the area, but for which there are one or more records that are considered beyond the normal range of the species. In this section, mysticetes are listed first, followed by odontocetes, then pinniped species (Table 3.1.2.4-1).

The acoustic abilities of marine mammals are important to their ability to communicate with conspecifics (offspring, mates, or competitors), navigation, foraging, and avoidance of predators. Little is known of the hearing abilities of mysticete whales, but generally they vocalize in low frequencies under 3 kHz, which may aid in long-range communication but do not echolocate (Review by Richardson et al., 1995a). The exception is the humpback whale, which may have a range up to 24 kHz (Au et al., 2006), and the north Atlantic right whale which may hear up to 22 kHz (Parks et al., 2004, 2007). It had been assumed that their hearing range was also under 3 kHz (Ketten, 1997) but from studies of vocalizations and anatomy, it may extend up to 24 kHz (Parks et al., 2004; Au et al., 2006; review by Southall et al., 2007). Odontocetes vocalize and echolocate over a much higher range of frequencies, ranging from below 1 kHz to 200 kHz (Review by Richardson et al., 1995a). Phocid seals, such as the Hawaiian monk seal (*Monachus schauinslandi*), hear underwater in the range of 2 to 40 kHz, with best hearing from 16 to 24 kHz (Thomas et al., 1990).

3.1.2.4.1.1 Mysticetes

North Pacific Right Whale (*Eubalaena japonica*)

Status. The North Pacific right whale is listed as endangered under the ESA and as a depleted and strategic stock under the MMPA (Carretta et al., 2005). Until recently, right whales in the North Atlantic and North Pacific were classified together as a single species, referred to as the "northern right whale." Genetic data indicate that these two populations represent separate species: the North Atlantic right whale (*Eubalaena glacialis*) and the North Pacific right whale (*Eubalaena japonica*) (Rosenbaum et al., 2000; Proposed in National Oceanic and Atmospheric Administration, 2006a).

The North Pacific right whale is perhaps the world's most endangered large whale species (Perry et al., 1999; International Whaling Commission, 2001). North Pacific right whales are classified as endangered both under the ESA and on the IUCN Red List (Reeves et al., 2003). There are insufficient genetic or resighting data to address whether there is support for the traditional separation into eastern and western stocks (Brownell et al., 2001); however, Clapham et al. (2004) noted that north–south migratory movements support the hypothesis of two largely discrete populations of right whales in the eastern and western North Pacific. No reliable population estimate presently exists for this species; the population in the eastern North Pacific is considered to be very small, perhaps only in the tens of animals (National Marine Fisheries Service, 2002a; Clapham et al., 2004), while in the western North Pacific, the population may number at least in the low hundreds (Brownell et al., 2001; Clapham et al., 2004). There is no proposed or designated critical habitat for the North Pacific right whale in the HRC.

Abundance and Distribution. Right whales occur in sub-polar to temperate waters. The North Pacific right whale historically occurred across the Pacific Ocean north of 35°N, with concentrations in the Gulf of Alaska, eastern Aleutian Islands, south-central Bering Sea, Sea of Okhotsk, and the Sea of Japan (Omura et al., 1969; Scarff, 1986; Clapham et al., 2004). Presently, sightings are extremely rare, occurring primarily in the Okhotsk Sea and the eastern Bering Sea (Brownell et al., 2001; Shelden et al., 2005). Prior to 1996, right whale sightings were very rare in the eastern North Pacific (Scarff, 1986; Brownell et al., 2001). Recent summer sightings of right whales in the eastern Bering Sea represent the first reliable consistent observations in this area since the 1960s (Tynan et al., 2001; LeDuc, 2001).

Neither the west coast of North America nor the Hawaiian Islands constituted a major calving ground for right whales within the last 200 years (Scarff, 1986). No coastal calving grounds for right whales have been found in the western North Pacific either (Scarff, 1986). Mid-ocean whaling records of right whales in the winter suggest that right whales may have wintered and calved far offshore in the Pacific (Scarff, 1986; 1991; Clapham et al., 2004). Such pelagic calving would appear to be inconsistent with the records of offshore calving grounds in other locales for the other right whale species.

There are very few recorded sightings from the Hawaiian Islands; they are from both shallow and deep waters (Herman et al., 1980; Rowntree et al., 1980; Salden and Mickelsen, 1999). Secondary occurrence is expected from the coastline to seaward of the HRC boundaries. Right whales are not expected to make their way into lagoons or busy harbors; therefore, occurrence in Pearl Harbor is expected to be rare to nonexistent (U.S. Department of the Navy, 2005b). Right whale occurrence patterns are assumed to be similar throughout the year. Based on migration patterns and whaling data, the Hawaiian Islands may have been a breeding ground for North Pacific right whales in the past (Clapham et al., 2004).

Reproduction/Breeding. Calving primarily occurs from December through March (Best, 1994).

Diving Behavior. Dives of 5 to 15 min or even longer have been reported (Winn et al., 1995; Mate et al., 1997; Baumgartner and Mate, 2003). Baumgartner and Mate (2003) found that the average depth of a North Atlantic right whale dive was strongly correlated with both the average depth of peak copepod abundance and the average depth of the bottom mixed layer's upper surface. North Atlantic right whale feeding dives are characterized by a rapid descent from the surface to a particular depth between 262 and 574 ft, remarkable fidelity to that depth for 5 to 14 min, and then rapid ascent back to the surface (Baumgartner and Mate, 2003). Longer surface intervals have been observed for reproductively active females and their calves (Baumgartner and Mate, 2003).

Acoustics. North Pacific right whale calls are classified into five categories: (1) up; (2) down-up; (3) down; (4) constant; and (5) unclassified (McDonald and Moore, 2002). The "up" call is the predominant type (McDonald and Moore, 2002; Mellinger et al., 2004). Typically, the "up" call is a signal sweeping from about 90 to 150 Hz in 0.7 sec and could be detected out to 13.5 nm (McDonald and Moore, 2002). Wiggins et al. (2004) recorded upsweeping low frequency (90 to 160 kHz) calls of North Pacific right whales in the Bering Sea. Right whales commonly produce calls in a series of 10 to 15 calls lasting 5 to 10 min, followed by silence lasting an hour or more; some individuals do not call for periods of at least 4 hours (McDonald and Moore, 2002). This calling pattern is similar to the "moan cluster" reported for North Atlantic right whales by Matthews et al. (2001). Vocalization rates of North Atlantic right whales are also highly variable, and individuals have been known to remain silent for hours (Gillespie and Leaper, 2001).

Frequencies of these vocalizations are between 50 and 500 Hz (Matthews et al., 2001; Laurinolli et al., 2003); typical sounds are in the 300 to 600 Hz range with up- and down-sweeping modulations (Vanderlaan et al., 2003). Vanderlaan et al. (2003) found that lower (<200 Hz) and higher (>900 Hz) frequency sounds are relatively rare. Source levels have been estimated only for pulsive calls of North Atlantic right whales, which are 172 to 187 dB re 1 µPa-m (Richardson et al., 1995a).

Morphometric analyses of the inner ear of right whales resulted in an estimated hearing frequency range of approximately 10 Hz to 22 kHz, based on established marine mammal models (Parks et al., 2004; 2007). Research by Nowacek et al. (2004) on North Atlantic right whales suggests that received sound levels of only 133 to 148 dB re 1 µPa at 500 Hz to 4.5 kHz for the duration of the sound exposure (three signals of 2 min each played over 18 min) are likely to disrupt feeding behavior. The authors did note, however, that a return to normal behavior within minutes of when the source is turned off would be expected. While some of the upper frequencies approach those of MFA sonar, the signals were not similar because they were either too low in frequency range or longer and contain a down sweep signal 4,500 to 500 Hz.

Humpback Whale (*Megaptera novaeangliae*)

Status. The humpback whale is listed as endangered under the ESA and as a depleted and strategic stock under the MMPA (Carretta et al., 2005). There is no designated critical habitat for this species in the North Pacific. Humpback whales and other marine mammals are of interest from a cultural perspective to some Native Hawaiians and other people (National Oceanic and Atmospheric Administration, 2003).

Abundance and Distribution. The best available estimate of abundance for the Central West Pacific stock of the humpback whales is 4,491 individuals (Mobley, 2004). Humpback whales use Hawaiian waters as a major breeding ground during winter and spring (November through April). Evidence suggests that some humpback whales may move between the waters of Japan in the Western North Pacific (Darling and Cerchio, 1993; Salden, et al., 1999; Calambokidis et al., 2001; Witteveen et al., 2004). Calambokidis et al. (1997) estimated that up to half of the North Pacific populations of humpback whales migrate to the Hawaiian Islands during the winter. Peak abundance around the Hawaiian Islands is from late February through early April (Mobley et al., 2001a; Carretta et al., 2005). During the fall–winter period, primary occurrence is expected from the coast to 50 nm offshore, which takes into consideration both the available sighting data and the preferred breeding habitat (shallow waters) (Herman and Antinoja, 1977; Mobley et al., 1999, 2000, 2001a). The greatest densities of humpback whales (including calves) are in the four-island region consisting of Maui, Molokai, Kahoolawe, and Lanai, as well as Penguin Bank (Baker and Herman, 1981; Mobley et al., 1999; Maldini, 2003) and around Kauai (Mobley, 2005). Secondary occurrence is expected from seaward of this area, past the HRC boundaries. Humpback whales are not expected to be in Pearl Harbor, though an anomalous sighting of an adult and calf was reported during 1998 and 2003 (U.S. Department of the Navy, 2005b). The occurrence of humpback whales in deeper waters is based on work in the Caribbean (the breeding ground for humpback whales in the North Atlantic), where humpback whale calls were acoustically detected over deep water, far from any banks or islands (Swartz et al., 2002; Frankel et al., 1995).

During the spring–summer period, secondary occurrence is expected offshore out to 50 nm, mainly to account for the possible occurrence of humpback whales during the end of the breeding season (April). Humpback whales return to the feeding grounds of near northern California to the Aleutian Islands as determined by comparing songs (McSweeney et al., 1989) and recording the migration path of animals with satellite tags (Mate et al., 1998). Occurrence further offshore, as well as in Pearl Harbor, is expected to be rare.

The Hawaiian Islands Humpback Whale National Marine Sanctuary was signed into law in November 1992. The Final EIS/Management Plan was released in March 1997, and the final rule was published in November 1999. Activities allowed within the Sanctuary are all classes of military activities, internal or external to the Sanctuary, that were being or had been conducted before the effective date of the regulations, as identified in the Final EIS/Management Plan. The sanctuary includes specific areas from the coast of the Hawaiian Islands seaward to the 100-fathom isobath.

Reproduction/Breeding. Most of the central north Pacific stock of humpback whales migrate south to Hawaii in winter for breeding and calving from December through April (Clapham and Mead, 1999; Mobley et al., 2001a).

Diving Behavior. Humpback whale diving behavior depends on the time of year (Clapham and Mead, 1999). In summer, most dives last less than 5 min; those exceeding 10 min are atypical. In winter (December through March), dives average 10 to 15 min; but dives of greater than 30 min have also been recorded (Clapham and Mead, 1999). Although humpback whales have been recorded to dive as deep as about 273 fathoms (Dietz et al., 2002), on the feeding grounds they spend the majority of their time in the upper 66 fathoms of the water column (Dolphin, 1987; Dietz et al., 2002). Humpback whales on the wintering grounds do dive deeply; Baird et al. (2000) recorded dives are to a maximum of 577 ft.

Acoustics. Humpback whales are known to produce three classes of vocalizations: (1) “songs” in the late fall, winter, and spring by solitary males; (2) sounds made within groups on the wintering (calving) grounds; and (3) social sounds made on the feeding grounds (Richardson et al., 1995a). The best-known types of sounds produced by humpback whales are songs, which are thought to be breeding displays used only by adult males (Helweg et al., 1992). Singing is most common on breeding grounds during the winter and spring months, but is occasionally heard outside breeding areas and out of season (Matilla et al., 1987; Clark and Clapham, 2004). There is geographical variation in humpback whale song, with different populations singing different songs, and all members of a population using the same basic song. However, the song evolves over the course of a breeding season, but remains nearly unchanged from the end of one season to the start of the next (Payne et al., 1983). Social calls are from 50 Hz to over 10 kHz, with the highest energy below 3 kHz (Silber, 1986). Female vocalizations appear to be simple; Simão and Moreira (2005) noted little complexity. The male song, however, is complex and changes between seasons. Components of the song range from under 20 Hz to 4 kHz and occasionally 8 kHz, with source levels of 144 to 174 dB re 1 µPa-m, with a mean of 155 dB re 1 µPa-m. Au et al. (2001) recorded high-frequency harmonics (out to 13.5 kHz) and source level (between 171 and 189 dB re 1 µPa-m) of humpback whale songs. (Au et al., 2001) Songs have also been recorded on feeding grounds (Mattila et al., 1987; Clark and Clapham, 2004). Zoidis et al. (2008) recorded humpback whale calves in Hawaii and reported that they produced simple structured vocalizations that were mostly low frequency (140 to 4,000 Hz with a mean of 220 Hz).

The main energy of the song lies between 0.2 and 3.0 kHz, with frequency peaks at 4.7 kHz. Feeding calls, unlike song and social sounds, are highly stereotyped series of narrow-band trumpeting calls. They are 20 Hz to 2 kHz, less than 1 sec in duration, and have source levels of 175 to 192 dB re 1 µPa-m. The fundamental frequency of feeding calls is approximately 500 Hz (D'Vincent et al., 1985).

No tests on humpback whale hearing have been made. Houser et al. (2001) constructed a humpback audiogram using a mathematical model based on the internal structure of the ear. The predicted audiogram indicates sensitivity to frequencies from 700 Hz to 10 kHz, with maximum relative sensitivity between 2 and 6 kHz. Maybaum (1989) reported that humpback whales showed a mild response to a hand held sonar marine mammal detection and location device (frequency of 3.3 kHz at 219 dB re 1 µPa at 1 meter or frequency sweep of 3.1 to 3.6 kHz), although this system is very different from the Navy's hull mounted sonars. In addition, the system had some low frequency components (below 1 kHz), which may be an artifact of the acoustic equipment. This may have affected the response of the whales to both the control and sonar playbacks. Humpback whales also stop singing in response to playbacks of the singing or social sounds of conspecifics (Tyack, 1983). Miller et al. (2000) reported that humpback whales sang longer during playbacks of low-frequency active sonar, which is much lower in frequency than the MFA sonar described in this EIS/OEIS. Recent information on the songs of humpback whales suggests that their hearing may extend to frequencies of at least 24 kHz (Au et al., 2006).

Minke Whale (*Balaenoptera acutorostrata*)

<u>Status</u>. The minke whale is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al*.,* 2005). The International Whaling Commission (IWC) recognizes three stocks of minke whales in the North Pacific: one in the Sea of Japan/East China Sea, one in the rest of the western Pacific west of 180°N, and one in the remainder of the Pacific (Donovan, 1991). For the National Oceanic and Atmospheric Administration (NOAA) stock assessment report, there are three stocks of minke whales within the U.S. Pacific EEZ: (1) a Hawaiian stock; (2) a California/Oregon/ Washington stock; and

(3) an Alaskan stock (Carretta et al*.,* 2005). There currently is no abundance estimate for the Hawaiian stock of minke whales, which appears to occur seasonally (approximately November through March) around the Hawaiian Islands (Carretta et al*.,* 2005).

Abundance and Distribution. There currently is no abundance estimate for the Hawaiian stock of minke whales, which appears to occur seasonally (approximately November through March) around the Hawaiian Islands (Carretta et al*.,* 2005). Mating is thought to occur in winter or early spring (Stewart and Leatherwood, 1985).

Minke whales are distributed in polar, temperate, and tropical waters (Jefferson et al*.,* 1993); they are less common in the tropics than in cooler waters. Minke whales are present in the North Pacific from near the equator to the Arctic (Horwood, 1990). The summer range extends to the Chukchi Sea (Perrin and Brownell, 2002). In the winter, minke whales are found south to within 2° of the equator (Perrin and Brownell, 2002). The distribution of minke whale vocalizations (specifically, “boings”) suggests that the winter breeding grounds are the offshore tropical waters of the North Pacific Ocean (Rankin and Barlow, 2003). There is no obvious migration from low-latitude, winter breeding grounds to high-latitude, summer feeding locations in the western North Pacific, as there is in the North Atlantic (Horwood, 1990); however, there are some monthly changes in densities in both high and low latitudes (Okamura et al*.,* 2001). In the northern part of their range, minke whales are believed to be migratory, whereas they appear to establish home ranges in the inland waters of Washington and along central California (Dorsey*,* 1983) and exhibit site fidelity to these areas between years (Borggaard et al*.,* 1999).

The minke whale is expected to occur seasonally in the HRC (Barlow, 2003). Abundance is expected to be higher between November and March (Carretta et al*.,* 2005). Therefore, an area of secondary occurrence is seaward of the shoreline during the fall–winter period. Both visual and acoustic detections of minke whales have been reported for this area (Balcomb, 1987; Thompson and Friedl, 1982; Barlow et al*.,* 2004; Carretta et al*.,* 2005; Norris et al*.,* 2005). The occurrence pattern takes into account both sightings in shallow waters in some locales globally as well as the anticipated oceanic occurrence of this species (U.S. Department of the Navy 2005b). “Boings” were recorded in waters with a bottom depth of approximately 700 to 2,100 fathoms (Norris et al*.,* 2005). Norris et al. *(*2005) reported sighting a minke whale 58 mi southwest of Kauai, in waters with a bottom depth of approximately 1,400 fathoms (U.S. Department of the Navy, 2005b). During the spring–summer period, there is a rare occurrence for the minke whale throughout the entire HRC although recent evidence from passive acoustic monitoring suggests that there may be more minke whales in the HRC than previously thought (Rankin and Barlow, 2005; Barlow 2006).

Reproduction/Breeding. Stewart and Leatherwood (1985) suggested that mating occurs in winter or early spring although it had never been observed. No breeding or calving areas for Hawaii have been described.

Diving Behavior. Stern (1992) described a general surfacing pattern of minke whales consisting of about four surfacings, interspersed by short-duration dives averaging 38 sec. After the fourth surfacing, there was a longer duration dive ranging from approximately 2 to 6 min. Minke whales are “gulpers,” like the other rorquals (baleen whales) (Pivorunas, 1979). Hoelzel et al. (1989) reported on different feeding strategies used by minke whales. In the North Pacific, major food items include krill, Japanese anchovy (*Engraulis japonicus)*, Pacific saury (*Cololabis saira)*, and walleye pollock (*Theragra chalcogramma*) (Perrin and Brownell, 2002).

Acoustics. Recordings in the presence of minke whales have included both high-and low-frequency sounds (Beamish and Mitchell, 1973; Winn and Perkins, 1976; Mellinger et al., 2000). Mellinger et al. (2000) described two basic forms of pulse trains that were attributed to minke whales: a “speed up” pulse train with energy in the 200 to 400 Hz band, with individual pulses lasting 40 to 60 milliseconds, and a less-common “slow-down” pulse train characterized by a decelerating series of pulses with energy in the 250 to 350 Hz band. Recorded vocalizations from minke whales have dominant frequencies of 60 Hz to greater than 12,000 Hz, depending on vocalization type (Richardson et al., 1995a). Recorded source levels, depending on vocalization type, range from 151 to 175 dB re 1 µPa-m (Ketten, 1998). Gedamke et al. (2001) recorded a complex and stereotyped sound sequence (“star-wars vocalization”) in the Southern Hemisphere that spanned a frequency range of 50 Hz to 9.4 kHz. Broadband source levels between 150 and 165 dB re 1 µPa-m were calculated. “Boings,” recently confirmed to be produced by minke whales and suggested to be a breeding call, consist of a brief pulse at 1.3 kHz, followed by an amplitude-modulated call with greatest energy at 1.4 kHz, with slight frequency modulation over a duration of 2.5 sec (Anonymous, 2002; Rankin and Barlow, 2003). While no data on hearing ability for this species are available, Ketten (1997) hypothesized that mysticetes have acute infrasonic hearing.

Sei Whale (*Balaenoptera borealis*)

Status. The sei whale is listed as endangered under the ESA and as a depleted and strategic stock under the MMPA (Carretta et al*.,* 2005). The IWC designates the entire North Pacific Ocean as one sei whale stock unit (Donovan, 1991), although some evidence exists for multiple stocks (National Marine Fisheries Service, 1998; Carretta et al*.,* 2005). For the NOAA stock assessment reports, sei whales within the Pacific EEZ are divided into three discrete, non-contiguous areas: (1) the Hawaiian stock; (2) California/Oregon/Washington stock; and (3) the Eastern North Pacific (Alaska) stock (Carretta et al*.,* 2005).

The taxonomy of the baleen whale group formerly known as sei and Bryde’s whales is currently confused and highly controversial (see Reeves et al*.,* 2004 for a recent review, also see the Bryde’s whale species account below for further explanation).

Abundance and Distribution. Barlow (2006) did not give a density estimate for sei whales in Hawaii because the survey (originally analyzed in Barlow, 2003) was not conducted during the peak period of abundance. Therefore, for the analysis undertaken in support of this EIS/OEIS, it was assumed that the number and density of sei whales did not exceed that of the small population of false killer whales (236 false killer whales in Hawaii). There is no information on the population trend of sei whales. Sei whales have a worldwide distribution, but are found primarily in cold temperate to subpolar latitudes, rather than in the tropics or near the poles (Horwood, 1987). Sei whales are also known for occasional irruptive occurrences in areas followed by disappearances for sometimes decades (Horwood, 1987; Schilling et al*.,* 1992; Clapham et al*.,* 1997).

Sei whales spend the summer months feeding in the subpolar higher latitudes and return to the lower latitudes to calve in winter. There is some evidence from whaling catch data of differential migration patterns by reproductive class, with females arriving at and departing from feeding areas earlier than males (Horwood, 1987; Perry et al., 1999). For the most part, the location of winter breeding areas remains a mystery (Rice, 1998; Perry et al., 1999). In the North Pacific, sei whales are thought to occur mainly south of the Aleutian Islands. They are present all across the temperate North Pacific north of 40°N (National Marine Fisheries Service, 1998) and are seen at least as far south as 20°N (Horwood, 1987). In the east, they range as far south as Baja California, Mexico, and in the west, to Japan and Korea (Reeves et al., 1999). As noted by Reeves et al. (1999), reports in the literature from any time before the mid-1970s are suspect, because of the frequent failure to distinguish sei from Bryde's whales, particularly in tropical to warm temperate waters where Bryde's whales are generally more common than sei whales.

The sei whale is considered to be rare in Hawaiian waters based on reported sighting data and the species' preference for cool, temperate waters. Secondary occurrence is expected seaward of the 1,640-fathom isobath on the north side of the islands only. This pattern was based on sightings made during the NMFS–Southwest Fisheries Science Center shipboard survey assessment of Hawaiian cetaceans (Barlow et al., 2004). Sei whales are expected to be rare throughout the remainder of the HRC. Occurrence patterns are expected to be the same throughout the year.

<u>Reproduction/Breeding</u>. No breeding areas have been determined but calving is thought to occur from September to March (Rice 1977). No breeding or calving areas for Hawaii have been described.

<u>Diving Behavior</u>. There are no reported diving depths or durations for sei whales.

<u>Acoustics</u>. Sei whale vocalizations have been recorded only on a few occasions. They consist of paired sequences (0.5 to 0.8 sec, separated by 0.4 to 1.0 sec) of 7 to 20 short (4 milliseconds) frequency modulated sweeps between 1.5 and 3.5 kHz; source level is not known (Richardson et al., 1995a). Sei whales in the Antarctic produced broadband "growls" and "whooshes" at a frequency of 433 ±192 kHz and source level of 156 ±3.6 dB re 1 µPa at 1 meter (Mc Donald et al., 2005).

Although no data on hearing ability for this species are available, Ketten (1997) hypothesized that mysticetes have acute infrasonic hearing.

Fin Whale (*Balaenoptera physalus*)

<u>Status</u>. The fin whale is listed as endangered under the ESA and as a depleted and strategic stock under the MMPA. There is no designated critical habitat for this species in the North Pacific. The IWC recognizes two management stocks in the North Pacific: a single widespread stock in the North Pacific and a smaller stock in the East China Sea (Donovan, 1991). The NOAA stock assessment report recognizes three stocks of fin whales in the North Pacific: (1) the Hawaii stock; (2) the California/Oregon/Washington stock; and (3) the Alaska stock (Carretta et al., 2005). There is no information on the population trend of fin whales.

<u>Abundance and Distribution</u>. Barlow (2006) did not give a density estimate for fin whales in Hawaii because the survey (originally analyzed in Barlow 2003) was not conducted during the peak period of abundance. Therefore, for the analysis undertaken in support of this EIS/OEIS, it was assumed that the number and density of fin whales did not exceed that of the small population of false killer whales (236 false killer whales in Hawaii). There is no information on

the population trend of fin whales. Fin whales are broadly distributed throughout the world's oceans, usually in temperate to polar latitudes, and less commonly in the tropics (Reeves et al., 2002). Fin whales are distributed across the North Pacific during the summer (May through October) from the southern Chukchi Sea (69°N) south to the Subarctic Boundary (approximately 42°N) and to 30°N in the California Current (Mizroch et al., 1999). They have been observed during the summer in the central Bering Sea (Moore et al., 2000).

Fin whales are not common in the Hawaiian Islands. Sightings were reported north of Oahu in May 1976, the Kauai Channel in February 1979, and north of Kauai in February 1994 (Shallenberger, 1981; Mobley et al., 1996). Thompson and Friedl (1982) suggested that fin whales migrate into Hawaiian waters mainly during fall and winter, based on acoustic recordings off the island of Oahu and the Midway Atoll (Northrop et al., 1971; McDonald and Fox, 1999). Primary occurrence is expected seaward of the 330-ft isobath during the fall-winter period to account for possible stragglers migrating through the area. There is a rare occurrence for the fin whale from the shore to the 55-fathom isobath. There is a rare occurrence of fin whales throughout the Hawaiian Islands during the spring–summer period.

<u>Reproduction/Breeding</u>. Reproductive activities for fin whales occur primarily in low latitude areas in the winter (Reeves 1998; Carretta et al. 2007). No breeding or calving areas for Hawaii have been described.

<u>Diving Behavior</u>. Fin whales typically dive for 5 to 15 min, separated by sequences of 4 to 5 blows at 10 to 20 sec intervals (Cetacean and Turtle Assessment Program, 1982; Stone et al., 1992; Lafortuna et al., 2003). Kopelman and Sadove (1995) found significant differences in blow intervals, dive times, and blows per hour between surface feeding and non-surface feeding fin whales. Croll et al. (2001) determined that fin whales dived to 321 ft ± 106.8 ft) with a duration of 6.3 min (standard deviation = ±1.53 min) when foraging and to 194 ft (standard deviation = ±97 ft) with a duration of 4.2 min (standard deviation = ±1.67 min) when not foraging. Goldbogen et al. (2006) reported that fin whales in California made foraging dives to a maximum of 748 to 889 ft and dive durations of 6.2 to 7.0 min. Fin whale dives exceeding 492 ft and coinciding with the diel migration of krill were reported by Panigada et al. (1999).

<u>Acoustics</u>. Fin whales produce calls with the lowest frequency and highest source levels of all cetaceans. Infrasonic, pattern sounds have been documented for fin whales (Watkins et al., 1987; Clark and Fristrup, 1997; McDonald and Fox, 1999). Fin whales produce a variety of sounds with a frequency range up to 750 Hz. The long, patterned 15 to 30-Hz vocal sequence is most typically recorded; only males are known to produce these (Croll et al., 2002). The most typical fin whale sound is a 20-Hz infrasonic pulse call (actually an FM sweep from about 23 to 18 Hz) with durations of about 1 sec and can reach source levels of 184 to 186 dB re 1 µPa-m (maximum up to 200) (Richardson et al., 1995a; Charif et al., 2002). Croll et al. (2002) recently suggested that these long, patterned vocalizations might function as male breeding displays, much like those that male humpback whales sing. The source depth, or depth of calling fin whales, has been reported to be about 27 fathoms (Watkins et al., 1987). While no data on hearing ability for this species are available, Ketten (1997) hypothesized that mysticetes have acute infrasonic hearing.

Blue Whale (*Balaenoptera musculus*)

Status. The blue whale is listed as endangered under the ESA and as a depleted and strategic stock under the MMPA. The NMFS considers blue whales found in Hawaii as part of the Western North Pacific stock (Carretta et al., 2005) due to differences in call types with the Eastern North Pacific stock (Stafford et al., 2001; Stafford, 2003). The blue whale was severely depleted by commercial whaling in the twentieth century (National Marine Fisheries Service, 1998). There is no designated critical habitat for this species in the North Pacific. There is no information on the population trend of blue whales.

Abundance and Distribution. Blue whales are distributed from the ice edges to the tropics in both hemispheres (Jefferson et al., 1993). Blue whales summer in high latitudes and move into the subtropics and tropics during the winter calving period (Yochem and Leatherwood, 1985). Data from both the Pacific and Indian Oceans, however, indicate that some individuals may remain in low latitudes year-round, such as over the Costa Rican Dome (Wade and Friedrichsen, 1979; Reilly and Thayer, 1990). The productivity of the Costa Rican Dome may allow blue whales to feed during their winter calving/breeding season and not fast, like humpback whales (Mate et al., 1999).

The only reliable sighting report of this species in the central North Pacific was a sighting made from a scientific research vessel about 216 nm northeast of Hawaii in January 1964 (National Marine Fisheries Service, 1998). There is a rare occurrence for the blue whale throughout the entire HRC. Blue whale calls have been recorded off the Midway Atoll and Oahu (Northrop et al., 1971; Thompson and Friedl, 1982; McDonald and Fox, 1999); these provide evidence of blue whales occurring within several hundred miles of these islands (National Marine Fisheries Service, 1998). The recordings made off Oahu showed bimodal peaks throughout the year, suggesting that the animals were migrating into the area during summer and winter (Thompson and Friedl, 1982; McDonald and Fox, 1999). The greatest likelihood of encountering blue whales would be in waters deeper than 55 fathoms, based on observations in locales where blue whales are seen regularly (Schoenherr, 1991).

Reproduction/Breeding. Calving occurs primarily during the winter (Yochem and Leatherwood, 1985). No breeding or calving areas for Hawaii have been described.

Diving Behavior. Blue whales spend more than 94 percent of their time below the water's surface (Lagerquist et al., 2000). Croll et al. (2001) determined that blue whales dive to an average of 462 ft for 7.8 min when foraging and to 222 ft for 4.9 min when not foraging. Calambokidis et al. (2003) deployed tags on blue whales and collected data on dives as deep as about 164 fathoms.

Acoustics. Blue whales produce calls with the lowest frequency and highest source levels of all cetaceans. Blue whale vocalizations are long, patterned low-frequency sounds with durations up to 36 sec (Richardson et al., 1995a) repeated every 1 to 2 min (Mellinger and Clark, 2003). Their frequency range is 12 to 400 Hz, with dominant energy in the infrasonic range at 12 to 25 Hz (Ketten, 1998; Mellinger and Clark, 2003). Source levels are up to 188 dB re 1 µPa-m over a frequency of 10 to 110 Hz (Ketten, 1998; McDonald et al., 2001). During the Magellan II Sea Test (at sea exercises designed to test systems for anti-submarine warfare) off the coast of California in 1994, blue whale vocalization source levels at 17 Hz were estimated in the range of 195 dB re 1 µPa-m (Aburto et al., 1997).

Vocalizations of blue whales appear to vary among geographic areas (Rivers, 1997), with clear differences in call structure suggestive of separate populations for the western and eastern regions of the North Pacific (Stafford et al., 2001). Stafford et al. (2005) recorded the highest calling rates when blue whale prey was closest to the surface during its vertical migration. Wiggins et al. (2005) reported the same trend of reduced vocalization during daytime foraging and then an increase in vocalizations at dusk as prey move up into the water column and disperse. Blue whales make seasonal migrations to areas of high productivity to feed and vocalize less in the feeding grounds than during the migration (Burtenshaw et al., 2004). Oleson et al. (2007) reported higher calling rates in shallow diving (<16 fathoms) whales while deeper diving (>27 fathoms) whales were likely feeding and calling less. Although no data on hearing ability for this species are available, Ketten (1997) hypothesized that mysticetes have acute infrasonic hearing.

Bryde's Whale (*Balaenoptera edeni*)

<u>Status</u>. The Bryde's whale is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). Bryde's whales can be easily confused with sei whales. It is not clear how many species of Bryde's whales there are, but genetic analyses suggest the existence of at least two species (Rice, 1998; Kato, 2002). The taxonomy of the baleen whale group formerly known as sei and Bryde's whales is currently confused and highly controversial (see Reeves et al., 2004 for a recent review).

The IWC recognizes three management stocks of Bryde's whales in the North Pacific: western North Pacific, eastern North Pacific, and East China Sea (Donovan, 1991). There is currently no biological basis for defining separate stocks of Bryde's whales in the central North Pacific (Carretta et al., 2005). For the NOAA stock assessment reports, Bryde's whales within the U.S. Pacific EEZ are divided into two areas: (1) Hawaiian waters, and (2) the eastern tropical Pacific (east of 150°W and including the Gulf of California and waters off California) (Carretta et al., 2005).

<u>Abundance and Distribution</u>. The best available estimate of abundance for the Hawaiian stock of the Bryde's whale is 469 (Coefficient of Variation [CV] = 0.45) individuals (Barlow, 2006). The Bryde's whale is found in tropical and subtropical waters, generally not moving poleward of 40° in either hemisphere (Jefferson et al., 1993). Long migrations are not typical of Bryde's whales, though limited shifts in distribution toward and away from the equator, in winter and summer, respectively, have been observed (Cummings, 1985). In summer, the distribution of Bryde's whales in the western North Pacific extends as far north as 40°N, but many individuals remain in lower latitudes, as far south as about 5°N. Data also suggest that winter and summer grounds partially overlap in the central North Pacific (Kishiro, 1996; Ohizumi et al., 2002). Bryde's whales are also distributed in the central North Pacific in summer; the southernmost summer distribution of Bryde's whales inhabiting the central North Pacific is about 20°N (Kishiro, 1996). Some whales remain in higher latitudes (around 25°N) in both winter and summer (Kishiro, 1996).

Bryde's whales are seen year-round throughout tropical and subtropical waters (Kato, 2002) and are also expected in the HRC year-round (U.S. Department of the Navy 2005b). It should be noted that more sightings are reported for the Northwest Hawaiian Islands than in the Main Hawaiian Islands (Barlow et al., 2004; Carretta et al., 2005). Bryde's whales have been reported to occur in both deep and shallow waters globally. There is a secondary occurrence of Bryde's whales seaward of the 27-fathom isobath in the HRC. Bryde's whales are sometimes seen very close to shore and even inside enclosed bays (Best et al., 1984). Occurrence is expected to be rare inshore of this area.

Reproduction/Breeding. Breeding and calving occur in warm temperate and tropical areas.

Diving Behavior. Bryde's whales are lunge-feeders, feeding on fish and krill (Nemoto and Kawamura, 1977). Cummings (1985) reported that Bryde's whales might dive as long as 20 min.

Acoustics. Bryde's whales produce low frequency tonal and swept calls similar to those of other rorquals (Oleson et al., 2003). Calls vary regionally, yet all but one of the call types has a fundamental frequency below 60 Hz; they last from 0.25 sec to several seconds; and they are produced in extended sequences (Oleson et al., 2003). Heimlich et al. (2005) recently described five tone types. While no data on hearing ability for this species are available, Ketten (1997) hypothesized that mysticetes have acute infrasonic hearing.

3.1.2.4.1.2 Odontocetes

Sperm Whale (*Physeter macrocephalus*)

Status. The sperm whale is listed as endangered under the ESA and as a depleted and strategic stock under the MMPA (Carretta et al., 2005). There is no designated critical habitat for this species in the North Pacific. Although many sperm whale populations have been depleted to varying degrees by past whaling activities, sperm whales remain one of the more globally common great whale species. In fact, in some areas, they are actually quite abundant. For example, there are estimated to be about 21,200 to 22,700 sperm whales in the eastern tropical Pacific Ocean (Wade and Gerrodette, 1993).

For management purposes, the IWC has divided the North Pacific into two management regions defined by a zig-zag line which starts at 150°W at the equator, is at 160°W between 40° to 50°N, and ends up at 180°W north of 50°N (Donovan, 1991). Preliminary genetic analyses reveal significant differences between sperm whales off the coast of California, Oregon, and Washington and those sampled offshore to the Hawaiian Islands (Mesnick et al., 1999; Carretta et al., 2005). The NOAA stock assessment report divides sperm whales within the U.S. Pacific EEZ into three discrete, noncontiguous areas: (1) waters around the Hawaiian Islands; (2) California, Oregon, and Washington waters; and (3) Alaskan waters (Carretta et al., 2005).

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the sperm whale is 6,919 (CV = 0.81) individuals (Barlow, 2006). Sperm whales are found from tropical to polar waters in all oceans of the world between approximately 70°N and 70°S (Rice, 1998). Females use a subset of the waters where males are regularly found. Females are normally restricted to areas with sea surface temperatures greater than approximately 15°C; whereas males, especially the largest males, can be found in waters as far poleward as the pack ice within approximately to the 40° parallels (50° in the North Pacific) (Whitehead, 2003). Sperm whale abundance in the eastern temperate North Pacific is estimated to be 32,100 individuals and 26,300 individuals by acoustic and visual detection methods, respectively (Barlow and Taylor, 2005).

Sperm whales are widely distributed throughout the Hawaiian Islands year-round (Rice, 1960; Shallenberger, 1981; Lee, 1993; and Mobley et al., 2000). Sperm whale clicks recorded from hydrophones off Oahu confirm the presence of sperm whales near the Hawaiian Islands throughout the year (Thompson and Friedl, 1982). Globally, sperm whales are typically distributed in waters over the shelf break and continental slope. The primary area of occurrence for the sperm whale is seaward of the shelf break in the HRC. There is a rare occurrence of sperm whales from the shore to the shelf break. This occurrence prediction is based on the possibility of this typically deepwater species being found in insular shelf waters that are in such close proximity to deep water. Mating behavior occurs from winter through summer and calving from spring through fall (U.S. Department of the Navy, 2005a). Occurrence patterns are assumed to be similar throughout the year.

<u>Reproduction/Breeding</u>. Breeding occurs from winter through summer and calving generally occurs in the summer through fall at lower latitudes and the tropics (U.S. Department of the Navy, 2005a). No breeding or calving areas for Hawaii have been described.

<u>Diving Behavior</u>. Sperm whales forage during deep dives that routinely exceed a depth of 219 fathoms and 30 min duration (Watkins et al., 2002). Sperm whales are capable of diving to depths of over 1,094 fathoms with durations of over 60 min (Watkins et al., 1993). Sperm whales spend up to 83 percent of daylight hours underwater (Jaquet et al., 2000; Amano and Yoshioka, 2003). Males do not spend extensive periods of time at the surface (Jaquet et al., 2000). In contrast, females spend prolonged periods of time at the surface (1 to 5 hours daily) without foraging (Whitehead and Weilgart, 1991; Amano and Yoshioka, 2003). The average swimming speed is estimated to be 2.3 ft per second (ft/sec) (Watkins et al., 2002). Dive descents averaged 11 min at a rate of 5 ft/sec, and ascents averaged 11.8 min at a rate of 4.6 ft/sec (Watkins et al., 2002).

<u>Acoustics</u>. Sperm whales produce short-duration (generally less than 3 sec), broadband clicks, (100 Hz to 30 kHz), with dominant energy in two bands (2 to 4 kHz and 10 to 16 kHz). Generally, most of the acoustic energy is present at frequencies below 4 kHz, although diffuse energy up to past 20 kHz has been reported (Thode et al., 2002). The source levels can be up to 236 dB re 1 µPa-m (Møhl et al., 2003). Thode et al. (2002) suggested that the acoustic directivity (angular beam pattern) from sperm whales must range between 10 and 30 dB in the 5 to 20 kHz region. The clicks of neonate sperm whales are very different from usual clicks of adults in that they are of low directionality, long duration, and low-frequency (centroid frequency between 300 and 1,700 Hz) with estimated source levels between 140 and 162 dB re 1 µPa-m (Madsen et al., 2003). Clicks are heard most frequently when sperm whales are engaged in diving/foraging behavior (Whitehead and Weilgart, 1991; Miller et al., 2004; Zimmer et al., 2005). These may be echolocation clicks used in feeding, contact calls (for communication), and orientation during dives. When sperm whales are socializing, they tend to repeat series of clicks (codas), which follow a precise rhythm and may last for hours (Watkins and Schevill, 1977). Codas are shared between individuals of a social unit and are considered to be primarily for intragroup communication (Weilgart and Whitehead, 1997; Rendell and Whitehead, 2004).

The anatomy of the sperm whale's ear indicates that it hears high-frequency sounds (Ketten 1992). Anatomical studies also suggest that the sperm whale has some ultrasonic hearing, but at a lower maximum frequency than many other odontocetes (Ketten, 1992). The sperm whale may also possess better low-frequency hearing than some other odontocetes, although not as extraordinarily low as many baleen whales (Ketten, 1992). Auditory brainstem response in a neonatal sperm whale indicated highest sensitivity to frequencies between 5 and 20 kHz (Ridgway and Carder, 2001).

Pygmy Sperm Whale (*Kogia breviceps*) and Dwarf Sperm Whale (*Kogia sima*)

Status. Neither species of *Kogia* is listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of pygmy sperm whales.

The difficulty in identifying pygmy and dwarf sperm whales is exacerbated by their avoidance reaction towards ships and change in behavior towards approaching survey aircraft (Würsig et al., 1998). Based on the cryptic behavior of these species and their small group sizes (much like that of beaked whales), as well as similarity in appearance, it is difficult to identify these species in sightings at sea.

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the pygmy sperm whale is 7,138 (CV = 1.12) individuals (Barlow 2006). Both *Kogia* species have a worldwide distribution in tropical and temperate waters (Jefferson et al., 1993).

Pygmy and dwarf sperm whales within the U.S. Pacific EEZ are each divided into two discrete, non-contiguous areas: (1) Hawaiian waters, and (2) waters off California, Oregon, and Washington (Carretta et al., 2005). The best available estimate of abundance for the Hawaiian stock of the dwarf sperm whale is 19,172 individuals (Barlow, 2003; Carretta et al., 2005).

Both species of *Kogia* generally occur in waters along the continental shelf break and over the continental slope (Baumgartner et al., 2001; McAlpine, 2002; Baird, 2005b). The primary occurrence for *Kogia* is seaward of the shelf break in the HRC and in deep water with a mean depth of 779 fathoms (Baird, 2005b). This takes into account their preference for deep waters. There is a rare occurrence for *Kogia* inshore of the area of primary occurrence. Occurrence is expected to be the same throughout the year. Dwarf sperm whales showed a high degree of site fidelity, determined from photo identification over several years, in areas west of the island of Hawaii (Baird et al., 2006a).

Reproduction/Breeding. There is no information on the breeding behavior in this area. No breeding or calving areas for Hawaii have been described.

Diving Behavior. *Kogia* feed on cephalopods and, less often, on deep-sea fishes and shrimps (Caldwell and Caldwell, 1989; Baird et al., 1996; Willis and Baird, 1998; Wang et al., 2002). Willis and Baird (1998) reported that *Kogia* make dives of up to 25 min. Median dive times of around 11 min have been documented for *Kogia* (Barlow, 1999). A satellite-tagged pygmy sperm whale released off Florida was found to make long nighttime dives, presumably indicating foraging on squid in the deep scattering layer (Scott et al., 2001). Most sightings of *Kogia* are brief; these whales are often difficult to approach, and they actively avoid aircraft and vessels (Würsig et al., 1998).

Acoustics. Pygmy sperm whale clicks range from 60 to 200 kHz, with a dominant frequency of 120 kHz (Richardson et al., 1995a). There is no information available on dwarf sperm whale vocalizations or hearing capabilities. An auditory brainstem response study indicates that pygmy sperm whales have their best hearing between 90 and 150 kHz (Ridgway and Carder, 2001).

Cuvier's Beaked Whale (*Ziphius cavirostris*)

Status. The Cuvier's beaked whale is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of Cuvier's beaked whales.

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the Cuvier's beaked whale is 15,242 (CV = 1.43) individuals (Barlow, 2006). Recent information collected from photo identification studies of Cuvier's beaked whale shows a degree of site fidelity near the island of Hawaii (Baird et al., 2006a). The same individuals had been observed multiple times off of the west coast of the island of Hawaii during a 15-year period, suggesting an island associated population (McSweeney et al., 1989). Mobley (2006a) report the presence of a Cuvier's beaked whale in the Alenuihaha Channel area between the islands of Maui and Hawaii during the RIMPAC 06 Exercise. There is no information on the population trend of Cuvier's beaked whales. Previously proposed definition of beaked whale habitat may be too narrow, and beaked whales may be found from the continental slope to the abyssal plain, in waters ranging from well-mixed to highly stratified. There was no geographic pattern in the data (Ferguson et al., 2006).

Reproduction/Breeding. Little is known of beaked whale reproductive behavior. No breeding or calving areas for Hawaii have been described.

Diving Behavior. Cuvier's beaked whales are generally sighted in waters with a bottom depth greater than about 109 fathoms and are frequently recorded at depths of 547 fathoms or more (Gannier, 2000; MacLeod, et al., 2004). They are commonly sighted around seamounts, escarpments, and canyons. In the eastern tropical Pacific Ocean, the mean bottom depth for Cuvier's beaked whales is approximately 1,859 fathoms, with a maximum depth of over 16,732 ft (Ferguson, 2005). Recent studies by Baird et al. (2006b) show that Cuvier's beaked whales dive deeply (maximum of 793 fathoms) and for long periods (maximum dive duration of 68.7 min) but also spent time at shallow depths. Gouge marks were observed on mud volcanoes on the sea floor at 930 to 1,094 fathoms, and Woodside et al. (2006) speculated that they were caused by Cuvier's beaked whales foraging on benthic prey.

Acoustics. There is no acoustic information on Longman's beaked whales but it is likely that they are similar to other beaked whales. MacLeod (1999) suggested that beaked whales use frequencies of between 300 Hz and 129 kHz for pulse sounds, and between 2 and 10 kHz, and possibly up to 16 kHz, for social communication. Cuvier's beaked whales echolocation clicks were recorded at frequencies from 20 to 70 kHz (Zimmer et al., 2005). Cook et al. (2006) reported that the Gervais beaked whale (*Mesoplodon europeus*) could hear in the range of 5 to 80 kHz although no measurements were attempted above 80 kHz). The Gervais beaked whale was most sensitive from 40 to 80 kHz (Cook et al., 2006).

Blainville's Beaked Whale (*Mesoplodon densirostris*)

Status. The Blainville's beaked whale is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005).

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the Blainville's beaked whale is 2,872 individuals (CV = 1.25) (Barlow, 2006). There is no information on the population trend of Blainville's beaked whales.

The Blainville's beaked whale occurs in temperate and tropical waters of all oceans (Jefferson et al., 1993). The distribution of *Mesoplodon* species in the western North Atlantic may relate to water temperature (Mead, 1989; MacLeod, 2000), with Blainville's beaked whale generally occurring in warmer southern waters (MacLeod 2000). In the eastern Pacific, where there are about a half-dozen *Mesoplodon* species known, the Blainville's beaked whale is second only to the pygmy beaked whale (*Mesoplodon peruvianus*) in abundance in tropical waters (Wade and Gerrodette, 1993). Mobley (2006a) reported the presence of a Blainville's beaked whale at the northern edge of the Kaulakahi Channel between the islands of Kauai and Niihau. Mobley (2006a) also reported the presence of a Blainville's beaked whale in the Alenuihaha Channel area between the islands or Maui and Hawaii during the RIMPAC 06 Exercise. The same individuals had been observed multiple times off the west coast of the island of Hawaii during a 15-year period, suggesting an island associated population (McSweeney et al., 2007). Previously proposed definition of beaked whale habitat may be too narrow and beaked whales may be found from the continental slope to the abyssal plain, in waters ranging from well-mixed to highly stratified. There was no geographic pattern in the data (Ferguson et al., 2006).

Reproduction/Breeding. Little is known of beaked whale reproductive behavior. No breeding or calving areas for Hawaii have been described.

Diving Behavior. Analysis of stomach contents from captured and stranded individuals suggests that beaked whales are deep-diving animals, feeding by suction (Heyning and Mead, 1996). Another species of beaked whales, the Baird's beaked whale (*Berardius bairdii*), feeds mainly on benthic fishes and cephalopods, but occasionally on pelagic fish such as mackerel, sardine, and saury (Kasuya, 2002; Walker et al., 2002; Ohizumi et al., 2003). Baird et al. (2006a) reported on the diving behavior of four Blainville's beaked whales off the west coast of Hawaii. The four beaked whales foraged in deep ocean areas (378 to 1,643 fathoms) with a maximum dive to 770 fathoms. Dives ranged from at least 13 min (lost dive recorder during the dive) to a maximum of 68 min (Baird et al., 2006a).

Acoustics. MacLeod (1999) suggested that beaked whales use frequencies of between 300 Hz and 129 kHz for echolocation, and between 2 and 10 kHz, and possibly up to 16 kHz, for social communication. Blainville's beaked whales echolocation clicks were recorded at frequencies from 20 to 40 kHz (Johnson et al., 2004).

Recent information on the hearing abilities of beaked whales (Gervais' beaked whales) shows that they are most sensitive from 40 to 80 kHz with an overall range of 5 to 80 kHz, although no measurements were attempted above 80 kHz (Cook et al., 2006).

Longman's Beaked Whale (*Indopacetus pacificus*)

Status. The Longman's beaked whale is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of Longman's beaked whale.

Abundance and Distribution. Beaked whales may be expected to occur in the area including around seaward of the shelf break. There is a low or unknown occurrence of beaked whales on the shelf between the 27-fathom isobath and the shelf break, which takes into account that deep waters come very close to the shore in this area. In some locales, beaked whales can be found in waters over the shelf, so it is possible that beaked whales have similar habitat preferences here. Occurrence patterns are expected to be the same throughout the year (U.S. Department of the Navy, 2005b). The best available estimate for the Hawaiian stock of the Longman's beaked whale is 1,007 (CV 1.26) individuals (Barlow, 2006).

Longman's beaked whale is not as rare as previously thought. However, the frequency with which it has been sighted in the eastern and western tropical Pacific oceans (MacLeod et al., 2004) suggests that it is probably not as common as the Cuvier's and *Mesoplodon* beaked whales (Ferguson and Barlow, 2001). Previously proposed definition of beaked whale habitat may be too narrow and beaked whales may be found from the continental slope to the abyssal plain, in waters ranging from well-mixed to highly stratified. There was no geographic pattern in the data (Ferguson et al., 2006).

Reproduction/Breeding. Little is known of beaked whale reproductive behavior. No breeding or calving areas for Hawaii have been described.

Diving Behavior. Analysis of stomach contents from captured and stranded individuals suggests that beaked whales are deep-diving animals, feeding by suction (Heyning and Mead 1996). Prolonged dives by the Baird's beaked whales for periods of up to 67 min have been reported (Kasuya, 2002), though dives of about 14 to 19 fathoms are typical, and dives of 45 min are not unusual (Balcomb, 1989; Von Saunder and Barlow, 1999).

Acoustics. There is no acoustic information on Longman's beaked whales, but it is likely that they are similar to other beaked whales. MacLeod (1999) suggested that beaked whales use frequencies of between 300 Hz and 129 kHz for echolocation, and between 2 and 10 kHz, and possibly up to 16 kHz, for social communication. Blainville's beaked whales echolocation clicks were recorded at frequencies from 20 to 40 kHz (Johnson et al., 2004) and Cuvier's beaked whales at frequencies from 20 to 70 kHz (Zimmer et al., 2005).

Recent information on the hearing abilities of beaked whales (Gervais' beaked whales) shows that they are most sensitive from 40 to 80 kHz with an overall range of 5 to 80 kHz, although no measurements were attempted above 80 kHz (Cook et al., 2006).

Rough-Toothed Dolphin (*Steno bredanensis*)

Status. The rough-toothed dolphin is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of rough-toothed dolphins. Nothing is known about stock structure for the rough-toothed dolphin in the North Pacific (Carretta et al., 2005).

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the rough-toothed dolphin is 8,709 (CV = 0.45) individuals (Barlow, 2006).

Rough-toothed dolphins are found in tropical to warm-temperate waters globally, rarely ranging north of 40°N or south of 35° (Miyazaki and Perrin, 1994). In the Main Hawaiian Islands, this species appears to demonstrate site fidelity to specific islands (Baird, R.W., 2005a).

Primary occurrence for the rough-toothed dolphin is from the shelf break to seaward of the HRC boundaries. There is also an area of rare occurrence of rough-toothed dolphins from the shore to the shelf break. Baird et al. *(*2003) noted that rough-toothed dolphins are rarely seen in offshore waters of the Main Hawaiian Islands. Occurrence patterns are expected to be the same throughout the year.

Reproduction/Breeding. Little is known of rough-toothed dolphin reproductive behavior. No breeding or calving areas for Hawaii have been described.

Diving Behavior. They are deep divers, and can dive for up to 15 min (Reeves et al., 2002). They usually inhabit deep waters (Davis et al., 1998), where they prey on fish and cephalopods (Reeves et al., 2002). Rough-toothed dolphins may stay submerged for up to 15 min and are known to dive as deep as 38 fathoms, but can probably dive much deeper (Miyazaki and Perrin, 1994).

Acoustics. The vocal repertoire of the rough-toothed dolphin includes broad-band clicks, barks, and whistles (Yu et al., 2003). Echolocation clicks of rough-toothed dolphins are in the frequency range of 0.1 to 200 kHz, with a peak of about 25 kHz (Miyazaki and Perrin, 1994; Yu et al., 2003). Whistles show a wide frequency range: 0.3 to >24 kHz (Yu et al., 2003). There is no published information on hearing ability of this species.

Bottlenose Dolphin (*Tursiops truncatus*)

Status. The bottlenose dolphin is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of bottlenose dolphins.

Genetic analyses of biopsied bottlenose dolphins in the Main Hawaiian Islands suggested the possibility of two species of bottlenose dolphins in Hawaiian waters (U.S. Department of the Navy, Command Third Fleet, 2006). In the meantime, however, information is presented on the one confirmed *Tursiops* species for this HRC.

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the bottlenose dolphin is 3,215 (CV = 0.59) individuals (Barlow, 2006).

The overall range of *Tursiops* is worldwide in tropical to temperate waters. *Tursiops* generally do not range poleward of 45°, except around the United Kingdom and northern Europe (Jefferson et al., 1993).

Bottlenose dolphins found in offshore waters around the Main Hawaiian Islands are island-associated, with all sightings occurring in relatively offshore and shallow waters (<109 fathoms), and no apparent movement between the islands (Baird et al., 2002, 2003). Baird et al. (2003) noted the possibility of a second population of bottlenose dolphins in the Hawaiian Islands, based on sighting data, with a preference for deeper (bottom depth of 219 to 492 fathoms) waters.

Bottlenose dolphins are regularly found around the Main Hawaiian Islands in both onshore and offshore waters (Rice, 1960; Shallenberger, 1981; Mobley et al., 2000; Baird et al., 2003). Based on photo-identification studies and sighting data, there is a possibility of separate island populations with different preferences for shallow (<109 fathoms) and deep (about 219 to 492 fathoms) waters (Baird et al., 2003; 2006b). Therefore, an area of primary occurrence is expected from the shore to the 547-fathom isobath in the HRC, excluding Nihoa due to no survey effort. This area is continuous between Niihau and Kauai and between Oahu, Molokai, Lanai, Maui, and Kahoolawe to account for possible movements between islands. There is a secondary occurrence seaward of the 547-fathom isobath and seaward from the shoreline of Nihoa. Mead and Potter (1990) suggested that the Atlantic species has a calving period of spring through fall with a peak in the spring. Occurrence patterns are expected to be the same throughout the year.

Reproduction/Breeding. Hohn (1980) reported a calving season of spring season with possible summer and fall seasons on the east coast of the United States, but Mead and Potter (1990) suggested a prolonged calving season with a peak in spring. No specific breeding or calving areas for Hawaii have been described.

Diving Behavior. Pacific coast bottlenose dolphins feed primarily on surf perches (Family Embiotocidae) and croakers (Family Sciaendae) (Norris and Prescott, 1961; Walker, 1981; Schwartz et al., 1992; Hanson and Defran, 1993), and also consume squid (*Loligo opalescens*) (Schwartz et al., 1992). Navy bottlenose dolphins have been trained to reach maximum diving depths of about 164 fathoms (Ridgway et al., 1969b). Reeves et al. (2002) noted that the presence of deep-sea fish in the stomachs of some offshore individual bottlenose dolphins suggests that they dive to depths of more than 273 fathoms. Dive durations up to 15 min have been recorded for trained individuals (Ridgway et al., 1969b). Typical dives, however, are more shallow and of a much shorter duration.

Acoustics. Sounds emitted by bottlenose dolphins have been classified into two broad categories: pulsed sounds (including clicks and burst-pulses) and narrow-band continuous sounds (whistles), which usually are FM. Clicks and whistles have a dominant frequency range of 110 to 130 kHz and a peak to peak source level of 218 to 228 dB re 1 μPa-m (Au, 1993) and 3.5 to 14.5 kHz and 125 to 173 dB re 1 μPa-m, respectively (Ketten, 1998). Generally, whistles range in frequency from 0.8 to 24 kHz (Richardson et al., 1995a).

The bottlenose dolphin has a functional high-frequency hearing limit of 160 kHz (Au, 1993) and can hear sounds at frequencies as low as 40 to 125 Hz (Turl, 1993). Inner ear anatomy of this species has been described (Ketten, 1992). Electrophysiological experiments suggest that the bottlenose dolphin brain has a dual analysis system: one specialized for ultrasonic clicks and the other for lower-frequency sounds, such as whistles (Ridgway, 2000). The audiogram of the bottlenose dolphin shows that the lowest thresholds occurred near 50 kHz at a level around 45 dB re 1 μPa (Nachtigall et al., 2000). Below the maximum sensitivity, thresholds increased continuously up to a level of 137 dB at 75 Hz. Above 50 kHz, thresholds increased slowly up to a level of 55 dB at 100 kHz, then increased rapidly above this to about 135 dB at 150 kHz. Scientists have reported a range of best sensitivity between 25 and 70 kHz, with peaks in sensitivity occurring at 25 and 50 kHz at levels of 47 and 46 dB re 1 µPa-m (Nachtigall et al., 2000).

Temporary threshold shifts (TTS) in hearing have been experimentally induced in captive bottlenose dolphins (Ridgway et al., 1997; Finneran et al., 2000; 2005, 2007; Schlundt et al., 2000; Nachtigall et al., 2003). Ridgway et al. (1997) observed changes in behavior at the following minimum levels for 1 sec tones: 186 dB at 3 kHz, 181 dB at 20 kHz, and 178 dB at 75 kHz (all re 1 µPa). TTS levels were 194 to 201 dB at 3 kHz, 193 to 196 dB at 20 kHz, and 192 to 194 dB at 75 kHz (all re 1 µPa). Schlundt et al. (2000) exposed bottlenose dolphins to intense tones (0.4, 3, 10, 20, and 75 kHz); the animals demonstrated altered behavior at source levels of 178 to 193 dB re 1 µPa, with TTS after exposures generally between 192 and 201 dB re 1 µPa (though one dolphin exhibited TTS after exposure at 182 dB re 1 µPa). Nachtigall et al. (2003) determined threshold for a 7.5 kHz pure tone stimulus. No shifts were observed at 165 or 171 dB re 1 µPa, but when the noise level reached 179 dB re 1 µPa, the animal showed the first sign of TTS. Recovery apparently occurred rapidly, with full recovery apparently within 45 min following noise exposure. TTS measured between 8 and 16 kHz (negligible or absent at higher frequencies) after 30 min of noise exposure (4 to 11 kHz) at 160 dB re 1 µPa (Nachtigall et al., 2004). Finneran et al. (2005) reported the onset of TTS in bottlenose dolphins at 197 dB re 1 µPa^2-s for 1-sec pulse sounds at 3.0 and 4.5 kHz. For further discussion of TTS in marine mammals, see Section 4.1.2.

Pantropical Spotted Dolphin (*Stenella attenuata*)

Status. The pantropical spotted dolphin is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of pantropical spotted dolphins.

Abundance and Distribution. The best available estimate of abundance for the pantropical spotted dolphin within the Hawaiian Islands EEZ is 8,978 (CV = 0.48) individuals (Barlow, 2003; Carretta et al., 2005).

The pantropical spotted dolphin is distributed in tropical and subtropical waters worldwide (Perrin and Hohn, 1994). Range in the central Pacific is from the Hawaiian Islands in the north to at least the Marquesas in the south (Perrin and Hohn, 1994).

Based on known habitat preferences and sighting data, the primary occurrence for the pantropical spotted dolphin is between the 330-ft and 13,122-ft isobaths throughout the HRC. This area of primary occurrence also includes a continuous band connecting all the Main Hawaiian Islands, Nihoa, and Kaula, taking into account possible inter-island movements. Secondary occurrence is expected from the shore to 330 ft, as well as seaward of 13,122 ft. Pantropical spotted dolphins are expected to be rare in Pearl Harbor. In the Eastern Tropical Pacific there are two calving periods, one in the spring and one in the fall (Perrin and Hohn, 1994). Occurrence patterns are the same throughout the year.

Reproduction/Breeding. In the Eastern Tropical Pacific there are two calving peaks in the spring and fall (Perrin and Hohn, 1994). No breeding or calving areas for Hawaii have been described.

Diving Behavior. Results from various tracking and food habit studies suggest that pantropical spotted dolphins in the Eastern Tropical Pacific and off Hawaii feed primarily at night on epipelagic species and on mesopelagic species which rise towards the water's surface after dark (Robertson and Chivers, 1997; Scott and Cattanach, 1998; Baird et al., 2001). Dives during the day generally are shorter and shallower than dives at night; rates of descent and ascent are higher at night than during the day (Baird et al., 2001). Similar mean dive durations and depths have been obtained for tagged pantropical spotted dolphins in the Eastern Tropical Pacific and off Hawaii (Baird et al., 2001).

Acoustics. Pantropical spotted dolphin whistles have a dominant frequency range of 6.7 to 17.8 kHz (Ketten, 1998). Click source levels between 197 and 220 dB re 1 μPa-m (peak to peak), in the range of 40 to 140 kHz, have been recorded for pantropical spotted dolphins (Schotten et al., 2004). Data from Atlantic spotted dolphins are provided to fill in the gaps of acoustic information for pantropical spotted dolphins. Echolocation clicks measured in wild Atlantic spotted dolphins showed bimodal ranges of 40 and 50 kHz and a high-frequency peak between 110 and 130 kHz, with a source level of 210 dB re 1 μPa (Au and Herzing, 2003).

There is no information on the hearing abilities of pantropical spotted dolphins.

Spinner Dolphin (*Stenella longirostris*)

Status. The spinner dolphin is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of spinner dolphins.

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the spinner dolphin is 3,351 (CV = 0.74) individuals (Barlow, 2006).

The spinner dolphin is found in tropical and subtropical waters worldwide. Limits are near 40°N and 40°S (Jefferson et al., 1993). These dolphins occur near islands such as the Hawaiian Islands, the Mariana Islands, the South Pacific, the Caribbean, and Fernando de Noronha Island off Brazil. Spinner dolphins have been documented to travel distances of about 25 mi between the Main Hawaiian Islands (Maldini, 2003). In the Hawaiian Islands, spinner dolphins occur along the leeward coasts of all the major islands and around several of the atolls northwest of the main island chain. Long-term site fidelity has been noted for spinner dolphins along the Kona coast of Hawaii, along Oahu, and off the island of Moorea in the Society Islands (Norris et al., 1994; Östman 1994; Poole, 1995; Marten and Psarakos, 1999), with some individuals being sighted for up to 12 years at Moorea (Poole, 1995). Recent data suggests that spinner dolphins do not readily move between islands as determined by genetic analysis (Andrews et al., 2006). Monitoring for RIMPAC 2006 showed that spinner dolphins are seen daily in the offshore area of Kekaha Beach, Kauai (near PMRF) and this despite being regularly accompanied by tour boats (U.S. Department of the Navy, 2006a).

Spinner dolphins occur year-round throughout the HRC, with primary occurrence from the shore to the 13,122-ft isobath. This takes into account offshore resting habitat and offshore feeding areas. Spinner dolphins are expected to occur in shallow water (about 162 ft or less) resting areas throughout the middle of the day, moving into deep waters offshore during the night to feed. Primary resting areas are along the west side of Hawaii, including Makako Bay, Honokohau Bay, Kailua Bay, Kealakekua Bay, Honaunau Bay, Kauhako Bay, and off Kahena on the southeast side of the island (Östman-Lind et al., 2004). Along the Waianae coast of

Oahu, spinner dolphins rest along Makua Beach, Kahe Point, and Pokai Bay during the day (Lammers, 2004). Kilauea Bay in Kauai is also a popular resting bay for Hawaiian spinner dolphins (U.S. Department of the Navy, Commander Third Fleet, 2006). There is an area of secondary occurrence seaward of 2,187 fathoms. Although sightings have been recorded around the mouth of Pearl Harbor (Lammers, 2004), spinner dolphin occurrence is expected to be rare. Occurrence patterns are assumed to be the same throughout the year. It is currently not known whether individuals move between islands or island groups (Carretta et al., 2005) but recent data on the genetic comparison of animals from each suggest there is little movement between the islands (Andrews et al., 2006). Spinner dolphins in Tahiti showed a pattern of being present a higher percentage of time on the weekend compared to weekdays despite the higher tourist traffic and encounter rate (Gannier and Petiau, 2007).

Reproduction/Breeding. Spinner dolphins have island specific populations and breeding may occur throughout the year (Östman-Lind et al., 2004).

Diving Behavior. Spinner dolphins feed primarily on small mesopelagic fishes, squids, and sergestid shrimp and they dive to at least 109 to 164 fathoms (Perrin and Gilpatrick, 1994). Foraging can begin in the late afternoon (Lammers, 2004), but takes place primarily at night when the mesopelagic prey migrates vertically towards the surface and also horizontally towards the shore (Benoit-Bird et al., 2001; Benoit-Bird and Au, 2004; Dollar and Grigg, 2003)

Acoustics. There is little information on the acoustic abilities of the spinner dolphin. They produce whistles in the range of 1 to 22.5 kHz with the dominant frequency being 6.8 to 17.9 kHz, above that of the active sonar frequencies. Whistles may have harmonics that may extend past 50 kHz and sometimes as high as 100 kHz (Lammers et al., 2003). The full range of hearing may extend down to 1 kHz or below as reported for other small odontocetes (Richardson et al., 1995a; Nedwell et al., 2004; Bazúa-Durán, C. and W.W.L. Au, 2002). They also display pulse burst sounds in the range of 5 to 60 kHz. Their echolocation clicks range up to at least 65 kHz (Richardson et al., 1995a). Whistles of spinner dolphins have harmonics that may extend past 50 kHz and sometimes as high as 100 kHz (Lammers et al., 2003). Spinner dolphins are island specific residents, but all island pods share about 48 percent of the parameters of their whistles (Bazua-Durana and Au, 2004).

Striped Dolphin (*Stenella coeruleoalba*)

Status. The striped dolphin is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of striped dolphins.

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the striped dolphin is 13,143 (CV = 0.46) individuals (Barlow, 2003; Carretta et al., 2005). The striped dolphin has a worldwide distribution in cool-temperate to tropical waters. This species is well documented in both the western and eastern Pacific off the coasts of Japan and North America (Perrin et al., 1994a); the northern limits are the Sea of Japan, Hokkaido, Washington State, and along roughly 40°N across the western and central Pacific (Reeves et al., 2002). Scattered records exist from the South Pacific as well (Perrin et al., 1994a).

The striped dolphin regularly occurs throughout the HRC. There is a primary occurrence for the striped dolphin seaward of 547 fathoms based on sighting records and the species' known preference for deep waters. Striped dolphins are occasionally sighted closer to shore (Mobley et al., 2000); therefore, an area of secondary occurrence is expected from 55 fathoms to 547 fathoms. Occurrence patterns are assumed to be the same throughout the year.

Reproduction/Breeding. Off of Japan there are two calving peaks, one in summer and one in winter (Perrin et al., 1994a). No specific breeding or calving areas for Hawaii have been described.

Diving Behavior. Striped dolphins often feed in pelagic or benthopelagic zones along the continental slope or just beyond oceanic waters. A majority of the prey possess luminescent organs, suggesting that striped dolphins may be feeding at great depths, possibly diving to about 109 to 383 fathoms to reach potential prey (Archer and Perrin, 1999). Striped dolphins may feed at night, in order to take advantage of the deep scattering layer's diurnal vertical movements. Small, mid-water fishes (in particular, myctophids or lanternfish) and squids are the dominant prey (Perrin et al., 1994a).

Acoustics. Striped dolphin whistles range from 6 to 24+ kHz, with dominant frequencies ranging from 8 to 12.5 kHz (Richardson et al., 1995a). The striped dolphin's range of most sensitive hearing (defined as the frequency range with sensitivities within 10 dB of maximum sensitivity) was determined to be 29 to 123 kHz using standard psycho-acoustic techniques; maximum sensitivity occurred at 64 kHz (Kastelein et al., 2003).

Risso's Dolphin (*Grampus griseus*)

Status. The Risso's dolphin is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of Risso's dolphins.

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the Risso's dolphin is 2,372 (CV = 0.65) individuals (Barlow, 2006). The Risso's dolphin is distributed worldwide in tropical to warm-temperate waters, roughly between 60°N and 60°S, where surface water temperature is usually greater than 50°F (Kruse et al., 1999). Water temperature appears to be a factor that affects the distribution of Risso's dolphins in the Pacific (Kruse et al., 1999). Changes in local distribution and abundance along the California coast are probably in response to protracted or unseasonal warm-water events, such as El Niño events (Shane, 1994).

There is an area of secondary occurrence between the 330-ft and 16,400-ft isobaths based on the known habitat preferences of this species, as well as the paucity of sightings, even though there is extensive aerial and boat-based survey coverage near the islands. There is a narrow band of rare occurrence from the shore to the 55-fathom isobath, including Pearl Harbor, which takes into consideration the possibility that this species, with a preference for waters with steep bottom topography, might swim into areas where deep water is close to shore. Risso's dolphins are expected to be rare seaward of the 16,400-ft isobath. Occurrence patterns are assumed to be the same throughout the year.

Reproduction/Breeding. There is no information on the breeding behavior in this area. No breeding or calving areas for Hawaii have been described.

Diving Behavior. They may remain submerged on dives for up to 30 min (Kruse et al., 1999). Cephalopods are the primary prey (Clarke, 1996).

Acoustics. Risso's dolphin vocalizations include broadband clicks, barks, buzzes, grunts, chirps, whistles, and simultaneous whistle and burst-pulse sounds (Corkeron and Van Parijs, 2001). The combined whistle and burst pulse sound appears to be unique to Risso's dolphin (Corkeron and Van Parijs, 2001). Corkeron and Van Parijs (2001) recorded five different whistle types, ranging in frequency from 4 to 22 kHz. Broadband clicks had a frequency range of 6 to greater than 22 kHz. Low-frequency narrowband grunt vocalizations had a frequency range of 0.4 to 0.8 kHz. A recent study established empirically that Risso's dolphins echolocate; estimated source levels were up to 216 dB re 1 µPa-m (peak to peak levels) with two prominent peaks in the range of 30 to 50 kHz and 80 to 100 kHz (Philips et al., 2003).

The range of hearing in Risso's dolphins is 1.6 to 122.9 kHz with maximum sensitivity occurring between 8 and 64 kHz (Nachtigall et al., 1995). The range of hearing in an infant Risso's dolphin was 4 to 150 kHz and showed more sensitive hearing at higher frequencies than adults (Nachtigall et al., 2005).

Melon-headed Whale (*Peponocephala electra*)

Status. The melon headed whale is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of melon headed whales.

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the melon-headed whale is 2,950 (CV = 1.17) individuals (Barlow, 2006). Melon-headed whales are found worldwide in tropical and subtropical waters. They have occasionally been reported from higher latitudes, but these sightings are often associated with incursions of warm water currents (Perryman et al., 1994). Preliminary results from photo-identification work in the Main Hawaiian Islands suggest inter-island movements by some individuals (e.g., between the islands of Kauai and Hawaii) as well as some residency by other individuals (e.g., at the island of Hawaii) (U.S. Department of the Navy 2005b).

The melon-headed whale is an oceanic species. Melon-headed whales are primarily expected to occur from the shelf break to seaward of the HRC and vicinity. There is a rare sighting occurrence from the shore to the shelf break. Occurrence patterns are assumed to be the same throughout the year.

Reproduction/Breeding. There is no information on the breeding behavior in this area. No breeding or calving areas for Hawaii have been described.

Diving Behavior. There is no information on the diving behavior of melon headed whales.

Acoustics. Watkins et al. (1997) reported melon-headed whale whistles in the range of 8 to 12 kHz (source level of 155 dB re 1µPa-m) and clicks in the range of 20 to 40 kHz (165 dB re 1µPa-m). There are no data on the hearing abilities of melon-headed whales.

Fraser's Dolphin (*Lagenodelphis hosei*)

Status. The Fraser's dolphin is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of Fraser's dolphins.

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the Fraser's dolphin is 10,226 (CV = 1.16) individuals (Barlow, 2006).

Fraser's dolphins have only recently been documented in Hawaiian waters (Carretta et al., 2005). Sightings have been recorded in the Northwestern Hawaiian Islands but not within the Main Hawaiian Islands (Barlow, 2003). There is a rare occurrence of the Fraser's dolphin from the shore to seaward of the HRC that takes into account that this is an oceanic species that can be found closer to the coast, particularly in locations where the shelf is narrow and deep waters are nearby. There is no evidence of a seasonal calving season (U.S. Department of the Navy, 2005a). Occurrence patterns are assumed to be the same throughout the year.

Reproduction/Breeding. There is little information on the breeding behavior in this area and there appears to be no seasonality to calving (Jefferson et al, 1994). No breeding or calving areas for Hawaii have been described.

Diving Behavior. There is no information available on their diving behavior.

Acoustics. Little is known of the acoustic abilities of Fraser's dolphins. Whistles have been reported in the range of 7.6 to 13.4 kHz (Leatherwood et al., 1993). Nothing is known of their hearing abilities.

Pygmy Killer Whale (*Feresa attenuata*)

Status. The pygmy killer whale is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of pygmy killer whales.

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the pygmy killer whale is 956 (CV = 0.83) individuals (Barlow, 2006). This species has a worldwide distribution in deep tropical and subtropical oceans. Pygmy killer whales generally do not range north of 40°N or south of 35°S (Jefferson et al., 1993). Reported sightings suggest that this species primarily occurs in equatorial waters, at least in the eastern tropical Pacific (Perryman et al., 1994). Most of the records outside the tropics are associated with strong, warm western boundary currents that effectively extend tropical conditions into higher latitudes (Ross and Leatherwood, 1994).

Pygmy killer whales regularly occur in the HRC. Pygmy killer whales are easily confused with false killer whales and melon-headed whales, which are two species that also have expected occurrence in the HRC. The pygmy killer whale is primarily expected to occur from the shelf break to seaward of the HRC boundaries. There is a rare sighting occurrence from the shore to the shelf break. Occurrence patterns are assumed to be the same throughout the year. Pygmy killer whales off the island of Hawaii demonstrate tremendous site fidelity to the island (U.S. Department of the Navy, 2005b).

Reproduction/Breeding. There is no information on the breeding behavior in this area.

Diving Behavior. There is no information on the diving behavior of pygmy killer whales.

Acoustics. The pygmy killer whale produces clicks in the range of 45 to 117 kHz, with the main energy in the range of 70 to 85 kHz (Madsen et al., 2004). Peak to peak source levels were 197 to 223 dB re 1 µPa. There is no information on the hearing of pygmy killer whales.

False Killer Whale (*Pseudorca crassidens*)

Status. This stock is listed as a strategic stock by NMFS because the estimated level of serious injury and mortality from the Hawaii-based tuna and swordfish longline fishery is greater than the potential biological removal (Carretta et al., 2005). Genetic evidence suggests that the Hawaiian stock might be a reproductively isolated population from false killer whales in the eastern tropical Pacific (Chivers et al., 2003). Baird et al. (2005) noted that more work was needed to determine whether false killer whales using coastal waters might even be a discrete population from those in offshore waters and waters off the Northwestern Hawaiian Islands.

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the false killer whale is 236 (CV = 1.13) individuals (Barlow, 2006). False killer whales are found in tropical and temperate waters, generally between 50°S and 50°N latitude with a few records north of 50°N in the Pacific and the Atlantic (Odell and McClune, 1999). Seasonal movements in the western North Pacific may be related to prey distribution (Odell and McClune, 1999). Baird et al. (2005) noted considerable inter-island movements of individuals in the Hawaiian Islands.

False killer whales are commonly sighted in offshore waters from small boats and aircraft, as well as offshore from longline fishing vessels (Mobley et al., 2000; Baird et al., 2003; Walsh and Kobayashi, 2004). Baird et al. (2005) reported that false killer whales in the Hawaiian Islands occur in waters from about 22 to 2,187 fathoms. There is an area of primary occurrence for the false killer whale from the shore to 1,094 fathoms, with the exception of Pearl Harbor, where there is a rare occurrence for this species. There is an additional area of primary occurrence seaward of 2,187 fathoms on the south side of the islands, which takes into account false killer whale sighting and incidental catch data in the southwestern portion of the HRC (Forney, 2004; Walsh and Kobayashi, 2004; Carretta et al., 2005). The area of secondary occurrence includes a narrow band between 1,094 fathoms and 2,187 fathoms south of the islands and the entire area north of the islands seaward of 1,094 fathoms. It has been suggested that false killer whales using coastal waters might be a discrete population from those in offshore waters and waters off the Northwestern Hawaiian Islands (Baird et al., 2005; Carretta et al., 2005). The area of secondary occurrence takes into account the possibility of two different stocks, with a possible hiatus in their distribution (U.S. Department of the Navy, Commander Third Fleet, 2006). There is no evidence of a seasonal calving period (Jefferson et al., 1993). Occurrence patterns are assumed to be the same throughout the year.

Reproduction/Breeding. There is no information on the breeding behavior in this area.

Diving Behavior. False killer whales primarily eat deep-sea cephalopods and fish (Odell and McClune, 1999), but they have been known to attack other cetaceans, including dolphins (Perryman and Foster, 1980; Stacey and Baird, 1991), sperm whales (Palacios and Mate, 1996), and baleen whales.

Acoustics. The dominant frequencies of false killer whale whistles are 4 to 9.5 kHz; those of their clicks are 25 to 30 kHz and 95 to 130 kHz (Thomas et al., 1990; Richardson et al., 1995a). The source level for clicks is 220 to 228 dB re 1 µPa-m (Ketten, 1998). Best hearing sensitivity measured for a false killer whale was around 16 to 64 kHz (Thomas et al., 1988, 1990). Yuen et al. (2005) tested a stranded false killer whale using auditory evoke potentials to produce an audiogram in the range of 4 to 44 kHz and with best sensitivity at 16 to 24 kHz, but it may have had age related hearing loss.

Killer Whale (*Orcinus orca*)

Status. The killer whale is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005). There is no information on the population trend of killer whales.

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the killer whale is 349 (CV = 0.98) individuals (Barlow, 2006). Genetic analysis of a biopsy sample taken from a killer whale in Hawaii (during the NMFS Hawaiian Islands Cetacean and Ecosystem Assessment Survey) was most closely related to mammal-eating killer whales in Alaska (Baird et al., 2003).

The killer whale is a cosmopolitan species found throughout all oceans and contiguous seas, from equatorial regions to the polar pack-ice zones. This species has sporadic occurrence in most regions (Ford, 2002). Though found in tropical waters and the open ocean, killer whales as a species are most numerous in coastal waters and at higher latitudes (Mitchell, 1975; Miyazaki and Wada, 1978; Dahlheim et al., 1982). Sightings in most tropical waters, although not common, are widespread (Visser and Bonoccorso, 2003).

Killer whales in general are uncommon in most tropical areas (U.S. Department of Defense, 2005). The distinctiveness of this species would lead it to be reported more than any other member of the dolphin family, if it occurs in a certain locale. Killer whales are infrequently sighted and found stranded around the Hawaiian Islands (Shallenberger, 1981; Tomich, 1986; Mobley et al., 2001b; Baird et al., 2003), though with increasing numbers of boaters, sightings each year could be expected (Baird et al., 2006c). Because the killer whale has a sporadic occurrence in tropical waters and can be found in both coastal areas and the open ocean, there is a rare occurrence of this species in the HRC from the shoreline to seaward of the HRC boundaries. Occurrence patterns are assumed to be the same throughout the year.

Reproduction/Breeding. There is no information on the breeding behavior in this area.

Diving Behavior. The maximum depth recorded for free-ranging killer whales diving off British Columbia is about 144 fathoms (Baird et al., 2005). On average, however, for seven tagged individuals, less than 1 percent of all dives examined were to depths greater than about 16 fathoms (Baird et al., 2003). The longest duration of a recorded dive from a radio-tagged killer whale was 17 min (Dahlheim and Heyning, 1999).

Acoustics. The killer whale produces a wide variety of clicks and whistles from 1.5 to 25 kHz, but most of its sounds are pulsed with dominant frequencies of 1 to 6 kHz (Richardson et al., 1995a). The peak-to-peak source levels of echolocation signals range between 195 and 224 dB re 1 μPa-m (Au et al., 2004). The source level of social vocalizations ranges between 137 to 157 dB re 1 μPa-m (Veirs, 2004). Acoustic studies of resident killer whales in British Columbia have found that there are dialects, in their highly stereotyped, repetitive discrete calls, which are group-specific and shared by all group members (Ford, 2002). These dialects likely are used to maintain group identity and cohesion, and may serve as indicators of relatedness that help in the avoidance of inbreeding between closely related whales (Ford, 2002). Dialects also have been documented in killer whales occurring in northern Norway, and likely occur in other locales as well (Ford, 2002). The killer whale has the lowest frequency of maximum sensitivity and one of the lowest high-frequency hearing limits known among toothed whales (Szymanski et al., 1999). The upper limit of hearing is 100 kHz for this species. The most sensitive frequency, in both behavioral and in auditory brainstem response audiograms, has been determined to be 20 kHz (Szymanski et al., 1999).

Short-finned Pilot Whale (*Globicephala macrorhynchus*)

Status. Stock structure of short-finned pilot whales has not been well-studied in the North Pacific Ocean, except in Japanese waters (Carretta et al., 2005). Two stocks have been identified in Japan based on pigmentation patterns and differences in the head shape of adult males (Kasuya et al., 1988). Pilot whales in Hawaiian waters are similar morphologically to the Japanese southern form (Carretta et al., 2005). Genetic analyses of tissue samples collected near the Main Hawaiian Islands indicate that the Hawaiian population is reproductively isolated from short-finned pilot whales found in the eastern North Pacific Ocean (Carretta et al., 2005).

Abundance and Distribution. The best available estimate of abundance for the Hawaiian stock of the short-finned pilot whale is 8,870 (CV = 0.38) individuals (Barlow, 2006). The short-finned pilot whale is found worldwide in tropical to warm-temperate seas, generally in deep offshore areas. The short-finned pilot whale usually does not range north of 50°N or south of 40°S (Jefferson et al., 1993). The long-finned pilot whale is not known to presently occur in the North Pacific (Kasuya, 1975); the range of the short-finned pilot whale appears to be expanding to fill the former range of the long-finned pilot whale (Bernard and Reilly, 1999). Pilot whales are sighted throughout the Hawaiian Islands (Shallenberger, 1981).

Short-finned pilot whales are expected to occur year-round throughout the HRC. They are commonly found in deep waters with steep bottom topography, including deepwater channels between the Main Hawaiian Islands, such as the Alenuihaha Channel between Maui and Hawaii (Balcomb, 1987). The area of primary occurrence for this species is between 109 fathoms and 2,187 fathoms. Considering the narrow insular shelf and deep waters in proximity to the shore, secondary occurrence is between 27 fathoms and 109 fathoms. Another area of secondary occurrence extends from 2,187 fathoms to seaward of the HRC boundaries. Short-finned pilot whales are expected to be rare between the shore and 27 fathoms. Occurrence patterns are assumed to be the same throughout the year. Photo-identification work suggests a high degree of site fidelity around the island of Hawaii (Shane and McSweeney, 1990).

Reproduction/Breeding. There is no information on the breeding behavior in this area.

Diving Behavior. Pilot whales are deep divers; the maximum dive depth measured is about 531 fathoms (Baird et al., 2002). Pilot whales feed primarily on squid, but also take fish (Bernard and Reilly, 1999). Pilot whales are not generally known to prey on other marine mammals; however, records from the Eastern Tropical Pacific suggest that the short-finned pilot whale does occasionally chase, attack, and may eat dolphins during fishery operations (Perryman and Foster, 1980), and they have been observed harassing sperm whales in the Gulf of Mexico (Weller et al., 1996).

Acoustics. Short-finned pilot whale whistles have a dominant frequency range of 2 to 14 kHz and clicks have frequency range of 30 to 60 kHz, both with source levels of 180 dB re 1 μPa-m (Fish and Turl, 1976; Ketten, 1998). There are no published hearing data available for this species.

3.1.2.4.1.3 Pinnipeds

Hawaiian Monk Seal (*Monachus schauinslandi*)

Status. The Hawaiian monk seal is listed as endangered under the ESA and as a depleted and strategic stock under the MMPA (Ragen and Lavigne, 1999; Carretta et al., 2005). Hawaiian monk seals are managed as a single stock, although there are six main reproductive subpopulations at French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, Midway Atoll, and Kure Atoll (Ragen and Lavigne, 1999; Carretta et al., 2005). Genetic comparisons between the Northwestern and Main Hawaiian Islands seals have not yet been conducted, but observed interchange of individuals among the regions is extremely rare, suggesting that these may be more appropriately designated as separate stocks; further research is needed (Carretta et al., 2005).

Critical habitat for the Hawaiian monk seal is designated from the shore out to 20 fathoms in 10 areas of the Northwestern Hawaiian Islands (National Marine Fisheries Service, 1988). The eastern-most island is located on the northwestern edge of the HRC. A revised recovery plan, which included species status, threats to the population and recommendations to prevent extinction, was issued in 2007 (National Marine Fisheries Service, 2007e). Hawaiian monk seals were given the Hawaiian name `ilio holo i ka uaua, which translates literally as “dog walking on water.”

Abundance and Distribution. The best estimate of the total population size is 1,252 individuals in the Hawaiian Islands Archipelago (Carretta et al., 2006). There are an estimated 77 seals in the Main Hawaiian Islands (National Marine Fisheries Services, 2007e). The vast majority of the population is present in the Northwestern Hawaiian Islands. The trend in abundance for the population over the past 20 years has mostly been negative (Baker and Johanos, 2004; Carretta et al., 2005). A self-sustaining subpopulation in the Main Hawaiian Islands may improve the monk seal’s long-term prospects for recovery (Marine Mammal Commission, 2003; Baker and Johanos, 2004; Carretta et al., 2005).

The Hawaiian monk seal occurs only in the central North Pacific. Until recently, this species occurred almost exclusively at remote atolls in the Northwestern Hawaiian Islands where six major breeding colonies are located: French Frigate Shoals, Laysan and Lisianski Islands, Pearl and Hermes Reef, Midway Atoll, and Kure Atoll. In the last decade, however, sightings of Hawaiian monk seals in the Main Hawaiian Islands have increased considerably (Baker and Johanos, 2004; Carretta et al., 2005). Most monk seal haulout events in the Main Hawaiian Islands have been on the western islands of Niihau and Kauai (Baker and Johanos, 2004; Carretta et al., 2005), although sightings or births have now been reported for all of the Main Hawaiian Islands, including Lehua and Kaula (Marine Mammal Commission, 2003; Baker and Johanos, 2004). Births of Hawaiian monk seal pups have been recorded in the Main Hawaiian Islands including Kauai, Niihau (Baker and Johanos, 2004), Oahu, and Molokai (National Marine Fisheries Service, 2007e) Hawaiian monk seals wander to Maro Reef and Gardner Pinnacles and have occasionally been sighted on nearby island groups such as Johnston Atoll, Wake Island, and Palmyra Atoll (Rice, 1998).

Hawaiian monk seals may give birth throughout the year, but most births occur between February to August with a peak from March to June (Gilmartin and Forcada, 2002). Hawaiian monk seals show very high site fidelity to natal (birthing) islands, with only about 10 percent of individuals moving to another island in their lifetime (Gilmartin and Forcada, 2002). While monk seals do move between islands, long-distance movements are not common. Seals move distances of up to 135 nm on a regular basis, but longer distances have been recorded (e.g from Laysan to Molokai) (Johanos and Baker, 2005). Primary occurrence of monk seals within the HRC is expected in a continuous band between Nihoa, Kaula, Niihau, and Kauai. This band extends from the shore to around 273 fathoms and is based on the large number of sightings and births recorded in this area (Westlake and Gilmartin, 1990; Ragen and Finn, 1996; Marine Mammal Commission, 2003; Baker and Johanos, 2004). An area of secondary occurrence is expected from 273 fathoms to 547 fathoms around Nihoa, Kaula, Niihau, and Kauai. A continuous area of secondary occurrence is also expected from the shore to 547 fathoms around the other Main Hawaiian Islands, taking into account sighting records, the location of deep sea corals, and the ability of monk seals to forage in water deeper than about 273 fathoms (Parrish et al., 2002; Severns and Fiene Severns, 2002; Kona Blue Water Farms, 2003; Kubota, 2004; Anonymous 2005 [from Honolulu Star Bulletin]; Fujimori, 2005). The Pearl Harbor entrance is included in the area of secondary occurrence based on sightings of this species near the entrance of the harbor (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a). There is a rare occurrence of the monk seal seaward of the 3,281-ft isobath. Occurrence patterns are expected to be the same throughout the year.

<u>Reproduction/Breeding</u>. Pupping can occur year round but generally occurs from February to August with a peak in March (Johanos et al., 1994; Gilmartin and Forcada, 2002). Most pupping occurs on the Northwestern Hawaii Islands.

<u>Diving Behavior</u>. Monk seals feed on a variety of benthic and mid-water fish and invertebrates (Goodman-Lowe, 1998; Parrish et al., 2000). Adult seals at French Frigate Shoals forage at depths of 164 to 273 fathoms in coral beds, and juveniles forage at depths of about 5.5 to 16 fathoms and to 27 to 55 fathoms at underwater sand fields (Parrish et al., 2002; 2005).

In a study conducted by NMFS and Hubbs-Sea World Research Institute, movements of 11 tagged seals were monitored in the MHI for 32 to 167 days. Most locations for all seals were in nearshore, neritic, marine habitats and within the 200-m depth contours surrounding the MHI or nearby banks. Several seals moved between islands in the Main Hawaiian Islands. One juvenile male seal instrumented on Kauai traveled to the northwest and southwest coasts of Oahu. The adult males that were tagged on the south coast of Kauai ranged extensively along the south and west coasts of Kauai and also traveled to Niihau (Littnan et al., 2006).

Acoustics. The range of underwater hearing in monk seals is 2 to 48 kHz, with best hearing from 16 to 30 kHz (Thomas et al., 1990). This audiogram was from only one animal and may not be indicative of the species.

There is no information on underwater sounds. In-air sounds are low frequency sounds (below 1,000 Hz) such as "soft liquid bubble," short duration guttural expiration, a roar and belching/coughing sound (Miller and Job, 1992). A pup produces a higher frequency call (1.4 kHz) that presumably is used to call its mother.

Northern Elephant Seal (*Mirounga angustirostris*)

Status. The northern elephant seal is not listed as endangered under the ESA and is not a depleted or strategic stock under the MMPA (Carretta et al., 2005).

Abundance and Distribution. The northern elephant seal population has recovered dramatically after being reduced to several dozen to perhaps no more than a few animals in the 1890s (Bartholomew and Hubbs, 1960; Stewart et al., 1994). Although movement and genetic exchange continues between rookeries, most elephant seals return to their natal rookeries when they start breeding (Huber et al., 1991). The population size has to be estimated since all age classes are not ashore at any one time of the year (Carretta et al., 2005). There is a conservative minimum population estimate of 60,547 elephant seals in the California stock (Carretta et al., 2005). Based on trends in pup counts, abundance in California is increasing by around 6 percent annually, but the Mexican stock is evidently decreasing slowly (Stewart et al., 1994; Carretta et al., 2005).

Breeding and molting habitat for northern elephant seals is characterized by sandy beaches, mostly on offshore islands, but also in some mainland locations along the coast (Stewart et al., 1994). When on shore, seals will also use small coves and sand dunes behind and adjacent to breeding beaches. They rarely enter the water during the breeding season, but some seals will spend short periods in tide pools and alongshore; these are most commonly weaned pups that are learning to swim (Le Boeuf et al., 1972).

The northern elephant seal is endemic to the North Pacific Ocean, occurring almost exclusively in the eastern and central North Pacific. However, vagrant individuals do sometimes range to the western North Pacific. Northern elephant seals occur in Hawaiian waters only rarely as extralimital vagrants. The most far-ranging individual appeared on Nijima Island off the Pacific coast of Japan in 1989 (Kiyota et al., 1992). This demonstrates the great distances that these animals are capable of covering.

There is a rare occurrence of northern elephant seals throughout the HRC year-round. There are several unconfirmed reports of elephant seals at Midway Atoll, Pearl and Hermes Reef, and Kure Atoll (U.S. Department of the Navy, 2005b). The first confirmed sighting of a northern elephant seal in the Hawaiian Islands was a female found on Midway Atoll in 1978 that had been tagged earlier at San Miguel Island (off the coast of southern California) (Northwest and Alaska Fisheries Center, 1978). The first sighting of an elephant seal in the Main Hawaiian

Islands occurred on the Kona coast of Hawaii in January 2002; a juvenile male was sighted hauled out at Kawaihae Beach and later at the Kona Village Resort (Fujimori, 2002;). Based on these sightings and documented long-distance movements as far west as Japan (Northwest and Alaska Fisheries Center, 1978; Antonelis and Fiscus, 1980; Tomich, 1986; Kiyota et al., 1992; Fujimori, 2002), rare encounters with northern elephant seals in the HRC are possible.

Reproduction/Breeding. Northern elephant seals haul out on land exclusively in Baja California, Mexico and California, to give birth and breed from December through March, and pups remain on shore or in the shallow waters adjacent to the rookery through May.

Diving Behavior. Feeding habitat is mostly in deep, offshore waters of warm temperate to subpolar zones (Stewart and DeLong, 1995; Stewart, 1997; Le Boeuf et al., 2000). Some seals will move into subtropical or tropical waters while foraging (Stewart and DeLong, 1995).

Both sexes routinely dive deep (82 to 437.5 fathoms) (Le Boeuf et al., 2000); dives average 15–25 min, depending on time of year, and surface intervals between dives are 2 to 3 min. The deepest dives recorded for both sexes are over 833 fathoms (e.g., Le Boeuf et al., 2000; Schreer et al., 2001). Females remain submerged about 86 to 92 percent of the time and males about 88 to 90 percent (Le Boeuf et al., 1989; Stewart and Delong, 1995). Feeding juvenile northern elephant seals dive for slightly shorter periods (13 to 18 min), but they dive to similar depths (163 to 250 fathoms) and spend a similar proportion (86 to 92 percent) of their time submerged (Le Boeuf et al., 1996).

Acoustics. The northern elephant seal produces loud, low-frequency in-air vocalizations (Bartholomew and Collias, 1962). The mean fundamental frequencies are in the range of 147 to 334 Hz for adult males (Le Bouef and Petrinovich, 1974). The mean source level of the male-produced vocalizations during the breeding season is 110 dB re 20 μPa 1 m (Sanvito and Galimberti, 2003). In-air calls made by aggressive males include: (1) snoring, which is a low intensity threat; (2) a snort (0.2 to 0.6 kHz) made by a dominant male when approached by a subdominant male; and (3) a clap threat (<2.5 kHz) which may contain signature information at the individual level (Richardson et al., 1995a). These sounds appear to be important social cues (Shipley et al., 1992). The mean fundamental frequency of airborne calls for adult females is 500 to 1,000 Hz (Bartholomew and Collias, 1962). In-air sounds produced by females include a <0.7 kHz belch roar used in aggressive situations and a 0.5 to 1 kHz bark used to attract the pup (Bartholomew and Collias, 1962). As noted by Kastak and Schusterman (1999), evidence for underwater sound production by this species is scant. Except for one unsubstantiated report, none have been definitively identified (Fletcher et al., 1996; Burgess et al., 1998). Burgess et al. (1998) detected possible vocalizations in the form of click trains that resembled those used by males for communication in air.

The audiogram of the northern elephant seal indicates that this species is well-adapted for underwater hearing; sensitivity is best between 3.2 and 45 kHz, with greatest sensitivity at 6.4 kHz and an upper frequency cutoff of approximately 55 kHz (Kastak and Schusterman, 1999).

3.1.3 CULTURAL RESOURCES—OPEN OCEAN AREA

Cultural resources include prehistoric and historic sites, structures, objects, districts, artifacts or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or any other reasons. For ease of discussion, cultural resources have been divided into archaeological resources (prehistoric and historic), historic buildings and structures, and traditional resources. Traditional resources include, but are not limited to, topographical areas, natural features, plants/trees, minerals, water sources, or archaeological sites that contemporary cultures value presently (or did so in the past) and consider essential for the persistence of their traditional culture. Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

For all locations analyzed in this EIS/OEIS, the region of influence for cultural resources (both terrestrial and underwater) is synonymous with the Area of Potential Effect as defined under the National Historic Preservation Act. In general, the region of influence includes any area where ground disturbance from the proposed activities described in Chapter 2.0 could occur. The region of influence also encompasses any identified historic buildings or structures that could be affected by demolition, renovation, or other major alteration.

The region of influence for cultural resources within the Open Ocean Area and offshore areas includes any locations where underwater demolition; trenching; or placement of new systems, infrastructure, or equipment might affect submerged sites, features, wrecks, or ruins. Humpback whales and other marine mammals of cultural value to some Native Hawaiians and other people (National Oceanic and Atmospheric Administration, 2003) are also known to transit these areas.

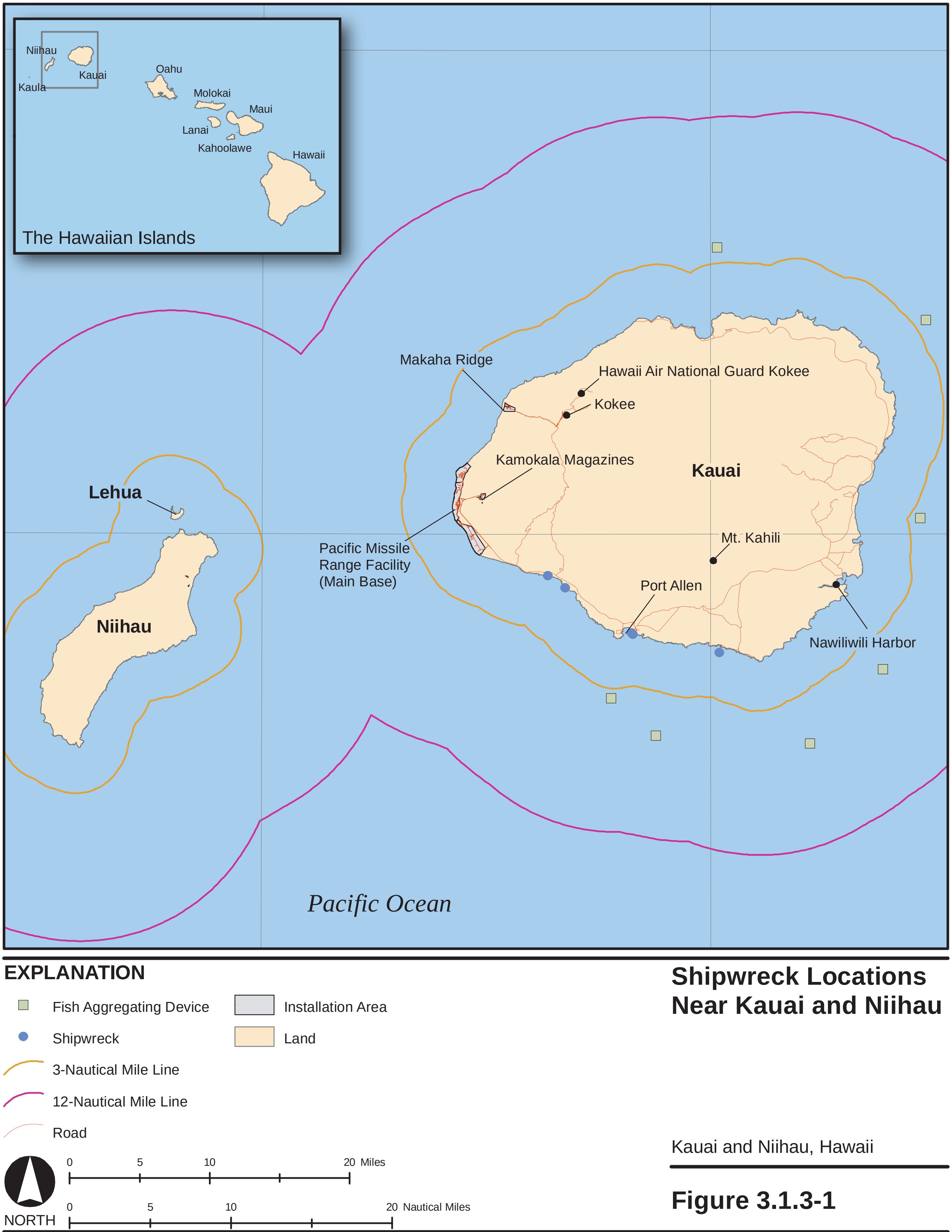
Affected Environment

Open Ocean Area Archaeological Resources

In the waters surrounding the Hawaiian Islands, there are thousands of submerged cultural resources. Among the typical deep water resources are wrecks of World War II submarines and ships, commercial fishing vessels and tankers, and aircraft. There is no definitive count of the number of shipwrecks surrounding the Hawaiian Islands, as Pacific Ocean currents are quick to destroy wrecks. In addition, identifying older wrecks can be problematic, as islands are periodically subjected to large storms, powerful seas, and occasional tsunamis. The types of shipwrecks most likely to occur around the Hawaiian Islands are 19th century cargo ships, submarines, old whaling and merchant ships, fishing boats, or 20th century U.S. Warships, recreational craft, and land vehicles.

The State of Hawaii's Geographic Information System and the *Marine Resources Assessment for the Hawaiian Islands Operating Area, Final Report* (U.S. Department of the Navy, 2005b) were reviewed to determine the potential for shipwrecks to exist within the waters surrounding the Hawaiian Islands, as well as the specific proposed regions of influence. Figures 3.1.3-1 through 3.1.3-3 show the distribution of shipwrecks identified.

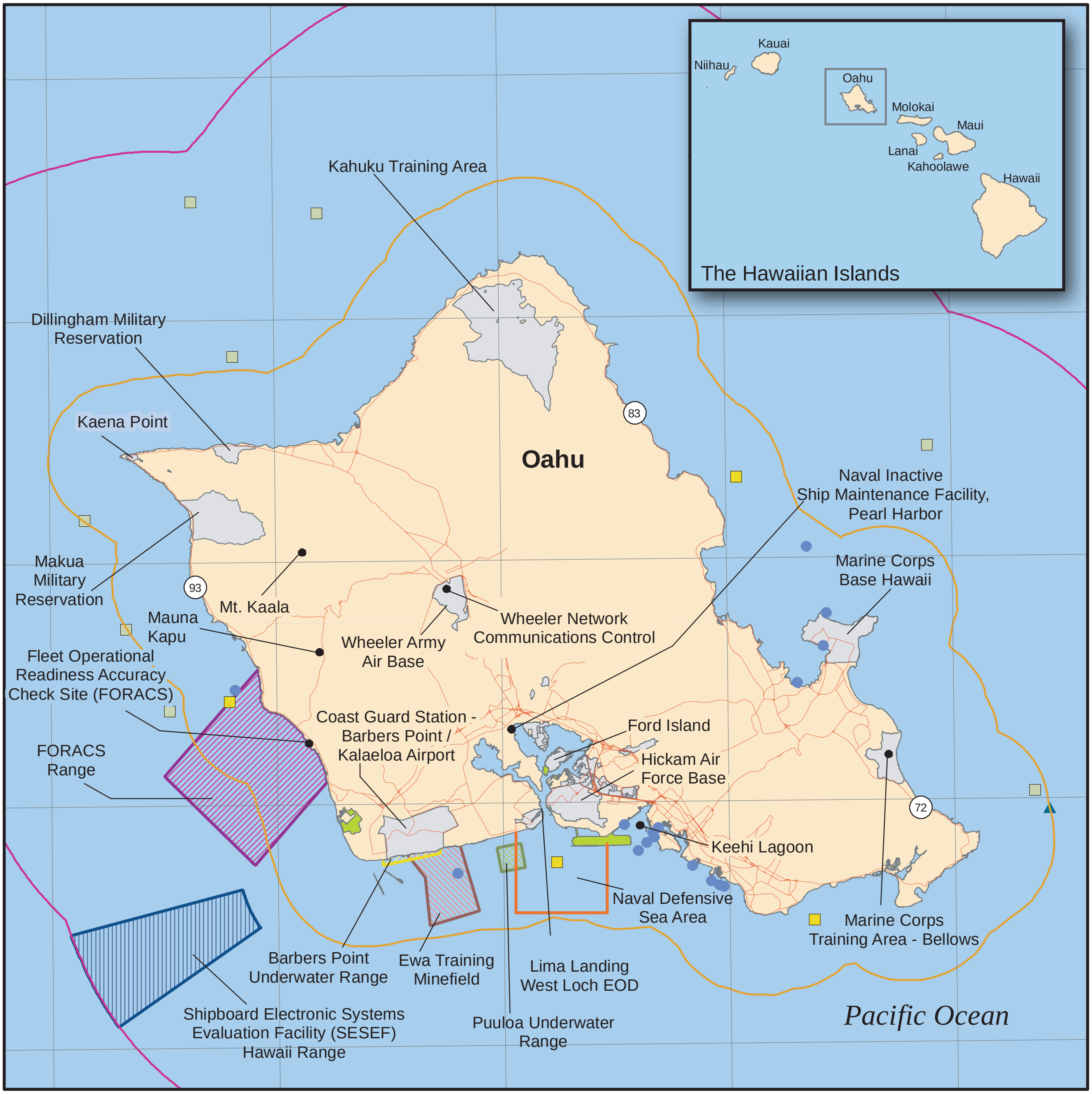
A discussion of offshore submerged resources (e.g., fishponds) is provided in Section 3.3.1.1.2.



Shipwreck Locations Near Kauai and Niihau

Kauai and Niihau, Hawaii

Figure 3.1.3-1



EXPLANATION

- Artificial Reef
- Fish Aggregating Device
- Shipwreck
- Wave Buoy
- 93 State Highway
- Road
- 3-Nautical Mile Line
- 12-Nautical Mile Line
- Shipboard Electronic Systems Evaluation Facility (SESEF) Hawaii Range
- Puuloa Underwater Range
- Ewa Training Minefield
- Fleet Operational Readiness Accuracy Check Site (FORACS) Range
- Barbers Point Underwater Range
- Naval Defensive Sea Area
- Artificial Habitat
- Installation Area
- Land

Note: EOD= Explosive Ordnance Disposal

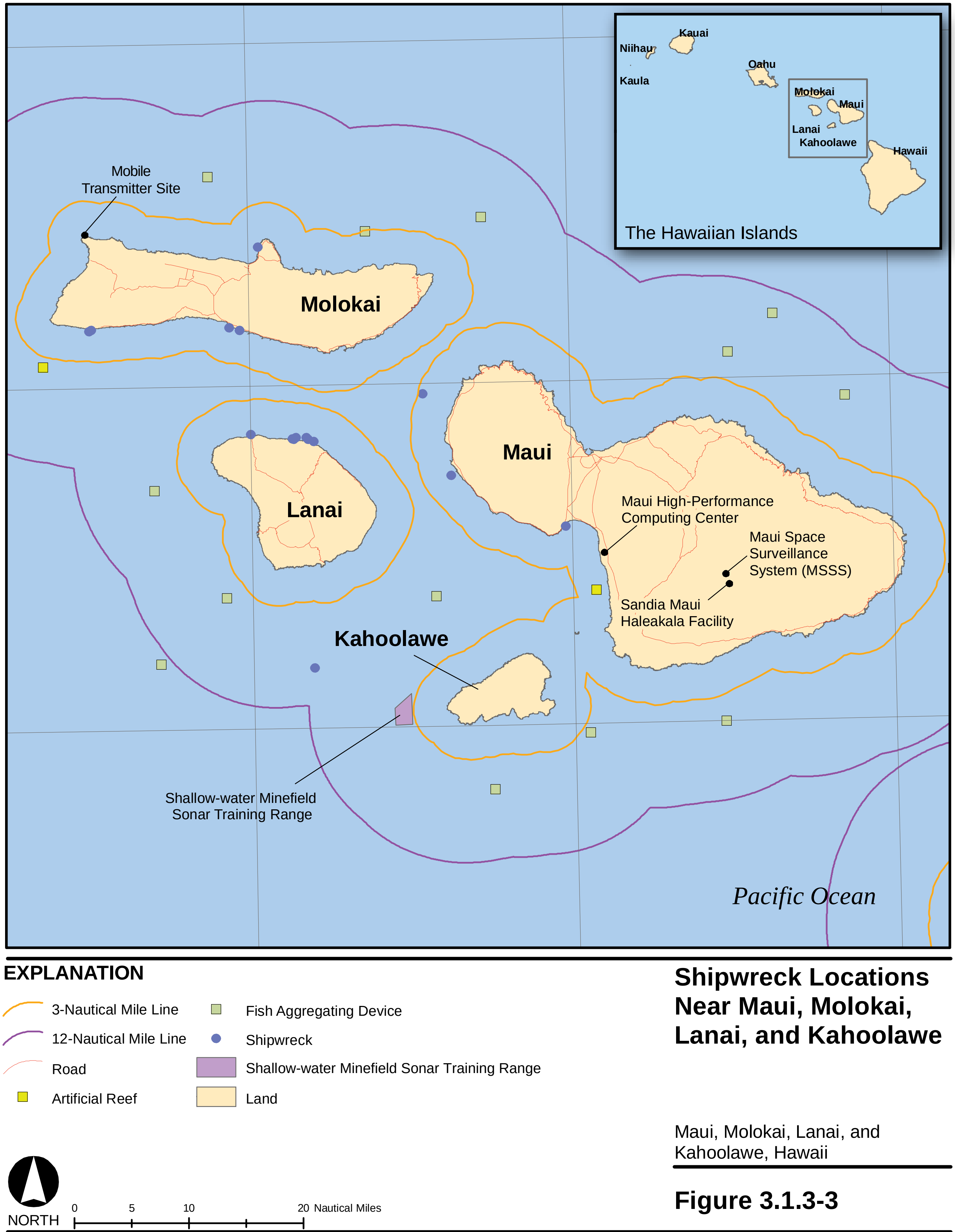
NORTH

0 2.5 5 10 Nautical Miles

Shipwreck Locations Near Oahu

Oahu, Hawaii

Figure 3.1.3-2



Shipwreck Locations Near Maui, Molokai, Lanai, and Kahoolawe

Maui, Molokai, Lanai, and Kahoolawe, Hawaii

Figure 3.1.3-3

3.1.4 HAZARDOUS MATERIALS AND WASTE—OPEN OCEAN AREA

Appendix C includes a discussion of hazardous materials and waste resource regulations.

Region of Influence

The hazardous materials and wastes region of influence for the Open Ocean Area includes the Navy's sea ranges and immediately adjacent waters.

Affected Environment

Hazardous Materials and Hazardous Constituents

Hazardous materials can be broadly defined as those materials with clearly hazardous properties that are in general use in commercial and industrial applications. Hazardous materials include, but are not limited to, petroleum products, coolants, paints, adhesives, solvents, corrosion inhibitors, cleaning compounds, photographic materials and chemicals, and batteries. Hazardous materials are required for maintenance and operation of vessels, machinery, and equipment used by the Navy in training activities.

Hazardous constituents can generally be defined as hazardous materials present at low concentrations in a generally non-hazardous matrix, such that their hazardous properties do not produce acute effects. Navy vessels conducting training do not intentionally release hazardous constituents into the water. U.S. Environmental Protection Agency (USEPA) and the Department of Defense (DoD), however, have identified numerous waste streams from Navy vessels that do or may contain hazardous constituents. Waste streams from Navy vessels that may contain hazardous constituents include hull coating leachate and:

- Bilgewater/oil water separator discharges,
- Gray water,
- Cooling water,
- Weather deck runoff
- Chain locker effluent,
- Elevator pit effluent, and
- Photographic laboratory drains.

In addition, small boat engines discharge petroleum products in their wet exhaust (U.S. Environmental Protection Agency, 2004).

Table 3.1.4-1 lists the hazardous constituents of common Navy training munitions. Hazardous materials associated with training are described below.

Table 3.1.4-1. Hazardous Constituents of Training Materials

Training Application/ Munitions Element	Hazardous Constituent
Pyrotechnics Tracers Spotting Charges	Barium chromate Potassium perchlorate
Oxidizers	Lead oxide
Delay Elements	Barium chromate Potassium perchlorate Lead chromate
Propellants	Ammonium perchlorate
Fuses	Potassium perchlorate
Detonators	Fulminate of mercury Potassium perchlorate
Primers	Lead azide

Hazardous Constituents of Concern

Missiles

The single largest hazardous constituent of missiles is solid propellant, but numerous hazardous constituents are used in igniters, explosive bolts, batteries, and warheads. Most of the missiles fired carry inert warheads that contain no hazardous constituents. Exterior surfaces may be coated, however, with anti-corrosion compounds containing chromium or cadmium.

Aerial Targets

Aerial targets are used for testing and training purposes. Most air targets contain jet fuels, oils, hydraulic fluid, batteries, and explosive cartridges as part of their operating systems. Fuel is shut off by an electronic signal, the engine stops, and the target begins to descend. A parachute is activated and the target descends to the ocean surface where range personnel retrieve it. Some targets are actually hit by missiles, however, and those targets fall into the Range unrecovered.

Surface Targets

Surface targets are used during Missile and Bombing Exercises. Surface targets are stripped of unnecessary hazardous constituents, and made environmentally clean; therefore, only minimal amounts of hazardous constituents are onboard.

Each Sinking Exercise (SINKEX) uses as a target an excess vessel hulk that is eventually sunk during the course of the training event. The target is an empty, cleaned, and environmentally remediated target vessel that is towed to a designated location where various ships, submarines, or aircraft use multiple types of weapons to fire shots at the target vessel. The vessels used as targets are selected from a list of USEPA-approved destroyers, tenders, cutters, frigates, cruisers, tugs, and transports (See Appendix D). Weapons can include missiles, precision and non-precision bombs, gunfire, and torpedoes. If none of the shots sinks the target vessel, either a submarine shot or placed explosive charges are used to sink the ship. If sunk by explosives, charges ranging from 100 to 200 lb, depending on the size of the ship, are placed on or in the target vessel.

USEPA granted the U.S. Department of the Navy a general permit through the Marine Protection, Research, and Sanctuaries Act to transport vessels "for the purpose of sinking such vessels in ocean waters…" (40 Code of Federal Regulations [CFR] Part 229.2). Subparagraph (a)(3) of this regulation states "All such vessel sinkings shall be conducted in water at least 1,000 fathoms (6,000 ft) deep and at least 50 nm from land." In Hawaii, SINKEX events take place in Warning Area W-188 (see Figure 3.1.1-1) at least 50 nm from shore and in water deeper than 1,000 fathoms.

Other Ordnance

Other ordnance includes bombs and gunnery rounds. Most of this ordnance is inert (non-explosive) and consists of non-hazardous constituents. Inert ordnance includes steel shapes or replicas containing concrete, vermiculite (clay), or other non-hazardous constituents similar in appearance, size, and weight to explosive ordnance.

Explosives

Trinitrotoluene (TNT), used since 1912 by the Navy, is a nitroaromatic compound that continues to be a component of modern military munitions. Modern explosives in military ordnance, however, are generally solid-cast explosive fills formed by melting the constituents and pouring them into casings (usually steel). Most new Navy formulations contain plastic-bonded explosives (PBX), with plastic or other polymer binders added to increase their stability (Jane's Information Group, 2005; 2006). Royal Demolition Explosive (RDX)/High Melting Explosive (HMX) blends have generally replaced TNT in plastic-bonded formulations.

Explosives become an environmental concern when expended ordnance fails to function as designed (dud), and explosive compounds in the unexploded ordnance (UXO) are released into the environment. Munitions constituents of concern include nitroaromatics—principally TNT, its degradation products, and related compounds—and cyclonitramines, including RDX, HMX, and their degradation products. TNT degrades to dinitrotoluene (DNT) and subsequent degradation products from exposure to sunlight (photolysis) or bacteria (biodegradation). RDX also is subject to photolysis and biodegradation once exposed to the environment. As a group, military-grade explosives have low water solubility (see Table 3.1.4-2), and are relatively immobile in water. The physical structure and composition of blended explosives containing multiple chemical compounds, often with additional binding agents, may further slow the degradation and dissolution of these materials (see Table 3.1.4-3).

Table 3.1.4-2. Water Solubility and Degradation Products of Common Explosives

Compound	Water Solubility, milligrams/liter (mg/L) (at 20°C)
Salt (sodium chloride) [for comparison]	357,000
Ammonium perchlorate	249,000
Picric acid	12,820
Nitrobenzene	1,900
Dinitrobenzene	500
Trinitrobenzene	335
Dinitrotoluene (DNT)	160-161
Trinitrotouene (TNT)	130
Tetryl	51
Pentaerythritol tetranitrate (PETN)	43
Royal Demolition Explosive (RDX)	38
High Melting Explosive (HMX)	7
White phosphorus	4

Source: U.S. Environmental Protection Agency, 2006

Table 3.1.4-3. Explosive Components of Munitions

Name	Composition	Use
Composition A	91% Royal Demolition Explosive (RDX)	Grenades, projectiles
Composition B	60% RDX, 39% trinitrotoluene (TNT)	Projectiles, grenades, shells, bombs
Composition C-4	91% RDX, 9% plasticizer	Demolition explosive
Explosive D	Picric acid, ammonium picrate	Bombs, projectiles
Octol	70-75% High Melting Explosive (HMX), 25-30% TNT	Shaped and bursting charges
TNT	Not Applicable	Projectiles, shells
Tritonal	80% TNT, 20% aluminum	Bombs, projectiles
H6	80% Composition B, 20% aluminum	Bombs, projectiles

Source: U.S. Environmental Protection Agency, 2006.

Other Munitions Constituents. Other munitions constituents of concern include pyrotechnic (illumination and smoke) compounds, propellants, primers, and metals (iron, manganese, copper, lead, zinc, antimony, mercury) released from both initiation primers and ordnance casing corrosion. Nitrocellulose, nitroglycerin, perchlorate, nitroguanidine, and pentaerythritol tetranitrate (PETN) are commonly used in artillery, mortar, and rocket propellants. Common primers include lead azide, lead styphnate, and mercury fulminate. PETN is a major component of detonation cord and blasting caps. Phosphorus, potassium perchlorate, and metal nitrates are common ingredients of pyrotechnics, flares, and smokes. In particular, the heavy metals tend to accumulate in the biosphere because of their generally low solubility and their elemental nature—they may oxidize or corrode, but do not break down in the manner of organic compounds.

Explosive Byproducts. The explosive byproducts generated when ordnance does function as designed (high order detonation), or experiences a low-order detonation, also generate constituents of concern. The major explosive byproducts of organic nitrated compounds such as TNT and RDX include water, carbon dioxide, carbon monoxide, and nitrogen (Department of Health and Human Services, Agency for Toxic Substance and Disease Registry, 2003); Renner and Short, 1980; Cook and Spillman, 2000). Residues of high-order detonations are primarily micron-sized and submicron-sized particles that are spread over hundreds of square meters. High-order detonations result in almost complete conversion of explosives (99.997% or more [U.S. Army Corps of Engineers, 2003]) into such inorganic compounds, whereas low-order detonations result in incomplete conversion (i.e., a mixture of the original explosive and its byproducts). For example, Table 3.1.4-4 lists the calculated chemical byproducts of high-order underwater detonation of TNT, RDX, and related materials. Table 3.1.4-5 lists the measured residues of high-order detonations of selected common military munitions.

Table 3.1.4-4. Chemical Byproducts of Underwater Detonations

Byproduct	Percent by Weight, by Explosive Compound			
	Trinitrotoluene (TNT)	Royal Demolition Explosive (RDX)	Composition B	Plastic-Bonded Explosive (PBX)
Nitrogen	18.2	37.0	29.3	33.2
Carbon dioxide	27.0	24.9	34.3	32.0
Water	5.0	16.4	8.4	13.2
Carbon monoxide	31.3	18.4	17.5	7.1
Carbon (elemental)	10.6	-	2.3	3.2
Ethane	5.2	1.6	5.4	7.1
Hydrogen	0.2	0.3	0.1	0.1
Propane	1.6	0.2	1.8	2.8
Ammonia	0.3	0.9	0.6	1
Methane	0.2	0.2	0.2	0.1
Hydrogen cyanide	<0.0	<0.0	<0.0	<0.0
Methyl alcohol	<0.0	<0.0	-	-
Formaldehyde	<0.0	<0.0	<0.0	<0.0
Other compounds	<0.0	<0.0	<0.0	<0.0

Source: Renner and Short, 1980

Munitions constituents are deposited on the surface of the ocean during training and testing in amounts similar to those identified on land ranges. Laboratory studies have determined that TNT exhibits toxicity in the marine environment at concentrations of 0.9 to 11.5 milligrams per liter (mg/L), while RDX generally showed limited toxicity. In marine sediments, TNT exhibits toxicity at concentrations of 159 to 320 parts per million (ppm). RDX exhibits no sediment toxicity at the concentrations tested (Lotufo and Ludy, 2005; Rosen and Lotufo, 2005; Rosen and Lotufo 2007a, 2007b). In a series of tests mimicking a natural environment, Ek et al. (2006) determined that, under environmental conditions typical of in-water UXO, no substantial toxicity or bioaccumulation of TNT munitions occurred. In general, munitions constituents in the marine environment appear to pose little risk to the environment.

Table 3.1.4-5. Per-Round Residues of Live Fire Detonations

Munition	Plume Area (square meters)	Residue (milligrams)				Total Residue (%)
		RDX	HMX	TNT	Total	
60-mm mortar	214	0.076	ND	ND	0.076	2.0×10^{-5}
81-mm mortar	230	8.3	ND	1.1	9.4	1.0×10^{-3}
120-mm mortar	450	17.0	1.3	2.8	21.0	7.0×10^{-4}
105-mm howitzer	530	0.095	ND	0.17	0.27	1.3×10^{-5}
155-mm howitzer	938	0.3	ND	0.009	0.31	4.4×10^{-6}

Source: U.S. Army Corps of Engineers, 2007
Notes:
HMX = High Melting Explosive
mm = millimeter
ND = not detected
RDX = Royal Demolition Explosive
TNT = trinitrotoluene

UXO and Low-Order Detonations

UXO is ordnance that fails to function as designed. This ordnance may remain capable of detonation, posing a physical risk to individuals in its vicinity. On ranges controlled by the Navy, this risk is limited to military personnel, who are trained in UXO avoidance. UXO poses a risk to the public when ordnance lands off-range and is not immediately recovered, or when Navy training activities occur in areas accessible to the public.

The failure rate, or percentage of ordnance that fails to properly function, varies widely by ordnance type and by the circumstances under which the ordnance is used. Quality control testing of Army ordnance identified failure rates by ordnance type (see Table 3.1.4-6). These rates were determined under controlled conditions; average failure rates under field conditions were estimated to be about 10 percent. The authors stated, however, that they had observed failure rates of up to 25 percent and low-order detonation rates of up to 5 percent for mortars (U.S. Army Corps of Engineers, 2007). These higher observed failure rates take into account operator error, missing the target, and other field conditions not present during the tests.

UXO and low-order detonations also account for much of the explosives residues on military ranges. Ordnance that does not detonate may break open on impact, or the casings may be compromised later by corrosion, releasing raw explosives into the environment. In low-order detonations, as much as 40 percent of the explosive material may remain, compared with about 0.003 percent for high-order detonations. For purposes of assessing impacts on the environment, a failure rate of 5 percent and a low-order detonation rate of 0.2 percent are assumed, and are considered to be sufficiently conservative.

Table 3.1.4-6. Failure and Low-Order Detonation Rates of Military Munitions

Munition	Failure Rate (%)	Low-Order Rate (%)
Gun/artillery	4.68	0.16
Hand grenade	1.78	NA
High explosive munitions	3.37	0.09
Howitzer	3.75	NA
Mortars	2.91	0.08
Rocket	3.84	NA
Submunition	8.23	NA

Sources: Rand Corporation, 2005; U.S. Army Corps of Engineers, 2007
NA = Not available

Expended Training Materials

Various types of small, expendable training items are shot, thrown, dropped, or placed within the training areas. These items include smoke grenades, flares, and sonobuoys of various types. They are used in relatively small quantities for selected training activities, and are scattered over a large area. Items that are expended on the water, and fragments that are not recognizable as training materials (e.g., flare residue, or candle mix) are not collected.

Sonobuoys and residues of flares, smoke grenades, and other pyrotechnic devices that fall in the water may release small amounts of toxic substances as they degrade and decompose. The items degrade very slowly, so the volume of decomposing training materials within the training areas—and the amounts of toxic substances being released to the environment—gradually increases over the period of military use. Concentrations of some substances in sediments surrounding the disposed items increase over time. Sediment movements in response to tidal surge and longshore currents, and sediment disturbance from ship traffic and other sources, eventually disperse some of the contaminants outside of the training areas.

Sonobuoys. Approximately 6,300 sonobuoys are deployed annually as part of the training events. Sonobuoys are electro-mechanical devices used for a variety of ocean sensing and monitoring tasks. Sonobuoys contain lead solder, lead weights, and copper anodes. Sonobuoys also may contain fluorocarbons and lithium sulfur dioxide, lithium, or thermal batteries.

During operation, a sonobuoy's seawater batteries may release copper, silver, lithium, or other metals to the surrounding marine environment, depending on the type of battery used. They also may release fluorocarbons. Marine organisms are exposed to battery effluents for up to 8 hours, which is about the maximum life of seawater batteries. The batteries cease operating when their chemical constituents have been consumed. Once expended and scuttled, the sonobuoys sink to the ocean floor.

Various types of sonobuoys are used, so the exact amounts of materials that are generated are not known. Table 3.1.4-7 provides estimates of sonobuoy wastes, based on the types of sonobuoys typically used for current Navy training activities.

Table 3.1.4-7. Sonobuoy Hazardous Constituents

Constituent	Amount / Sonobuoy (lb)	Total Constituent Amount / Year[a]	
		Pounds	Kilograms
Copper thiocyanate	1.59	19,900	9,030
Fluorocarbons	0.02	250	114
Copper	0.34	4,250	1,930
Lead	0.94	11,800	5,340
Steel, tin/lead plated	0.06	750	341
TOTAL	2.95	37,000	16,800

Source: U.S. Department of the Navy, San Clemente Island Ordnance Database [No Date]

Notes: (a) values based on 12,500 sonobuoys discarded in the HRC, and rounded to three significant digits. Based on average amounts of constituents per sonobuoy.

Pyrotechnic Residues. About 760 smoke grenades and over 2,210 flares are used under baseline conditions. Solid flare and pyrotechnic residues may contain, depending on their purpose and color, aluminum, magnesium, zinc, strontium, barium, cadmium, nickel, and perchlorates. At an average weight of about 0.85 lb per item, about 1.3 tons per year of these wastes would be generated. Although pyrotechnic residues typically include hazardous constituents, most of them are present in small amounts or low concentrations, and are bound up in relatively insoluble compounds. As inert, incombustible solids with low concentrations of leachable metals, these materials typically do not meet the criteria for characteristic hazardous wastes. The perchlorate compounds present in the residues are relatively soluble.

Chaff. Chaff is a thin, non-toxic polymer with a metallic (aluminum) coating used to decoy enemy radars. The chaff is shot out of launchers using a propellant charge. The fine, neutrally buoyant chaff streamers act like particulates in the water, temporarily increasing the turbidity of the ocean's surface, but they quickly disperse. The Air Force has studied chaff and has determined that chaff has no adverse environmental impacts (U.S. Air Force, Air Combat Command, 1997).

At present, about 34 Chaff Exercises are held per year, releasing about 255 packages of chaff over the Open Ocean Area. In addition, Air Combat Maneuvers release more than 4,400 packages of chaff per year. The chaff disperses quickly, and the widely spaced exercises have no discernable effect on the marine environment.

Baseline Conditions

Open ocean areas are typically considered to be relatively pristine with regard to hazardous materials and hazardous wastes. Hazardous materials are present on the ocean, however, as cargoes and as fuel, lubricants, and cleaning and maintenance materials for marine vessels and aircraft. Infrequently, large hazardous materials leaks and spills—especially of petroleum products—have fouled the marine environment and adversely affected marine life. No quantitative information is available on the overall types and quantities of hazardous materials present on the sea ranges at a given time, nor on their distribution among the various categories of vessels.

Navy vessels present on the Hawaii sea ranges represent a small fraction of the overall commercial and recreational boat traffic and, correspondingly, account for only a small fraction of the potentially hazardous materials present in the Open Ocean Area around Hawaii. As described earlier, Navy training activities in open ocean areas involve the use of fuel, lubricants, explosives, propellants, batteries, oxidizers, and other hazardous substances. The Navy makes every effort to minimize its use of hazardous materials during training, and recovers and reuses unexpended training materials to the extent practicable.

Hazardous Wastes

Management

Environmental compliance policies and procedures applicable to training and RDT&E activities on shore are defined in Naval Operations Instruction (OPNAVINST) 5090.1C (2007), while environmental compliance policies and procedures applicable to shipboard operations afloat are defined in OPNAVINST 5090.1C (2007). The Consolidated Hazardous Materials Reutilization and Inventory Management Program (CHRIMP) also provides information on management of hazardous materials for both afloat and ashore. These documents provide a comprehensive compilation of procedures and requirements that are mandated by law, directive, or regulation. These documents have a compliance orientation to ensure safe and efficient control, use, transport, and disposal of hazardous waste. Hazardous wastes generated afloat are stored in approved containers. The waste is offloaded for proper disposal within 5 working days of arrival at a Navy port.

Generation

Environmental compliance policies and procedures applicable to shipboard operations afloat are defined in OPNAVINST 5090.1C (2007). Munitions containing or comprising hazardous materials expended during training exercises that are irretrievable from the ocean are not considered a hazardous waste in accordance with the Military Munitions Rule.

Storage

Navy ships may not discharge overboard untreated used or excess hazardous materials generated onboard the ship within 200 nm of shore. Ships retain used and excess hazardous material on board for shore disposal. Ships offload used hazardous materials within 5 working days of arrival at a Navy port.

Disposal

Hawaii lacks permitted hazardous waste disposal facilities; therefore, hazardous waste generated by the Navy is shipped to the mainland for disposal. Limited facilities for treatment and processing of recycled materials exist on Oahu.

Baseline Conditions

Commercial, scientific, and military vessels generate small quantities of hazardous wastes during their operations. These materials typically are accumulated while at sea, and then offloaded and transported to land disposal facilities when in port. No quantitative information is available on the overall types and quantities of hazardous wastes present on the sea ranges at a given time, nor on their distribution among the various categories of vessels.

3.1.5 HEALTH AND SAFETY—OPEN OCEAN AREA

Public health and safety issues include potential hazards inherent in flight operations, weapons firings, vessel operations, and target activities. This section also addresses public proximity and access, effects of electromagnetic radiation (EMR), potential ordnance hazards, and potential fuel hazards. The safety policy of the Navy is to observe every reasonable precaution in planning and executing its range operations to prevent injuries to or adverse health effects on its personnel or the public. Appendix C includes a discussion of health and safety resource regulations.

Region of Influence

The region of influence for public health and safety includes the sea ranges themselves, and ocean areas adjacent to the sea ranges.

Affected Environment

The ocean in the vicinity of the main Hawaiian Islands is used for a variety of recreational, commercial, scientific, transportation, cultural, and institutional purposes. The intensity of use generally declines with increasing distance from the shoreline, although specific resources in the Open Ocean Area may result in a concentration of use (e.g., sea mounts are preferred fishing locations). Areas that are shielded by land masses from the full force of wind and waves, such as the channels between Maui and adjacent islands, are preferred recreational areas. The HDAR is conducting a Hawaii Marine Recreational Fishing Survey Project to determine the quantity of recreational fishing in Hawaii.

Activities in the Open Ocean Area have no influence on public health. These areas are widely used for recreation, commerce, and scientific, educational, and cultural activities, however, surface vessel transits, aircraft operations, and weapons firing have the potential to affect public safety. The Navy has developed extensive protocols and procedures for the safe operation of its vessels and the safe execution of its training events.

3.1.6 NOISE—OPEN OCEAN AREA

Appendix C includes a definition of noise and the main regulations and laws that govern them. Wildlife receptors and their acoustic characteristic and sensitivities are described in Section 3.1.2, Biological Resources.

Region of Influence

Noise sources in the HRC are transitory and widely dispersed. The region of influence for noise includes all areas of the HRC where air operations or live weapons firings take place.

Affected Environment

Table 3.1.6-1 lists typical noise sources and their effects on the corresponding noise environments. Note that each of the sound levels indicated is for a single event. Such events are discrete, and the resulting noise is not additive.

Airborne Noise Sources

Airborne noise sources include civilian and military aircraft (both types of which fly at altitudes ranging from hundreds of feet to tens of thousands of feet above the surface), bombs, naval gunfire, missiles, rockets, and small arms. Noise levels may be significant in the vicinity of these activities, but the noise intensity decreases rapidly with increasing distance from the source, especially for impulsive noise from the discrete noise events characteristic of military training. Additionally, these activities take place miles at sea, where few or no human receptors are exposed to the noise. Open Ocean Area noise events are widely dispersed, temporally and geographically, with little or no overlap or additive effects.

Airborne Noise Levels

As shown on Table 3.1.6-1, at the lower end of the threshold, human hearing begins at 0 dB. At the upper end of the hearing range, sounds become uncomfortable, and even painful at approximately 140 dB. At or above approximately 140 dB, permanent damage and hearing loss can occur, even with brief exposure to the noise. The noise levels shown are measured at the receiver, not the source. For example, the vacuum cleaner level of 70 dB is measured 10 ft from the vacuum cleaner itself. In general, sound levels decrease by 6 dB as you double the distance to the source. At 20 ft from the same vacuum cleaner, a person would receive approximately 64 dB of noise. Therefore, both the source level and the distance from the source are important to gauge the impact of a noise on a human receptor.

Underwater Noise

Underwater sources on the HRC may be categorized in terms of their time-related characteristics. The categories are continuous or slowly varying, pulse (tonal), impulse (broadband), and explosive sources. The continuous or slowly varying source category includes submarine simulators, and torpedoes. Noise radiated into water from slower, low-flying fixed-wing aircraft and helicopters is also included in this category. The pulse category includes active sonar, beacons, transponders, fathometers, underwater telephones, and various pingers. The broadband impulse category includes noise made by fast, low-flying aircraft, naval surface gunfire, and objects impacting the water (e.g., sonobuoys, intact missiles, bombs, aerial targets, mine shapes, and various projectiles). Underwater noise sources include bombs and other projectiles that explode underwater and demolition activities. These sources are distinguished from the broadband impulse category by shock wave propagation near the source with high peak pressures and short durations. See Appendix G for additional details.

Table 3.1.6-1. Sound Levels of Typical Airborne Noise Sources and Environments

COMMON SOUNDS	SOUND LEVEL dB		LOUDNESS (Compared to 70 dB)
	130		
Oxygen Torch	120	UNCOMFORTABLE	32 Times as Loud
Discotheque	110		16 Times as Loud
Textile Mill	100	VERY LOUD	
Heavy Truck at 50 Feet	90		4 Times as Loud
Garbage Disposal	80	MODERATE	
Vacuum Cleaner at 10 Feet	70		
Automobile at 100 Feet	60		
Air Conditioner at 100 Feet	50		
Quiet Urban Daytime	40	QUIET	1/4 as Loud
Quiet Urban Nighttime	30		
Bedroom at Night	20		1/16 as Loud
Recording Studio	10	JUST AUDIBLE	
	0	Threshold of Hearing	

Sources: Harris, 1979; Federal Interagency Committee On Noise (FICON), 1992

3.1.7 WATER RESOURCES—OPEN OCEAN AREA

Appendix C describes the primary laws and regulations regarding water resources.

Region of Influence

The region of influence for water resources includes open ocean waters within the HRC.

Affected Environment

The Open Ocean Area off the Hawaiian Islands is a dynamic, tropical marine environment. Average water temperatures vary from 71° F in March to 81°F in September. Wave height varies from occasional flat seas to over 40 ft during high winter winds. Average swells commonly range from 3.3 to 9.8 ft in height. Water quality in the Open Ocean Area is excellent, with high clarity, low concentrations of suspended particles, high levels of dissolved oxygen, and low levels of contamination from trace metals or hydrocarbons (components of petroleum-based fuels) (U.S. Department of the Navy, 2000).

Physical and Chemical Properties

The general composition of the ocean includes water, salts, dissolved gases, minerals, and nutrients. The characteristics of seawater determine, in part, the interactions between the ocean and its inhabitants. The most important physical and chemical properties of seawater are temperature, salinity, density, alkalinity (pH), and dissolved gases.

Salinity

Salinity refers to the salt (sodium chloride) content of seawater. For oceanic waters, the salinity is approximately 35 parts of salt per 1,000 parts of seawater. Variations in the salinity of ocean water are linked primarily to climatic conditions. Salinity variations are at their highest at the surface of the water. The salinity of surface water is increased by the removal of water through evaporation. Alternately, it decreases through dilution from the addition of fresh water (e.g., rain, runoff from fresh water sources such as streams).

Seawater salinity has a profound effect on the concentration of salts in the tissues and body fluids of organisms. Slight shifts of salt concentrations in the bodies of animals can have stressful or even fatal consequences. Therefore, animals have either evolved mechanisms to control body salt levels, or they let them rise and fall with the levels of the seawater around them. (Waller, 1996)

In addition to the direct effects on marine biota, salinity also has an effect on the ocean's physical properties. For example, salinity helps maintain a constant temperature throughout the ocean depths. A high salt content in water slightly increases its density, which makes it resistant to drastic temperature fluctuations.

Density

Density (mass per unit volume) of seawater depends on its composition, and is affected by temperature. The dissolved salt and other dissolved substances contribute to the higher density of seawater versus fresh water. As temperatures increase, density decreases. Accordingly, water that is denser will sink, while water which is less dense will rise. Therefore, oceans can be thought of as having a three-layered system of water masses. The three layers of the ocean include: the surface layer, from 0 to 92 fathoms; an intermediate layer, from 92 to 250 fathoms; and a deepwater layer, from 250 fathoms to the sea floor. (Waller, 1996)

Temperature

Water temperature is one of the most important physical factors of the marine environment. Temperature controls the rate at which chemical reactions and biological processes occur (Waller, 1996). In addition, most organisms have a distinct range of temperatures in which they may thrive. A greater number of species live within the moderate temperature zones with fewer species tolerant of extremes in temperature. Typically, the vast majority of organisms cannot survive dramatic temperature fluctuations.

Temperature gradients are created when warmer, lighter water floats above the cold, denser water. The warm and cold layers of water are separated by a thin, narrow band of stable water called a thermocline. In tropical latitudes, the thermocline is present as a permanent feature and is located approximately 33 to 167 fathoms below the surface. The temperature below the thermocline remains relatively constant, with most areas of the Pacific Ocean maintaining a temperature of 39.2ºF. The thermocline acts as a depth barrier to many plants and animals and often represents the boundary between hospitable and inhospitable water masses for many species of organisms. (Waller, 1996)

pH

The measure of the acidity or alkalinity of a substance, known as the pH, is based on a scale ranging from 1 (highly acidic) to 14 (highly basic). A pH of 7 is considered neutral. Surface seawater often has a pH between 8.1 and 8.3 (slightly basic), but generally the acidity of ocean water is very stable with a neutral pH. In shallow seas and coastal areas, the pH can be altered by plant and animal activities, by pollution, and interaction with fresh water. (Waller, 1996)

Dissolved Gases

Oxygen is not readily soluble in seawater. The amount of oxygen present in seawater will vary with the rate of production by plants, consumption by animals and plants, bacterial decomposition, and by surface interactions with the atmosphere. Most organisms require oxygen for their life processes. When surface water sinks to deeper levels, it retains its store of oxygen. (Waller, 1996) Carbon dioxide is a gas required by plants for photosynthetic production of new organic matter. Carbon dioxide is 60 times more concentrated in seawater than it is in the atmosphere. Seawater in tropical regions has lower levels of dissolved gas in a given volume of water compared to seawater in high latitudes (Waller, 1996).

Marine Pollutants

Ocean waters and sediments are chemically complex solutions that contain numerous natural and manmade substances, including all of the heavy metals and manmade organic compounds such as polychlorinated biphenyls (PCBs). Depending upon their concentrations and other factors, such as the concentrations of other substances or the alkalinity, salinity, or temperature of the water, some of these substances could be toxic to marine plants or animals. NOAA has established pollutant thresholds (i.e., screening concentrations of potential contaminants) for marine waters and sediments (see Table 3.1.7-1). These thresholds (for acute exposures) are not intended to indicate observable effects on marine biota in general, but rather to trigger a more-detailed evaluation of their potential effects on specific target organisms. NOAA's screening thresholds are based, in part, on USEPA water quality criteria and sediment quality guidelines, as well as other relevant studies and recommendations (National Oceanic and Atmospheric Administration, 2006f).

Table 3.1.7-1. Threshold Marine Pollutant Concentrations

Constituent	Concentration (ppb)	
	Water Column	Sediment*
Antimony	1,500	9,300
Arsenic	69	70,000
Cadmium	40	9,600
Chromium	10,300	370,000
Copper	4.8	270,000
Lead	210	218,000
Mercury	1.8	710
Nickel	74	51,600
Zinc	90	410,000
Benzene	5,100	ns
Phenol	5,800	130
Polychlorinated biphenyls (PCBs)	10	180
Polycyclic aromatic hydrocarbons	300	44,792
Toluene	6,300	ns

Source: National Oceanic and Atmospheric Administration, 2006f.

Notes: ppb - parts per billion; ns - no standard; * - Effects Range - Median (median value), except for the values for antimony and phenol, which are their Apparent Effects Thresholds.

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3.2 NORTHWESTERN HAWAIIAN ISLANDS

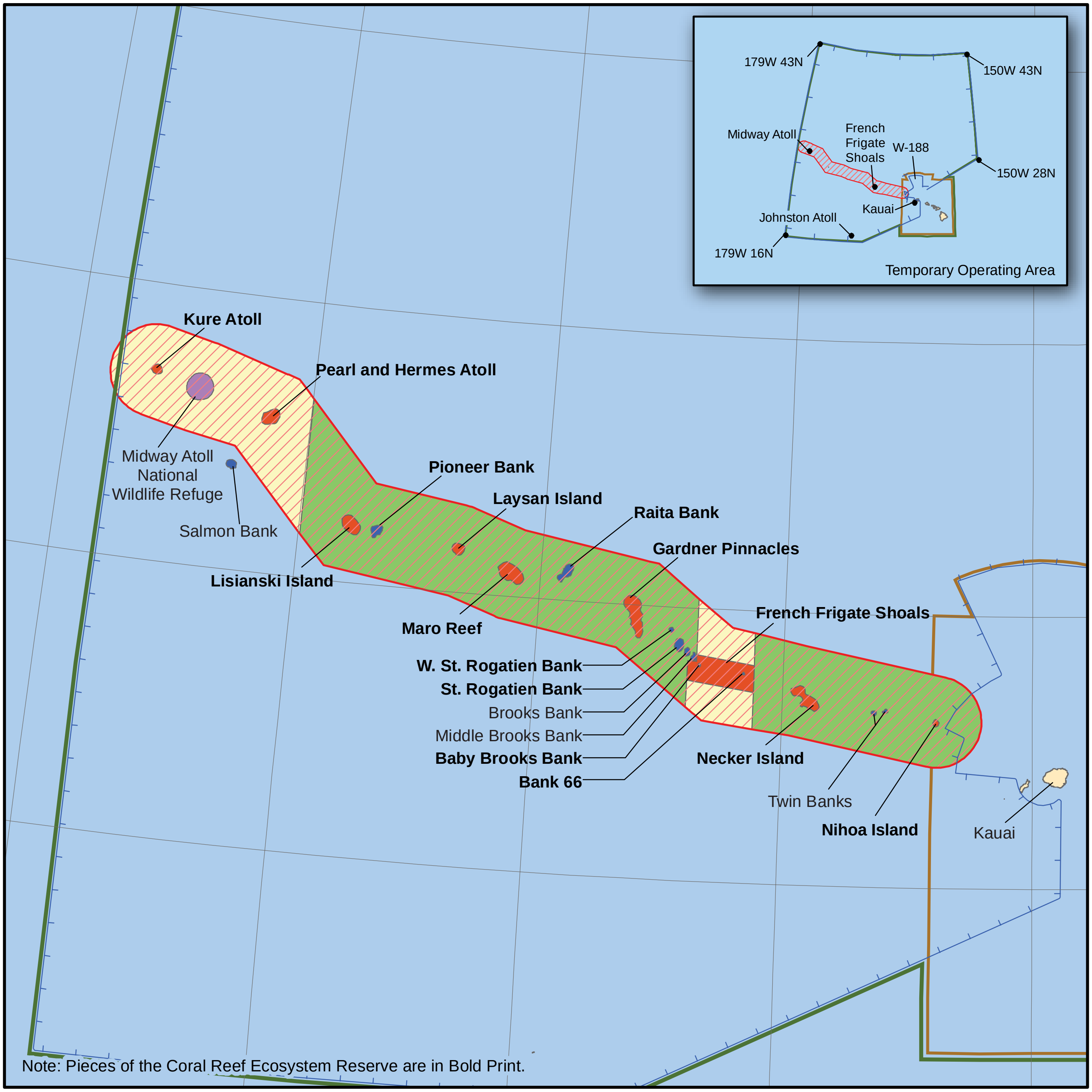
The Northwestern Hawaiian Islands are a chain of small islands, atolls, submerged banks, and reefs stretching for more than 1,000 miles (mi) northwest of the Main Hawaiian Islands. According to Friedlander et al. (2004), the coral reef fauna from the Northwestern Hawaiian Islands is rich, with over 1,000 identified species. Fifty-seven stony coral species have been identified in the shallow, subtropical waters of the Northwestern Hawaiian Islands (Friedlander et al., 2004). Only 12 species of alien marine algae, invertebrates, and fish have been recorded in the Northwestern Hawaiian Islands. *Hypnea musciformis*, an invasive algal species, is not yet established in the Northwestern Hawaiian Islands. It is located in drift only at Maro Reef. (National Oceanic and Atmospheric Administration, 2006c)

Depending on the trajectory, missiles launched from the Pacific Missile Range Facility (PMRF) have the potential to overfly portions of the Papahānaumokuākea Marine National Monument. Of particular concern is the potential for missile debris on or offshore of Nihoa and Necker, which are the islands closest to the Main Hawaiian Islands. Thus, these two islands are described in greater detail. Nihoa is located at the southeastern end of the Northwestern Hawaiian Islands and is 240 nautical miles (nm) northwest of Oahu.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for the Northwestern Hawaiian Islands. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

Papahānaumokuākea (Northwestern Hawaiian Islands) Marine National Monument

The Northwestern Hawaiian Islands Marine National Monument was established in June 2006 by Presidential Proclamation 8031 (Presidential Document, 2006), under the authority of the Antiquities Act (16 United States Code section 431). The Monument is nearly 140,000-square-mile (mi^2) area, 100 mi wide, established to protect marine resources in the area including coral reefs, the endangered Hawaiian monk seal (*Monachus schauinslandi*), the threatened Hawaiian green turtle (*Chelonia mydas*), and the endangered leatherback and hawksbill turtles (*Dermochelys coriacea* and *Eretmochelys imbricata*). The Monument includes the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, the Hawaiian Islands National Wildlife Refuge, the Midway Atoll National Wildlife Refuge, and the Battle of Midway National Memorial, which are briefly described below (National Oceanic and Atmospheric Administration, 2006b). The Monument was given the name Papahānaumokuākea Marine National Monument in 2007. Only a fraction of the Monument is within the Hawaiian Islands Operating Area on its western boundary near the northern border (Figure 3.2-1). The Temporary Operating Area encompasses the entire Monument.



EXPLANATION

- Hawaii Range Complex (HRC)
- Hawaii Operating Area (OPAREA)
- Temporary Operating Area (TOA)
- Papahānaumokuākea Marine National Monument
- Hawaiian Islands National Wildlife Refuge
- Midway Atoll National Wildlife Refuge
- Bank
- Ecological Reserve
- Commercial Fishing Phase-Out Area
- Land

NORTH

0 100 200 400 Nautical Miles

Papahānaumokuākea (Northwestern Hawaiian Islands) Marine National Monument

Hawaiian Islands

Figure 3.2-1

The Monument is situated in the Pacific Ocean northwest of the Main Hawaiian Islands and is an approximately 1,200-nm stretch of coral islands, seamounts, banks, and shoals (Figure 3.2-1). The Monument has been established for the protection of natural resources, including one of the last intact marine ecosystems in the world, home to sharks, whales, extensive coral reefs, and the endangered Hawaiian monk seal. The Presidential Proclamation establishing the Monument includes the following language regarding military activities in the area:

“1. The prohibitions required by this proclamation shall not apply to activities and exercises of the Armed Forces (including those carried out by the United States Coast Guard) that are consistent with applicable laws.
2. Nothing in this proclamation shall limit agency actions to respond to emergencies posing an unacceptable threat to human health or safety or to the marine environment and admitting of no other feasible solution.
3. All activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities.
4. In the event of threatened or actual destruction of, loss of, or injury to a monument resource or quality resulting from an incident, including but not limited to spills and groundings, caused by a component of the Department of Defense or the USCG [U.S. Coast Guard], the cognizant component shall promptly coordinate with the Secretaries for the purpose of taking appropriate actions to respond to and mitigate the harm and, if possible, restore or replace the monument resource or quality.” (U.S. Government, The White House, 2006)

In April 2007, the Departments of Commerce and Interior issued a notice in the Federal Register (U.S. Fish and Wildlife Service, 2007c) advising the public that the National Oceanic and Atmospheric Administration, the U.S. Fish and Wildlife Service (USFWS) and the Department of Land and Natural Resources (DLNR), State of Hawaii intend to prepare a Monument Management Plan as well as an associated Environmental Assessment for the Papahānaumokuākea Marine National Monument in the Northwestern Hawaiian Islands and the surrounding marine areas. The Monument Plan will modify the existing Northwestern Hawaiian Islands Proposed National Marine Sanctuary Draft Management Plan and incorporate USFWS refuge comprehensive conservation planning requirements, DLNR planning needs, and other elements to reflect the area’s new status as a national monument.

The Departments of Commerce and Interior solicited comments from the public and other agencies. In September 2007, the agencies issued a Scoping Report that summarized the public comments and responses to those comments. Currently, the public review draft of the Monument Management Plan is planned for release in spring of 2008 with a final Plan to be issued in July 2008.

The Draft Management Plan’s Scoping Report indicates that the Management Plan and Environmental Assessment will address current military activities, with the understanding that “activities of the Armed Forces that could occur within the Monument are beyond the scope of [Monument Management Board] management activities,” wording in keeping with the Presidential Proclamation’s statement that required prohibitions are not applicable to activities and exercises of the Armed Forces.

The Monument's large geographic area is vitally important to strategic interests and international commerce. The Navy expects that the final Monument Plan will continue to recognize the need to preserve the operational flexibility of the military services and combatant commanders in this strategically important region.

Nihoa lies 130 mi northwest of Niihau and is the closest of the Northwestern Hawaiian Islands to the Main Hawaiian Islands. It is the largest volcanic island in the northwestern chain, with approximately 170 acres of land. The submerged coral reef habitat associated with Nihoa is approximately 142,000 acres.

The next closest island is Necker. This is a dry, volcanic island shaped like a fish hook that includes about 45 acres of land. More than 380,000 acres of coral reef habitat are associated with Necker (Hawaii Department of Land and Natural Resources, no date[b]). Because Nihoa and Necker are more likely to be impacted by program activities, they are discussed in more detail at the end of this section.

French Frigate Shoals is an 18-mi wide, crescent-shaped atoll. Its lagoon contains two exposed volcanic rocks and 11 low, sandy islets. Ninety to 95 percent of green turtle nesting and breeding occurs at French Frigate Shoals. Tern Island is a part of French Frigate Shoals. Approximately 67 acres of land and 230,000 acres of coral reef habitat are associated with French Frigate Shoals. Gardner Pinnacles consists of two peaks of volcanic rock that total 5 acres. Gardner Pinnacles is an important roosting site and breeding habitat for 12 species of tropical seabirds and is surrounded by approximately 600,000 acres of coral reef habitat (Hawaii Department of Land and Natural Resources, no date[b]).

Maro Reef is a largely submerged atoll, with only approximately 1 acre of emergent land but about 475,000 acres of submerged coral reef habitat. Laysan is the largest island in the chain, with about 1,000 acres of land. It is well vegetated and contains a hypersaline lake that is one of only five natural lakes in the State of Hawaii. Approximately 145,000 acres of coral reef habitat are associated with this island (Hawaii Department of Land and Natural Resources, no date[b]). Approximately 2 million birds nest on the island (National Oceanic and Atmospheric Administration, 2006c).

Lisianski Island is a low sand and coral island, with approximately 400 acres of land. It lies at the northern end of a large reef bank that spans about 65 mi^2, and totals about 310,000 acres. Pearl and Hermes Reef is a large atoll with several small islets forming about 80 acres of land with approximately 200,000 acres of coral reef habitat. The islets are periodically washed over during winter storms (Hawaii Department of Land and Natural Resources, no date[b]).

Midway Atoll measures 5 mi across and includes three small islands located at the southeastern end of the lagoon totaling 1,550 acres. The protective reef around the lagoon is submerged in some places and 4 to 5 feet (ft) above sea level in others. Approximately 55,000 acres of reef habitat are associated with Midway Atoll (Hawaii Department of Land and Natural Resources, no date[b]).

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve

Executive Order (EO) 13178, *Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve*, created the Reserve. EO 13196, *Final Northwestern Hawaiian Islands Coral Reef Ecosystem*

Reserve, amended EO 13178 by finalizing several of its provisions. The principal purpose of the Reserve is the long-term conservation and protection of the coral reef ecosystem and related marine resources and species of the Northwestern Hawaiian Islands in their natural character.

The Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve lies to the northwest of the main islands of the Hawaiian chain. The Reserve includes submerged lands and waters of the Northwestern Hawaiian Islands, extending approximately 1,200 nm long and 100 nm wide. The Reserve is adjacent to and seaward of the seaward boundaries of the State of Hawaii and the Midway Atoll National Wildlife Refuge, and overlies the Hawaiian Islands National Wildlife Refuge to the extent that it extends beyond the seaward boundaries of the State of Hawaii (Presidential Document, 2000).

Midway Atoll National Wildlife Refuge

The Midway Atoll National Wildlife Refuge was created by EO 13022 in 1996. It is administered by the Secretary of the Interior through the USFWS in part to maintain and restore natural biological diversity and to provide for the conservation and management of fish and wildlife and their habitat. Fifteen species of seabirds nest on islands within the refuge, including the world's largest colony of Laysan albatross (*Phoebastria immutabilis*) and the largest colonies of red-tailed tropicbirds (*Phaethon rubricauda rothschildi*), black noddies (*Anous minutus*), and white terns (*Gygis alba*) in the Hawaiian archipelago. (U.S. Fish and Wildlife Service, 2006b)

Over 250 species of fish and a large diversity of marine invertebrates inhabit the lagoon and surrounding waters. Approximately 50 to 65 Hawaiian monk seals are located within the area offshore of the refuge. Midway's beaches provide critically important habitat where monk seals raise their pups. Threatened green turtles are most common offshore of Sand Island's beaches, but they are seen throughout the lagoon and surrounding offshore waters. A population of about 300 spinner dolphins (*Stenella longirostris*) also inhabit Midway's lagoon during daylight hours. (U.S. Fish and Wildlife Service, 2006b)

As part of the base closure process for Naval Air Facility Midway Island, the Navy was obligated to consider the effects of the closure process on historic sites and structures. The Navy determined that 78 structures, buildings, or objects were eligible for inclusion in the National Register of Historic Places, including the structures associated with the Battle of Midway National Historic Landmark, designated in 1986. (U.S. Fish and Wildlife Service, 2006b)

To guide the historic preservation process during the transition, the Navy entered into a Programmatic Agreement with the USFWS, the Hawaii State Historic Preservation Office and the Advisory Council on Historic Preservation. The Programmatic Agreement recommended specific types of treatment for the 78 historic sites or structures. (U.S. Fish and Wildlife Service, 2006a)

Hawaiian Islands National Wildlife Refuge

The Hawaiian Islands National Wildlife Refuge was designated by President Theodore Roosevelt in 1909. It consists of a chain of islands, atolls, and reefs extending approximately 800 mi northwest from the Main Hawaiian Islands. The refuge consists of Nihoa, Necker, French Frigate Shoals, Gardner Pinnacles, Maro Reef, Laysan, Lisianski, and Pearl and

Hermes Reef. Millions of seabirds, such as the sooty tern (*Sterna fuscata*) and albatross, live within the refuge, which also provides a rich habitat for marine life (U.S. Fish and Wildlife Service, Pacific Islands, 2002).

Kure Atoll State Wildlife Sanctuary

Kure is the northernmost coral atoll in the world. The island has a 6-mi diameter that encloses approximately 200 acres of emergent land. The outer reef almost completely encircles the lagoon except for passages to the southwest. The only permanent land in the atoll is Green Island, located near the fringing reef in the southeastern part of the lagoon. Almost 80,000 acres of coral reef habitat are associated with Kure Atoll. (Hawaii Department of Land and Natural Resources, no date[b]) Kure Atoll is a State wildlife refuge/sanctuary under the jurisdiction of the Hawaii Division of Forestry and Wildlife, DLNR. Jurisdiction of the USFWS and National Marine Fisheries Service (NMFS) applies to the enforcement of the Marine Mammal Protection Act and Endangered Species Act, although Kure Atoll is not part of the Hawaiian Islands National Wildlife Refuge.

3.2.1 NORTHWESTERN HAWAIIAN ISLANDS OFFSHORE

3.2.1.1 BIOLOGICAL RESOURCES—NORTHWESTERN HAWAIIAN ISLANDS OFFSHORE

Appendix C includes a definition of biological resources and the main regulations and laws that govern their protection. The 12- to 50-nm portion of the Papahānaumokuākea Marine National Monument is discussed in Section 3.2. As earlier noted, Nihoa and Necker islands are more likely to be affected by program activities. Their biological resources are addressed in greater detail below.

3.2.1.1.1 Nihoa—Biological Resources—Northwestern Hawaiian Islands Offshore

Region of Influence

The region of influence for biological resources offshore of Nihoa is the ocean surrounding the island from the shoreline out to 12 nm.

Affected Environment

A description of the coral reef area associated with the Hawaiian Islands and its management by both the State of Hawaii and the Federal government is provided in Section 3.1.2.1. Pink coralline, red, brown, and green algae are present offshore of Nihoa. The amount of shallow reef habitat immediately surrounding Nihoa is small due to the lack of suitable habitats, and fewer fish and other species have colonized there and been able to survive (Coral Reef Information System, 2007). Only submerged reefs are located around Nihoa. Most of the coral present only survives at depths greater than 40 ft, and coral cover is not greater than 25 percent. Seventeen species of stony coral have been identified offshore of Nihoa. Small lobe coral (*Porites lobata*) and rose coral colonies (*Pocillopora meandrina*) are the most common. The soft corals *Palythoa* sp. and *Sinularia abrupta* and the wire coral *Cirrhipathes* sp. are also present (National Oceanic and Atmospheric Administration, 2001). The most common invertebrates are small encrusting species such as sponges, bryozoans, and tunicates. (Coral Reef Information System, 2007; U.S. Fish and Wildlife Service and Hawaii Department of Land and Natural Resources, Division of Aquatic Resources, 2002; National Oceanic and Atmospheric Administration, 2006c)

No age data are available for coral communities off Nihoa; however, marine surveys indicate that the rocky bottoms around Nihoa are scoured by powerful surf and have limited coral growth, suggesting that coral communities are composed of relatively young colonies. High-wave energy coral communities appear to be most common and are dominated by cauliflower coral (*Pocillopora* spp.) and lobe coral (*Porites* spp.).

Reef sharks (*Carcharhinus* spp.) and jacks are common to the waters offshore of the island. The spotted knifejaw (*Oplegnathus punctatus*), which is uncommon in the Main Hawaiian Islands, is often seen. (Coral Reef Information System, 2007)

Nihoa supports a small population of endangered Hawaiian monk seals (Table 3.2.1.1.1-1) with limited reproduction, which is possibly maintained by immigration from other breeding colonies (National Oceanic and Atmospheric Administration, 2006c). The NMFS Southwest Fisheries Science Center (1999) estimated the population of monk seals to be approximately 35 to 77. Green turtles and leatherback turtles are located in the waters surrounding the Northwestern Hawaiian Islands, including Nihoa (Coral Reef Information System, 2007).

Table 3.2.1.1.1-1. Listed Species Known or Expected to Occur Offshore of Nihoa and Necker

Scientific Name	Common Name	Federal Status
Reptiles		
Chelonia mydas	Green turtle	T
Dermochelys coriacea	Leatherback turtle	E
Eretmochelys imbricata	Hawksbill turtle	E
Mammals		
Monachus schauinslandi	Hawaiian monk seal	E

Source: U.S. Fish and Wildlife Service, 2003b; 2007a; National Oceanic and Atmospheric Administration, 2006c

Key to Federal Status:
T = Threatened
E = Endangered

3.2.1.1.2 Necker—Biological Resources—Northwestern Hawaiian Islands Offshore

Region of Influence

The region of influence for biological resources offshore of Necker is the ocean surrounding the island from the shoreline out to 12 nm.

Affected Environment

A description of the coral reef area associated with the Hawaiian Islands and its management by both the State of Hawaii and the Federal government is provided in Section 3.1.2.1. A broad reef shelf surrounds the island, but is not shallow enough to protect the island from wave action. However, the number of coral species is comparable to that of Nihoa, fewer than 20. Reef growth is minimal (National Oceanic and Atmospheric Administration, 2006c). Most coral is found in habitats that are somewhat protected from wave scour, such as caves, overhangs, and trenches. The most commonly observed stony corals are small lobe coral and rose coral. Corals found at Necker that are not reported from Nihoa are finger coral (*Porites compressa*), cauliflower coral (*Pocillopora ligulata*), and corrugated coral (*Pavona varians*). (Coral Reef Information System, 2007)

Grey reef sharks (*Carcharhinus amblyrhynchos*), giant Trevally jacks (*Caranx ignobilis*), and gray snappers (*Lutjanus griseus*) are common. Large manta rays (*Manta birostris*) have been observed along the island's rocky surf zone.

Necker supports a small population of Hawaiian monk seals (Table 3.2.1.1.1-1) with limited reproduction that is possibly maintained by immigration from other breeding colonies. Green turtles occasionally are observed off the coast (National Oceanic and Atmospheric Administration, 2006c). Leatherback turtles are located in the waters surrounding the Northwestern Hawaiian Islands, including Necker (Coral Reef Information System, 2007).

3.2.2 NORTHWESTERN HAWAIIAN ISLANDS ONSHORE

3.2.2.1 BIOLOGICAL RESOURCES—NORTHWESTERN HAWAIIAN ISLANDS ONSHORE

Appendix C includes a definition of biological resources and the main regulations and laws that govern their protection.

3.2.2.1.1 Nihoa—Biological Resources—Northwestern Hawaiian Islands Onshore

Region of Influence

The region of influence for biological resources of Nihoa is the entire island.

Affected Environment

Vegetation

Most of the ridges on Nihoa are covered by grass: Kawelu (*Eragrostis variabilis*) and torrid panicgrass or kakonakona (*Panicum torridum*). The valleys are covered with dense shrubs, mainly goosefoot shrub or `aheahea (*Chenopodium oahuense*) and popolo (*Solanum nelsoni*). (U.S. Forest Service, undated; Resture, 2002)

Threatened and Endangered Plant Species

Nihoa is the home of three endemic, endangered plants (Table 3.2.2.1.1-1) located in what is reported to be an intact example of a Hawaiian coastal scrub community (U.S. Fish and Wildlife Service and Hawaii Department of Land and Natural Resources, Division of Aquatic Resources, 2002).

Table 3.2.2.1.1-1. Listed Species Known or Expected to Occur on Nihoa and Necker

Scientific Name	Common Name	Federal Status
Plants[1]		
Amaranthus brownii	No common name	E
Pritchardia remota	Loulu (Nihoa fan palm)	E
Schiedea verticillata	No common name	E
Sesbania tomentosa	`Ohai	E
Birds		
Acrocephalus familiaris kingi	Nihoa Millerbird	E
Telespyza ultima	Nihoa finch	E
Mammals		
Monachus schauinslandi	Hawaiian monk seal	E

Source: U.S. Fish and Wildlife Service, 2003b; National Oceanic and Atmospheric Administration, 2006c

1 Note: The entire island of Nihoa other than manmade features has been designated as critical habitat for these plants.

Key to Federal Status:
E = Endangered

The three endemic endangered plants on Nihoa are the loulu (Nihoa fan palm) (*Pritchardia remota), Amaranthus brownii* (no common name, last observed in 1983)*,* and *Schiedea verticillata* (no common name). The endangered `ohai (*Sesbania tomentosa*) is also found on Nihoa. The loulu relies on the isolation and protection from invasive species and disturbance that the Hawaiian Islands provide (U.S. Fish and Wildlife Service and Hawaii Department of Land and Natural Resources, Division of Aquatic Resources, 2002). The entire island other than manmade features has been designated as critical habitat for these plants (U.S. Fish and Wildlife Service, 2003b).

Wildlife

For many years the only regular inhabitants of Nihoa have been vast numbers of birds, including black-footed albatross (*Phoebastria nigripes*), Tristram's storm-petrel (*Oceanodroma tristrami*), Bulwer's petrel (*Bulweria bulwerii*), wedge-tailed shearwaters (*Puffinus pacificus chlororhynchus*), blue-gray noddies (*Procelsterna cerulea*), red-tailed tropic birds, great frigate birds or `iwa (*Fregata minor palmerstoni*), three kinds of boobies (*Sula* spp.), and terns such as the gray-backed tern or pakalakala (*Sterna lunata*), white (fairy) tern or manu-o-ku, and sooty tern or `ewa`ewa. Birds nest in a variety of places, from the ground to the crowns of the loulu palms. (State of Hawaii, 2005a)

Several species of migratory birds covered by the Migratory Bird Treaty Act (MBTA) are present during some portion of the year including, but not limited to boobies, wedge-tailed shearwaters, and albatross.

<u>Threatened and Endangered Wildlife Species</u>

In addition to the seabirds mentioned above, there are two species of native land birds: the Nihoa finch (*Telespyza ultima*) and the Nihoa Millerbird (*Acrocephalus familiaris kingi*), both endangered, endemic species found only on Nihoa (Table 3.2.2.1.1-1), but related to species on Laysan (Resture, 2002). Nihoa supports a small population of Hawaiian monk seals with limited reproduction, which is possibly maintained by immigration from other breeding colonies (National Oceanic and Atmospheric Administration, 2006c).

The current estimate of 300 to 700 Nihoa Millerbirds and 2,000 to 4,000 Nihoa finches rely on the isolation and protection from invasive species and disturbance that the Hawaiian Islands provide (State of Hawaii, 2005b; U.S. Fish and Wildlife Service and Hawaii Department of Land and Natural Resources, Division of Aquatic Resources, 2002). While critical habitat has not been designated for either species on Nihoa, the area nevertheless contains important habitat for both birds, and protection afforded by the Endangered Species Act still applies.

3.2.2.1.2 Necker—Biological Resources—Northwestern Hawaiian Islands Onshore

Region of Influence

The region of influence for biological resources of Necker is the entire island.

Affected Environment

Vegetation

Although Necker appears from a distance to be devoid of vegetation, its rounded crest and narrow terraces are actually sparsely covered with five species of plants: `aheahea, also common throughout the main Hawaiian Islands; kakonakona; purslane or ihi (*Portulaca lutea*); pickle weed or akulikuli kai (*Batis maritima*); and a few `ohai shrub. None of the plants reach more than 2 ft high. (Resture, 2004; Coral Reef Information System, 2007)

Threatened and Endangered Plant Species

The endangered `ohai shrub is present on the island (Table 3.2.2.1.1-1) (Coral Reef Information System, 2007).

Wildlife

The only wildlife other than land snails, spiders, and several endemic insects, are seabirds. Brown noddies (*Anous stolidus*) are year-round residents; egg laying has been documented throughout the year (Megyesi and Griffin, 1996). Great frigate birds or `iwa, blue-gray noddies, and masked boobies (*Sula dactylatra*) are also present. These birds are covered under the MBTA.

Threatened and Endangered Wildlife Species

Green turtles (Table 3.2.2.1.1-1) occasionally bask along the coast (National Oceanic and Atmospheric Administration, 2006c). Necker also supports a small population of endangered Hawaiian monk seals (Table 3.2.2.1.1-1) with limited reproduction that is possibly maintained by immigration from other breeding colonies (Coral Reef Information System, 2007).

3.2.2.2 CULTURAL RESOURCES—NORTHWESTERN HAWAIIAN ISLANDS ONSHORE

Appendix C includes a definition of cultural resources and the main regulations and laws that govern their protection.

Region of Influence

The region of influence for cultural resources encompasses portions of the Papahānaumokuākea Marine National Monument, particularly in the vicinity of Nihoa or Necker (Mokumanamana).

Affected Environment

Archaeological Resources (Prehistoric and Historic)

The Northwestern Hawaiian Islands were explored, colonized, and in some cases, semi-permanently settled by Native Hawaiians in pre-contact times. Nihoa and Necker (Mokumanamana), the islands that are closest to the Main Hawaiian Islands (approximately 150 mi apart), are listed in the National and Hawaii State Registers of Historic Places and are protected by the USFWS.

Several archaeological surveys of Nihoa and Necker have been conducted beginning with a survey by the Bishop Museum (the Tanager Expedition in 1923) (Emory, 1928). Between the two islands more than 140 archaeological sites have been documented. Though barren and seemingly inhospitable to humans, the number of cultural sites they support is testimony to their occupation and use prior to European discovery, and demonstrates how human colonization and settlement can occur even in seemingly marginal environments (U.S. Department of Commerce, The Under Secretary of Commerce for Oceans and Atmosphere, 2007).

All of the documented prehistoric archaeological sites within Papahānaumokuākea are on either Nihoa or Necker (Mokumanamana). The other islands within Papahānaumokuākea have been less investigated for these types of sites, but may contain cultural sites that have either not yet been discovered or properly interpreted. Archaeologists suspect that Hawaiians did not leave artifacts that they wished to preserve on such low-lying islets because they knew that the elements would soon reclaim them. Several underwater ko`a have been found in the main Hawaiian Islands, however, and burials are not unknown; therefore, it is possible that additional cultural sites may be discovered in Papahānaumokuākea (U.S. Department of Commerce, The Under Secretary of Commerce for Oceans and Atmosphere, 2007).

In addition to the prehistoric features within Papahānaumokuākea, there are World War II-era sites of national significance. These include the Battle of Midway National Memorial and nine defensive positions on Midway Atoll; each designated a National Historic Landmark under the theme of World War II Pacific battlefields (U.S. Department of Commerce, The Under Secretary of Commerce for Oceans and Atmosphere, 2007).

Nihoa

On Nihoa, 89 cultural sites have been recorded. The sites date from before the 13th century and include 25 to 35 house terraces, 15 ceremonial structures, burial caves, bluff shelters, and agricultural terraces. Numerous artifacts found on Nihoa establish a close relationship with Native Hawaiian culture in the Main Hawaiian Islands, and to the first settlers of Hawaii who sailed through the Pacific on large voyaging canoes. Because the island had sufficient soil and water for limited agriculture, Nihoa was a good place for voyagers to stop and resupply their canoes. This is evidenced by the remains of stone terraces that suggest an investment in agricultural food production (U.S. Department of Commerce, The Under Secretary of Commerce for Oceans and Atmosphere, 2007).

In 1789, Captain Douglas of the *Iphegenia* was the first Westerner to visit Nihoa. Queen Kaahumanu visited and annexed the island for the Kingdom of Hawaii in 1822 and, in 1885, Queen Liliuokalani and her 200-person entourage landed on Nihoa. As many as 175 people are estimated to have lived on the island at one time, but a shortage of fresh water likely was a limiting factor (Emory, 1928).

Necker (Mokumanamana)

At least 52 cultural sites exist on Necker (Mokumanamana), including 33 ceremonial features, which is the highest concentration of religious sites found anywhere in the Hawaiian Archipelago. Like Nihoa, Necker (Mokumanamana) shows clear evidence of prehistoric Hawaiian occupation, although given the numerous religious sites, the island appears to have been used primarily for worship by visitors from other Hawaiian Islands, rather than having supported permanent inhabitants for any length of time. Many of the temple sites closely resemble those of Tahiti, possibly establishing a link between this site and early Polynesian culture. Carved basalt human figurines found there are of a style not seen elsewhere in Hawaii, showing instead similarities to those found in the Marquesas. Emory (1928) considered the sites of Necker (Mokumanamana) to be a "…pure sample of the culture prevailing in Hawaii before the thirteenth century" (U.S. Department of Commerce, The Under Secretary of Commerce for Oceans and Atmosphere, 2007).

The first European to document Necker (Mokumanamana) was Compte de La Perouse in 1786. Captain John Paty claimed the island for the Kingdom of Hawaii in 1857, though his claim was later contested until the island was formally annexed by Hawaii's Provisional Government in 1894 (U.S. Department of Commerce, The Under Secretary of Commerce for Oceans and Atmosphere, 2007).

There are no longer permanent inhabitants of Nihoa or Necker (Mokumanamana); however, research scientists and other educational expeditions occasionally visit the various islands of the island chain and camp for 1 to 12 weeks (Northwestern Hawaiian Islands Multi-Agency Education Project, 2006).

Historic Buildings and Structures

There are no modern historic buildings or structures on Nihoa or Necker (Mokumanamana); however, there are a number of pre-contact stone structures representing habitation, agricultural, and ceremonial features (Emory, 1928).

Traditional Resources (Including Burials)

Among the recorded sites on Nihoa and Necker (Mokumanamana) are religious and ceremonial features (cairns, terraces, stone platforms, upright stones, and burial sites) (Emory, 1928; TenBruggencate, 2005; U.S. Department of Commerce, The Under Secretary of Commerce for Oceans and Atmosphere, 2007).

3.3 KAUAI

Kauai is the oldest and fourth largest of the Main Hawaiian Islands. It covers approximately 550 square miles (mi^2) and was formed by the volcano Waialeale located at its center. The town of Lihue is Kauai's county seat and is home to the State and County buildings. The islands of Kauai, Niihau, and Kaula combine to form Kauai County. Current and proposed Hawaii Range Complex (HRC) training and research, development, test, and evaluation (RDT&E) activities on Kauai addressed in this Environmental Impact Statement (EIS)/Overseas EIS (OEIS) are located at Pacific Missile Range Facility (PMRF) (PMRF/Main Base) or facilities that support PMRF range operations (Kauai Test Facility [KTF], Makaha Ridge, Kokee, Hawaii Air National Guard Kokee, Kamokala Magazines, Port Allen, Kikiaola Small Boat Harbor, and Mt. Kahili). PMRF also conducts range operations on the nearby islands of Niihau and Kaula. PMRF plans to continue using all sites. For organizational purposes in this document, discussions about Niihau and Kaula are included under the Kauai heading, because they are part of Kauai County.

3.3.1 KAUAI OFFSHORE

Kauai Offshore addresses ocean areas within 12 nautical miles (nm) of Kauai, Niihau, and Kaula, including ranges and training areas where activities are performed by the Navy. Discussions include PMRF Offshore (the Barking Sands Tactical Underwater Range [BARSTUR], the Barking Sands Underwater Range Expansion [BSURE], Shallow Water Training Range [SWTR], and the Kingfisher Underwater Training Area [Kingfisher]), Niihau Offshore, and Kaula Offshore. These offshore areas are not within the Hawaiian Islands Humpback Whale National Marine Sanctuary.

3.3.1.1 PMRF OFFSHORE (BARSTUR, BSURE, SWTR, KINGFISHER)

PMRF Offshore includes HRC ranges and training areas 0 to 12 nm from PMRF/Main Base (Figure 2.1-2). Included in PMRF Offshore are BARSTUR and BSURE, which are within the 12-nm area from PMRF/Main Base; SWTR, which is within 3 nm and extends into the 12-nm area offshore of PMRF/Main Base; and Kingfisher, which is within 3 nm of PMRF/Main Base. BARSTUR is a 104-square nautical mile range used for anti-submarine training. BSURE provides the capability to support Anti-Submarine Warfare (ASW) training and over 80 percent of PMRF's underwater tracking capability. SWTR provides submarine forces with a shallow-water sonar training area to conduct shallow-water sonar proficiency training and readiness under realistic conditions. Kingfisher is a simulated underwater minefield used with the Kingfisher mine detection system.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for PMRF Offshore. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, hazardous materials and waste, health and safety, land use, noise, and utilities resources are not addressed.

3.3.1.1.1 Biological Resources—PMRF—Offshore (BARSTUR, BSURE, SWTR, Kingfisher)

Region of Influence

The region of influence for offshore biological resources is the ocean area from the shoreline out to 12 nm.

Affected Environment

Vegetation

The substrates of Hawaiian rocky intertidal habitats are mostly consolidated basalts with some consolidated limestones (cemented beach rock or raised coral reefs). Common plants found in rocky intertidal habitats include sea lettuce (*Ulva*), Sargasso or kala (*Sargassum*), coralline red algae (*Hydrolithon*), red fleshy algae (*Melanamansia*, *Pterocladiella*, *Jania*), brown algae (*Padina*, *Turbinaria*, *Dictyota*), and fleshy green algae (*Neomeris*, *Halimeda*, and *Caulerpa*). (U.S. Department of the Navy, 2005c)

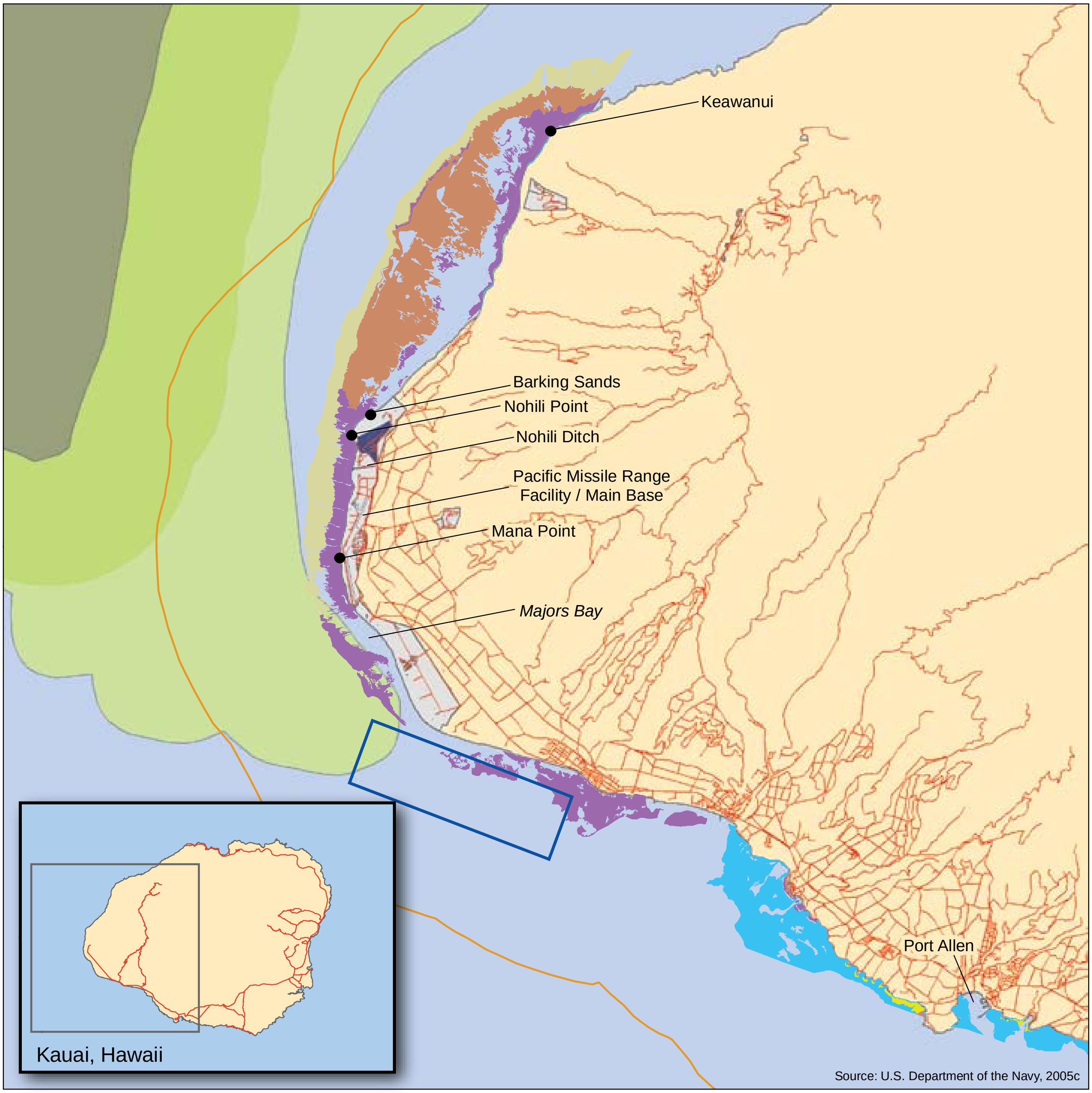
Algal species on the limestone bench fronting Nohili Point preferred by the green turtle (*Chelonia mydas*) include but are not limited to lipuupuu (*Dictyospheria versluysii*), kala-lau-nunui (*Sargassum echinocarpum*), pahalahala (*Ulva fasciatus*), and mane`one`o (*Laurencia nidifica*). The algal and macroinvertebrate survey in Majors Bay noted that four macroalgal and eight macroinvertebrate species were present. (Pacific Missile Range Facility, 2001; Commander, Navy Region Hawaii, 2007)

<u>Threatened and Endangered Vegetation</u>

No threatened or endangered vegetation is located in the offshore area.

Wildlife

A description of the coral reef area associated with the Hawaiian Islands and its management by both the State of Hawaii and the Federal government is provided in Section 3.1.2.1. North of Mana Point on Kauai, a narrow fringing reef follows the coastline up to Nohili Point and Barking Sands (Figure 3.3.1.1.1-1). Coral density is low and is dominated by lobe coral (*Porites lobata*) and small stands of arborescent (branched or tree shaped) corals. Broad uncolonized pavement (1,772 feet [ft] wide) and colonized pavement (2,297 ft wide) stretch along the coastline seaward of the fringing reef. North of Nohili Point, the uncolonized pavement ends and the colonized pavement continues along a northward heading; it turns gradually to the east to join the coastline north of Keawanui. (U.S. Department of the Navy, 2007a) Uncolonized pavement is flat, low relief, solid carbonate rock often covered by a thin sand veneer. The surface of the pavement often has sparse coverage of macroalgae, hard coral, and other sessile invertebrates that does not obscure the underlying surface. Colonized pavement is flat, low-relief, solid carbonate rock with coverage of macroalgae, hard coral, and other sessile invertebrates that are dense enough to begin to obscure the underlying surface. (Center for Coastal Monitoring and Assessment, 2006)



EXPLANATION

- Road
- 3-Nautical Mile Line
- Uncolonized Volcanic Rock/Boulder
- Colonized Pavement
- Colonized Volcanic Rock/Boulder
- Uncolonized Pavement
- Submerged Vegetation
- Kauai Test Facility
- PMRF Shallow Water Training Range (SWTR)
- Barking Sands Tactical Underwater Range (BARSTUR)
- Kingfisher Range
- Existing Structure
- Installation Area
- Land

NORTH

0 1 2 4 Miles

Offshore Hardbottom Habitats of Pacific Missile Range Facility

Kauai, Hawaii

Figure 3.3.1.1.1-1

Wave action is the main natural control on coral reef structure along the coastline of the Hawaiian Islands (Grigg, 1997a; Jokiel et al., 2001; 2004). Corals in wave-exposed areas die as fast as they can be replaced (Grigg, 1997a). The breaking, scouring, and abrading action caused by waves on corals yields high mortality. Hence, no coral accretion takes place in wave-exposed areas. Despite the fact that wave action limits the accretion of reef building corals, reefs are also found along the north coastline of Kauai. (Maragos, 2000)

The general marine topography of the nearshore region off of PMRF consists of four sectors separated by distinct physiographic and biotic structure. The first three of these sectors are (1) the Nohili Sector, which extends from the northern end of the property to approximately the location of Nohili Ditch; (2) the Mana Point Sector, which extends southward to the southern part of Mana Point; and (3) the Majors Bay Sector, which extends to the southern boundary of PMRF at Kokole Point extending from the shoreline to a depth of approximately 49 ft. The fourth sector is considered the Offshore Sector, and extends along most of the entire length of PMRF within the depth range of 49 to 66 ft. (Commander, Navy Region Hawaii, 2007)

Total coral cover in the Nohili Sector ranges from 32 to 39 percent of bottom cover. The most abundant coral species are lobe coral, rose or cauliflower coral (*Pocillopora meandrina*), and ringed rice coral (*Montipora patula*). Macroinvertebrates in this area include the rock oyster (*Spondylus tenebrosus*), cone shells (*Conus* spp.), sea urchins (*Echinometra mathaei*), and sea cucumbers (*Holothuria atra*). Along the central portion of PMRF in the Mana Sector, living coral is sparsely distributed, approximately one half of that found in the Nohili area. The dominant species is lobe coral. Coral cover in the Major's Bay Sector is less than 2 percent. The algal and macroinvertebrate survey in Majors Bay noted that eight macroinvertebrate species were present. (Pacific Missile Range Facility, 2001; Commander, Navy Region Hawaii, 2007)

The predominant coral found in the Offshore Sector is antler coral (*Pocillopora eydouxi*), which occurs as single large branching colonies. Other corals found on the platform are primarily smaller species which have a collective coverage of about 5 percent of bottom cover: rose or cauliflower coral, lobe coral, corrugated coral (*Pavona varians*), flat lobe coral (*P. duerdeni*), blue rice coral (*Montipora flabellata*), ringed rice coral, Verrill's ringed rice coral *(M. verrilli),* rice coral (*M. capitata*), crust coral (*Leptastrea purpurea*), and mushroom coral (*Fungia scutaria*). (Commander, Navy Region Hawaii, 2007)

Black coral (Family *Antipathidae*) is found south of Kauai outside the region of influence, closer to shore and in shallower water than black coral of other Hawaiian Islands (Western Pacific Regional Fishery Management Council, 2006).

Essential Fish Habitat (EFH) occurs and is incorporated within Kauai's Exclusive Economic Zone (EEZ), the 200-mile (mi) limit around the island. EFH and Habitat Areas of Particular Concern (HAPC) are described in Section 3.1.2.2.1 (Open Ocean), and a detailed description, including status, distribution, and habitat preference of managed fisheries is provided in the Navy's *Final Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007a). EFH for adult and juvenile bottomfish includes the water column and all bottom habitats extending from the shoreline to a depth of 219 fathoms, which encompasses important steep drop-offs and high relief habitats. Shallow-water (0 to 328 ft) bottomfish species include uku or grey snappers (*Aprion virescens*), thicklip trevallies (*Pseudocaranx dentex*), groupers (*Epinephelus quernus*), emperors (*Lethrinus* spp.), amberjacks (*Seriola dumerili*), and taape or bluestriped snappers (*Lutjanus kasmira*). Deep-water (328 to 1,312 ft) species, which are discussed in Section 3.1.2, include ehu or squirrelfish snapper (*Etelis carbunculus*), onaga or red snapper (*Pristipomoides zonatus)*, opapaka or pink snapper (*Pristipomoides filamentosus*), gindai or snapper (*Etelis coruscans)*, hapu`upu`u or Hawaiian grouper (*Epinephelus quernus*), and lehi or ironjaw snapper (*Aphareus rutilans*). (Western Pacific Regional Fishery Management Council, 2005)

Pelagic HAPC that include the offshore area are designated as the water column down to 3,280 ft from the shoreline to the EEZ that lies above all seamounts and banks shallower than 1,100 fathoms. Marketable pelagic species include striped marlin (*Tetrapturus audax*), bluefin tuna (*Thunnus thynnus*), swordfish (*Xiphias gladius*), albacore (*Thunnus alalunga*), skipjack (*Katsuwonus pelamis*), sailfish (*Istiophorus platypterus)*, kawakawa or tuna (*Euthynnus affinis*), and various sharks. Banks with summits less than 16.3 fathoms have been designated as HAPC for crustaceans. Crustacean species include spiny lobsters (*Panulirus marginatus*), slipper lobsters (*Scyllarides squammosus*), and Kona crabs (*Ranina ranina*). (Western Pacific Regional Fishery Management Council, 2005)

Common animals found in rocky intertidal habitats include limpets or `opihi (*Cellana exerata*), periwinkles (*Littorina* sp.), littorine snails (*Littorina*, *Nerita*), rock crabs or `a`ama (*Metapograpsus* sp.), gastropods (*Drupa*, *Morula*, *Cypraea*, *Strombus*), and rock urchins (*Colobocentrotus atratus*). Adjacent to rocky shoreline, offshore waters are possible feeding areas for the threatened green turtle. (U.S. Department of the Navy, 2005c)

Spinner dolphins (*Stenella longirostris*) are the most commonly recorded cetaceans observed within 12 nm of the PMRF coastline. The spinner dolphin inhabits bays and protected waters, often in waters less than 40 ft deep (Pacific Missile Range Facility, 2001). Monitoring for Rim of the Pacific (RIMPAC) Exercises in 2006 showed that spinner dolphins are seen daily in the offshore area of Kekaha Beach, Kauai (near PMRF/Main Base) despite being accompanied regularly by tour boats (U.S. Department of the Navy, 2006a). Spinner dolphins are expected to occur in shallow water resting areas (about 162 ft deep or less) throughout the middle of the day, moving into deep waters offshore during the night to feed. Additional information on spinner dolphins, including description, habitat, abundance, and distribution is provided in Section 3.1.2.

A small-boat based survey for odontocetes was undertaken off the islands of Kauai and Niihau in October and November 2005 to photo-identify individuals and collect genetic samples for examining stock structure. Survey coverage was from shallow coastal waters out to over 9,842 ft depth, though almost half was in waters less than 1,640 ft in depth. There were 56 sightings of five species of odontocetes: 30 spinner dolphins; 14 bottlenose dolphins (*Tursiops truncatus*); 6 short-finned pilot whales (*Globicephala macrorhynchus)*; 5 rough-toothed dolphins (*Steno bredanensis*); and 1 pantropical spotted dolphin (*Stenella attenuata*). (Baird et al., 2006a)

<u>Threatened and Endangered Wildlife Species</u>

Table 3.3.1.1.1-1 lists threatened and endangered species that are known or expected to occur in the offshore areas off PMRF/Main Base.

Table 3.3.1.1.1-1. Listed Species Known or Expected to Occur Offshore of PMRF/Main Base

Scientific Name	Common Name	Federal Status
Reptiles		
Caretta caretta	Loggerhead turtle*	T
Chelonia mydas	Green turtle	T
Dermochelys coriacea	Leatherback turtle	E
Eretmochelys imbricata	Hawksbill turtle	E
Lepidochelys olivacea	Olive ridley turtle	T
Birds		
Phoebastria albatrus	Short-tailed albatross**	E
Phoebastria nigripes	Black-footed albatross	P
Pterodroma phaeopygia sandwichensis	\`Ua\`u (Hawaiian dark-rumped petrel)	E
Puffinus auricularis newelli	\`A\`o (Newell's Townsend's shearwater)	T
Mammals		
Megaptera noveangliae	Humpback whale	E
Monachus schauinslandi	Hawaiian monk seal	E

Source: U.S. Fish and Wildlife Service, 2006b; 2005a;b; 2007a; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007; U.S. Fish and Wildlife Service, 2007b

Notes: *Considered for listing as endangered
** Observed in May 2000

Key to Federal Status:
T = Threatened
E = Endangered
P = Proposed for listing as threatened or endangered

Green and hawksbill (*Eretmochelys imbricata*) turtles are the most common sea turtles in offshore waters around the Main Hawaiian Islands, as they prefer reef-type environments that are less than about 55 fathoms in depth (U.S. Department of the Navy, 2005c). Additional information on sea turtles, including description, habitat, abundance, and distribution, is provided in Section 3.1.2. Green turtles have been observed offshore of Nohili Ditch, the only area where basking/haul-out activity on PMRF/Main Base is observed. The PMRF Natural Resources Manager monitors sea turtle activity at PMRF. Security patrol reports include a record of the presence and locations of turtles. Any records of green turtle sitings are maintained by the PMRF Environmental Office. (Pacific Missile Range Facility, 2001)

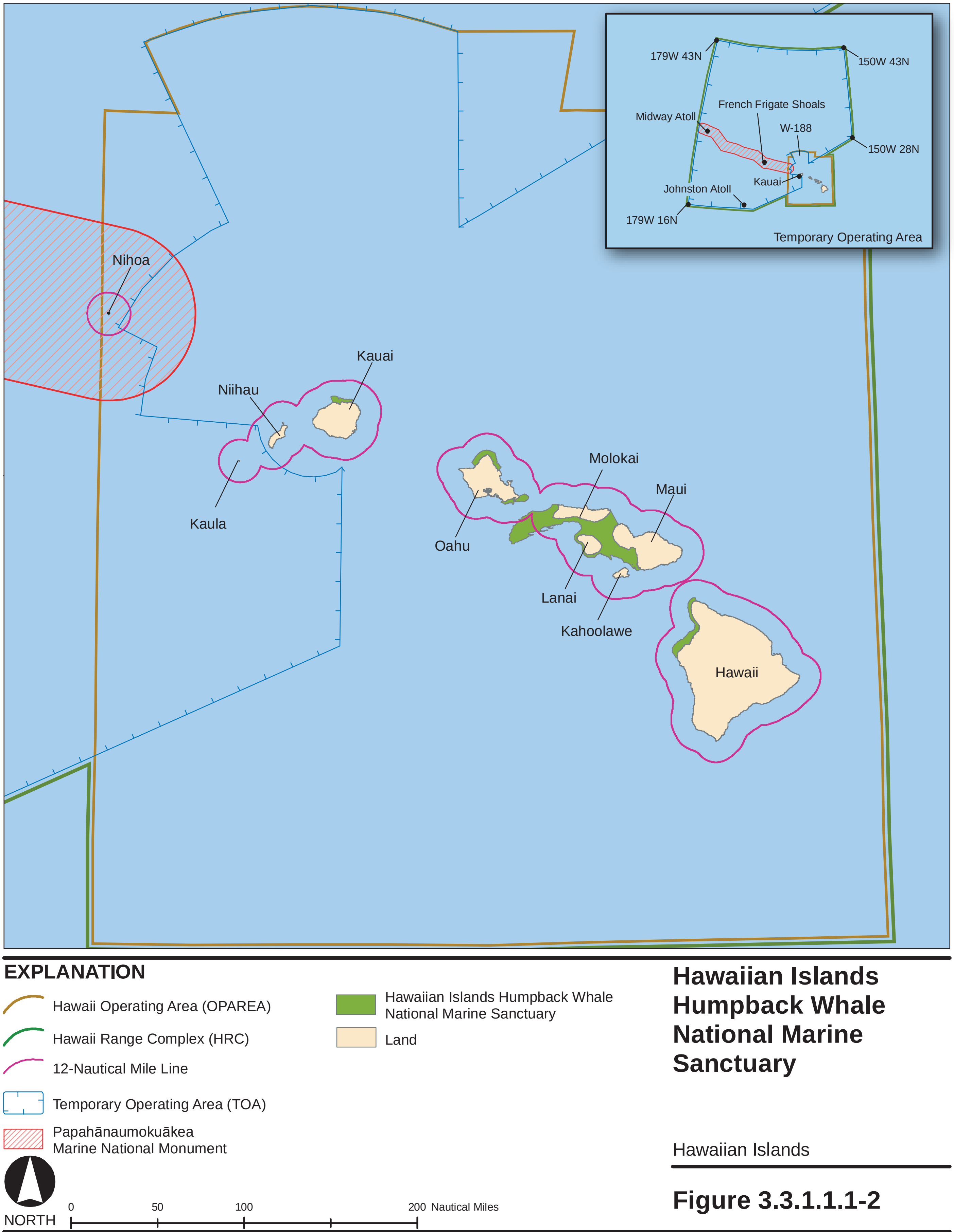
In March of 2000, a juvenile short-tailed albatross (*Phoebastria albatrus*) was observed at PMRF, resting in the grass on the mountain side of the PMRF runway (U.S. Fish and Wildlife Service, 2004). The black-footed albatross (*Phoebastria nigripes*), a seabird that has been observed on and offshore of PMRF, has been proposed for listing as threatened or endangered (U.S. Fish and Wildlife Service, 2007b). The Newell's shearwater (*Puffinus auricularis newelli*) or \`A\`o is a seabird that forages over deep open ocean and offshore waters near its breeding grounds from October to April when it returns to land to look for nest sites (State of Hawaii, Department of Land and Natural Resources, 2005). On Kauai, several grounded dark-rumped petrel (*Pterodroma phaeopygia sandwichensis*) fledglings have been collected in recent years as part of the Newell's shearwater recovery program. Most birds have been found near the mouth of Waimea Canyon, indicating that some birds still breed in the vicinity. Observations of the dark-rumped petrel at sea are scarce. (Virginia Tech Conservation Management Institute, 1996)

Of the marine mammals listed in Table 3.1.2.4-1, the Hawaiian monk seal (*Monachus schauinslandi*), humpback whale (*Megaptera noveangliae*), and spinner dolphin (discussed above) are the most likely species to be observed within 12 nm of the PMRF coastline. The endangered Hawaiian monk seal is an indigenous mammal that has been observed at PMRF. The primary occurrence of Hawaiian monk seals within the HRC is expected to be in a continuous band between Nihoa, Kaula, Niihau, and Kauai. This band extends from the shore to around 273 fathoms and is based on the large number of sightings and births recorded in this area (Westlake and Gilmartin, 1990; Ragen and Finn, 1996; Marine Mammal Commission, 2003; Baker and Johanos, 2004). Additional information on Hawaiian monk seals, including description, habitat, abundance, and distribution, is provided in Section 3.1.2.

The humpback whale peak abundance around the Hawaiian Islands is from late February through early April (Mobley et al., 2001b; Carretta et al., 2005). During the fall-winter period, primary occurrence is expected from the coast to 50 nm offshore, including the areas off PMRF. Additional information on humpback whales, including description, habitat, abundance, and distribution, is provided in Section 3.1.2.

Hawaiian Islands Humpback Whale National Marine Sanctuary

The Hawaiian Islands Humpback Whale National Marine Sanctuary (Figure 3.3.1.1.1-2) was created by Congress in 1992. The Sanctuary includes a portion of the ocean north of Kauai, but not within the PMRF vicinity or in the BSURE coverage area (Pacific Missile Range Facility 2001). Further discussion of the sanctuary is provided in Section 3.7. Humpback whales are endangered marine mammals and are therefore protected under provisions of the Endangered Species Act and the Marine Mammal Protection Act wherever they are found. Humpbacks are seen in the winter months in the shallow waters surrounding the Hawaiian Islands where they congregate to mate and calve. The humpback whale population is growing by an average of 7 percent annually. The best available estimate of abundance for the Central West Pacific stock of humpback whales is 4,491 individuals (Mobley, 2004). The whales travel more than 3,500 mi from Alaska to Hawaii's warm waters to mate, give birth, and care for their calves. The whales span more than a quarter-million square miles of ocean surrounding Hawaii. The first whales of the season usually arrive around October, with the greatest number seen around Hawaii between 1 December and 15 May. (National Oceanic and Atmospheric Administration, 2007; Mobley, 2002)



Hawaiian Islands Humpback Whale National Marine Sanctuary

Hawaiian Islands

Figure 3.3.1.1.1-2

3.3.1.1.2 Cultural Resources—PMRF—Offshore (BARSTUR, BSURE, SWTR, Kingfisher)

Region of Influence

The underwater cultural resources region of influence for PMRF would include offshore areas in Majors Bay and areas offshore from PMRF/Main Base (including PMRF Warning Area 188). The training and RDT&E activities proposed for these areas include Expeditionary Assault and other amphibious landings; torpedo; torpedo defense; submarine detection; deep and shallow water testing of anti-submarine torpedo sensors and weapons systems; mine-laying and neutralization; over-water missile launches and intercepts; Gunnery Exercise (GUNEX); Bombing Exercise (BOMBEX); and movement of the simulated underwater minefield (Kingfisher).

Affected Environment

Underwater Cultural Resources

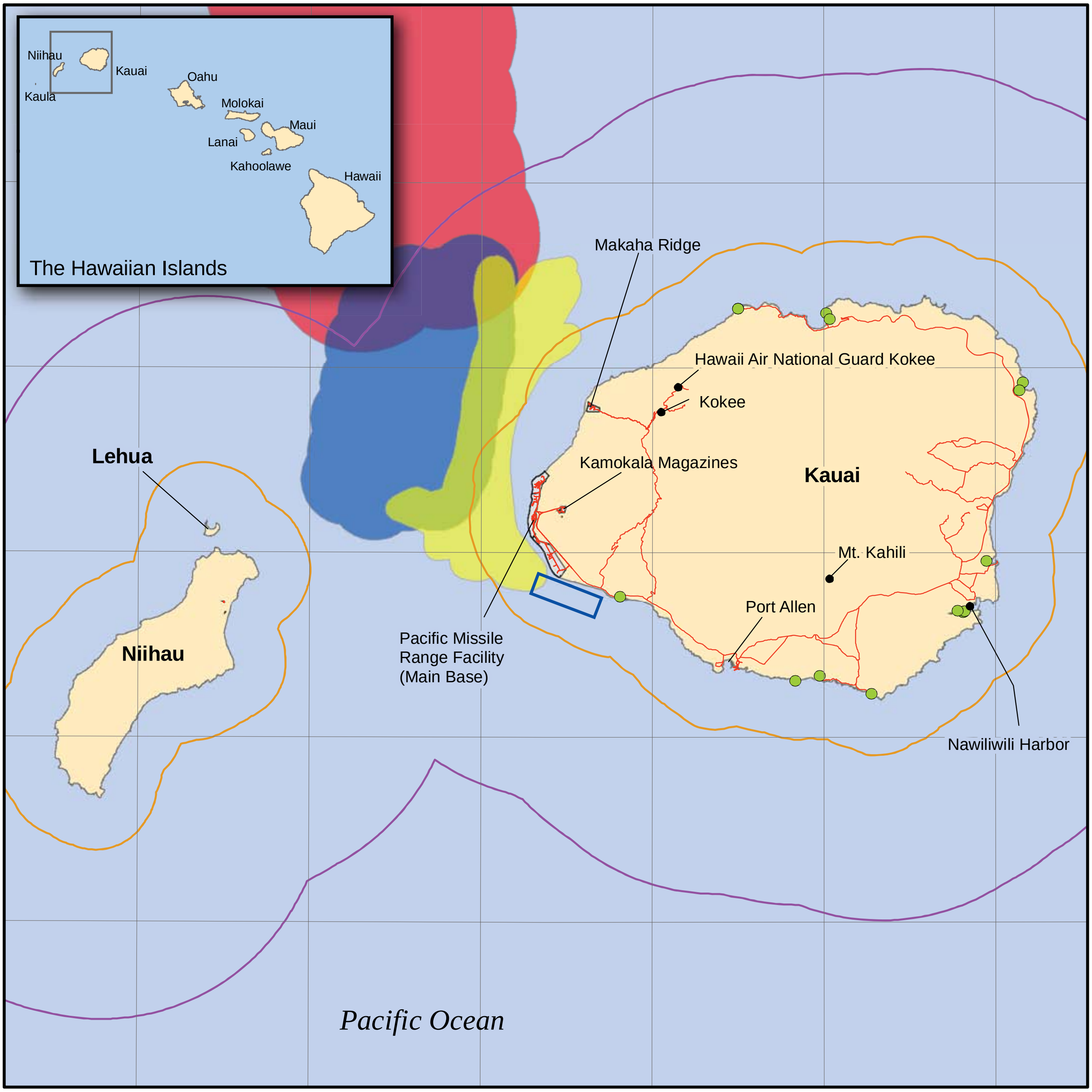
For a discussion of Open Ocean Area underwater cultural resources, see Section 3.1.3.

Offshore Area Archaeological Resources

Within the offshore waters surrounding each island, there are a variety of submerged resources. The most common of these are shipwrecks (Figure 3.1.3-1) and fishponds; however, junked motor vehicles, harbor features, and old shoreline structures are also present.

Historically, Native Hawaiians constructed four different types of fishponds—freshwater taro ponds, other freshwater ponds, brackish water ponds, and seawater ponds (Aquaculture in Hawaii, 2006). Aquaculture was employed to supplement their other fishing activities, and permanent fishponds guaranteed a stable food supply for populations in lean times. Tended ponds provided fish without requiring fishing expertise, and harvesting the pond, unlike fishing at sea, was not weather dependent. Village-owned fishponds also increased the wealth of the managing Hawaiian Chief. At the time of European contact, there were hundreds of fishponds along the coast of the Hawaiian Islands. Many of the fishponds remain, but few are actively used (Aquaculture in Hawaii, 2006). Saltwater fishponds constructed on shallow water coral reef platforms are unique to the Hawaiian Islands and are very important national and international historical assets. Evidence suggests that Hawaiian fishponds were constructed as early as A.D. 1000, if not earlier, and continued to be built until the 1820s. The operation of fishponds declined throughout the islands by the early 1900s; there are approximately 488 fishponds in varying states of repair scattered throughout the six main islands. A database of identified Hawaiian saltwater fishponds is managed by the University of Hawaii at Manoa to publicize research and restoration projects, and to raise awareness of their cultural value.

Figure 3.3.1.1.2-1 shows the distribution of fishponds in the waters surrounding the Hawaiian Islands (State of Hawaii Office of Planning, 2005).



EXPLANATION

- Fishpond
- 3-Nautical Mile Line
- 12-Nautical Mile Line
- Road
- Kingfisher Range
- Shallow Water Training Range (SWTR)
- Barking Sands Tactical Underwater Range (BARSTUR) Hydrophones
- Barking Sands Underwater Range Expansion (BSURE) Hydrophones
- Installation Area
- Land

NORTH

0 3 6 12 Nautical Miles

Hawaiian Fishpond Locations in the Vicinity of Kauai and Niihau

Kauai and Niihau, Hawaii

Figure 3.3.1.1.2-1

The underwater environment surrounding Kauai encompasses a large number of shipwrecks and Hawaiian fishponds (see Figures 3.1.3-1 and 3.3.1.1.2-1). Among the wrecks is *Pele*, a freighter that sank on March 22, 1892. *Pele* rammed into an underwater pinnacle (tearing the hull) and sank a half-mile later in 14 fathoms of water. Very little of the wreck remains—the boiler, some hull plates, and a couple of anchors.

In 1824 the King of Hawaii used a vessel named *Ha`aheo o Hawaii (Pride of Hawaii)* as a private yacht, a cargo and passenger transport, and a diplomatic vehicle. The ship was also once used as a pirate ship. While the king was en route to England on a diplomatic mission, a Native Hawaiian crew sailed her to the northern shore of the island of Kauai and wrecked her in the southwestern corner of Hanalei Bay. The ship struck a 5-ft-deep reef just a hundred yards offshore and sank after an unsuccessful salvage attempt by the local population. (Johnston, 2005)

Within the specific offshore and open ocean underwater cultural resources region of influence for PMRF and KTF are a sparse distribution of shipwrecks and fishponds (see Figures 3.1.3-1 and 3.3.1.1.2-1).

3.3.1.1.3 Socioeconomics—PMRF—Offshore (BARSTUR, BSURE, SWTR, Kingfisher)

Region of Influence

The region of influence for offshore Socioeconomics is the ocean area from the shoreline out to 12 nm from PMRF/Main Base. This includes the Kingfisher, which is within 3 nm of PMRF/Main Base; SWTR, which is within 3 nm and extends into the 12 nm area offshore of PMRF/Main Base; and BARSTUR and BSURE, which are within 12 nm of PMRF/Main Base.

Affected Environment

There are activities that occur in the offshore area of PMRF/Main Base that contribute to the economy of Kauai. They can be categorized as shipping, recreation, subsistence fishing, and tourism related.

Shipping

There is no commercial shipping to PMRF/Main Base, although boat tours are conducted within the region of influence. A primary commercial shipping route exists approximately 50 mi north of Kauai (EDAW, Inc., 2005).

Hawaii's remote location in the mid-Pacific makes it economically dependent upon the local waterways and its inter-modal maritime transportation system. Hawaii's harbors and local waterways use vessel traffic separation schemes that are closely monitored and supervised by the U.S. Coast Guard to promote safe navigation and provide a secure system for shipping. Barges and ships navigate these waterways daily to transport goods and personnel, not just within the Hawaiian Islands and to and from the mainland of North America, but across the Pacific Ocean to all the major ports of Asia, Oceania, Central and South America, and the South Pacific.

The National Oceanic and Atmospheric Administration (NOAA) provides frequently updated electronic and paper navigation charts for all mariners depicting the current vessel traffic separation schemes for all of Hawaii's major harbors and inland waterways. While traffic separation schemes are demarcated on NOAA charts to maintain safe traffic flow, inter-modal shipping lanes are not. Outside of the traffic schemes and regulated waterways of the Hawaiian Islands, mariners are free to plot their own course; however, it is common practice for many shipping companies to use great circle routes with track adjustments made for navigational risks such as restricted waters, obstructions, depth of water, currents, weather, traffic, and environmental factors. Great circle routes are commonly used because they are the shortest distance between two points on the globe; therefore, it is more economical for companies to follow these routes.

Recreation

Recreational activities include surfing, fishing, and boating. The physical areas accessible for fishing/surfing/recreation and socializing run from Shenanigans (all-hands club) up to KiniKini Ditch (south end of runway). Under PMRF Instruction 5530.7, normal access is allowed 7 days a week from 6:00 a.m. to 30 minutes after sunset, except during heightened force protection conditions or PMRF range operational periods.

Offshore of PMRF/Main Base, fishing is also allowed up to 1,000 ft in the Special Use Fishing Area (Kawaiele Ditch northward to the windsock adjacent to the runway) on weekends and Federal holidays, except during heightened force protection conditions and PMRF range operational periods. Use of this area is limited to 25 fishermen at one time. Fish species of commercial and recreational interest seen in the Majors Bay area in surveys performed in 2000 and 2006 included weke (*Mulloidichthys samoensi)*, moano (*Parupeneus multifasciatus*), malu (*Parupeneus pleurostigma)*, palani (*Acanthurus dussumieri*), mai`i`i (*Acanthurus nigrofuscus*), and naenae (*Acanthurus olivaceus*). The 2006 survey also found a small school of bonefish (*Albula vulpes*)*,* uku, and juvenile ula (*Panulirus marginatus*). Discussions with fisherman familiar with the resources fronting PMRF indicate that those waters are well known for the commercial catches of akule or bigeye scad (*Selar crumenophthalmus*) which is done using nets, papios (members of the Jack family), threadfin or moi (*Polydactylus sexfilis*)*,* opelu (*Decapterus macarellus*), uku, goatfishes and surgeonfishes*,* all of which are caught by a variety of methods by both commercial and recreational fishers. Surfing is also permitted in front of the PMRF housing area. (Commander, Navy Region Hawaii, 2007)

Subsistence Fishing

Hawaii Revised Statutes (HRS) Section 188-22.6 defines subsistence fishing as the customary and traditional Native-Hawaiian uses of renewable ocean resources for direct personal or family consumption or sharing. HRS defines Native-Hawaiian as any descendant of the races inhabiting the Hawaiian Islands prior to 1778.

Fishing is still an extremely popular pastime for people in Hawaii (Western Pacific Regional Fishery Management Council, 1999). Recent data indicate that a quarter of Hawaii's population participates in some form of fishing at least once a year. Hawaii's annual fish consumption is about 90 pounds (lb) per capita, over twice the national average (Western Pacific Regional Fishery Management Council, National Oceanic and Atmospheric Administration, 2003).

The overall level of subsistence fishing activity is difficult to assess, due to a lack of detailed catch data. Under-reporting by commercial fishermen and the existence of a large number of recreational and subsistence fishermen without licensing or reporting requirements have resulted in uncertainty in actual fisheries catch statistics for the state. Consequently, in the past no formal attempt to assess the subsistence fishing contribution to island economies has been made, but the value of fishing for subsistence by contemporary Native Hawaiians is known to be an important component of some communities, particularly rural communities (Pooley, 1993). However, it is believed that offshore recreational and subsistence catch is likely equal to or greater than the offshore commercial fisheries catch, with more species taken using a wider range of fishing gear (Friedlander, et al., 2004).

The Pacific Islands Region has a special mandate under the Magnuson and Stevens Fishery Conservation and Management Act to promote the sustained participation of indigenous communities. In March of 2004, the "Strategic Plan for the Conservation and Management of Marine Resources in the Pacific Islands Region" was developed by three Federal agencies: the National Marine Fisheries Service (NMFS) Pacific Islands Fisheries Science Center, the Pacific Islands Regional Office, and the Western Pacific Regional Fishery Management Council. The plan discusses critical issues facing the region and provides plans for addressing the issues. The plan identifies five research projects which the offices have started: (1) developing a sociological baseline of the Hawaii longline fishery; (2) developing profiles of fishing communities and fishing ports; (3) compiling and analyzing historical fishing club and tournament records, studies concerning fishing capacity in Hawaii's commercial fisheries; (4) developing an economic evaluation of fishing tournaments; and (5) developing cost-earning studies for Hawaii fisheries.

Hawaii's coastal fisheries, as in other parts of the world, are facing unprecedented overexploitation and severe depletion. In heavily populated areas of the Main Hawaiian Islands, fishing demands for offshore resources appear to exceed the capacity for resource renewal (Friedlander, et al., 2004).

The Western Pacific Regional Fishery Management Council and NOAA worked together to prepare a *Supplemental EIS to the Final Environmental Impact Statement on the Fishery Management Plan for Bottomfish and Seamount Groundfish Fisheries of the Western Pacific Region* in May of 2005. The purpose of the Supplemental EIS was to implement measures which would end overfishing in the bottomfish complex in the Hawaiian Archipelago. The draft of this document was published in March 2006. The draft Supplemental EIS analyzed five alternatives: (1) no action; (2) area closures; (3) seasonal closures; (4) catch quotas; and (5) combination of alternatives two and three. The draft Supplemental EIS concluded that the most effective means of ending overfishing would be implementation of alternative three (seasonal closures). For seasonal closures to be effective, State and Federal regulations would need to be promulgated (Western Pacific Regional Fishery Management Council, National Oceanic and Atmospheric Administration, 2003).

State and Federal agencies have given protective status to a variety of marine areas in Hawaii in efforts to improve fisheries. These areas include Marine Life Conservation Districts, Fisheries Management Areas, Fisheries Replenishment Areas, Bottomfish Restricted Fishing Areas, Hawaii Marine Laboratory Refuge-Coconut Island, Kahoolawe Island Reserve, Paiko Lagoon Wildlife Sanctuary, Ahihi-Kinau Natural Area Reserve, South Kona opelu fishing area, the Hawaiian Islands Humpback Whale National Marine Sanctuary (Figure 3.3.1.1.1-2), and the

Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (Figure 3.2-1) (Friedlander, et al., 2004).

In Hawaii, habitats with low spatial relief and limited shelter were found to be associated with low biomass and diversity of reef fishes, whereas highly complex habitats harbored high fish biomass and diversity. Ideally, EFH in the Main Hawaiian Islands should consist of an area with high rugosity (roughness) or relief and moderate wave exposure that has a high percentage of branching and/or lobate coral coupled with legal protection from fish pressure. Habitats with these optimal characteristics should possess fish assemblages with high species richness, abundance, biomass, and diversity. If protective areas are to be effective, they must include the diversity of habitats necessary to accommodate the wide range of fish species (Friedlander, et al., 2004).

Due to the shape of Kauai and the lack of any protective barrier reef structure, the shoreline region is nearly continually scoured by the force of breaking waves. The essentially “round” shape of Kauai results in exposure from swells emanating from both the north and the south Pacific, hence the nearly continual wave action. The entire region offshore of PMRF is directly exposed to long-period swells generated by storms in both the North (winter) and South (summer) Pacific. As a result of these physical processes, the offshore areas are subjected to extreme stress from wave impact and scouring of sediment from wave action. Consequently, there is minimal coral reef development in the offshore areas off the coast of PMRF (Commander, Navy Region Hawaii, 2007). Since the implementation of the Force Protection Restriction after September 11, 2001, there has been a decline in fishing activities in the waters fronting PMRF, and this has corresponded to increases in the abundance, mean size, and biodiversity of fish in the area (Commander, Navy Region Hawaii, 2007).

Tourism

The tourism industry has been the economic mainstay of the Hawaiian Islands since statehood in 1959. The industry accounts for 22.3 percent of all jobs in Hawaii (Kauai, County of, 2005). Kauai’s share of the Hawaii visitor market was 14.5 percent in 2005. Despite terrorism concerns and periodic economic slumps, the tourism industry on Kauai has remained robust, with the number of annual visitors consistently over 1 million a year in the past 5 years (Kauai, County of, 2005). Estimated visitor expenditure in 2005 was $11.9 billion, a 9.6 percent increase from 2004 (State of Hawaii, Department of Business, Economic Development & Tourism, 2006). Many island visitors enjoy participating in activities in the ocean areas within the HRC such as scuba diving, kayaking, sailing, and dinner cruises. There are many businesses that rent equipment, offer guided tours, operate charter boats, and supply other services to the tourists within the region of influence. The Super Ferry was just starting its operations at the same time this document was drafted.

3.3.1.1.4 Transportation—PMRF—Offshore (BARSTUR, BSURE, SWTR, Kingfisher)

Region of Influence

The region of influence for offshore transportation is the ocean area from the shoreline out to 12 nm. This area includes the Kingfisher Area, which is within 3 nm of PMRF/Main Base; SWTR, which is within 3 nm and extends into the 12 nm range of PMRF/Main Base; and BARSTUR and BSURE, which are within 12 nm of PMRF/Main Base.

Affected Environment

The affected environment is the area from the shoreline of PMRF/Main Base out to 12 nm.

Waterways

There is no commercial shipping to PMRF, although boat tours are conducted within the region of influence. A primary commercial shipping route exists approximately 50 mi north of Kauai (EDAW, Inc., 2005).

3.3.1.2 NIIHAU OFFSHORE

Niihau is a privately owned island located approximately 17 nm southwest of Kauai. It is about 8 mi wide by 18 mi long and comprises approximately 72 mi^2. PMRF leases 1,170 acres of land in the northeastern corner of the island and operates radar units, optics, and electronic warfare sites on Niihau. Niihau Offshore includes proposed HRC ranges and training areas 0 to 12 nm from Niihau (Figure 2.1-2).

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Niihau Offshore. Of the 13 resources considered for analysis, airspace, air quality, cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.3.1.2.1 Biological Resources—Niihau—Offshore

Region of Influence

The region of influence for offshore biological resources is the ocean area from the shoreline of Niihau out to 12 nm.

Affected Environment

Vegetation

Common plants found in Niihau's rocky intertidal habitats include sea lettuce (*Ulva lactuca*), Sargasso or *kala*, coralline red algae, red fleshy algae, brown algae, and fleshy green algae (U.S. Department of the Navy, 2005c). Common plants that inhabit the sandy beach intertidal habitat on Niihau include the beach morning glory (*Ipomoea imperati*), beach heliotrope (*Heliotropium anomalum*), milo (*Thespesia populnea*), and hau (*Hibiscus tiliaceus*) (Maragos, 1998).

Threatened and Endangered Vegetation

No threatened or endangered vegetation is located in the offshore area.

Wildlife

Common animals using and inhabiting the sandy beach intertidal habitat on Niihau include ghost crabs (*Ocypode ceratophthalma*), mitre and auger shells (*Terebra*), clams, and seabirds. (Maragos, 1998)

Reefs offshore of Niihau are poorly developed due to extreme wave energy from all directions. There are no substantial bays that could shelter coral development. Colonized and uncolonized hardbottom areas are located off the western coastline. High-wave energy coral communities appear to be most common and are dominated by cauliflower coral and lobe coral. Black coral (*Antipathes sp.*) occurs as shallow as 90 ft off the northern end of the island. (Hawaii Institute of Marine Biology, 2006)

Pelagic fish such as tuna swim close to steep vertical walls around the northwest portion of Niihau. Large kumu (white saddle goatfish) (*Parupeneus porphyreus*), u`u (squirrelfish) (*Myripristis* spp.), and uhu (parrotfish) (*Chlorurus sordidus*) are abundant. Sharks are also present off of Niihau, including the grey reef shark (*Carcharhinus amblyrhynchos*), sandbar shark (*C. plumbeus*), Galapagos (*C. galapagensis*), and tiger shark (*Galeorcerdo cuvier*). (Papastamatiou, et al., 2006; Hawaii Institute of Marine Biology, 2006)

EFH and HAPC are described in Section 3.1.2 (Open Ocean), and a detailed description, including status, distribution, and habitat preference of managed fisheries is provided in the Navy's *Final Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007a).

<u>Threatened and Endangered Wildlife</u>

The endangered Hawaiian monk seal and the threatened green turtle have been observed offshore of Niihau.

3.3.1.3 KAULA OFFSHORE

Kaula is approximately 108 acres of land used by the Navy for aircraft gunnery and inert ordnance target practice. No HRC training events are performed offshore (0 to 12 nm) of Kaula; however, onshore training events may affect offshore resources.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Kaula Offshore. Of the 13 resources considered for analysis, air quality, airspace, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.3.1.3.1 Biological Resources—Kaula—Offshore

Vegetation

Common plants found in rocky intertidal habitats include sea lettuce, coralline red algae, red fleshy algae, brown algae, and fleshy green algae (U.S. Department of the Navy, 2005c).

No threatened or endangered vegetation is located in the offshore area.

Wildlife

Kaula is surrounded by Kaula Bank, which supports some coral reefs. The entire bank has been identified as a HAPC in the Coral Reef Ecosystem Fisheries Management Plan. Several commercially important fish, such as tunas and jacks observed spawning in the area, have been reported. Another species seen in the area is the whale shark (*Rhincodon typus*), which is rarely sighted in the Main Hawaiian Islands. Gray reef and sandbar sharks have also been observed. Spinner dolphins are common in the water around Kaula. (Pacific Missile Range Facility, 2001)

<u>Threatened and Endangered Wildlife Species</u>

Coastal waters off Kaula are considered viable foraging habitat for green turtles, but no sightings of sea turtles have been documented (Pacific Missile Range Facility, 2001).

Four consecutive NMFS humpback whale surveys conducted between 1976 and 1979 established that humpback whales occur in the offshore waters of Kaula during the peak of the winter season on an annual basis (Pacific Missile Range Facility, 2001). Three Hawaiian monk seals were observed on a shelf off Kaula in a 2000 aerial survey (Baker and Johanos, 2004). Fifteen Hawaiian monk seals were counted during a 4-hour period hauled out on Kaula during a 2006 cruise (National Marine Fisheries Service, 2007b).

3.3.1.3.2 Cultural Resources—Kaula—Offshore

Region of Influence

The underwater cultural resources region of influence for Kaula would include areas offshore of the southwestern tip of the island where there is an existing, heavily disturbed ordnance impact area. Proposed or ongoing training with the potential to affect cultural resources on Kaula and within Warning Area W-187 include BOMBEX and GUNEX.

Affected Environment

Underwater Cultural Resources

There are no recorded underwater archaeological resources surrounding Kaula (e.g., shipwrecks) (see Figures 3.1.3-1 and 3.3.1.1.2-1).

3.3.2 KAUAI ONSHORE

3.3.2.1 PMRF/MAIN BASE

The Main Base portion of PMRF is located on the west side of Kauai, approximately 120 nm from Pearl Harbor. The majority of PMRF's facilities and equipment are at the Main Base, which occupies a land area of 1,925 acres and lies just south of Polihale State Park. PMRF/Main Base is generally flat and approximately 0.5 mi wide and 6.5 mi long with a nominal elevation of 15 ft above mean sea level except for the target launch pad areas. PMRF is a multi-environment range capable of supporting surface, subsurface, air, and space events and activities simultaneously. Training and RDT&E activities areas on PMRF/Main Base contain tracking and surveillance radars, data processing, and the communications network. Airfield facilities are located on PMRF/Main Base. Ordnance and launch areas are also located on PMRF/Main Base, the KTF launch area, northern launch area, and southern launch facility. Sandia National Laboratories operates the KTF for the Department of Energy and provides PMRF with rocket launch services for target systems and upper atmosphere measurements.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for PMRF/Main Base. All 13 environmental resources are addressed.

3.3.2.1.1 Air Quality—PMRF/Main Base

Air quality in Hawaii is defined with respect to compliance with primary and secondary National Ambient Air Quality Standards (NAAQS) (40 Code of Federal Regulations [CFR] §50) established by U.S. Environmental Protection Agency (USEPA) and adopted by the State of Hawaii. The Clean Air Act (42 United States Code [U.S.C.] 7401-7671q), as amended, gives USEPA the responsibility to set safe concentration levels for six criteria pollutants: particulate matter measuring less than 10 and 2.5 microns in diameter (PM-10 and PM-2.5), sulfur dioxide, carbon monoxide, nitrogen oxides, 8-hour ozone, and lead. Ozone is measured by emissions of volatile organic compounds (VOCs) and nitrogen oxides. The NAAQS and State Ambient Air Quality Standards (AAQS) are presented in Appendix C.

Region of Influence

For inert pollutants (all pollutants other than ozone and its precursors), the region of influence is generally limited to an area extending several miles downwind from the source. The region of influence for ozone may extend much farther downwind than the region of influence for inert pollutants. As the project area has no heavy industry and very few automobiles, ozone and its precursors are not of concern. Consequently, for the air quality analysis, the region of influence for project activities is the existing airshed (the geographic area responsible for emitting 75 percent of the air pollution reaching a body of water) surrounding the various sites, which encompasses the Mana Plain, including PMRF/Main Base.

Affected Environment

Climate

Weather is an important factor in the disbursement of air pollutants. PMRF/Main Base is located just south of the Tropic of Cancer and has a mild and semi-tropical climate. Typical temperatures for the area are 80 to 84 degrees Fahrenheit (°F) during the day and 65 to 68°F during the night. The trade winds are from the northeast and are typically light—mean trade winds between 16 to 18 knots. Precipitation in the area averages 41 inches annually. Most of the rain falls during the October through April wet season. Relative humidity is approximately 60 percent during the day throughout the year.

Regional Air Quality

Air quality data in Hawaii are collected by the Hawaii State Department of Health, Clean Air Branch. The most recent available data (for the years 2001–2005) from monitoring stations State-wide are used to describe the existing ambient air quality in Hawaii.

The only State air quality monitoring station on Kauai is located in Lihue and collects data on PM-10 levels. The monitored ambient air concentrations in Lihue are well below the corresponding State and Federal annual average AAQS (Hawaii State Department of Health, Clean Air Branch, 2005). Between 2001 and 2005, none of the monitored ambient air concentrations in the entire state exceeded the annual average AAQS. Areas that meet the NAAQS for a criteria pollutant are designated as being “in attainment”; areas exceeding NAAQS are “nonattainment.” The entire State of Hawaii is in attainment of the NAAQS and State AAQS established for all criteria pollutants. Consequently, Clean Air Act applicability analysis and conformity determination do not apply to Navy actions in Hawaii.

Existing Emission Sources

The only major stationary sources for pollution at PMRF/Main Base are the five diesel generators that serve as a backup to the utility power system. During power outages and some of the mission events and activities, these generators are run to provide back-up power to critical facilities at the Main Base area. All five units are normally cycled, so that two or three units are in service at any time. However, when electrical demand is high, three or more of these generators may be operated simultaneously. During the worst case emergency conditions, all five generators can be operated simultaneously.

These generators are covered under the PMRF Title V Covered Source Permit. By restricting the hours of use for each generator and limiting the sulfur content of the diesel fuel supplied for the generators to 0.5 percent by weight, the Title V permit controls the nitrogen dioxide emissions. Operational limitations for the three 320-kilowatt (kW) generators are 208,000 gallons (gal) of fuel annually at maximum fuel consumption rate of 23.2 gal/hour, and the limitations for the two 600-kW generators are 217,800 gal of fuel annually at 43.5 gal/hour (Hawaii Department of Health, 2003).

Stationary emissions sources at KTF include two electrical generators that are permitted for operation by the State of Hawaii under a Non-covered Source Permit through April 2009 (Sandia National Laboratories, 2006).

Mobile sources from PMRF-associated training include aircraft, rocket launches, diesel-fueled vehicles, and dust from vehicular traffic. Aircraft are operated and supported at PMRF Airfield. Records show that existing PMRF air operations in fiscal year (FY) 2004 consisted of 13,395 air operations (defined as a takeoff or landing of one aircraft) of which 8,129 were Navy. The C-26 “Metroliner” aircraft and UH-3H “Sea King” helicopter accounted for 67 percent of all Navy air operations at PMRF. Transient Navy H-60, C-20, and NP-3D aircraft combined for the remaining 33 percent of Navy air operations at PMRF. (U.S. Department of the Navy, Engineering Field Activity Chesapeake, 2006)

Rocket launches are another source of mobile emissions at PMRF. Currently, there are as many as 46 missile launches per year from PMRF. These systems use both solid and liquid propellants. Appendix E includes a detailed list of the typical weapon systems tested at PMRF. The most common exhaust components for typical missiles include aluminum oxide, carbon dioxide, carbon monoxide, hydrogen, hydrogen chloride, nitrogen, water, ferric chloride, ferric oxide, nitric oxide, chlorine, and sulfur dioxide.

3.3.2.1.2 Airspace—PMRF/Main Base

Airspace, or that space which lies above a nation and comes under its jurisdiction, is generally viewed as being unlimited. However, it is a finite resource that can be defined vertically and horizontally, as well as temporally, when describing its use for aviation purposes. The time dimension is a very important factor in airspace management and air traffic control.

Under Public Law (PL) 85-725, *Federal Aviation Act of 1958*, the Federal Aviation Administration (FAA) is charged with the safe and efficient use of our nation's airspace and has established certain criteria and limits to its use. The method used to provide this service is the National Airspace System. This system is "…a common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information and manpower and material." Appendix C includes a detailed description of airspace.

Region of Influence

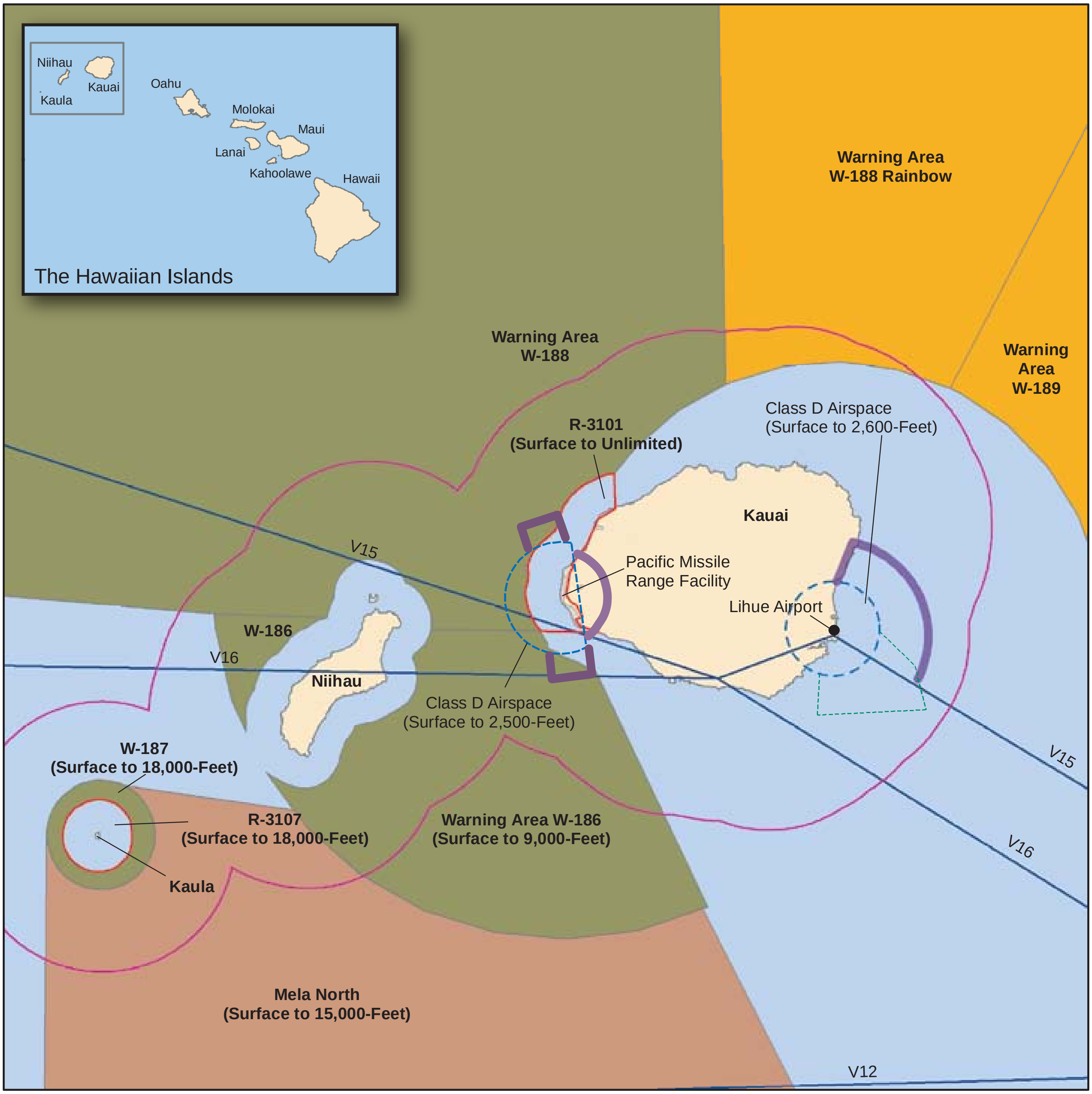
The region of influence for airspace includes the airspace over and surrounding PMRF/Main Base. Figure 3.3.2.1.2-1 shows a view of the airspace within the PMRF/Main Base region of influence, it includes the PMRF Aircraft Operational Areas, the R-3101 Restricted Area, and surrounding airspace off the western and northwestern coast of Kauai. For airspace, the region of influence also includes KTF, Makaha Ridge, Kokee, Kaula, and Niihau.

Affected Environment

The affected airspace use environment in the PMRF region of influence is described below in terms of its principal attributes: controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, airports and airfields, and air traffic control. There are no military training routes in the region of influence.

Controlled and Uncontrolled Airspace

The airspace outside the special use airspace identified below is essentially international airspace controlled by Honolulu Air Route Traffic Control Center (ARTCC). Class D airspace (described in Appendix C) surrounds the PMRF/Main Base airfield with a ceiling of 2,500 ft. It is



EXPLANATION

- 12-Nautical Mile Line
- Airway
- Class E Airspace with Floor at the Surface
- Class E Airspace with Floor 700-Feet Above Surface
- Class D Airspace
- Restricted Airspace
- Oahu Warning Area
- Pacific Missile Range Facility (PMRF) Warning Area
- Air Traffic Control Assigned Airspace (ATCAA)
- Installation Area
- Land

NORTH

0 5 10 20 Nautical Miles

Airspace Use Surrounding Pacific Missile Range Facility

Kauai, Niihau, and Kaula, Hawaii

Figure 3.3.2.1.2-1

surrounded to the north, south, and east by Class D airspace with a floor 700 ft above the surface (see Figure 3.3.2.1.2-1). Lihue Airport, located approximately 20 nm east of PMRF, includes Class D, surface Class E, and additional Class E airspace with a floor 700 ft above the surface.

No Class B (U.S. terminal control areas) airspace, which usually surrounds the nation's busiest airports, or Class C airspace, is found in the region of influence.

Special Use Airspace

A restricted area is airspace designated under Part 73 within which the flight of aircraft, while not wholly prohibited, is subject to restriction. A warning area is airspace of defined dimensions, extending from 3 nm outward from the coast of the United States that contains activity that may be hazardous to nonparticipating aircraft. The purpose of such warning areas is to warn nonparticipating pilots of the potential danger. A warning area may be located over domestic or international waters or both. (14 CFR Title 14 Part 1.1, 2006)

The special use airspace in the region of influence (see Figure 3.3.2.1.2-1) consists of Restricted Area R-3101, which lies immediately above PMRF/Main Base and to the west of Kauai, portions of Warning Area W-188 north of Kauai, and Warning Area W-186 southwest of Kauai, all controlled by PMRF. Restricted Area R-3107 over Kaula, a small uninhabited rocky islet 19 nm southwest of Niihau that is used for fixed- and rotary-wing aircraft gunnery practice, and which lies within the W-187 Warning Area, is also special use airspace within the region of influence. Restricted Area R-3107 and Warning Area W-187 are scheduled through the Navy Fleet and Area Control and Surveillance Facility Pearl Harbor (FACSFACPH). PMRF and FACSFACPH each coordinate with the FAA Hawaii Combined Facility regarding special use airspace. The Hawaii Combined Facility is the location in which the ARTCC, the Honolulu control tower, and the Combined Radar Approach Control are collocated.

Table 3.3.2.1.2-1 lists the affected Restricted Areas and Warning Areas and their effective altitudes, times used, and their manager or scheduler. There are no Prohibited or Alert special use airspace areas in the PMRF airspace use region of influence.

En Route Airways and Jet Routes

Although relatively remote from the majority of jet routes that crisscross the Pacific, the airspace use region of influence has two instrument flight rules (IFR) en route low altitude airways used by commercial air traffic that pass through the region of influence: V15, which passes east to west through the southernmost part of Warning Area W-188, and V16, which passes east to west through the northern part of Warning Area W-186 and over Niihau (see Figure 3.3.2.1.2-1). An accounting of the number of flights using each airway is not maintained.

The airspace use region of influence, located to the west, northwest, and north of Kauai, is far removed from the low altitude airways carrying commercial traffic between Kauai and Oahu and the other Hawaiian islands, all of which lie to the southeast of Kauai. There is a high volume of island helicopter sightseeing flights along the Na Pali coastline and over the Waimea Canyon, inland and to the east of PMRF, particularly out of Port Allen near Hanapepe on Kauai's southern coastline and other tourist and resort towns on the island. However, these do not fly over PMRF or into Restricted Area R-3101 (National Aeronautical Charting Office, 2007).

Table 3.3.2.1.2-1. Special Use Airspace in the PMRF/Main Base Airspace Use Region of Influence

Number	Location	Altitude (Ft)	Time of Use		Controlling Agency
			Days	Hours	
R-3101	PMRF	To Unlimited	M-F	0600-1800	PMRF
R-3107	Kaula	To FL 180	M-F S-Su	0700-2200 0800-1600	FACSFACPH/HCF HCF
W-186	Southwest of PMRF	To 9,000	Continuous	Continuous	PMRF
W-187	Kaula	To 18,000	M-F S-Su	0700-2200 0800-1600	FACSFACPH/HCF HCF
W-188	Northwest of PMRF	To Unlimited	Continuous	Continuous	PMRF/HCF

Source: National Aeronautical Charting Office, 2007

Notes:
R = Restricted, W = Warning
FL = Flight Level (FL 180 = 18,000 ft)
PMRF = Pacific Missile Range Facility
HCF = Hawaii Combined Facility, the location in which the Air Route Traffic Control Center (ARTCC), the Honolulu control tower, and the Combined Radar Approach Control are collocated.
FACSFACPH = Navy Fleet and Area Control and Surveillance Facility Pearl Harbor

Airports and Airfields

With the exception of the airfield at PMRF/Main Base, and the Kekaha airstrip approximately 3 mi to the southeast of PMRF and 2 mi northwest of Kekaha, there are no airfields or airports in the airspace use region of influence. Lihue Airport is located 20 nm east of PMRF, outside the region of influence. In addition to helicopter and fixed-wing aircraft landings associated with PMRF's mission, the PMRF airfield serves as a training facility for landings and takeoffs. The overall number of air operations was 13,395 for 2004. (U.S. Department of the Navy, Engineering Field Activity Chesapeake, 2006)

There is a heliport, used by PMRF personnel, located at the Makaha Ridge Instrumentation Site, as well as a heliport at Kokee Park used by State Park personnel. The standard instrument approach and departure procedure tracks for Kauai's principal airport at Lihue are all to the east and southeast of the island itself, well removed from the airspace use region of influence. (National Aeronautical Charting Office, 2007)

Air Traffic Control

Use of the airspace by the FAA and PMRF is established by a Letter of Agreement between the two agencies. Under this agreement, PMRF is required to notify the FAA by 2:00 p.m. the day before range operations would infringe on the designated airspace. Range Control and the FAA are in direct real-time communication to ensure safety of all aircraft using the airways and jet routes and the special use airspace. Within the special use airspace, military activities in Warning Areas W-186 and W-188 are under PMRF control, and the PMRF Range Control Officer is solely authorized and responsible for administering range safety criteria, the surveillance and clearance of the range, and the issuance of range RED (no firing) and GREEN (clearance to fire) status (Pacific Missile Range Facility, Barking Sands, Hawaii, 1991). Warning Area W-187 is scheduled through the Fleet Area Control and Surveillance Facility.

As Warning Areas are located in international airspace, the procedures of the International Civil Aviation Organization (ICAO), outlined in ICAO Document 444, *Rules of the Air and Air Traffic Services*, are followed. ICAO Document 444 is the equivalent air traffic control manual to FAA Handbook 7110.65, *Air Traffic Control*. The FAA acts as the U.S. agent for aeronautical information to the ICAO, and air traffic in the region of influence is managed by the Honolulu ARTCCs.

3.3.2.1.3 Biological Resources—PMRF/Main Base

Native or naturalized vegetation, wildlife, and the habitats in which they occur are collectively referred to as biological resources. Existing information on plant and animal species and habitat types in the vicinity of the proposed sites was reviewed, with special emphasis on the presence of any species listed as threatened or endangered by Federal or State agencies, to assess their sensitivity to the effects of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. For the purpose of discussion, biological resources have been divided into the areas of vegetation, wildlife, threatened and endangered species, and environmentally sensitive habitat.

The main Federal Acts that provide guidance on avoiding or minimizing impacts on biological resources are detailed in Appendix C.

Region of Influence

The region of influence for biological resources includes the area within the PMRF/Main Base property boundary and offshore areas used for testing and training. Within the region of influence, human activities have altered most of the natural terrestrial environment. The land in PMRF/Main Base is used for military activities such as air operations, rocket launches, various training, and base maintenance operations. Most of the same terrestrial species discussed below for PMRF/Main Base could also occur within the adjacent Mana Plain area.

Affected Environment

Vegetation

There are six recognized vegetation types on the undeveloped portions of PMRF/Main Base: kiawe *(Prosopis pallida*)-koa haole (*Leucaena leucocephala*) scrub, a`ali`i (*Dodonaea viscosa*)-nama (*Nama sandwicensis*) scrub, pohinahina (*Vitex rotundifolia*), naupaka (*Scaevola sericea*) dune, strand, drainage-way wetlands, and ruderal vegetation. Kiawe/koa haole and a`ali`i-nama scrub are the dominant vegetation in the undeveloped portions of the PMRF/Main Base region of influence. A well-developed native strand community exists along the shoreline. (Pacific Missile Range Facility, 2001) Common plants that inhabit the sandy beach habitat on Kauai include the beach morning glory, beach heliotrope, milo, and hau (Maragos, 1998).

Drainage-way wetlands vegetation occupies only a small area on PMRF/Main Base. Ruderal (disturbed, weedy) vegetation is present along roadsides and other areas where man has disturbed the natural vegetation, and much of this vegetation is mowed on a regular basis. The broad, white, sandy beach that fronts Majors Bay supports only sparse littoral kiawe-koa haole thickets on the northern half and native a`ali`i-nama scrub on the southern half. (Pacific Missile Range Facility, 2001)

Golden crown beard (*Verbesina enceliodes*) is a new invasive species on the Nohili dunes since the 2000 survey. It has recently begun to take over areas that were previously dominated by native vegetation such as nama. Other alien species include ironwood (*Casuarina* spp.), sourbush (*Pluchea carolinensis*), and swollen fingergrass (*Chloris barbata*). (Pacific Missile Range Facility, 2006a)

The vegetation in the Mana Plain restrictive easement area was dominated by sugar cane (*Saccharum officinarum*), ruderal vegetation, and wetlands associated with agricultural ponds and drains. Sugar cane is being phased out, and more diversified agricultural crops are being grown (Hawaii Coral Reef Assessment and Monitoring Program, 2006). The non-native, non-agricultural vegetation is dominated by kiawe/koa haole. This vegetation type is the dominant type present on the relatively undisturbed areas of the sand dunes, associated with PMRF and Polihale State Park, as well as along the cliff face in the restrictive easement area. Because of the restrictions on off-highway vehicle activities, the sand dune related vegetation within the PMRF boundary is less disturbed than the vegetation in Polihale State Park. (Pacific Missile Range Facility, 2001)

At KTF, naupaka, beach morning glory, and \`a\`ali\`i are common. Coastal dune vegetation covers much of the dunes north of KTF, which is located in the northern portion of the base. Vegetation at the Kokole Point Launch Complex in the southern portion of the base is composed of a mixture of Bermuda grass (*Cynodon dactylon*), portulaca (*Portulaca lutea*), and buffelgrass (*Cenchrus ciliaris*). (Department of Energy, 1991; Pacific Missile Range Facility, 2001)

<u>Threatened and Endangered Plant Species</u>

Table 3.3.2.1.3-1 lists threatened and endangered species known or expected to occur within the PMRF/Main Base region of influence. There is no known plant species listed as threatened or endangered on PMRF/Main Base. (Pacific Missile Range Facility, 2001)

Two Federally listed plant species have been observed north of, but not on, PMRF/Main Base. Ohai (*Sesbania tomentosa*), a spreading shrub, is a Federally endangered species that has been observed in the sand dunes to the north of PMRF/Main Base in Polihale State Park and could potentially occur on the installation, including KTF. Lau\`ehu (*Panicum niihauense*), an endangered species of rare grass, has been observed near Queens Pond also north of PMRF/Main Base. (Pacific Missile Range Facility, 2001; U.S. Department of the Navy, 1998a)

Wildlife

Birds identified at PMRF/Main Base include non-native, migratory and species endemic to Hawaii. The pueo *(Asio flammeus sandwichensis),* or Hawaiian short-eared owl, is the only endemic non-migratory bird species that occurs in the region. Non-native bird species on Kauai are usually common field and urban birds such as the non-migratory zebra dove (*Geopelia striata*) and Japanese white-eye (*Zosterops japonicus*) and the migratory ring-necked pheasant (*Phasianus colchicus*), northern cardinal (*Cardinalis cardinalis*), northern mockingbird (*Mimus polyglottos*), and house finch (*Carpodacus mexicanus*). (Pacific Missile Range Facility, 2001; 2006b)

Table 3.3.2.1.3-1. Listed Species Known or Expected to Occur in the Vicinity of PMRF/Main Base

Scientific Name	Common Name	Federal Status
Plants[1]		
Panicum niihauense	Lau`ehu	E
Sesbania tomentosa	Ohai	E
Reptiles		
Chelonia mydas	Green turtle	T
Birds		
Anas wyvilliana	Koloa maoli (Hawaiian duck)	E
Branta sandvicensis	Nene (Hawaiian goose)	E
Fulica alai	`Alae ke`oke`o (Hawaiian coot)	E
Gallinula chloropus sandvicensis	Alae ula (Hawaiian common moorhen)	E
Himantopus mexicanus knudseni	Ae`o (Hawaiian black-necked stilt)	E
Phoebastria albatrus	Short-tailed albatross**	E
Phoebastria nigripes	Black-footed albatross	P
Pterodroma phaeopygia sandwichensis	`Ua`u (Hawaiian dark-rumped petrel)	E
Puffinus auricularis newelli	`A`o (Newell's Townsend's shearwater)	T
Mammals		
Lasiurus cinereus spp. *semotus*	Hawaiian hoary bat	E
Monachus schauinslandi	Hawaiian monk seal	E

Source: U.S. Fish and Wildlife Service, 2005a; b; 2007a; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007

Notes: [1] Critical habitat has been designated on the installation for these plants.

** Observed in May 2000

Key to Federal Status:
T = Threatened
E = Endangered
P = Proposed for listing as threatened or endangered

Several species of migratory seabirds and shorebirds covered by the Migratory Bird Treaty Act (MBTA) are present during some portion of the year. Brown boobies (*Sula leucogaster*), sanderlings (*Calidris alba*), wandering tattlers (*Heteroscelus incanus*), ruddy turnstones (*Arenaria interpres*), and Pacific golden plovers (*Pluvialis fulva*) are commonly observed at PMRF/Main Base. Wedge-tailed shearwaters (*Puffinus pacificus*) nest in the Nohili dunes area. A nesting colony of wedge-tailed shearwaters is also located near the beach cottages. Nesting colony restoration efforts begun in 2006 included removing non-native trees and planting naupaka seedlings and native beach vegetation (pohinahina), ilima (*Sida fallax*), and akiaki (*Sporobolus virginicus*) seeds. The Navy built a fenced-in, 1-acre compound near the middle of PMRF to foster wedge-tailed shearwater nesting and to keep out unwanted "guests." There were an estimated 276 breeding pairs in the compound in 2006 (U.S. Navy NAVFAC Pacific Environmental Planning, 2007). The Navy also installed PVC pipe segments into the compound to provide some artificial burrows that would not collapse. (Currents, 2007)

The Laysan albatross (*Phoebastria immutabilis*), also protected under the MBTA, uses ruderal vegetation areas on the base for courtship and nesting (Pacific Missile Range Facility, 2001; 2006b).

The Laysan albatross is being discouraged from nesting at PMRF to prevent interaction between the species and aircraft using the runway. Albatross on the airfield are tagged and released on the north portion of the base or returnees are relocated to Kilauea National Wildlife Refuge in order to prevent bird/aircraft strikes. This action is accomplished under a U.S. Fish and Wildlife (USFWS) permit. During the nesting season, PMRF staff in cooperation with the U.S. Department of Agriculture's Animal and Plant Health Inspection Service and the Kauai National Wildlife Refuge Complex relocates viable PMRF albatross eggs to Kilauea Point and other north shore nest sites to replace eggs that would never hatch. All of the resulting chicks were accepted by new surrogate parents and should now return to the north shore when old enough to mate. With no chicks to feed, the adult albatross returned to the open sea. This surrogate parenting program continues through the 2007/2008 nesting season and is anticipated to continue as long as viable eggs are available at PMRF/Main Base. Thirty-seven eggs were placed with surrogate parents during the 2007 season (Burger, 2007e). (Burger, 2007a; U.S. Fish and Wildlife Service, 2005b; U.S. Department of the Navy, 1998a; U.S. Army Space and Missile Defense Command, 2001)

Feral dogs (*Canis familiaris*) and cats (*Felis catus*) occur in the region and prey on native and introduced species of birds. Rodents including the Polynesian black rat (*Rattus exulans*), Norway or brown rat (*Rattus norvegicus*), and the house mouse (*Mus musculus*) are also known to occur in the region. (U.S. Department of the Navy, 1998a; U.S. Army Space and Missile Defense Command, 2001) PMRF has an ongoing feral animal-trapping program to protect the albatross as well as the wedge-tail shearwater and other birds on base (Burger, 2007a). Reptiles observed on PMRF/Main Base during recent surveys were the house gecko (*Hemidactylus frenatus*), mourning gecko (*Lepidodactylus lugubris*), and snake-eyed skink (*Cryptoblepharus poecilopleurus*). The only amphibian observed was the marine toad (*Bufo marinus)*. (Pacific Missile Range Facility, 2006c; U.S. Department of the Navy, 1998c; U.S. Army Space and Missile Defense Command, 2001)

Wildlife on KTF is similar to that described above for PMRF/Main Base. Birds on KTF include resident species such as the red junglefowl (*Gallus gallus*), ring-necked pheasant, and northern mockingbird. Non-resident species identified include the short-eared owl, brown noddy (*Anous stolidus*), and great frigate bird (*Fregata minor*). The Laysan albatross has also been observed in the KTF area. Feral dogs and cats occur in the region. Rodents including the roof rat (*Rattus rattus*), Norway or brown rat, and the house mouse are also expected to be present on KTF. (Pacific Missile Range Facility, 2001)

Threatened and Endangered Wildlife Species

Seven birds Federally listed as threatened or endangered are potentially present or confirmed in the PMRF area (Table 3.3.2.1.3-1). The black-footed albatross, a seabird that has recently been proposed for listing as threatened or endangered (U.S. Fish and Wildlife Service, 2007b), has also been observed on PMRF. According to the Navy and USFWS, the nene (*Branta sandvicensis*) is present on PMRF/Main Base (U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007). Kauai provides the majority of Hawaii's habitat for the threatened Newell's shearwater. The Newell's shearwater nests from April to November in the interior mountains of Kauai. Fledglings leave the nesting grounds at night in October and November and head for the open ocean. They may become temporarily blinded by lights when flying near brightly lit urban areas or street lights, and some may collide with trees, utility lines and light poles, buildings, and automobiles. PMRF personnel have retrofitted their outdoor lighting with hoods that direct the lights downward to prevent confusing the seabirds, which can be disoriented by upward- and outward-shining lights (Honolulu Advertiser, 2006). (Audubon, 2006; Hawaii Department of Land and Natural Resources, no date[a])

The Hawaiian dark-rumped petrel, which is federally listed as endangered and protected by the MBTA, arrives in February and may traverse the area from its nesting grounds to the sea. On Kauai, several grounded dark-rumped petrel fledglings have been collected in recent years as part of the Newell's shearwater recovery program. Most birds have been found near the mouth of Waimea Canyon, indicating that some birds still breed in the vicinity. Dark-rumped petrels are nocturnal over land and are active from about 1 hour after sunset until about 1 hour before sunrise. Nesting occurs from April through May. Chicks begin hatching in late June and fledge in late October to November, slightly earlier than that of the Newell's Townsend's shearwater. (Audubon, 2006; Virginia Tech Conservation Management Institute, 1996)

The Hawaiian coot (*Fulica alai*), Hawaiian black-necked stilt (*Himantopus mexicanus knudseni*), Hawaiian common moorhen (*Gallinula chloropus sandvicensis*), and Hawaiian duck (*Anas wyvilliana*) are endangered waterbirds that have been observed in the drainage ditches and ponds on PMRF/Main Base. The Hawaiian coot, black-necked stilt, and common moorhen are listed as migratory species (U.S. Fish and Wildlife Service, 2006c), but nest year-round, May through September, and April through October respectively. (U.S. Department of the Navy, 1998a)

The Hawaiian hoary bat (*Lasiurus cinereus* spp. *semotus*) is listed as a Federal and State endangered species. It has been recorded at PMRF; a group of four was observed foraging around the sewage treatment ponds, and another group of five bats was seen just offshore of northern PMRF/Main Base. It has also been observed at the Polihale State Park north of the base. (Pacific Missile Range Facility, 2001)

The threatened Newell’s shearwater and endangered Hawaiian coot, Hawaiian black-necked stilt, Hawaiian common moorhen, and Hawaiian duck are potentially present or confirmed within or near the KTF area. The endangered Hawaiian hoary bat has been observed at the Polihale State Park north of KTF. (Pacific Missile Range Facility, 2001)

Two marine wildlife species Federally and State listed as threatened or endangered commonly occur on PMRF/Main Base. The endangered Hawaiian monk seal has been observed at PMRF. The first Hawaiian monk seal birth recorded on a Kauai beach since 1993 occurred on PMRF in 1999 (Marine Mammal Commission, 2003; Pacific Missile Range Facility, 1999). Two and three pups were born on Kauai beaches in 2003 and 2004 respectively (Kauai Monk Seal Watch Program, 2003; National Oceanic and Atmospheric Administration, 2006d; National Marine Fisheries Service, 2007e). Three pups were born on Kauai in 2005 and four pups were born in 2006 (National Oceanic and Atmospheric Administration, 2006d; National Marine Fisheries Service, 2007e). Pups are born between February and August. Sitings of Hawaiian monk seal haul outs are documented by the PMRF Environmental Office.

Green turtles have been observed basking on shore in the vicinity of Nohili Ditch; the only area where basking/haul-out activity on PMRF/Main Base is observed. The PMRF Natural Resources Manager monitors sea turtle activity at PMRF. Green turtles have not nested anywhere along the beachfront. In the past 3 years only one apparent “false nesting” has been observed. (Burger, 2007b) Security patrols reports include a record of the presence and locations of turtles. Any records of green turtle sitings are maintained by the PMRF Environmental Office. (Pacific Missile Range Facility, 2001)

Environmentally Sensitive Habitat

Wetlands

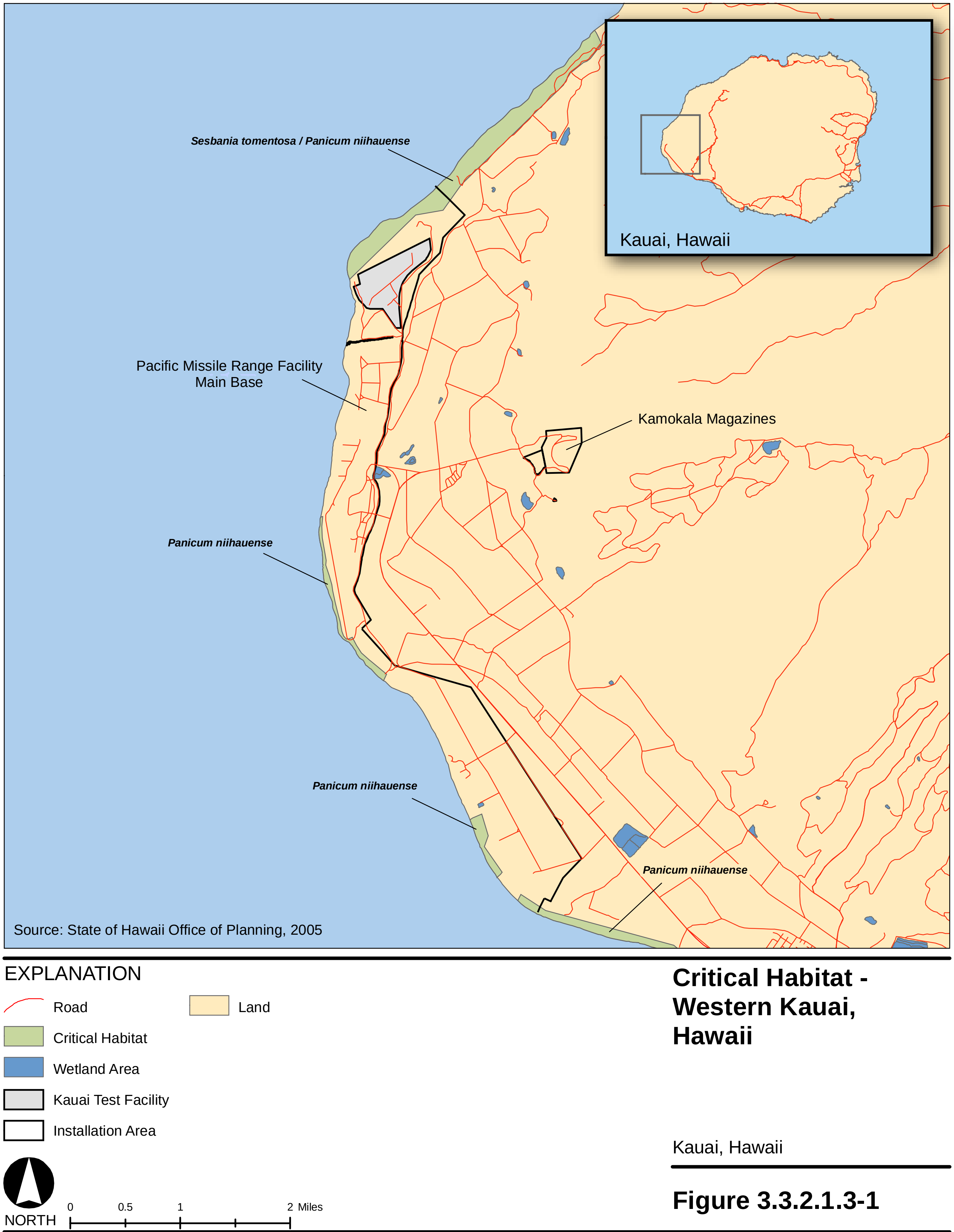
Wetlands are associated with (1) the Mana base pond located outside the industrial area of the facility boundaries; (2) Kawaiele wildlife sanctuaries that include a State Waterbird Refuge for Hawaii's four endangered waterbird species, created at Mana during a sand removal program; and (3) agricultural drains from the Nohili and Kawaiele ditches within PMRF/Main Base. (National Wetlands Inventory, 2007) The freshwater discharge at Nohili Ditch appears to be at least partially responsible for the preferred turtle foraging habitat since it stimulates filamentous algae growth on the nearshore reef bench (Commander, Navy Region Hawaii, 2007).

Two marine system, subtidal subsystem, reef class, coral subclass, subtidal wetlands exist along part of the coastline west of KTF. (Pacific Missile Range Facility, 2001)

Critical Habitat

A proposed rule to designate critical habitat for 76 listed plant species on the islands of Kauai and Niihau published in November 2000 (U.S. Fish and Wildlife Service, 2000) included land in the northwestern end of PMRF near Polihale Park as critical habitat for the endangered ohai and lau`ehu. In January 2002, the USFWS proposed critical habitat for additional plant species on Kauai and Niihau, revising the total number of plants to 83, which included additional land in the southern portion of PMRF for protection of lau`ehu. (U.S. Fish and Wildlife Service, Pacific Region, 2002; U.S. Fish and Wildlife Service, 2002) The USFWS reevaluated the dune habitat on PMRF and the habitat on Navy land at Makaha Ridge and determined that these lands were not essential for the conservation of ohai or dwarf iliau (*Wilkesia hobdyi*, found on Makaha Ridge). Although lau`ehu does not grow on PMRF/Main Base, the USFWS has determined that land on PMRF adjacent to Polihale State Park and dune areas along the southern portion of the range contain primary constituents necessary for the recovery of lau`ehu because not enough areas exist outside of PMRF (Figure 3.3.2.1.3-1). The USFWS designated these areas as unoccupied critical habitat because there are not enough other areas outside the base that contain the elements to achieve the USFWS's goal of 8 to 10 populations. (U.S. Fish and Wildlife Service, 2003a)

The areas of unoccupied critical habitat for the lau`ehu established along the coast of PMRF include the KTF coastal area and the area adjacent to Kokole Point. Lau`ehu has not been observed on KTF. (Pacific Missile Range Facility, 2001; U.S. Fish and Wildlife Service, 2003a)



Critical Habitat - Western Kauai, Hawaii

Kauai, Hawaii

Figure 3.3.2.1.3-1

3.3.2.1.4 Cultural Resources—PMRF/Main Base

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The region of influence for terrestrial cultural resources at PMRF/Main Base/KTF consists of areas throughout the installation. These areas include existing launch pads and locations for the construction of new facilities and infrastructure features (e.g., Directed Energy facilities) (see Figures 2.2.2.5.1-2, 2.2.3.6.4-5, and 2.2.4.5-1). Survey data indicate that most of the proposed construction locations are surficially devoid of archaeological sites; however, subsurface archaeological and traditional cultural materials (particularly burials) could be present anywhere within the boundary of the installation. Locations for the proposed warehouse and consolidated Range Operations complex (see Figure 2.2.3.6.4-5) are located with an area of medium sensitivity for burials. Building 282, where a new Automatic Identification System antenna is planned, has not been recommended as a historic building (see Appendix H).

Affected Environment

Archaeological Resources (Prehistoric and Historic)

Brief Prehistory/Early History

PMRF/Main Base and KTF are situated in a region known as Mana. Throughout prehistory, large areas of the Mana Plain were covered by the great Mana swamp, allowing Native Hawaiians to canoe as far south as Waimea (Von Holt, 1985; State of Hawaii, 1993). It is believed that these wet conditions encouraged the independent invention of aquaculture on Kauai and the construction of stone and earthen ponds for growing staples such as taro, yam, and sweet potatoes (Kikuchi, 1987). After the arrival of Europeans to the island, aquaculture transitioned to agriculture through the eventual draining of the swamp and the cultivation of sugar cane and rice. The first successful sugar plantation to export from the islands was established at Koloa in 1835 (Hawaii Visitors Bureau, 1993), and by the 1930s, nearly all of the Mana swamp had been filled to produce this crop.

Brief Military History

In 1940, 549 acres in Mana were deeded to the U.S. War Department for an Army Air Corps flight training field. The Navy was given permission to use the facilities in 1944; however, after the Air Force was established (1947), it assumed control of the facility (redesignated Barking Sands Air Force Base), and continued operations through the Korean War years. In 1953, the base was re-named Bonham Air Force Base and in 1961, the U.S. Departments of the Air Force and Navy were operating the facility under a joint use agreement. In 1964, 1,884 acres of the Mana Plain were officially transferred to the Navy, and by 1966 the facility was renamed PMRF (International Archaeological Resources Institute, Inc., 2005).

Throughout the Cold War years (1946-1991), PMRF supported both offensive and defensive Cold War missions, including offensive weapons managed by the Navy, air defense weapons managed by the Hawaii Air National Guard, and research into ballistic missile defensive systems. PMRF also supported atmospheric nuclear testing by the Atomic Energy Commission, which led to the establishment of the KTF in the early 1960s. In 2007, PMRF is the largest instrumented multi-environment test range in the world. The range is unique in providing realistic testing environments for anti-submarine, air, surface, and subsurface weapons systems. The installation also provides services for training, tactics development, and evaluation of air, surface, and subsurface weapons systems for the Navy, other Department of Defense (DoD) agencies, foreign military forces, and private industry (International Archaeological Resources Institute, Inc., 2005).

Native Hawaiian (Traditional) Information

Mana is an area specifically referred to in Hawaiian literature and oral tradition as a leina-a-ka-uhane, a place (generally cliffs or seacoast promontories) where the spirits of men, after death, plunge into eternity and are divided into one of three spiritual realms: the realm of the wandering spirits; the realm of the ancestral spirits; or the realm of the endless night (Han, et al., 1986; Fornander, 1917). Typical of Native Hawaiian mortuary practices, burial sites believed to be associated with the Mana leina-a-ka-uhane have been identified throughout the area.

Large portions of PMRF have been systematically surface surveyed for archaeological resources; however, subsurface features may still be present (West and Desilets, 2005). Previous investigations have identified a variety of prehistoric and historic resources, including burial sites, heiaus (temples), campsites, house sites, lithic (stone) scatters, aquaculture ponds, and modern military-associated sites, any or all of which could be potentially eligible for inclusion in the National Register of Historic Places (NRHP). Appendix H includes a list of significant archaeological and traditional resources (International Archaeological Resources Institute, Inc., 2005).

Historic Buildings and Structures

Since 1991, several architectural evaluations have been conducted for PMRF, including PMRF/Main Base, Kamokala Ridge, and Port Allen (Drolet et al., 1996; Rechtman, et al., 1998). The evaluations covered pre-military facilities and features, as well as World War II and Cold War era resources. Appendix H includes a list of the buildings and structures recommended eligible for inclusion in the NRHP (International Archaeological Resources Institute, Inc., 2005).

Traditional Resources

Traditional resources can include archaeological sites, burial sites, ceremonial areas, natural features (e.g., caves, mountains, water sources, trails, plant habitat, or gathering areas), or any other natural area important to a culture for religious or heritage reasons. As such, many of the cultural materials identified within the region of influence could also be considered traditional resources. In addition to Native Hawaiians, several other cultures have also inhabited the island of Kauai. These include the Japanese, Korean, Portuguese, Chinese, and Filipino. A Japanese cemetery is located within the boundary of PMRF, and cemeteries associated with each of the other cultures are located near Kekaha, Hanapepe, and Waimea.

A comprehensive cultural study of the Mana Plain was carried out by Flores and Kaohi in 1992 as part of investigations related to the proposed Strategic Defense Command Energy Dispersive X-Ray Analysis project (U.S. Army Strategic Defense Command, 1990). This study included historical research, review of documented Hawaiian traditions, and oral history interviews with knowledgeable local residents.

Intensive historical research and a review of traditions were also undertaken by Maly and Wulzen (1997) as part of an extensive reconnaissance survey of PMRF Barking Sands and Makaha Ridge. Oral histories were collected by McGerty and Spear (1997) for a project that technically covered an area inland of PMRF Barking Sands. Oral history information, however, is pertinent to the Mana Plain in general and thus provides a cultural context for PMRF.

In 1999, traditional cultural properties on Navy lands in Hawaii were assessed. The PMRF research was conducted by Alitha Kachi and Kalani Flores, with some additional research by Tuggle and Tomonari-Tuggle. The assessment lists Kawaiele Ditch, Nohili Dune, and Elekuna Heiau as potential traditional cultural properties. Identified traditional Hawaiian sites under the jurisdiction of PMRF are listed in Appendix H. Traditional sites recommended as eligible for listing in the NRHP are listed in Appendix H.

Burials

Burials are the most significant cultural resources concern within the sandy soils of PMRF. There have been numerous inadvertent discoveries of human remains in both the coastal and back bay areas of the installation. The sites represent both traditional Hawaiian and Plantation-era periods (see Appendix H).

3.3.2.1.5 Geology and Soils—PMRF/Main Base

Geology and soils are considered earth resources that may be adversely affected by proposed training and RDT&E activities. This resource is described in terms of existing information on the land forms, geology, and associated soil development as it may be subject to erosion, flooding, mass wasting, mineral resource consumption, contamination, and alternative land uses resulting from proposed construction and launch activities. Appendix C includes a description of geology and soils.

Region of Influence

Geology and soils are considered resources that may be adversely affected by proposed training and RDT&E activities. These resources are described in terms of existing information on land forms, geology, and associated soil development.

Affected Environment

Physiography

PMRF/Main Base is situated on a strip of low-lying coastal terrace called the Mana Plain. The plain bounds the western flank of the island, forming gentle westerly slopes ranging from about 2 percent near the volcanic uplands to relatively flat over the coastal margin occupied by PMRF/Main Base. The plain does not form cliffs at the PMRF/Main Base shoreline. Local relief is formed by low beach barrier dunes, mildly undulating blanket sands, and the more prominent Nohili Dune located in the northern portion of PMRF/Main Base, adjacent to the northwestern side of KTF at Nohili Point. Ground elevations over the facility average between 10 ft to 20 ft, rising to 100 ft at Nohili Dune. PMRF/Main Base is not traversed by perennial or ephemeral streams. Surface runoff is controlled by manmade channels located at Nohili Ditch on northern PMRF/Main Base, Kawaiele Drainage in central PMRF/Main Base, and a drainage channel just south of Kawaiele Drainage.

Geology

Kauai is the result of a massive shield volcano, part of the chain of similar volcanoes that migrated northwest to southeast to form the Hawaiian archipelago. Kauai is the oldest of the eight main islands. Volcanic rocks exposed in the western half of the island are composed of Pliocene basaltic flows of the Waimea Volcanic Series (U.S. Army Strategic Defense Command, 1992). The volcanic terrain forms an abrupt, crescent-shaped scarp at the eastern boundary of the Mana Plain, the result of wave action from a higher sea stand. The surface of the volcanic basement complex plunges beneath the Mana Plain at approximately 5 degrees (U.S. Army Strategic Defense Command, 1992).

The Mana Plain is composed of alluvium, lagoon, beach, and dune deposits that overlie the volcanic basement. This sedimentary sequence forms a wedge that thickens east to west, attaining an approximate thickness of 200 ft at the eastern base boundary, increasing to about 400 ft at the coast (U.S. Army Strategic Defense Command, 1992). Older and younger terrestrial alluvium interfingers with gypsum-bearing clayey lagoonal deposits and marine offshore deposits at depth. Sediments are characteristically red and brown near volcanic outcrops, changing to tan and gray calcareous sand near the coast.

The surface of the Mana Plain typically consists of loose sand associated with younger (Modern) alluvium and flattened dunes with little relief (U.S. Army Strategic Defense Command, 1992). The dune sands can be of substantial thickness along the coastal margin where they have been reported to be in excess of 42 ft thick at the Kokole Point housing area (U.S. Army Strategic Defense Command, 1992). The dunes are composed of loose fine sand and silty sand that is weakly to strongly indurated (hardened) a few meters below ground surface. This indurated surface can form resistant remnants, or fossil dunes, fronting the beach along some reaches of the PMRF shoreline. The beach berm is about 10 ft high and is breached only where drainage canals have been excavated at Nohili and Kawaiele (U.S. Army Strategic Defense Command, 1992).

Coral reefs developed on the eroded platform around the island when the sea was about 5 ft above its current level (U.S. Army Strategic Defense Command, 1992). Wave action has eroded the coral surface, creating a primary source for beach sand which is actively being deposited and reworked along the shoreline. Coral reefs are also discussed in Section 3.3.1.1.1. Beach sand is generally medium to coarse grained.

Soil

The U.S. Department of Agriculture Soil Conservation Service published a soil survey that includes the surficial deposits of the Mana Plain (PMRF and Easement areas). The dominant soil within the PMRF area has been mapped as Jaucas loamy fine sand, 0 to 8 percent slopes (U.S. Army Strategic Defense Command, 1992). The U.S. Department of Agriculture describes this soil as occurring on old (inactive) beaches and on windblown sand deposits. It is pale brown to very pale brown sand, and in some cases it is more than 5 ft deep. In many places, the surface layer is dark brown as a result of accumulated organic matter and alluvium. The silt is neutral to moderately alkaline through its profile. It has an available water capacity of 0.05 to 0.07 inch per foot of soil (U.S. Army Strategic Defense Command, 1992). The soils are permeable, and infiltration is rapid. Wind erosion is severe where vegetation has been removed.

Along the ocean margin of PMRF/Main Base are areas of active dunes and beaches. Dune lands consist of hills and ridges of sand drifted and piled by the wind. The hills and ridges are actively shifting, or so recently stabilized that no soil horizons have developed. The sand is chiefly calcareous, derived from coral and seashells (U.S. Army Strategic Defense Command, 1992).

Soil samples at the Vandal launch site were obtained to determine if lead concentrations exceeded the 400 milligrams per kilogram (mg/kg) cleanup goal established by the Hawaii Department of Health for residential use. No site soil samples had lead concentrations exceeding 400 mg/kg prior to the 1994 Vandal launches. After five 1994 launches, two sites contained lead concentrations exceeding 400 mg/kg. Both of these sites were located within 50 ft of the launch site. Concentrations of lead 100 ft away in the same direction were only 30 and 75 mg/kg. None of the lead concentrations outside this 100-ft range were above the reporting limit. (U.S. Department of the Navy, Naval Facilities Engineering Command, Pearl Harbor, 1996)

Although the Vandal target missile is no longer used, past launches from PMRF appear to have caused elevated lead concentrations in soil only within 100 ft of the launch mechanism. The locations of these soil samples suggest that lead concentrations do not pose an immediate risk to human health because the launch pad is restricted from public access and that none of the apparently contaminated sand has been or will be transported to the beach.

A study was conducted by the Department of Energy to determine if elevated aluminum concentrations occur at PMRF/Main Base and/or KTF as a result of rocket emissions. Analysis of background aluminum levels from Mana Plain soils ranged from 0.2 to 1.1 ounces per pound (oz/lb). Kauai soil aluminum values range from 0.09 to 0.7 oz/lb. Deposits of gibbsite, the trihydrate of aluminum oxide, occur naturally in the high rainfall areas of windward Kauai (Land Study Bureau, 1967). The study suggested that if there has been an increase in the amount of aluminum in the soil at PMRF/Main Base as a result of rocket emissions, the total amount is still less than nearby soils.

KTF also tested for lead and found levels up to 270 mg/kg and indicated that these were not “actionable levels” (U.S. Army Strategic Defense Command, 1992). The KTF report described studies of lead poisoning in children, which found that levels of lead of 300 to 400 mg/kg (300 to 400 parts per million) are acceptable. An additional study of the soils of the Mana Plain and KTF area revealed that chloride and pH do not indicate residual effects from past missile launches at KTF.

3.3.2.1.6 Hazardous Materials and Waste—PMRF/Main Base

Appendix C includes a discussion of hazardous materials and waste resource laws and regulations.

Region of Influence

The region of influence for hazardous materials and hazardous waste would be limited to areas of PMRF/Main Base, including KTF, to be used for launch preparation, launch, and post-launch activities and in areas where hazardous materials are stored and handled.

Affected Environment

Hazardous Materials

PMRF manages hazardous materials through the Navy's Consolidated Hazardous Materials Reutilization and Inventory Management Program (CHRIMP). CHRIMP mandates procedures to control, track, and reduce the variety and quantities of hazardous materials in use at facilities. The CHRIMP concept established Hazardous Materials Minimization Centers as the inventory controllers for Navy facilities. All departments, tenant commands, and work centers must order hazardous materials from the Hazardous Materials Minimization Centers, where all such transactions are recorded and tracked. The exception to this is KTF, which obtains its hazardous materials through Department of Energy channels. Hazardous materials on PMRF are managed by the operations and maintenance contractor through CHRIMP. Hazardous materials managed through the CHRIMP program other than fuels are stored in Building 338. Typical materials used on PMRF/Main Base and stored at Building 338 include cleaning agents, solvents, and lubricating oils.

PMRF has management plans for oil and hazardous materials outlined in the *PMRF Spill Prevention Control and Countermeasures Plan* and the *Installation Spill Contingency Plan.* These plans regulate both PMRF/Main Base as well associated sites and tenant organizations, including KTF, Makaha Ridge, Kokee, Kamokala Magazines, and Port Allen.

PMRF has developed programs to comply with the requirements of the Superfund Amendments and Reauthorization Act Title III and Emergency Planning and Community Right-to-Know Act. This effort has included submission to the State and local emergency planning committees of annual Tier II forms, which are an updated inventory of chemicals or extremely hazardous substances in excess of threshold limits. These chemicals at PMRF include jet fuel, diesel fuel, propane, gasoline, aqueous fire fighting foam, chlorine, used oil, paint/oils, and paint.

Hazardous Waste Management

PMRF/Main Base is a large-quantity hazardous waste generator with a USEPA identification number. Hazardous waste on PMRF is not stored beyond the 90-day collection period. In 2004, PMRF/Main Base generated 35,613 lb of hazardous waste.

PMRF/Main Base has two accumulation points on base for hazardous wastes: Building 392 and Building 419. Building 392 accumulates all base waste except for OTTO (torpedo) fuel, a liquid monopropellant. Building 419 is the torpedo repair shop. At present, both buildings are not used at their maximum hazardous waste storage capacity. KTF has one hazardous waste accumulation point. Makaha Ridge and Kokee generate only used oil, which is recycled. Port Allen activities generate used oil and oily bilge water, which are taken to PMRF/Main Base to be recycled and processed. The oily bilge water is processed through an oil/water separator and then is fed into the PMRF/Main Base sewage treatment plant.

PMRF outlines management and disposal procedures for used oils and fuels in the Hazardous Waste Management Plan. PMRF maintains a Used Oil transporter/Processor Permit through the Hawaii Department of Health. Additionally, degraded jet fuel is used in crash-fire training events. The majority of wastes are collected and containerized at PMRF/Main Base for direct offsite disposal through the Defense Reutilization and Marketing Office (DRMO) at Pearl Harbor within 90 days. The DRMO provides for the transportation and disposal of the wastes to the final disposal facility.

KTF is a small-quantity hazardous waste generator and has a USEPA identification number. There is one hazardous waste accumulation point on KTF; however, KTF has not generated enough hazardous waste for disposal since becoming a small quantity generator in 1994. (Sandia National Laboratories, 2006)

<u>Pollution Prevention/Recycling/Waste Minimization</u>

PMRF has a pollution prevention plan in place for the Main Base and all sites on Kauai, which follows CHRIMP procedures for controlling, tracking, and reducing hazardous materials use and waste generation. PMRF/Main Base currently has three hazardous waste elimination programs in place. These involve recycling toner cartridges, mercury from mercury lamps, and acid/lead batteries.

<u>Installation Restoration Program</u>

PMRF/Main Base has 19 Installation Restoration Program (IRP) sites. Two fire fighting training pits, the battery acid disposal, three former oil change pits, a battery acid neutralization unit and the torpedo post run facility require no further action based on the results of past investigations and approval by the Hawaii Department of Health. Three landfills (5, 6, and 7), tanker truck pod facility, former missile (Regulus) defueling pit, and the former oil/fuel pipeline are scheduled to be investigated in FY 2011. A site investigation of transformer sites (four) and the reclamite asphalt rejuvenation burial areas is complete. A recommendation for a No Further Action was sent to the Hawaii Department of Health for these sites.

KTF has no Environmental Restoration sites. Three Environmental Restoration sites were identified in 1995 and were given a No Further Action determination by USEPA in 1996 (Sandia National Laboratory, 2006).

<u>Underground and Aboveground Storage Tanks</u>

PMRF/Main Base has nine 50,000-gal field constructed underground storage tanks (USTs) located at the Fuel Farm, one 30,000-gal UST located at the Power Plant, two 5,000-gal USTs at the Navy Exchange, three 5,000-gal USTs at the gasoline station, and one 1,000-gal UST at the Calibration Lab. With the exception of the field constructed tanks, all tanks are double-walled, fiberglass-reinforced plastic. All USTs are equipped with a leak detection system. (Burger, 2006)

There are two 25,000-gal aboveground storage tanks (ASTs) at the Kokee Power Plant, two 6,000-gal diesel ASTs and one 1,000-gal AST at Makaha Ridge, three 200-gal ASTs near building 510 and one 1,000-gal AST near building 450. All tanks have proper capacity spill containment systems. (Burger, 2006)

There is one UST and one 10,000-gal aboveground fuel tank at KTF. KTF complies with PMRF's management plans for oil and hazardous materials outlined in the *PMRF Spill Prevention Control and Countermeasures Plan* and the *Installation Spill Contingency Plan.* (Sandia National Laboratories, 2006)

Asbestos, Lead-Based Paint, and Polychlorinated Biphenyls

PMRF manages asbestos in accordance with the base asbestos management plan. Prior to any construction projects, areas to be disturbed are surveyed for asbestos, and any asbestos is removed, before disturbance, by a certified asbestos contractor. The handling of hazardous materials and the potential generation and disposal of hazardous wastes follow ongoing, standard, and applicable regulations and procedures at PMRF.

All facilities associated with PMRF follow its lead-based paint management plan. The exception is KTF, which follows Department of Energy plans for the removal of lead-based paint wastes.

No known components at PMRF/Main Base contain polychlorinated biphenyl (PCBs). In the event that components containing PCBs are found at PMRF/Main Base and become waste, they would be labeled according to the Toxic Substances Control Act, 40 CFR 761, requirements for shipping, and disposed of through the DRMO or a contractor within 1 year of the waste's initial storage.

KTF follows the Department of Energy plans for the removal of any lead-based paint wastes. The transformers on the KTF site have been tested and are free of PCBs, and there are no asbestos issues at the site. (Sandia National Laboratory, 2006)

Liquid Fuels and Other Toxic Fuels

PMRF uses gasoline and diesel fuels to power range trucks and equipment. Aircraft at PMRF utilize jet fuel and Jet-A. Jet-A is available at the fuel farm near the airfield. Both aircraft fuels are delivered to the flight line in refuelers.

3.3.2.1.7 Health and Safety—PMRF/Main Base

Health and safety includes consideration of any activities, occurrences, or training and RDT&E activities that have the potential to affect one or more of the following:

The well-being, safety, or health of workers—Workers are considered to be persons directly involved with the training and RDT&E activities producing the effect or who are physically present at the site.

The well-being, safety, or health of members of the public—Members of the public are considered to be persons not physically present at the location of the training and RDT&E activities, including workers at nearby locations who are not involved in the training and RDT&E activities and the off-base population. Also included within this category are hazards to equipment, structures, plants, and wildlife.

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for potential impact related to the health and safety of workers includes work areas associated with range operations, training, and RDT&E activities. The population of concern includes the workers employed at PMRF/Main Base, including KTF, but also encompasses the contractor, military, and government civilian personnel directly involved with range operation, training, and RDT&E activities.

The region of influence for potential impact related to public health and safety includes the areas of Kauai County and the island of Kauai and Niihau affected by range operations, training, and RDT&E activities. These areas include the PMRF overwater training areas. The population of concern consists of visitors to Kauai and permanent residents living in Kauai County.

Affected Environment

PMRF takes every reasonable precaution during the planning and execution of the range operations, training, and RDT&E activities to prevent injury to human life or property. In addition to explosive, physical impact, and electromagnetic hazards, potential hazards from chemical contamination, ionizing and non-ionizing radiation, radioactive materials, and lasers are studied by PMRF Range Safety Office to determine safety restrictions. In addition, Appendix K includes a discussion in general terms of the potential health and safety hazards associated with missile launch activities and the corresponding procedures that are in place to protect people and assets.

Range Safety

Range Safety at PMRF is controlled by Range Control, which is responsible for hazard area surveillance and clearance and control of all PMRF operational areas. Range Control maintains real time surveillance, clearance, and safety at all PMRF areas including PMRF/Main Base. PMRF sets requirements for minimally acceptable risk criteria to occupational and non-occupational personnel, test facilities, and non-military assets during range operations. For all range operations at PMRF, the Range Control Officer requires a safety plan. A Range Safety Operation Plan (RSOP) is generated by PMRF Range Safety personnel prior to range operations.

The PMRF Range Safety Office is responsible for establishing Ground Hazard Areas and Launch Hazard Areas over water beyond which no debris from early flight termination is expected to fall. The Ground and Launch Hazard Areas for missile launches are determined by size and flight characteristics of the missile, as well as individual flight profiles of each flight test. Data processed by ground-based or onboard missile computer systems may be used to recognize malfunctions and terminate missile flight. Before a launch is allowed to proceed, the range is determined cleared using input from ship sensors, visual surveillance from aircraft and range safety boats, radar data, and acoustic information.

Other safety areas under PMRF's control include radars, explosives, and airspace. All range users must: (1) provide a list of project materials, items, or test conditions that could present hazards to personnel or material through toxicity, combustion, blast, acoustics, fragmentation, electromagnetic radiation (EMR), radioactivity, ionization, or other means; (2) describe radiation, toxic, explosive, or ionization problems that could accumulate as a result of their tests; (3) provide aerodynamic and flight control information, and destruct system information and parameters; (4) submit plans, specifications, and procedural or functional steps for events and activities involving explosives to conform to criteria in the PMRF instruction; and (5) provide complete operational specifications of any laser to be used and a detailed description of its planned use. (U.S. Department of the Navy, 1998a)

Missile Flight Analysis

PMRF conducts missile flight safety, which takes into account potential hazards from chemical contamination, ionizing and non-ionizing radiation, radioactive materials, and lasers in accordance with Naval Air Warfare Center Weapons Division Instruction. Missile flight safety includes analysis of missile performance capabilities and limitations, of hazards inherent in missile operations and destruct systems, and of the electronic characteristics of missiles and instrumentation. It also includes computation and review of missile trajectories, launch azimuths, kinetic energy intercept debris impact areas, and hazard area dimensions, review and approval of destruct systems proposals, and preparation of the RSOP required of all programs at PMRF. These plans are prepared by the PMRF Safety Office for each mission and must be approved by the Commanding Office prior to any launch. Launch is only allowed when the risk levels are less than the acceptable risk criteria in PMRF Instruction 8020.16, which are equivalent to the criteria developed by the Range Commanders Council (e.g., RCC 321).

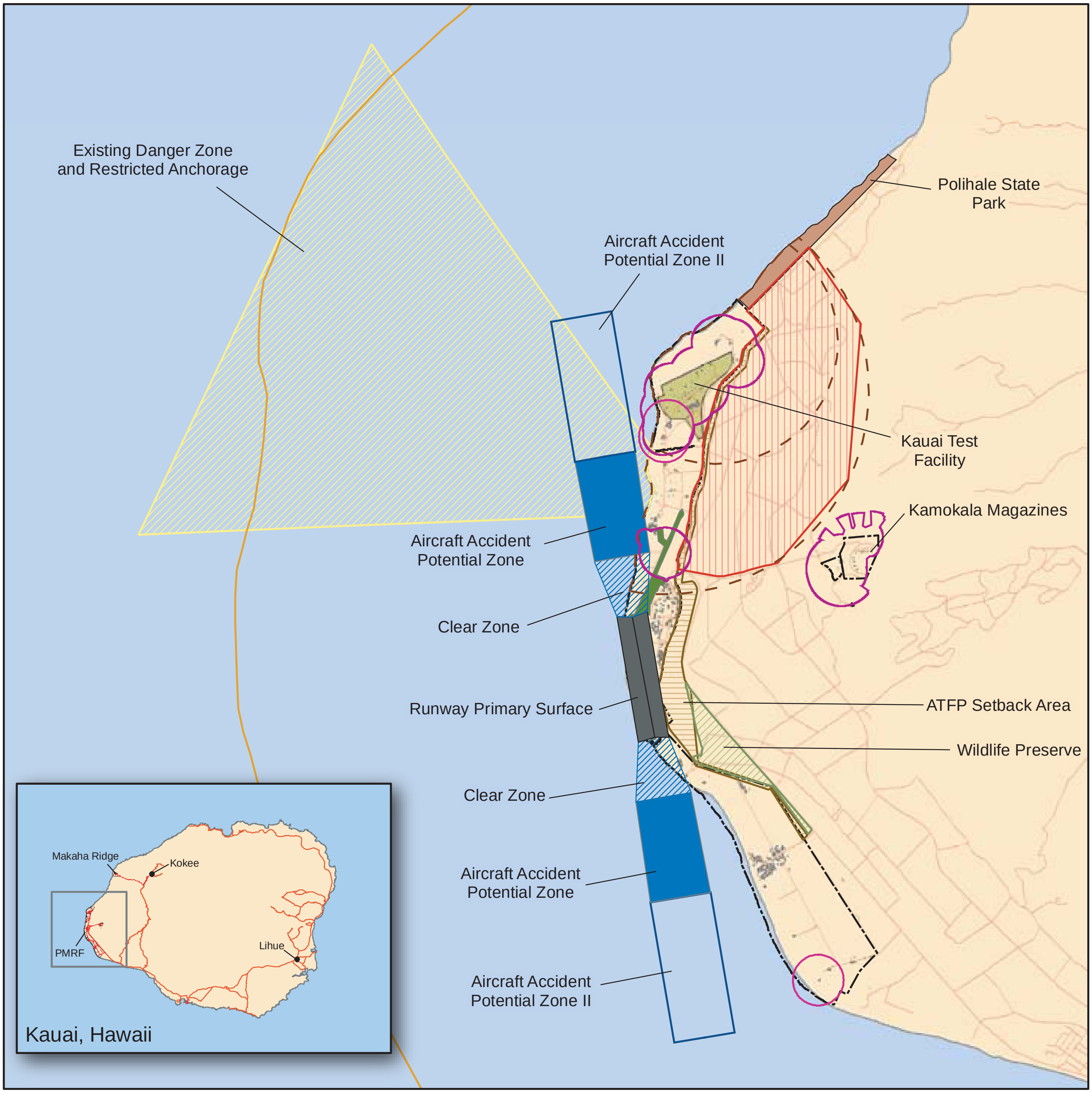
Ground Safety

The Range Control Officer using PMRF assets is solely responsible for determining range status and setting RED (no firing – unsafe condition due to a fouled firing area) and GREEN (range is clear and support units are ready to begin the event) range firing conditions. The Range Safety Approval and the RSOP documents are required for all weapons systems using PMRF (U.S. Department of the Navy, 1998a). PMRF uses RCC 321, *Common Risk Criteria for National Test Ranges*. RCC 321 sets requirements for minimally-acceptable risk criteria to occupational and non-occupational personnel, test facilities, and non-military assets during range operations. Under RCC 321, the general public shall not be exposed to a probability of casualty greater than 1 in 10 million for each individual during any single mission and a total expectation of casualty must be less than 30 in 1 million. (Range Commanders Council, Range Safety Group, 2002) Figure 3.3.2.1.7-1 shows the PMRF health and safety areas including the Ground Hazard Areas associated with missile launch activities at PMRF/Main Base.

To ensure the protection of all persons and property, standard operating procedures (SOPs) have been established and implemented for the Ground Hazard Areas. These SOPs include establishing road control points and clearing the area using vehicles and helicopters (if necessary). Road control points are established 3 hours prior to launches. This allows security forces to monitor traffic that passes through the Ground Hazard Areas. At 20 minutes before a launch, the Ground Hazard Area is cleared of the public to ensure that, in the unlikely event of early flight termination, no injuries or damage to persons or property would occur. After the Range Safety Officer declares the area safe, the security force gives the all-clear signal, and the public is allowed to reenter the area. (U.S. Department of the Navy, 1998a) No inhabited structures are located within the off-base sections of the Ground Hazard Area. The potential for launch-associated hazards are further minimized through the use of the PMRF Missile Accident Emergency Team. This team is assembled for all launches from PMRF facilities and on-call for all PMRF launches in accordance with PMRF Instruction (PMRFINST) 5100.1F.

Ordnance Management and Safety

Ordnance safety includes procedures to prevent premature, unintentional, or unauthorized detonation of ordnance. Any program using a new type of ordnance device for which proven safety procedures have not been established requires an Explosive Safety Approval before the



EXPLANATION

- Road
- 3-Nautical Mile Line
- Existing ESQD Arc
- 6,000-Foot and Modified 10,000-Foot Ground Hazard Area
- Restrictive Easement
- Aircraft Accident Potential Zone II
- Aircraft Accident Potential Zone
- ATFP Setback Area
- Clear Zone
- Runway Primary Surface
- Airfield Area
- Wildlife Preserve
- Existing Danger Zone and Restricted Anchorage
- Polihale State Park
- Kauai Test Facility
- Existing Structure
- Installation Area
- Land

0 0.5 1 2 Nautical Miles

0 0.5 1 2 Miles

NORTH

ATFP = Anti-Terrorism Force Protection

Pacific Missile Range Facility Health and Safety Areas

Kauai, Hawaii

Figure 3.3.2.1.7-1

ordnance is allowed on PMRF or used on a test range. This approval involves a detailed analysis of the explosives and of the proposed training and RDT&E activities, procedures, and facilities for surveillance and control, an adequacy analysis of movement and control procedures, and a design review of the facilities where the ordnance items will be handled.

Ordnance management procedures are found in PMRFINST 8020.5, *Explosive Safety Criteria for Range Users Ordnance Operation*s. The Range Control Branch of the Range Programs Division is responsible for: (1) providing detailed analysis of all proposals concerning missiles or explosives and their proposed operation on the range; (2) establishing procedures for surveillance and control of traffic within and entering hazard areas; (3) reviewing the design of facilities in which ordnance items are to be handled to ensure that safety protection meets the requirements of Naval Sea System Command Publication (NAVSEAOP) -5, *Ammunition and Explosives Ashore; Safety Regulations for Handling, Storing, Production, Renovation, and Shippin*g, Chapter 4; (4) training, certifying, and providing Launch Control Officers, Safety Monitors, and Ordnance personnel for training and RDT&E activities involving explosive ordnance; (5) assuming responsibility for the control of all emergency facilities, equipment, and personnel required in the event of a hazardous situation from a missile inadvertently impacting on a land area; (6) providing positive control of the ordering, receipt, issue, transport, and storage of all ordnance items; and (7) ensuring that only properly certified handling personnel are employed in any handling of ordnance.

Ordnance is either delivered to PMRF/Main Base by aircraft to the on-base airfield or by ship to Nawiliwili Harbor, then over land by truck transport along Highway 50 to the base (see Figure 2.1-2). The barges carrying explosives are met at Nawiliwili Harbor by trained ordnance personnel and special vehicles for transit to and delivery at PMRF/Main Base. All ordnance is transported in accordance with U.S. Department of Transportation regulations. Ordnance is stored in caves at the Kamokala Magazine area, except for the Strategic Target System, which is stored in a specially constructed facility on KTF. No mishaps involving the use or handling of ordnance have occurred at PMRF.

PMRF/Main Base has defined explosive safety-quantity distance (ESQD) arcs. The arcs are generated by launch pads, the Kamokala Magazine ordnance storage area, the Interim Ordnance Handling Pad, and the Missile Assembly/Test Buildings 573 and 685. Only the ESQD arcs generated by the Interim Ordnance Handling Pad and Building 573 are covered by a waiver or exemption. The Sandia Launcher site can accommodate a 1,250-ft ESQD arc.

A 1,250-ft ESQD Red Label Area, to handle incoming and outgoing ordnance items, is centered on the airfield taxiway, 1,250 ft from Building 412 (see Figure 3.3.2.1.7-1). A soft pad in the Red Label recovery area is used by helicopters for setting down targets and weapons recovered from the range. The 800-ft ESQD surrounding the soft pad falls totally within the Red Label ESQD area.

Ocean Area Clearance

Range Safety officials manage operational safety for projectiles, targets, missiles, and other hazardous activities into PMRF operational areas. The operational areas consist of two Warning Areas (W-186 and W-188) and one Restricted Area (R-3101) under the local control of PMRF. The Warning Areas are in international waters and are not restricted; however, the surface area of the Warning Areas is listed as “HOT” (actively in use) 24 hours a day. For special operations, multi-participant or hazardous weekend firings, PMRF publishes dedicated warning Notices to Mariners (NOTMARs) and Notices to Airmen (NOTAMs) 1 week before hazardous operations. In addition, a 24-hour recorded message is updated on the hotline daily by Range Operations to inform the public when and where hazardous operations will take place.

Prior to a hazardous operation proceeding, the range is determined to be cleared using inputs from ship sensors, visual surveillance of the range from aircraft and range safety boats, radar data, and acoustic information from a comprehensive system of sensors and surveillance from shore.

Transportation Safety

PMRF transports ordnance by truck from Nawiliwili Harbor to PMRF along Highway 50 (see Figure 2.1-2). The barges carrying explosives are met at Nawiliwili Harbor by trained ordnance personnel and special vehicles for transit to and delivery at PMRF. All ordnance is transported in accordance with U.S. Department of Transportation regulations. PMRF has established PMRFINST 8023.G, which covers the handling and transportation of ammunition, explosives, and hazardous materials on the facility.

In addition, liquid fuels (e.g., nitrogen tetroxide and unsymmetrical dimethylhydrazine) are transported to KTF. These fuels can be shipped to the site by truck, aircraft or barge, which do not affect transportation routes on the island of Kauai. Transportation of these materials is conducted in accordance with U.S. Department of Transportation regulations and specific safety procedures developed for the location.

Range Control and the FAA are in direct communication in real time to ensure the safety of all aircraft using the airways and the Warning Areas. Within the Special Use Airspace, military activities in Warning Areas W-186 and W-188 are under PMRF control. Warning Areas W-189, W-187, and W-190 are scheduled through the Fleet Area Control and Surveillance Facility. Section 3.3.2.1.2 provides further airspace details.

The Warning Areas are located in international airspace. Because they are in international airspace, the procedures of the ICAO are followed. The FAA acts as the U.S. agent for aeronautical information to the ICAO, and air traffic in the region of influence is managed by the Honolulu ARTCC.

Fire and Crash Safety

The Navy has developed standards that dictate the amount of fire/crash equipment and staffing that must be present based on the number and types of aircraft stationed on base, and the types and total square footage of base structures and housing. PMRF Crash/Fire is located in the base of the Air Traffic Control Tower, Building 300. Personnel are trained to respond to activities such as aircraft fire fighting and rescue in support of airfield operations, hazardous material incidents, confined space rescue, and hypergolic fuel releases, plus structure and brush fire fighting, fire prevention instruction and fire inspections.

Ambulance and Class II Emergency Medical Technician services are provided by Emergency Medical Technicians assigned to Crash/Fire. These contractor-operated services are available to military, civil service, and non-government personnel at PMRF, 24 hours a day, 7 days a week. More extensive emergency medical services are available from the West Kauai Medical Center in Waimea, 10 mi from the Main Gate at Barking Sands.

KTF

KTF is a launch facility operated by Sandia National Laboratories for the Department of Energy on PMRF/Main Base through Inter-Service Support Agreements (U.S. Department of the Navy, 1998a). KTF notifies PMRF Operations, Security, Fire Department, and Ordnance/Explosive Disposal as required prior to launch and other hazardous operations. (Sandia National Laboratories, 2006)

All hazardous operations at KTF are performed under strict adherence to SOPs. A site SOP provides general requirements and guidance for all range operations at KTF, including ordnance safety, pre-launch and hazardous operations control, ordnance handling and storage facilities, liquid fuels storage and handling, and launch pad operations.

KTF rocket motors and other ordnance components are stored in explosive storage magazines by PMRF, except when needed by KTF for processing, assembly, and launch. The movement of explosives and other hazardous materials between PMRF and KTF is conducted in accordance with PMRF procedures and DoD Explosives Safety Standards.

PMRF provides fire protection and fire fighting services to KTF, and enforces base safety regulations and programs on KTF.

3.3.2.1.8 Land Use—PMRF/Main Base

This section describes current land-based uses including recreational activities. The No-action Alternative will be a continuation of training and RDT&E activities which currently occur on PMRF/Main Base, and the Alternative Actions are incremental increases of training and RDT&E activities which already occur or have occurred. The Navy has no intention of expanding land ownership in the PMRF/Main Base area. Appendix C includes a definition of land use and laws and regulations that pertain to it. Additionally, Appendix I describes the circumstance by which the lands now known as PMRF came into Federal ownership.

Region of Influence

The region of influence for land use includes the Main Base Complex and adjacent areas on the Mana Plain. Because KTF resides entirely within PMRF/Main Base, all discussion regarding land use and recreation stated for PMRF/Main Base would apply to KTF.

Affected Environment

On-base Land Use

PMRF's land use is managed via the 2006 Comprehensive Infrastructure Plan. The plan promotes efficient, effective use of resources through a consolidation of like land uses and the minimization, recognition, and deconfliction of existing constraints. The plan supports the protection of essential range operations from encroachment and the protection of human and natural environments (U.S. Department of the Navy, 2006b, U.S. Department of the Navy, 1998a).

According to the State Land Use Classification, PMRF is located within a conservation district (Figure 3.3.2.1.8-1). The 2000 Kauai General Plan and the Waimea-Kekaha Region Development Plan classify PMRF as a Military Land Use area. Kauai County has designated the dune area from Nohili Point to the north boundary of PMRF as a scenic ecological area.

The Nohili and Kinikini Ditches act as natural dividers, separating PMRF into three zones: North, Central, and South (Figure 3.3.2.1.8-1). The North Zone is used for rocket launches and its associated support activities, administration, and services. This includes ESQD Arcs and Ground Hazard Areas. The Central Zone contains air operations, administration, supply, base services, range operations, ordnance maintenance, and fuel/supply. In addition, the runway has Clear Zones and Accident Potential Zones (I & II) as safety measures which are discussed further in Section 3.3.2.1.7. The South Zone contains housing, personnel support, recreational, communications and rocket launcher facilities (KTF). ESQDs and Ground Hazard Areas exist for the rocket launcher pad as well. Additionally, KTF, as shown in Figure 3.3.2.1.8-1 is located in the northern portion of PMRF/Main Base. Sandia National Laboratories operates KTF for the Department of Energy and provides testing, evaluation, research and development of rocket systems (Sandia National Laboratories, 2006; U.S. Department of Defense, 2006).

On-base Recreation

Recreational services available to military and civilian personnel include an auto hobby shop, a craft center, a 200-seat outdoor movie theater, a recreation center, a wood hobby shop, and a racquetball/handball court. Outdoor facilities include three tennis courts, a lighted golf driving range, a lighted softball field, a lighted multi-purpose playing court, a year-round swimming pool, and an 18-hole miniature golf course (U.S. Department of the Navy, 1998a).

Public access to the installation’s approximately 200 ft wide by 2 mi long coastline is outlined in PMRF Instruction 5530.7 (March 2004). Individuals who can demonstrate Kauai residency can obtain a PMRF-approved beach access pass, which allows them access to the beach recreation area of Majors Bay at PMRF/Main Base. PMRF Range Operations maintains a 24-hour hotline, which is updated daily in order to provide information on recreational area access. Recreational activities include surfing, fishing, and boating. The physical areas accessible for fishing/surfing/recreation/and socializing run from Shenanigans (All-hands club) up to KiniKini Ditch (south end of runway). Under PMRF Instruction 5530.7, normal access is allowed 7 days a week from 6:00 am to 30 minutes after sunset, except during heightened force protection conditions or range operational periods.

Off-base Land Use

Current land uses adjacent to PMRF are agricultural, recreational, and a landfill. No inhabited buildings are within these areas. The non-developed, open-type uses of these adjacent lands are compatible with range operations and safety requirements of PMRF. The State Land Use District Boundary Map classifies adjacent lands to the north of PMRF/Main Base (Polihale State Park) and adjacent lands to the South of PMRF/Main Base (Kekaha Landfill), as conservation (Figure 3.3.2.1.8-1). Adjacent lands to the east of PMRF/Main Base are classified as agricultural (formerly sugar cane fields). To the west of PMRF/Main Base is the Pacific Ocean (for Naval training and recreational activities). The County of Kauai classifies adjacent lands as open and agricultural. The State and County’s designations are compatible with base activities

EXPLANATION

- Road
- Elevation
- Kamokala Magazines
- Pacific Missile Range Facility - Main Base
- Special Management Area
- Proposed State Expansion Area for Polihale State Park
- Conservation
- Agriculture
- Kekaha Landfill
- Urban
- Existing Structure
- Land

NORTH

0 3,000 6,000 12,000 Feet

State Land Use - Western Kauai, Hawaii

Kauai, Hawaii

Figure 3.3.2.1.8-1

and limits development that would conflict with current use. PMRF activities which affect off-base land uses include those within the ESQD arcs, EMR areas, aircraft noise contours, and missile Ground Hazard Areas. ESQD arcs that extend beyond the PMRF boundary include four areas in the northern area and one in the central portion of the base. The off-base land use within these State-owned lands has been designated by both the County and State as agricultural areas. Missile Ground Hazard Areas which are only used during launch events, and extend off-base, occur in northern PMRF and encompass agricultural and recreational uses. Specifically, adjacent areas to PMRF include Polihale State Park, the Agricultural Preservation Initiative (API) and the Kekaha Landfill.

Coastal Zone Management

All Federal development projects in a coastal zone and all Federal activities which directly affect a coastal zone must be consistent to the maximum extent practicable with the Coastal Zone Management Program as authorized by the Coastal Zone Management Act of 1972. The entire State of Hawaii is included in Hawaii's Coastal Program and Coastal Zone. Federally owned, leased, or controlled facilities and areas are excluded from the State's Coastal Zone Management Plan, and are thus outside of the Coastal Zone. The proposed action required a determination evaluating the consistence of the PMRF activities with the policies of the Hawaii Coastal Act. The proposed actions are incremental increases in activities that already occur at PMRF and which were previously found to be consistent to the maximum extent possible with the Hawaii Coastal Act in the 1998 PMRF Enhanced Capability Final EIS.

In December 2007 the Kauai County Council passed a science-based shoreline setback ordinance. The law mandates a 40-ft minimum setback plus 70 times the annual coastal erosion rate as recommended in the Hawaii Coastal Hazard Mitigation Guidebook. The law preserves beaches and protects property owner's coastal assets. (The Garden Island, 2007, Hawaii Revised Statutes (HRS), 2007) Federally owned, leased, or controlled facilities are not subject to such requirements, but the Navy will remain consistent to the maximum extent possible or practicable.

<u>Polihale State Park</u>

Polihale State Park, a small area just east of PMRF North Gate, and a parcel of land south of PMRF and south makai, from the Kekaha Landfill have been designated as special management areas (U.S. Department of the Navy, 1998a). Kauai County established guidelines for reviewing proposed developments in special management areas (Figure 3.3.2.1.8-1) as part of the Coastal Zone Management Act Program. Any development in these areas requires a special management use permit.

<u>The Agricultural Preservation Initiative (API)</u>

In May of 2004, by amendments, the State Board of Land and Natural Resources approved the API (U.S. Department of the Navy, 2006a). The purpose of the API is to ensure lands adjacent to PMRF (5,371 acres + 215 acres-leased = 5,586 acres), which are currently designated as agricultural by the State Land Use Commission, remain agricultural lands for the term of the agreement (the agreement expires December 31, 2030 [U.S. Department of the Navy, 1998a]). The use of this land requires activation of a restrictive easement. The initiative is consistent with the Kauai General Plan policy for agricultural lands, which states: "The primary intent of the Agriculture designation is to conserve land and water resources" (Kauai, County of, 2005.)

The agricultural land is owned by the State of Hawaii and is leased to the Agribusiness Development Corporation.

The API benefits to the Navy include: (1) land use remains compatible with PMRF activities, thus preventing encroachment issues; (2) able to maintain compliance with Anti-Terrorism Force Protection criteria (Unified Facilities Criteria 4-010-01); and (3) improved Homeland defense/physical security. The API includes 215 leased acres, which contain the pumping system for the Mana Plain. By placing the drainage pumps under a Navy lease, the Navy will be able to use Federal funds to maintain the pumps that help prevent flooding in the Mana Plain (U.S. Department of the Navy, 2006b). The lease agreement (S-3852) for the 215 acres was signed February 2007 with the State of Hawaii. The over 5,000 acres maintained in the API support the initiatives of the State Department of Agriculture in its charge to preserve important resources to ensure the viability of Hawaii's diversified agricultural industry. The API restrictive use easement was signed by the State of Hawaii, June 2007. Figure 3.3.2.1.8-2 shows the land use alignment of PMRF and the Agricultural Preservation Initiative/Mana Plan and Figure 3.3.2.1.7-1 shows the Restrictive Easement.

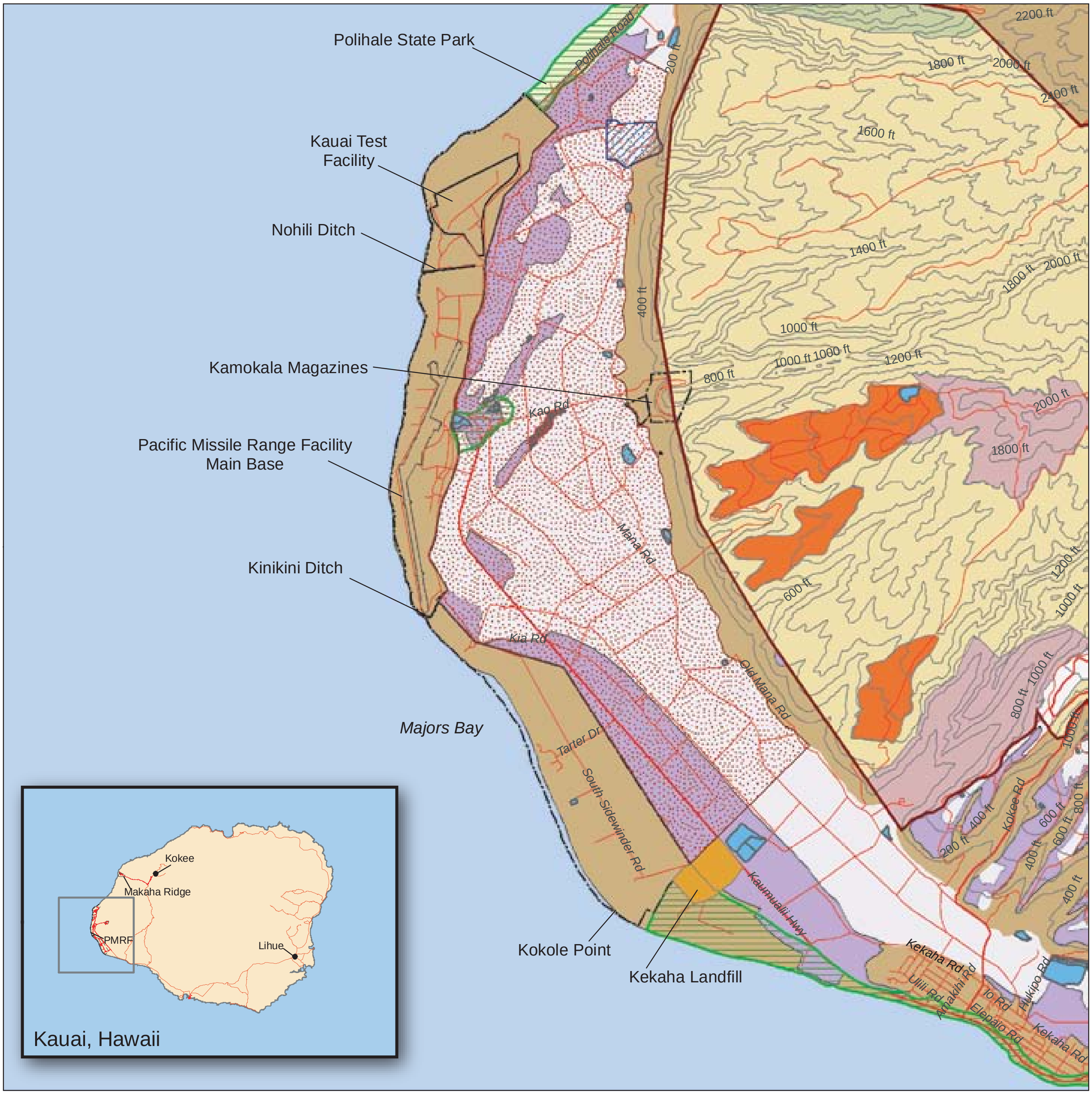
Kekaha Landfill

Kekaha Landfill sits on 64 acres of land, of which 32 acres make up the footprint of the lined Subtitle-D landfill itself. Kekaha averages 230 tons of trash per day and 88,000 tons of trash per year. The Landfill was opened in 1953 and was expected to close in 2004, but was recently given permission to operate until approximately 2012 (Kauai Island Utility Cooperative, 2006a).

Off-base Recreation

Off-base recreation within the region of influence is limited to range operations within the 140 acres of Polihale State Park (Figure 3.3.2.1.8-2). The park provides overnight camping and day use recreational activities (swimming, shore fishing, subsistence fishing, picnicking). It is operated by the Department of Land and Natural Resources, Division of State Parks, which estimates half a million people visit during the day, each year. Approximately 70 acres of the southern extent of the park is within the restrictive easement boundary (Figure 3.3.2.1.7-1). Use of the restrictive easement may be exercised up to 30 times per year during launches conducted by the U.S. Government. In order to launch missiles from PMRF and KTF, the U.S. Government must, in accordance with DoD policy, be able to exclude nonparticipants from a Ground Hazard Area (U.S. Army Space and Strategic Defense Command, 1993a). None of the developed campsites or picnic areas are within the restricted easement or the Ground Hazard Area (southern extent). The northern area, where picnicking and camping facilities are located, is accessible via a 5-mi dirt road from Highway 50 and is within a Ground Hazard Area.

The Division of State Parks plans to expand Polihale State Park, subject to the availability of funds. The expansion would include a portion of a sugar cane field and cliffs adjacent to the park’s boundary (Figure 3.3.2.1.8-2). The purpose is to encompass sensitive cultural resources and biological resources within the park boundary. No park development, other than interpretive trail signs, is expected within the expansion area (U.S. Department of the Navy, 1998a).



EXPLANATION

Road
Elevation
Department of Hawaiian Homelands Area (DHHL)
Agriculture Preservation Initiative (API) Area
Proposed State Expansion Area for Polihale State Park
Wetland Area
Military Reservation
Special Management Area
Prime Land
Unique Land
Other Land
Unclassified Land
DHHL Future Development
DHHL Conservation
DHHL Special District
DHHL Subsistence Agriculture
DHHL General Agriculture
Non-Agricultural Land
Kekaha Landfill

NORTH

0 2,950 5,900 11,800 Feet

Agricultural Lands of Importance to the State of Hawaii / Department of Hawaiian Homelands

Kauai, Hawaii

Figure 3.3.2.1.8-2

3.3.2.1.9 Noise—PMRF/Main Base

Appendix C includes a definition of noise and the main regulations and laws that govern it.

Region of Influence

The region of influence for noise analysis is the area within and surrounding PMRF/Main Base in which humans and wildlife may suffer annoyance or disturbance from noise sources at PMRF/Main Base. This would include all areas on the Mana Plain (PMRF, Polihale State Park, and sugar cane fields), KTF, and the city of Kekaha.

Affected Environment

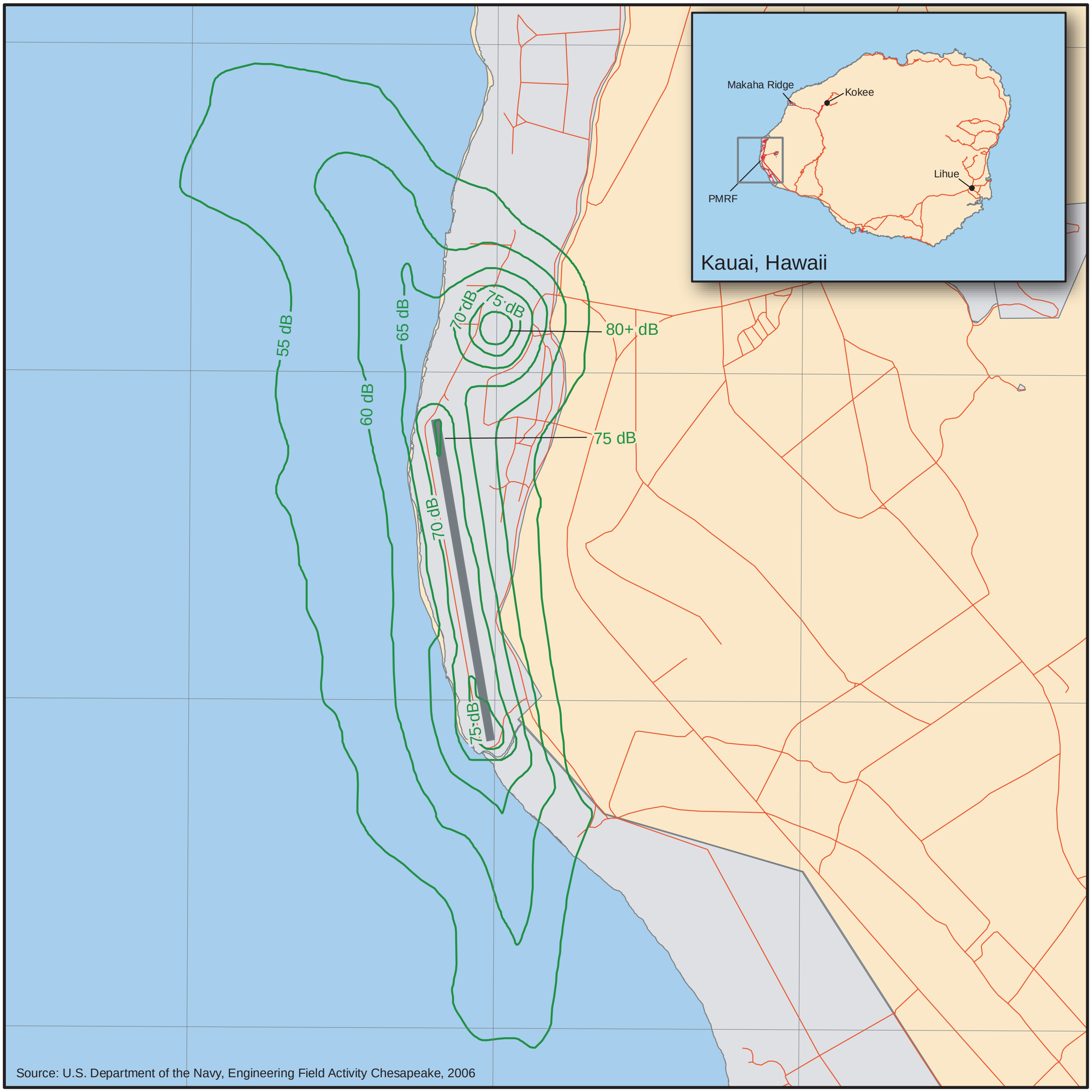
Primary sources of noise on PMRF/Main Base include airfield and range operations and missile, rocket, and drone launches. Airfield operations include take-offs and landings of high-performance and cargo/passenger aircraft, as well as helicopter operations. Range operations include training and RDT&E activities support. Ambient noise levels from natural sources include wind, surf, and wildlife.

Noise generated at the PMRF airfield stem from one active runway, four helicopter operating spots, and maintenance operations. Noise levels produced by airfield operations tend to have a continuous impact on PMRF/Main Base. Existing noise levels near the runway may average as high as 75 A-weighted decibels (dBA). Buildings in this area are insulated to achieve a noise reduction of up to 35 dBA. Noise levels farther away from the runway are more characteristic of a commercial park, with levels not exceeding 65 dBA. Airfield noise zones have been established to safeguard the public and all station personnel from the effects of noise from air operations. Figure 3.3.2.1.9-1 depicts modeled noise contours based on 2004 airfield operations. The *Final Noise and Accident Potential Zone Study for the Pacific Missile Range Facility Barking Sands* determined that noise levels around the airfield are low due to the relatively few annual air operations, 13,395 for 2004. The noise study determined that 1 acre of land was affected by 75-decibel noise levels and that no housing units or populations are impacted. (U.S. Department of the Navy, Engineering Field Activity Chesapeake, 2006)

Range operations that may impact the sound environment include, but are not limited to, power generation, training and RDT&E activities support, maintenance operations, and construction or renovation. Table 3.3.2.1.9-1 lists typical construction noise levels.

The activity with the most noticeable sound events is the launch of missiles, rockets, and drones. These launches result in high-intensity, short-duration sound events. Typical launches at PMRF/Main Base (including KTF launch sites) include Strategic Target System, Terminal High Altitude Area Defense, and Strypi missile launches and have resulted in no public noise complaints. Table 3.3.2.1.9-2 lists the noise levels monitored for previous ZEST and Strategic Target System launches at PMRF/Main Base.

The nearest on-base housing area is located approximately 5 mi south of the northern KTF and PMRF launch areas and 1 mi from the southern launch site. The nearest off-base residential area is Kekaha, which is approximately 8 mi south of the northern launch areas and 2 mi from the southern launch sites.



EXPLANATION

- Noise Contour
- Road
- Pacific Missile Range Facility
- Runway
- Land

Note: dB = Decibels

Noise contours shown are Day-Night Average Sound Levels

NORTH

0 0.25 0.5 1 Miles

Pacific Missile Range Facility/Main Base Noise Contours for 2004 Aircraft Operations

Kauai, Hawaii

Figure 3.3.2.1.9-1

Table 3.3.2.1.9-1. Typical Range Operations Noise Levels

Source	Noise level (peak)	Distance from Source			
		50 feet	100 feet	200 feet	400 feet
Heavy Trucks	95	84-89	73-83	72-77	66-71
Dump Trucks	108	88	82	76	70
Concrete Mixer	105	85	79	73	67
Jackhammer	108	88	82	76	70
Scraper	93	80-89	74-82	68-77	60-71
Dozer	107	87-102	81-96	75-90	69-84
Generator	96	76	70	64	58
Crane	104	75-88	69-82	63-76	55-70
Loader	104	73-86	67-80	61-74	55-68
Grader	108	88-91	82-85	76-79	70-73
Dragline	105	85	79	73	67
Pile Driver	105	95	89	83	77
Fork Lift	100	95	89	83	77

Source: Golden et al., 1980

Table 3.3.2.1.9-2. Noise Levels Monitored for ZEST and Strategic Target System Launches

Launch Vehicle	Distance (ft)	Measured Average Peak (dB)
ZEST	725	124.8
	1,000	122.5
	1,263	119.6
	1,400	119.5
	2,975	110.5
Strategic Target System	575	125.3
	800	123.0
	881	121.8
	1,222	118.2
	1,584	115.3
	10,000	97.1
	35,000	54.0

Source: U.S. Army Strategic Defense Command, 1992

KTF supports a variety of sounding rocket missions; therefore, occasional rocket, missile, or drone launches produce high-intensity, short-duration sound events. Table 3.3.2.1.9-2 lists noise levels associated with these types of launches. Data collected in the nearest town of Kekaha indicated that levels were no louder than noise generated from passing vehicles on a nearby highway. No noise-sensitive land uses are affected by existing noise levels. (Sandia National Laboratories, 2006)

In addition to the noise of the rocket engine, sonic booms are possible. A sonic boom is a sound that resembles rolling thunder, and is produced by a shock wave that forms at the nose of a vehicle that is traveling faster than the speed of sound. Sonic booms from PMRF/Main Base launches do not occur over land. Offshore vessels impacted by sonic booms will be expected to experience sound resembling mild thunder. Sonic booms generated during launch activities will occur over the Pacific Ocean, and will not affect the public on Kauai or Niihau because the proposed missile trajectory will not include overflight of populated areas.

Wildlife receptors at the PMRF/Main Base area are discussed in Section 3.3.2.1.3, Biological Resources.

3.3.2.1.10 Socioeconomics—PMRF/Main Base

Socioeconomics describes the social and economic character of a community through the review of several metrics including population size, employment characteristics, income generated, and the type and cost of housing. This section presents a socioeconomic overview of the Kauai region. Appendix C includes a general definition of socioeconomics.

Region of Influence

The region of influence for socioeconomics is defined as the island of Kauai, which covers 552 mi^2. The entire island is designated as Kauai County.

Affected Environment

Population and Income

In 2000, the population of Kauai County was 58,463. The 2005 Bureau of Census Counties Profile estimates that the population for the County rose to 62,640 in 2005 (equal to 4.9 percent of the population of Hawaii), a change of approximately 7.1 percent over the 5-year period. The estimated population for 2006 is 63,004 (U.S. Census Bureau, 2007a). The projected population for 5 and 10 years out is 65,900 people in 2010 and 70,200 people in 2015 (Hawaii, State of, 2004). PMRF employs nearly 1,000 personnel, of which 54 are military personnel (Mossman, 2007). The 54 personnel account for 0.086 percent of the estimated 2006 population of Kauai. Table 3.3.2.1.10-1 summarizes the demographics of the population of Kauai in 2000. Table 3.3.2.1.10-2 illustrates the age profile of those living in Kauai County in 2000.

Personal income in Kauai was estimated by the Department of Business, Economic Development and Tourism to be $1.595 billion in 2005 (FY 2000 dollars). This represented 4 percent of the total personal income of Hawaii. In FY 2000 the annual average salary for Kauai County was $26,550, while the annual average income in 2005 for Kauai County was $29,650, which is an 11.6 percent increase.

Table 3.3.2.1.10–1. Demographics of the Population of Kauai in 2000

Persons		**58,463**
	Male	29,252
	Female	29,211
Race	Asian	21,042
	White	17,255
	Native Hawaiian & Other Pacific Islander	5,334
	Hispanic/Latino	4,803
	Black or African American	177
	American Indian and Alaska Native	212
	Other	505
Households		**20,183**
Families		**14,572**

Source: U.S. Census Bureau, 2000b.

Table 3.3.2.1.10-2. Age Profile of Kauai County Residents in 2000

	Kauai County		State Of Hawaii	
Age group (years)	**Population**	**Percentage**	**Population**	**Percentage**
Under 5 years old	3,605	6.2	78,163	6.5
18 years-64 years	43,020	73.6	915,770	75.6
65 and over	8,067	13.8	160,601	13.3

Source: U.S. Census Bureau, 2000b.

In FY 2005 the total defense expenditures of Hawaii were $5.6 billion, an increase of 8.7 percent over FY 2004, and for this same time period, defense procurement contracts in Hawaii totaled $2.0 billion, an increase of 16.2 percent over FY 2004. Appropriations for FY 2006 defense projects in Hawaii totaled $767 million, which includes a military construction program of $354 million, and $413 million for defense related projects. Appropriations for FY 2007 defense projects total nearly $622 million (Chamber of Commerce of Hawaii, Military Affairs Council, 2007). Table 3.3.2.1.10-3 shows the economic impact of the military in Hawaii for 2006.

PMRF is a major contributor to the economy of Kauai County, particularly on the western side of the island. The installation employs nearly 1,000 military, civilian and contract personnel and has a $130 million impact annually on the local economy. In FY 2001, expenditures for PMRF and other defense initiatives on Kauai totaled about $144 million (Division of Economics, U.S. Fish and Wildlife Service, 2002). In 2004, it was estimated that FY 2005 expenditures for PMRF and other defense initiatives on Kauai would total about $113 million (Inouye, 2004).

Housing

In 1993, housing on Kauai was characterized as overcrowded, costly, and in short supply (U.S. Department of the Navy, 1998a). In December 2006 sales remained fairly steady at half sold for more than $592,500 and half for less, as the median price dropped 2 percent. In December 2005, the median price of a Kauai home was $605,000. At the market height of summer 2005, the median sales price on Kauai reached close to $700,000. Median home prices declined by 15.4 percent between the summer of 2005 and December 2006 and declined by 2.1 percent between December 2005 and December 2006 (Star Bulletin, 2007). Condominium prices on Kauai, on the other hand, increased to by 17.7 percent; up to $570,000 in December 2005 from $484,500 in December 2005 (Star Bulletin, 2007).

Table 3.3.2.1.10-3. 2006 Economic Impact of the Military in Hawaii

Industry Output (millions of dollars)		Employment (number of jobs)		Household Income (millions of dollars)	
Fed Def-Military & civilian	766	Fed Def-Military & civilian	10,371	Def-Military & civilian	690
Real estate & Rentals	149	Retail trade	1,198	Health services	45
Health services	88	Health services	1,086	Professional services	35
Mining & Construction	77	Business services	771	Mining & construction	31
Retail Trade	77	Professional services	721	Retail trade	29
Professional services	68	Other services	667	Business services	22
Finance & insurance	51	Mining & construction	530	Finance & insurance	16
Other manufacturing	47	Eating & drinking	503	Other services	15
Business services	39	Real Estate & rentals	400	Wholesale trade	11
Other services	35	Finance & insurance	326	Other government	11
Wholesale trade	30	Wholesale trade	256	Information	10
Information	29	Educational services	231	Other manufacturing	9
Eating & drinking	26	Other government	213	Eating & drinking	9
Transportation	23	Arts & entertainment	172	Real estate & rentals	8
Utilities	22	Information	172	Transportation	7
All other industries	61	All other industries	721	All other industries	23
Total	1,588	Total	18,338	Total	971

Source: Chamber of Commerce of Hawaii, Military Affairs Council, 2007

Employment

Government, tourism, and tourism-related services have been the main employment generators on Kauai since the 1992 hurricane (U.S. Department of the Navy, 1998a). In 2006, government and tourism were the main employment generators. In FY 2006 PMRF employed a total of 821 employees, which comprised 128 DoD civilian personnel, 54 military personnel, 512 ITT personnel (Prime Support Contractor), 97 other contractors personnel, and 30 Hawaii Island Air National Guard. Table 3.3.2.1.10-4 shows the number of individuals employed in the main sectors of the economy of Kauai and in Hawaii as a whole.

Unemployment in Kauai has steadily declined from 4.5 percent in 2000 to 2.7 percent in 2005. This is the lowest the rate has been in over 15 years, which is also significantly lower than the 1998 unemployment rate of 11.6 percent. During the same period, the total labor force has increased from 30,350 in 2000 to 32,350 in 2005, a 6.7 percent increase (Hawaii, State of, 2005a).

Table 3.3.2.1.10-4. Employment in Kauai and Hawaii

Employment Sector	Kauai Employees		Hawaii Employees	
	Number of Employees	Percent of Total	Number of Employees	Percent of Total
Agriculture, forestry, fishing, hunting, and mining	1,227	4.6	12,119	2.3
Construction	2,083	7.8	32,180	6.0
Manufacturing	652	2.4	18,979	3.5
Transportation and public utilities	1,497	5.6	33,559	6.2
Wholesale trade	456	1.7	17,188	3.2
Retail trade	3,341	12.5	65,693	12.2
Finance, insurance real estate, rental and leasing	1,667	6.2	37,867	7.0
Transportation, warehousing and utilities	1,497	5.6	33,559	6.2
Information	426	1.6	13,278	2.5
Professional, scientific, management, administrative and waste management services	2.505	9.4	51,039	9.5
Education, health, and social services	4,372	16.3	102,254	19.0
Public Administration	1,598	6.0	43,711	9.1
Other Services (except public administration)	1,111	4.1	320,324	59.5
Total	**26,789**	**100**	**537,909**	**100**

Source: U.S. Census Bureau, 2000b.

Agriculture

Although the number of farms on Kauai increased from 450 in 1994 to 600 in 2004, and the number of self-employed farm operators and their unpaid family members stood at 350 persons in 2004, farm acreage declined by approximately 25 percent (Hawaii, State of, 2005b). Despite the decline in farmland, sales of all crops increased 14 percent from 2002 to 2004. Sugar cane had the highest sales in 2004 with 15.3 million dollars, approximately 32 percent of Kauai's total crop sales. However, the reduction of sugar cane farms (only two are left, one on Kauai and one on Maui) has led to the diversification of crops. This diversity includes the production of coffee, seed corn, vegetables, melons, fruits, macadamia nuts, taro, field crops, flowers, and nursery products. The Aquaculture industry is on the rise as well, increasing from 85 operations with $22 million in sales in 2000 to 100 operations with $28 million in sales in 2004.

Tourism

The tourism industry has been the economic mainstay of the Hawaiian Islands since statehood in 1959. The industry accounts for 22.3 percent of all jobs in Hawaii (Kauai, County of, 2005). Kauai's share of the Hawaii visitor market was 14.5 percent in 2005. Despite terrorism concerns and periodic economic slumps, the tourism industry on Kauai has remained robust, with the number of annual visitors consistently over 1 million/year in the past 5 years (Kauai, County of, 2005). Estimated visitor expenditure in 2005 was $11.9 billion, a 9.6 increase from 2004 (State of Hawaii, Department of Business, Economic Development & Tourism, 2006).

The accommodation inventory for Kauai rose 18 percent between 1998 and 2005, with 447 properties providing 8,081 rooms. This inventory is slightly less than the peak capacity in 2004 of 8,105 rooms. The capacity could increase by 6,225 units based on projects on file in the County of Kauai Planning and Permitting Department (Kauai, County of, 2005). Concurrently, the number of annual visitors is expected to rise to approximately 1.5 million (Kauai, County of, 2005). Table 3.3.2.1.10-5 shows the numbers of annual visitors to Kauai from 2000 through 2006.

Table 3.3.2.1.10-5. Visitors to Kauai (2000– 2006)

Year	Kauai Visitors	State of Hawaii Visitors
2000	1,074,821	6,948,594
2001	1,008,698	6,303,790
2002	1,005,897	6,389,058
2003	975,867	6,380,439
2004	1,022,442	6,917,166
2005	1,090,147	7,416,574
2006	1,203,264	7,461,299

Source: State of Hawaii, Department of Business, Economic Development & Tourism, 2006.

Education

Each year since FY 2000, the DoD has contributed $5 million to the Hawaiian public education system via the Joint Venture Education Forum. The Joint Venture Education Forum was started in 1998 as a cooperative effort between the Hawaii Department of Education and U.S. Pacific Command, and was formalized as an organization, via charter, in August of 2005. The organization is comprised of public school educators and leaders from military commands, business, government, and the community (Joint Venture Education Forum, 2005). In FY 2005-06, the federal education budget included $46 million in impact aid funding for Hawaii's public schools (Honolulu Advertiser, 2006). Additionally, in FY 2005-06, $5.5 million was provided to improve infrastructure for Hawaii's public schools with high enrollments of military children; more than $31 million has been given over the past 6 years (Chamber of Commerce of Hawaii, Military Affairs Council, 2006).

3.3.2.1.11 Transportation—PMRF/Main Base

Transportation is the movement within the area of study of all equipment, facilities, and resources (materials, manpower) by ground, water, and air. Transportation fluctuates depending on training, testing, and construction activities which occur throughout the year. Appendix C includes definition and general description of transportation.

Region of Influence

The region of influence for transportation includes ground transportation and waterways in the vicinity of PMRF expected to be utilized for training and RDT&E activities. There are no railways within the region of influence. See Section 3.3.2.1.2 for the discussion on PMRF/Main Base airways.

Affected Environment

Ground Transportation

Imiloa Road is a two-lane roadway that provides direct access to PMRF from the southwest through its intersection with State Highway 50 (Kaumualii Highway), a primary circulation route connecting the base with Kekaha and Lihue. Kaumualii Highway, in the vicinity of Imiloa Road, is a two-lane road with a posted speed limit of 50 mi per hour. On September 20 and 21, 2005, a Hawaii Department of Transportation traffic counter, located on Kaumualii Highway between Imiloa Road and Kao Road, measured 24-hour total volumes of 469 and 516 vehicles respectively. The average daily volume of 493 translates to Level of Service (LOS) B, which is a 50 to 75 percent volume-to-capacity of the roadway capacity. Another traffic counter between Imiloa Road and Kia Road on the same days counted 749 and 747 vehicles respectively in a 24-hr period, which again translates into LOS B (Hawaii Department of Transportation, 2005; Transportation Research Board, 2000; 2006). North Nohili Road, which branches off Imiloa Road, provides access to KTF.

3.3.2.1.12 Utilities—PMRF/Main Base

This section discusses utilities serving the existing and proposed project areas, which include water supply, wastewater treatment, electricity, and natural gas. Additionally, this section identifies utility providers and the major attributes of utility systems in these areas such as existing capacity and existing demand. The PMRF Public Works Office maintains base facilities and oversees the facility's environmental program (U.S. Army Space and Missile Defense Command, 2002). Appendix C includes a definition and general discussion of utilities.

Region of Influence

The utility systems that could potentially be affected include potable water distribution, wastewater collection, solid waste collection and disposal, and electrical lines within or servicing the project sites.

Affected Environment

Water

Potable water at PMRF is a blend of on-base and municipal sources, including both the State Department of Land and Natural Resources and the Waimea-Kekaha Service Area of the Kauai Department of Water. The water department of Kauai County supplies water to PMRF that originates from the Kekaha's Waipao Valley Well, Paua Valley Well, and Shaft 12, as well as Waimea wells A and B (County of Kauai, Department of Water, 2006 and Naval Facilities Engineering Command, Hawaii, 2007). PMRF's portion is stored in two 126,000-gal tanks at Kokole Point. These sources serve the southern portions of the base. The Department of Land and Natural Resources supply water originates from the Mana well (located approximately 1,000 ft south of the Kamokala Ridge magazine), which is pumped to PMRF and stored near the Main Hanger in one 100,000-gal tank and one 420,000-gal tank. This source serves the central and northern portions of the base (U.S. Army Space and Missile Defense Command, 2002). In 2006, PMRF's water consumption from the Mana well system was 78,533,000 gal and 10,817,909 gal from the Kauai County Department of Water. The monthly consumption from the Mana well ranged from as low as 3,753,000 gal in November 2006 to as high as 8,827,000 gal in July 2006. The monthly consumption from the Kauai County Department of Water ranged from as low as 215,147 gal in November 2006 to as high as 1,719,843 gal in May

2006 (Maintenance Logs and Records-PMRF, 2006). The Navy chlorinates and fluoridates all purchased water before distribution, except that provided by the State of Hawaii (Commerce Business Daily, 2000). The maximum delivery capacity of water from the State is 320,000 gal per day (GPD).

Wastewater

The PMRF wastewater system comprises two domestic sewage treatment facilities and a collection system. These facilities include a treatment plant located approximately one half-mile south of the Main Gate and an oxidation pond south of the family housing area (U.S. Army Space and Missile Defense Command, 2002). A package treatment plant located at PMRF/Main Base treats approximately 8,000 GPD, or 27.7 percent of its 30,000-GPD design capacity. On the southern end of the base, an oxidation pond receives 20,000 to 25,000 GPD of its 54,000-GPD capacity. Both sites discharge their effluent into leach fields. For the period of 6 June 1995 to 31 May 1996, the average flow into the leach field (situated between the runway and the coast) was 9,500 GPD, or 37 percent of its 26,000-GPD design capacity. PMRF also has approximately 22 septic tank/leachfield systems and cesspools serving individual buildings in the northern part of PMRF/Main Base (U.S. Army Space and Missile Defense Command, 2002; Commerce Business Daily, 2000).

Solid Waste

Kauai County's Kekaha Landfill sits on 64 acres of land, of which 32 acres make up the footprint of the lined Subtitle-D landfill itself. Kekaha averages 230 tons per day and 88,000 tons per year. The Landfill was opened in 1953 and was expected to close in 2004, but was recently given permission to operate until approximately 2012. The FY 2006 total for refuse deposited into the landfill from PMRF was 530.6 tons, and 252.32 tons were recycled by PMRF (Burger and Nizo, 2007). To minimize waste flow, PMRF maintains a recycling program for aluminum cans, glass, paper and cardboard, all of which are collected biweekly. Green waste is collected and chipped for composting and use on the base (U.S. Army Space and Missile Defense Command, 2002).

Electricity

Until recently, PMRF's municipal power was provided by Kauai Electric; however, in 2002 Kauai Electric was purchased by Kauai Island Utility Cooperative (Pacific Business News, 2002). The total firm electrical generating capacity on the island is 110 megawatts (MW), with an additional 4.1 MW provided by non-firm sources (Kauai County, 2005).

PMRF is located in Kauai County's West Side region. The West Side's main transmission line runs along Kaumualii Highway from Port Allen to Mana, and includes double circuits between Port Allen and Kekaha. There are switchyards in Kekaha and Port Allen, as well as substations in Mana and Kaumakani (Kauai County, 2005). Power to PMRF/Main Base and northern complex area is supplied via a 57-kilovolt (kV)/69-kV transmission line between the Kauai Island Utility Cooperative's Mana Substation and Kekaha Switchyard. This West Side transmission line's capacity is 7.6 MW at 95 percent power factor; the current peak load is 2.5 MW (U.S. Department of the Navy, Naval Sea Systems Command, 2005). A 12.47-kV feeder circuit system owned by Kauai Island Utility Cooperative supplies primary power to the base's southern area; this circuit has a capacity of 4.3 MW at 95 percent power factor (U.S. Department of the Navy, Naval Sea Systems Command, 2005). In the event of a power outage PMRF provides additional power, utilizing commercial power as a backup. The PMRF power plant contains two 600-kW and three 300-kW generator units (U.S. Army Space and Missile Defense Command, 2002).

By 2003, PMRF's energy consumption had been considerably reduced from its 1985 baseline; moreover, the base's energy consumption during peak hours had decreased by $100,000 annually, allowing the Kauai Island Utility Commission to redirect energy to other areas on the island (U.S. House of Representatives, 2003). PMRF has been recognized for these energy-saving efforts, as well as initiating innovative high-tech energy conservation projects, including using methane gas, by the County of Kauai's Kekaha landfill and using fuel cells to support range operations (U.S. House of Representatives, 2003). Since 2005, photovoltaic panels have been used to augment base requirements without increasing consumption from the island's commercial electric utility grid (Naval Facilities Engineering Command, Hawaii Public Affairs, 2005).

3.3.2.1.13 Water Resources—PMRF/Main Base

Water resources include those aspects of the natural environment related to the availability and characteristics of water. For the purposes of this document, water resources can be divided into three main sections: surface water, groundwater, and flood hazard areas.

Surface water includes discussions of runoff, changes to surface drainage, and general surface water quality. Groundwater discussions focus on aquifer characteristics, general groundwater quality, and water supply. Flood hazard area discussions center on floodplains.

Where practicable, water resources are described quantitatively (volume, mineral concentrations, salinity, etc.); otherwise they are described qualitatively (good, poor, etc.) when necessary. Appendix C includes a description of the primary laws and regulations regarding water resources.

Detailed descriptions of fresh water quality and well water supplies can be found in the Utilities section of this EIS/OEIS.

Region of Influence

The region of influence for PMRF/Main Base includes the area within and surrounding the PMRF property boundaries. The region of influence also includes KTF and the restrictive easement, including the Mana Plain and the Ground Hazard Area.

Affected Environment

Surface Water

The surface water within the PMRF boundary is in the canals that drain the agricultural areas east of PMRF. Apart from these drainages, no surface drainage has been established because the rain sinks into the permeable sand. There are numerous drains and several irrigation ponds in the agricultural land.

The waters in the irrigation ponds generally do not meet drinking water standards for chloride salts, but have near neutral to slightly alkaline pH. A surface water quality study for chloride was conducted in the Mana Plain/KTF area. The chloride levels do not indicate residual hydrochloric acid effects of the past launches at KTF (U.S. Army Program Executive Office, 1995). The surface waters on the southern half of PMRF/Main Base are expected to have similar chemical characteristics. Because the drainage ditches are designed to move water away from the agricultural fields during irrigation and rainfall, and to leach salts from the soil, no residual effects of past launches are expected. (U.S. Army Program Executive Office, 1995)

Surface water in the area of the restrictive easement on the Mana Plain is restricted to drains and agricultural irrigation ponds. Within the restrictive easement boundary, the surface water and storm water runoff drain onto Amfac Sugar-Kauai lands and agricultural ponds below the Mana cliffs. The Mana Plain is drained by canals that flow seaward. Typically, the water from the canals that drain from the sugar cane fields is brackish. (U.S. Army Space and Strategic Defense Command, 1993a)

The waters in the agricultural ponds along the Mana cliffs generally do not meet drinking water standards for chloride salts but are near neutral to slightly alkaline. The highest chloride salt levels, near those of seawater, were observed in water from the Mana Pond Wildlife Sanctuary near the north gate of PMRF. This may be due to the infiltration of brackish to saline groundwater into the pond basin or excessive evaporation to a low surface level. (U.S. Army Space and Strategic Defense Command, 1993a)

Water quality along the PMRF shoreline was within Department of Health standards, with the exception of two locations where sugar cane irrigation water, pumped from the sugar cane fields, is discharged to the ocean (Belt Collins Hawaii, 1994). In these areas, Department of Health water quality criteria are exceeded within 164 ft of the shoreline. Mixing processes are sufficient to dilute the drainage water to near background levels within 164 to 328 ft of the shoreline (Belt Collins Hawaii, 1994).

Groundwater

Bedrock, alluvium, and sand dunes make up hydraulically connected aquifers within the region of influence. The bedrock (basement volcanics, primarily basalt) is highly permeable, containing brackish water that floats on seawater. (U.S. Army Space and Strategic Defense Command, 1993a)

The overlying sediments act as a caprock because of their overall low permeability, although individual layers, such as buried fossil coral reefs, may be as permeable as the basalt. Although the sediments are saturated, they are not exploitable as an aquifer because of unfavorable hydraulic characteristics. The groundwater in the sediments originates as seepage from irrigation percolation and rainfall in the basalt aquifer, especially where the sediments are thin near the inland margin of the Mana Plain.

The dune sand aquifer on which PMRF/Main Base lies has a moderate hydraulic conductivity and moderate porosity of about 20 percent. It consists of a lens of brackish groundwater that floats on seawater and is recharged by rainfall and by seepage from the underlying sediments. The only record of an attempt to exploit this groundwater is of a well drilled for the Navy in 1974, 4 to 5 mi south of KTF. The well was drilled to a depth of 42 ft, and tested at 300 gal per minute. In 1992, the water was too brackish for plants and animals to consume; consequently, the well is not used. (U.S. Army Program Executive Office, 1995)

The nearest fresh groundwater sources are in the Napali formation at the inland edge of the coastal plain along the base of the Mana cliffs. Groundwater in the region is generally considered to be potable at the base of the cliffs, increasing in salinity closer to the coast. (U.S. Army Space and Strategic Defense Command, 1993a)

The groundwater beneath the restrictive easement increases in salinity from the base of the Mana cliffs to the Pacific Ocean. To keep the groundwater table below the root zone of the sugar cane, thousands of feet of canal have been excavated to drain excess water from the soil. The water is then pumped into canals such as the Nohili Ditch for release into the ocean. (U.S. Army Space and Strategic Defense Command, 1993a)

Sampling for perchlorate was initiated at PMRF in 2006. USEPA adopted an oral reference dose for perchlorate in 2005, following a National Academy of Sciences recommendation that it not exceed 24.5 parts per billion in drinking water. Until USEPA promulgates standards for perchlorate, the DoD has established 24 parts per billion as the current level of concern for managing perchlorate. This level has also been adopted in the Navy Perchlorate Sampling and Management Policy, 15 April 2006.

As part of the implementation of the Navy policy, perchlorate sampling has been conducted at two drinking water supply locations. One location is the "Mana well," which is the former Kekaha Sugar/AMFAC well from which PMRF obtains drinking water, referenced as "BS 335," and supplies the "north end" of PMRF. It is a hand-dug well, now concrete-lined, approximately 90 ft deep, and is located at the base of the ridge near the Kamokala Caves. The pumps and electric motors are down in the well. The other location is the water tank at the southern end of the base identified as reference code "BS 820." Water in the tank comes from the County of Kauai. The results are shown in Table 3.3.2.1.13-1.

Table 3.3.2.1.13-1. Water Tank Perchlorate Sampling

Sample Location	Sample date 1	Sample Date 2
BS 335	0.860 ppb	<4 ppb (specifics pending)
BS 820	3.500 ppb	<4 ppb (specifics pending)

Note: ppb = parts per billion

Perchlorate concentrations at both sites were less than the initial screening level of 4.0 parts per billion. Based on guidance PMRF received from Navy Region Hawaii, since the two consecutive samples were less than 4 parts per billion, no further analysis was required.

Flood Hazard Areas

The primary flood hazard is from overflow of the ditches that drain the Mana Plain. Extended periods of heavy rainfall have resulted in minor flooding of low-lying areas of PMRF/Main Base. In addition, most of PMRF/Main Base is within the tsunami evacuation area.

3.3.2.2 MAKAHA RIDGE

Makaha Ridge, a secondary range operation area for PMRF, is about 7 miles north of PMRF/Main Base. This 244.7-acre complex is located approximately at the 1,600-ft elevation of Makaha Ridge and is leased from the State of Hawaii. Its primary mission in support of PMRF is to provide facilities for range operations at PMRF. Makaha Ridge features tracking and surveillance radars, primary telemetry receivers and recorders, a Frequency Monitoring Station, and Electronic Warfare and networked communications systems.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Makaha Ridge. Of the 13 resources considered for analysis, airspace, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed. Any issues with these resources that are associated with Makaha Ridge are included within the PMRF/Main Base discussion.

3.3.2.2.1 Air Quality—Makaha Ridge

Appendix C includes a definition of air quality and the main regulations and laws governing its protection.

Region of Influence

For inert pollutants (all pollutants other than ozone and its precursors), the region of influence is generally limited to an area extending a few miles downwind from the source. The region of influence for ozone may extend much farther downwind than the region of influence for inert pollutants. However, as the project area has no heavy industry and very few automobiles, ozone and its precursors are not of concern. Consequently, for the air quality analysis, the region of influence for project activities is the existing airshed surrounding Makaha Ridge.

Affected Environment

Climate and Regional Air Quality

Section 3.3.2.1.1 describes climate and regional air quality on Kauai, which includes Makaha Ridge.

Existing Emission Sources

The primary air pollutant emissions at Makaha Ridge are from diesel generators. The two 600-kW and two 300-kW generators are permitted by the State of Hawaii under a non-covered source permit.

3.3.2.2.2 Biological Resources—Makaha Ridge

Appendix C includes a definition of biological resources and the main regulations and laws that govern their protection.

Region of Influence

The region of influence for biological resources encompasses Makaha Ridge and limited adjacent areas.

Affected Environment

Vegetation

Vegetation at the sites is dominated by introduced non-native, naturalized species. The most common native species that occur on the cliffs in the area are false sandalwood, or naio, (*Myoporum sandwicense*) and kawela, a bunch grass. Thirteen endemic species are represented within the boundaries of the Makaha Ridge facility: `ahinahina (*Artemisia australis*), ko`oko`olau (*Bidens sandwicensis*), *Carex wahuensis*, *Gahnia beecheyi, Pteridium aquilinum* var. *decompositum,* koa (*Acacia koa)*, naupaka kuahiwi (*Scaevola gaudichaudi)*, kawelu (*Eragrostis variabilis),* hakonakona (*Panicum torridum),* kumuniu (*Doryopteris decipiens),* lepelepe a moa (*Selaginella arbuscula*), the native herb (*Spermolepis hawaiiensis),* and dwarf iliau (*Wilkesia hobdyi*). The last two species are discussed below as endangered plant species. There are also 14 indigenous species on the property including naio (*Myoporum sandwicense)*, and `ilima (*Sida fallax).* (Pacific Missile Range Facility, 2006d) A few shrubs of naio and introduced lantana (*Lanatana camara*) occur along the makai (coastal) edge of the Makaha Ridge complex. Pine plantings and mixed scrub covers most of the area at the Makaha Ridge facility. Rows or scattered clumps of pine trees have been planted for erosion control. There are high levels of erosion at the ridge with many areas having less than 10 percent cover due most likely to ungulates (hoofed mammals). Silk oak trees (*Grevillea robusta)* are also abundant. Mixed scrub consisting mainly of lantana shrubs and molasses grass (*Melinis minutiflora)* with scattered guava shrubs (*Psidium* spp.) is located between the trees. Some native koa trees are located in the southern portion of the property. Well-maintained grassy lawns and landscape plantings are located around the existing buildings. (Pacific Missile Range Facility, 2001; U.S. Department of the Navy, 1998a)

<u>Threatened and Endangered Plant Species</u>

Table 3.3.2.2.2-1 lists threatened and endangered species known or expected to occur in the vicinity of the Makaha Ridge site. The endemic dwarf iliau, a shrub species Federally and State listed as endangered, occurs on cliffs overlooking the Makaha Valley along the northern boundary of the Makaha Ridge site. The Makaha Ridge population was estimated to be about 50 plants in 2000. A survey conducted in April 2006 documented an additional 11 colonies of dwarf iliau on cliffs within and adjacent to the Makaha Ridge boundary totaling 214 individuals (Pacific Missile Range Facility, 2006d). The plants are out of the reach of goats (*Capra hircus*) that frequent the area. (Center for Plant Conservation, 2006; U.S. Fish and Wildlife Service, 2002; Pacific Missile Range Facility, 2001)

Table 3.3.2.2.2-1. Listed Species Known or Expected to Occur in the Vicinity of Makaha Ridge

Scientific Name	Common Name	Federal Status
Plants		
Spermolepis hawaiiensis	No common name	E
Wilkesia hobdyi	Dwarf iliau	
Birds		
Branta sandvicensis	Nene (Hawaiian goose)	E
Pterodroma phaeopygia sandwichensis	\`Ua\`u (Hawaiian dark-rumped petrel)	E
Puffinus auricularis newelli	\`A\`o (Newell's Townsend's shearwater)	T
Mammals		
Lasiurus cinereus spp. *semotus*	Hawaiian hoary bat	E

Source: U.S. Fish and Wildlife Service, 2005a; b; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007

Key to Federal Status:
T = Threatened
E = Endangered

Also during the April survey, two large colonies (about 700 individual plants) of another endangered plant *(Spermolepis hawaiiensis*) were discovered. This herb is a member of the parsley family. It was previously thought to be extinct on Kauai, but including this new discovery, about 2,400 reproducing individuals have been documented on the island. (Pacific Missile Range Facility, 2006d)

Wildlife

Sixteen species of birds were observed during a wildlife survey conducted in 2000, including the indigenous white-tailed tropicbird (*Phaeton lepturus*) and the migratory Pacific golden plover. Species of introduced birds commonly found in this area of Kauai and observed during the survey included the spotted dove (*Streptopelia chinensis*), zebra dove, house finch, northern mockingbird, chukar (*Alectoris chukar*), and the common myna (*Acridotheres tristis*). (Pacific Missile Range Facility, 2001; 2006b) Another introduced species, the Japanese white-eye, is very abundant at the facility, as noted during a 2006 survey (Pacific Missile Range Facility, 2006b).

The green anole (*Anolis carolinensis*), house gecko, and mourning gecko were documented during a 2006 survey, as well as rats (Pacific Missile Range Facility, 2006c). Although no evidence of cats or rats was observed, it is likely that these mammals inhabit the Makaha Ridge area. Feral goats and pigs, and black-tailed deer (*Odocoileus hemionus columbianus*) are also seen in this general area. Goat densities on Makaha Ridge are likely higher than densities from other areas on the island because hunting is not allowed on base. (Pacific Missile Range Facility, 2001; 2006c)

Threatened and Endangered Wildlife Species

Table 3.3.2.2.2-1 lists threatened and endangered species known or expected to occur in the vicinity of the Makaha Ridge site. The threatened Newell's shearwater may fly over the site while on the way to its feeding grounds at sea. In addition, the endangered Hawaiian goose, or nene (*Branta sandvicensis*), occurs as a breeding population within the Makaha Ridge facility. The nene appears to still use the area, but may not nest due to the high density of goats. The endangered Hawaiian hoary bat is known to frequent the area and may forage or roost on the property or in surrounding forested areas. (Pacific Missile Range Facility, 2001)

Environmentally Sensitive Habitat

No critical habitat is located at the Makaha Ridge Facility (Figure 3.3.2.2.2-1).

3.3.2.2.3 Cultural Resources—Makaha Ridge

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The region of influence for cultural resources at Makaha Ridge encompasses the location for a new laboratory, power plant, and fiber optic cable. There are no archaeological resources within the region of influence. Building 720, where a new Automatic Identification System antenna is planned (see Figure 2.2.3.6.4-3), has not been identified as a historic property.

Affected Environment

Archaeological Resources (Prehistoric and Historic)

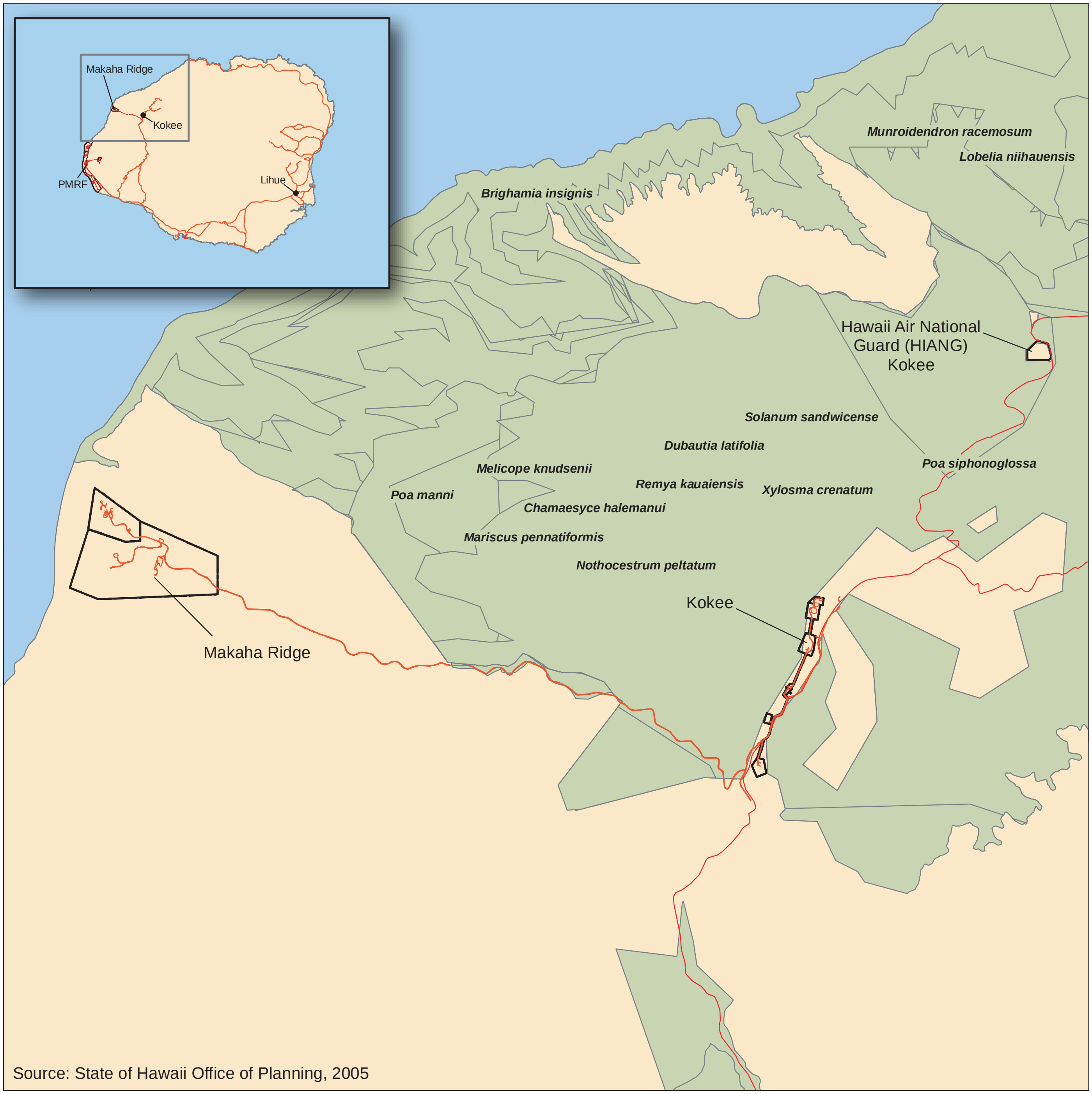
Operated as a sub-installation of PMRF, Makaha Ridge encompasses 244 acres of a prominent ridgeline overlooking the Mana Plain. The area consists of range operations communications facilities (International Archaeological Resources Institute, Inc., 2005). Makaha Ridge has been surveyed for archaeological resources and found to contain no significant archaeological sites (International Archaeological Resources Institute, Inc., 2005).

Historic Buildings and Structures

There are no identified historic buildings or structures at Makaha Ridge (International Archaeological Resources Institute, Inc., 2005).

Traditional Resources

Makaha Ridge has been surveyed and found to contain no significant traditional Hawaiian sites (International Archaeological Resources Institute, Inc., 2005).



EXPLANATION

Road

Critical Habitat

Installation Area

Land

NORTH

0 0.5 1 2 Miles

Critical Habitat - Northwestern Kauai, Hawaii

Kauai, Hawaii

Figure 3.3.2.2.2-1

3.3.2.2.4 Hazardous Materials and Waste—Makaha Ridge

Appendix C includes a discussion of hazardous materials and waste resource laws and regulations.

Region of Influence

The region of influence for hazardous materials and potential hazardous waste is limited to areas of Makaha Ridge where hazardous materials are stored, handled, and consumed.

Affected Environment

Hazardous materials and potential hazardous waste activities at Makaha Ridge are included in PMRF management plans for these types of materials. Daily activities are in accordance with those plans and similar range operations described in Section 3.3.2.1.6 for PMRF/Main Base.

Makaha Ridge follows PMRF's hazardous materials management plans as described under PMRFINST 5100.2C, *Hazardous Material Control and Management Program*. The hazardous materials used at Makaha Ridge consist of lubricating oils, low sulfur diesel fuel, and some minor amounts of solvents. Each hazardous material storage area has appropriate Material Safety Data Sheets.

Hazardous waste generated at Makaha Ridge has been eliminated through Best Management Practices for routine range operations. Small aerosol solvent requirements for electrical parts/radar maintenance do not generate hazardous waste, and empty containers are returned to the PMRF Hazardous Material Minimization Center for disposal. Corrosion control/painting activities do not generate hazardous waste. Generator overhauls, following 1,000 hours of operations, produce “on-specification used oil fuel” confirmed by routine laboratory testing.

There are two 600-kW and two 300-kW generators supplied by two 6,000-gal diesel tanks and four 300-gal day tanks. There is one 1,000-gal gasoline tank and one 55-gal drum of motor oil. All tanks are above ground with appropriate containment devices.

Pesticide use at Makaha Ridge is applied by the certified applicator from PMRF. There are no radon issues at the site, and ordnance is not stored at Makaha Ridge. No medical or radioactive wastes are generated, and there are no IRP sites at Makaha Ridge. Lead-based paint management and asbestos management at Makaha Ridge follow the same procedures as described for PMRF/Main Base.

3.3.2.2.5 Health and Safety—Makaha Ridge

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for health and safety of workers includes immediate work areas and EMR hazard areas. The region of influence for public safety includes areas bordering Makaha Ridge.

Affected Environment

Hazards to health and safety potentially occur as a result of EMR at the site. There are four tracking radars, two surveillance radars, and the primary PMRF telemetry station at Makaha Ridge. Frequency Interference Control, Electronic Warfare (EW) and Communication Facilities are also located at Makaha Ridge.

Hazards of EMR to personnel and fuel (called HERP and HERF, respectively) are the main concerns at Makaha Ridge. No ordnance is stored at the site, so there are no Hazards of Electromagnetic Radiation to Ordnance (HERO) issues. The helicopters that use the heliport at Makaha Ridge may have Electro-explosive Devices; however, the area is below HERO unsafe levels due to sector blanking (i.e., filtering) of the area. To ensure conditions are safe, the site is regularly surveyed for radiation hazards, and all systems have warning lights to inform personnel when radar units are operating. Because of Makaha Ridge’s location at the end of a ridge, there are no health and safety issues associated with the public. As discussed under airspace, aircraft are warned through aeronautical charts of the potential EMR hazards associated with Makaha Ridge.

3.3.2.3 KOKEE

Kokee is located at an altitude of 3,710 ft above mean sea level within Kokee State Park, which is owned by the State of Hawaii and managed by the Department of Land and Natural Resources, Division of State Parks. Kokee is operated jointly by PMRF and NASA. Kokee supports tracking radars, telemetry, Ultra-High Frequency/Very High Frequency (UHF/VHF) communications, and Command and Control (C2) systems.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Kokee. Of the 13 resources considered for analysis, air space, cultural resources, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed. Any issues with these resources that are associated with Kokee are included within the PMRF/Main Base discussion.

3.3.2.3.1 Air Quality—Kokee

Appendix C includes a definition of air quality and the main regulations and laws governing its protection.

Region of Influence

For inert pollutants (all pollutants other than ozone and its precursors), the region of influence is generally limited to an area extending a few miles downwind from the source. The region of influence for ozone may extend much farther downwind than the region of influence for inert pollutants; however, as the project area has no heavy industry and very few automobiles, ozone and its precursors are not of concern. Consequently, for the air quality analysis, the region of influence for project activities is the existing airshed surrounding Kokee.

Affected Environment

Climate and Regional Air Quality

Section 3.3.2.1.1 describes climate and regional air quality on Kauai, which includes Kokee.

Existing Emission Sources

The primary air pollutant emissions at Kokee are from backup diesel generators. The two 500-kW, two 350-kW, and one 250-kW generator sets are permitted by the State of Hawaii under a current non-covered source permit.

3.3.2.3.2 Biological Resources—Kokee

Appendix C includes a definition of biological resources and the main regulations and laws that govern their protection.

Region of Influence

The region of influence for biological resources is the area within the fence surrounding the site.

Affected Environment

Vegetation

A botanical assessment survey was conducted at Kokee in 2000. The vegetation on the site is dominated by non-native species. The site is surrounded by forested areas that are a mixture of exotic species and some native trees and shrubs. Kokee is composed of mainly intact koa-ohia mesic native forest that is contiguous with the surrounding State forest (Pacific Missile Range Facility, 2006e). Most of the areas around existing buildings and within the fenceline are paved or are grassy lawns (kikuyu grass [*Pennisetum clandestinum*]). Native plants observed include koa, \`ohi\`a, and \`a\`ali\`i. The areas outside the fence lines of the southern portion of Kokee are periodically maintained and consist of grassy lawn. Dense thickets of blackberry (*Rubus argutus*), mats of kikuyu grass, and scattered firetree and firethorn are located outside the common fence line surrounding the northern portion of Kokee. The northern portion of Kokee also contains large iliahi/sandalwood trees. A small patch of Asian melastome (*Melastoma septemnervium*), an invasive species targeted for removal in the Kokee area, was found near the roadside at northern Kokee. (Pacific Missile Range Facility, 2001; 2006e)

<u>Threatened and Endangered Plant Species</u>

No threatened or endangered plant species were identified on Navy property at Kokee during the surveys conducted as part of the Integrated Natural Resources Management Plan process.

Wildlife

A bird and feral mammal survey was conducted at Kokee in 2001. Native and migratory bird species observed at Kokee included the Pacific golden plover, the common amakihi (*Hemignathus kauaiensis*), short-eared owl, Kauai \`elepaio (*Chasiempis sandwichensis)*, \`i\`iwi (*Vestiaria coccinea*), and \`apapane (*Himatione sanguinea*). The \`apapane was the most abundant native bird observed in 2006, followed by the Kauai amakihi and \`elepaio. \`I\`iwi were not observed in 2006. Other birds observed at Kokee included the common myna, Japanese white-eye, red junglefowl, spotted dove, white-rumped shama (*Copsychus malabaricus*), northern cardinal, house finch, hwa-mei (*Garrulax canorus*), zebra dove, and nutmeg manikin (*Lonchura punctulata*). (Pacific Missile Range Facility, 2001; 2006b)

No evidence of cats or rats was noted at the facility, but these mammals likely do occur on or near the site. Roof and Norway rats were captured at Kokee during a 2006 survey. The metallic skink (*Lampropholis delicata*) was observed during the same survey. There was also evidence of dogs, black-tailed deer (*Odocoileus hemionus*), and feral pigs on the site. (Pacific Missile Range Facility, 2001; 2006c)

<u>Threatened and Endangered Wildlife Species</u>

Table 3.3.2.3.2-1 provides a list of threatened and endangered species at or adjacent to the Kokee facility. The threatened Newell's shearwater may fly over the Kokee site. Three endangered Hawaiian hoary bats were observed at Site 3, foraging above the forest. (Pacific Missile Range Facility, 2001)

Table 3.3.2.3.2-1. Listed Species Known or Expected to Occur in the Vicinity of Kokee

Scientific Name	Common Name	Federal Status
Plants[1]		
*Chamaesyce halemanui**	Akoko	E
Diellia pallida	No common name	E
*Dubautia latfolia**	Na ena e	E
Lipochaeta waimeaensis	No common name	E
*Nothocestrum peltatum**	Aiea	E
Phyllostegia waimeae	No common name	E
Psychotria grandiflora	Kopiko	Candidate
Schiedea spergulina spergulina	No common name	E
*Solanum sandwicense**	Popolo aiakeakua	E
Spermolepsis hawaiiensis	No common name	E
Invertebrates		
Drosophila musaphila	Hawaiian picture-wing fly	E
Birds		
Anas wyvilliana	Koloa maoli (Hawaiian duck)	E
Branta sandvicensis	Nene (Hawaiian goose)	E
Fulica alai	`Alae ke`oke`o (Hawaiian coot)	E
Gallinula chloropus sandvicensis	Alae ula (Hawaiian common moorhen)	E
Himantopus mexicanus knudseni	Ae`o (Hawaiian black-necked stilt)	E
Pterodroma phaeopygia sandwichensis	`Ua`u (Hawaiian dark-rumped petrel)	E
Puffinus auricularis newelli	`A`o (Newell's Townsend's shearwater)	T
Mammals		
Lasiurus cinereus spp. *semotus*	Hawaiian hoary bat	E

Source: U.S. Fish and Wildlife Service, 2005a; b; 2007a; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007

Notes: [1] Plants listed have not been observed on Navy property at Kokee, but may be on adjacent property.

* Critical habitat has been designated for these plants.

Critical habitat has also been designated for *Mariscus pennatiformis, Poa mannuum, and Poa siphonoglossa.*

Environmentally Sensitive Habitat

No environmentally sensitive habitat is located at the Kokee site (Figure 3.3.2.2.2-1).

3.3.2.3.3 Hazardous Materials and Waste—Kokee

Appendix C includes a discussion of hazardous materials and waste resource laws and regulations.

Region of Influence

The region of influence for hazardous materials and potential hazardous waste would be limited to areas of Kokee where hazardous materials are stored, handled, and consumed.

Affected Environment

Hazardous materials and activities that may result in hazardous waste at Kokee are included in PMRF management plans for these types of materials. Daily activities are in accordance with those plans and similar range operations described in Section 3.3.2.1.6 for PMRF/Main Base.

Kokee follows PMRF's hazardous materials management plans as described under PMRFINST 5100 and the Navy's CHRIMP. The hazardous materials used at Kokee consist of lubricating oils, low sulfur diesel fuel, and some minor amounts of solvents. Each hazardous material storage area has appropriate Material Safety Data Sheets.

Best Management Practices for routine range operations have eliminated hazardous waste at Kokee. Small aerosol solvent requirements for electrical parts/radar maintenance do not generate hazardous waste, and empty containers are returned to PMRF Hazardous Material Minimization Center for disposal. Corrosion control/painting activities do not generate hazardous waste. Generator overhauls, following 1,000 hours of operations, produce "on-specification used oil fuel" confirmed by routine laboratory testing.

Hydrostatic oil associated with the radar units is replaced every 4 years and generates approximately 55 gal of used oil. There are five generators at Kokee, two 500-kW, two 350-kW, and one 250-kW, with associated fuel tanks. There are two 25,000-gal aboveground diesel tanks, and one 500-gal day tank. All tanks have appropriate containment devices.

Pesticide at Kokee is applied by the certified applicator from PMRF. There are no radon issues at the site, and ordnance is not stored at Kokee. No medical or radioactive wastes are generated, and there are no IRP sites at Kokee. Lead-based paint management and asbestos management at Kokee follow the same procedures as described for PMRF/Main Base.

There are no PCB-containing transformers at Kokee. Kokee radar facilities do have capacitors and other components that contain PCBs. When such an oil-containing part is no longer functional and requires disposal, the component is disposed according to PMRF's Hazardous Waste Management Plan. When a component suspected of containing PCBs needs to be disposed of, the manufacturer is called to determine if PCBs are actually present in the part. Disposal occurs according to the required procedures.

3.3.2.3.4 Health and Safety—Kokee

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for health and safety of workers includes immediate work areas and EMR hazard areas. The region of influence for public safety includes areas bordering Kokee.

Affected Environment

Kokee supports tracking radars, telemetry, UHF/VHF Communications, and C2 systems. Hazards to health and safety potentially occur as a result of EMR at the site. Hazards of electromagnetic radiation to personnel and fuel (called HERP and HERF, respectively) are the main concerns at Kokee. No ordnance is stored at the site, so there are no HERO issues. The only fuel stored at the site (low sulfur diesel fuel for the electrical generators) is located outside of any EMR generating areas, so there are no HERF issues at the site. Appropriate sector blanking and the elevation of the radar units above the ground have eliminated any potential HERP issues at Kokee. To ensure that conditions are safe, the site is regularly surveyed for radiation hazards, and all systems have warning lights to inform personnel when the radar units are operating. The public is not exposed to any unsafe EMR levels. As discussed under airspace, aircraft are warned through aeronautical charts of the potential EMR hazards associated with Kokee range operations.

3.3.2.4 HAWAII AIR NATIONAL GUARD KOKEE

The Hawaii Air National Guard provides operation and maintenance of the Hawaii Digital Microwave System. Hawaii Air National Guard Kokee is a radar site, and PMRF maintains an APS-134, X-band, surface search radar.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Hawaii Air National Guard Kokee. Of the 13 resources considered for analysis, air quality, airspace, cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.3.2.4.1 Biological Resources—Hawaii Air National Guard Kokee

Appendix C includes a definition of biological resources and the main regulations and laws that govern their protection.

Region of Influence

The region of influence includes the areas on and surrounding Kokee.

Affected Environment

Kokee Air Force Station is located on 11 acres of leased land operated by Hawaii Air National Guard 150th Aircraft Control and Warning Squadron.

Vegetation

Kokee Air Force Station lies within the Na Pali-Kona Forest Reserve. \`Ohi\`a and koa trees are present in the area as well as native dry-land shrubs pukiawe and \`a\`ali\`i.

<u>Threatened and Endangered Plant Species</u>

No rare, threatened, or endangered plants have been recorded at Kokee Air Force Station (Air Force Center for Environmental Excellence Environmental Services Office, 2003).

Wildlife

Wildlife present in the Kokee Air Force Station area is similar to that described above in Section 3.3.2.3.2, such as the birds Kauai elepaio, \`i\`iwi, and \`apapane. Feral pigs and goats are also located in the area.

<u>Threatened and Endangered Wildlife</u>

Table 3.3.2.4.1-1 provides a list of threatened and endangered species at the Kokee Air Force Station. Three endangered species have been recorded at Kokee Air Force Station: the Newell's shearwater, dark-rumped petrel, and the Hawaiian hoary bat. The Hawaiian hoary bat roosts and forages on the station property or in adjacent forested areas. The seabirds are known to nest near the installation. (Air Force Center for Environmental Excellence Environmental Services Office, 2003)

Table 3.3.2.4.1-1. Listed Species Known or Expected to Occur in the Vicinity of Kokee Air Force Station

Scientific Name	Common Name	Federal Status
Birds		
Branta sandvicensis	Nene (Hawaiian goose)	E
Pterodroma phaeopygia sandwichensis	\`Ua\`u (Hawaiian dark-rumped petrel)	E
Puffinus auricularis newelli	\`A\`o (Newell's Townsend's shearwater)	T
Mammals		
Lasiurus cinereus spp. *semotus*	Hawaiian hoary bat	E

Source: U.S. Fish and Wildlife Service, 2005a; b; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007

Key to Federal Status:
T = Threatened
E = Endangered

Environmentally Sensitive Habitat

There are three designated wetlands located in the immediate vicinity of Kokee Air Force Station. Kalalau Stream and Honopu Stream are directly downslope and north of the installation in the direction of its surface runoff. Alakai Swamp is approximately 1 mi east of the station. (Air Force Center for Environmental Excellence Environmental Services Office, 2003)

3.3.2.5 KAMOKALA MAGAZINES

Kamokala Magazines are located approximately 2 mi east of PMRF/Main Base. Kamokala Magazines are a secure explosive storage area consisting of 10 magazines.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Kamokala Magazines. Of the 13 resources considered for analysis, air quality, airspace, biological, cultural resources, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.3.2.5.1 Hazardous Materials and Waste—Kamokala Magazines

Appendix C includes a discussion of hazardous materials and waste resource laws and regulations.

Region of Influence

The region of influence for hazardous materials and potential hazardous waste would be limited to areas of Kamokala Magazines where hazardous materials are stored, handled, and consumed. The only hazardous materials stored at the Kamokala Magazines are associated with the devices authorized for storage; specifically, hypergolic fuels, solid propellants, and other ordnance. These materials are contained in the devices that are required to be stored in the Kamokala Magazines with proper ventilation, marking, and placarding.

Affected Environment

No hazardous materials are used or hazardous waste generated from range operations at Kamokala Magazines. There are no storage tanks or known IRP sites at this location. The gunnite material lining the caves has not been tested for asbestos, and therefore, must be presumed to be an asbestos-containing material. The site does not have any PCB-containing material or radon issues.

The magazines are a secured area controlled by the PMRF Ordnance Office, Code 7331, and they are the storage sites for the ordnance and solid rocket motors used in training events at PMRF. When needed, they are transported to the launch or loading site. All explosive ordnance, including solid rocket motors, is handled in accordance with NAVSEA OP5, Volume 1.

3.3.2.5.2 Health and Safety—Kamokala Magazines

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for health and safety consists of the immediate work areas and ordnance hazard areas. The region of influence for public safety includes Kamokala Magazines, Mana Plain, and the ESQD not within the surrounding cliffs.

Affected Environment

Kamokala Magazines are an explosive storage area consisting of 10 magazines. The health and safety issues for Kamokala Magazines are associated with the transfer and storage of ordnance. No more than 30,000-lb net explosive weight can be stored at each magazine cave; this generates a safety area with a 2,350-ft radius in a 60-degree arc to the front of each 30,000-lb net explosive weight tunnel, diminishing in radius by 30-degree increments away from the front (see Figure 3.3.2.1.7-1). Ordnance is stored in accordance with DoD and Navy standards. In addition, PMRF has established instruction 8023.G, which details how the storage and handling of ordnance is conducted.

3.3.2.6 PORT ALLEN

Port Allen is a State of Hawaii harbor facility, located approximately 17 miles from PMRF/Main Base, on the southern coast of Kauai. The Navy leases office, storage, and berthing space at the Port Allen pier for range vessels and surface target support. Port Allen hosts PMRF's Range Support Boats and Seaborne Powered Target Boat site operations and maintenance facilities, and provides pier space, protected anchorage, and small-boat launch facilities. A review of the 13 resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from site operations at Port Allen.

3.3.2.7 KIKIAOLA SMALL BOAT HARBOR

Kikiaola Harbor is located on the southwest coast of the island of Kauai. The Harbor hosts Range Support Boats and small-boat launch facilities. PMRF's Seaborne Powered Targets are launched from Kikiaola. A review of the 13 resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from site operations at the Kikiaola Small Boat Harbor.

3.3.2.8 MT. KAHILI

Mt. Kahili is an existing Department of Energy/PMRF communication site required for line-of-sight transmissions that contains a repeater station. The Mt. Kahili electronic site is one of the most remote tower locations in the Hawaiian Islands. Frequency band information is listed in Appendix E, Table E-5 (Remote Sites). There is no lighting at the facility. Road access is limited, in good weather, to very high-clearance 4-wheel drive vehicles only, and one can only drive within about a mile below the tower. From the end of the road, there is a 1-hour hike up a steep ridge covered with wet Hawaiian ferns, and finally a 30 ft. rope leads to the summit and the electronic site. (Broadcast Engineering Services of Bonny Doon, 2007)

The endangered Newell's shearwater and Hawaiian petrel traverse the area, which may support breeding locations for these species. Hawaiian hoary bats are also likely to be using Mt. Kahili. (U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007) A review of the 13 environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from site operations at Mt. Kahili.

3.3.2.9 NIIHAU

Niihau is a privately owned island located about 17 nm southwest of Kauai. It is about 8 mi wide by 18 mi long and comprises approximately 72 mi^2. PMRF leases 1,170 acres of land in the northeastern corner of the island and operates radar units, optics, and electronic warfare sites.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Niihau. Of the 13 resources considered for analysis, air quality, airspace, cultural resources, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources for Niihau are not addressed.

3.3.2.9.1 Biological Resources—Niihau

Appendix C includes a definition of biological resources and the main regulations and laws that govern their protection.

Region of Influence

The region of influence for biological resources is the island of Niihau and its offshore environment.

Affected Environment

Vegetation

The vegetation of the island is dominated by non-native plant species and plant communities. The dominant types of vegetation on Niihau are kiawe forest, grassland, and koa haole. On the northern lowland areas, the kiawe forest is more open and has a kiawe overstory with an extensive shrub understory of `ilima. A coastal dry herbland/grassland community is present along the northeastern coast of Niihau. A dry coastal community, koa haole shrubland, often dominated by pure stands of koa haole, occurs at scattered locations at higher elevations on the island. This vegetation community is often associated with abandoned pastures. In some locations the koa haole canopy is so thick and grazing pressure of feral sheep and pigs so intense that there is little, if any, herbaceous understory. Small mixed stands of eucalyptus (*Eucalyptus robusta*) and common ironwood occur in a few sheltered areas at higher elevations. Ironwood also occurs in coastal areas near the ocean. Scattered individuals of the endemic naio occur at higher elevations in a mixed kiawe/koa haole shrub association. (Pacific Missile Range Facility, 2001; U.S. Department of the Navy, 1998a)

<u>Threatened and Endangered Plant Species</u>

Table 3.3.2.9.1-1 lists threatened and endangered species known or expected to occur on Niihau. Alula (*Brighamia insignis*), Federally listed as endangered, was historically known on Niihau. A population occurred on the Kaali Cliff, but has not been observed since 1947. Other endangered plants that have been found in the area include pu`uka`a (*Cyperus trachysanthos)* and *Lobelia niihauensis* (no common name) (Hawaii Department of Land and Natural Resources, no date [c]). Threats to the species include loss of native pollinators, browsing by goats, and invertebrate pests. (Hawaii Department of Land and Natural Resources, 2006)

Table 3.3.2.9.1-1. Listed Species Known or Expected to Occur on Niihau

Scientific Name	Common Name	Federal Status
Plants		
Brighamia insignis	Alula	E
Cyperus trachysanthos	Pu`uka`a (Sticky flatsedge)	E
Lobelia niihauensis	No common name	E
Panicum niihauense	Lau`ehu	E
Pritchardia aylmer-robinsonii	Lo`ulu	E
Sesbania tomentosa	`Ohai	E
Reptiles		
Chelonia mydas	Green turtle	T
Birds		
Anas wyvilliana	Koloa maoli (Hawaiian duck)	E
Fulica alai	`Alae ke`oke`o (Hawaiian coot)	E
Hemignathus munroi	`Akiapola`au (Honeycreeper)	E
Himantopus mexicanus knudseni	Ae`o (Hawaiian black-necked stilt)	E
Mammals		
Lasiurus cinereus spp. *semotus*	Hawaiian hoary bat	E
Monachus schauinslandi	Hawaiian monk seal	E

Source: U.S. Fish and Wildlife Service, 2005a; b; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007

Key to Federal Status:
T = Threatened
E = Endangered

Wildlife

The wildlife on Niihau is dominated by non-native species. The terrestrial vertebrate animal community is dominated by feral pigs, sheep, cattle, horses, donkeys, turkeys (*Meleagris gallopavo*), quail, pheasants, and peacocks. Large numbers of pigs and sheep freely roam the island. The common bird species are introduced species such as the spotted dove, cardinal, and mynah. The migratory Laysan albatross nests on Niihau, but its success is limited by predation by feral pigs. (Pacific Missile Range Facility, 2001)

Threatened and Endangered Wildlife Species

Table 3.3.2.9.1-1 lists threatened and endangered species known or expected to occur on Niihau. The koloa maoli (Hawaiian duck), alae ula (common moorhen), ae`o (Hawaiian stilt), and the `alae ke`oke`o (Hawaiian coot) are found in and around the lakes (playas) on the southern part of Niihau.

The endangered Hawaiian monk seal uses most of the coastline on Niihau to haul out, bask, and occasionally pup. From 10 to 12 pups are born on Niihau annually (Hawaii Institute of Marine Biology, 2006). The threatened green turtle has been observed to come ashore on selected beaches and occasionally nests at some of these locations.

Environmentally Sensitive Habitat

An area of 357 acres in the northern portion of Niihau has been designated as critical habitat for the alula (Figure 3.3.2.9.1-1). This area is considered essential to the conservation of the taxon by the USFWS. (U.S. Fish and Wildlife Service, 2003a)

3.3.2.9.2 Hazardous Materials and Waste—Niihau

Appendix C includes a discussion of hazardous materials and waste resource laws and regulations.

Region of Influence

The region of influence for hazardous materials and potential hazardous waste would be limited to areas of Niihau where hazardous materials are stored, handled, and consumed.

Affected Environment

Hazardous materials are used on Niihau during the minor maintenance activities associated with PMRF facilities, including some aerosol solvents, diesel fuel for generators, paint, and oil. These materials are used for the radar unit and EW site facilities. These materials are brought to Niihau when required for maintenance. General site maintenance is provided by Niihau Ranch. All hazardous materials used and waste generated are managed in accordance with PMRF procedures described in Section 3.3.2.1.6.

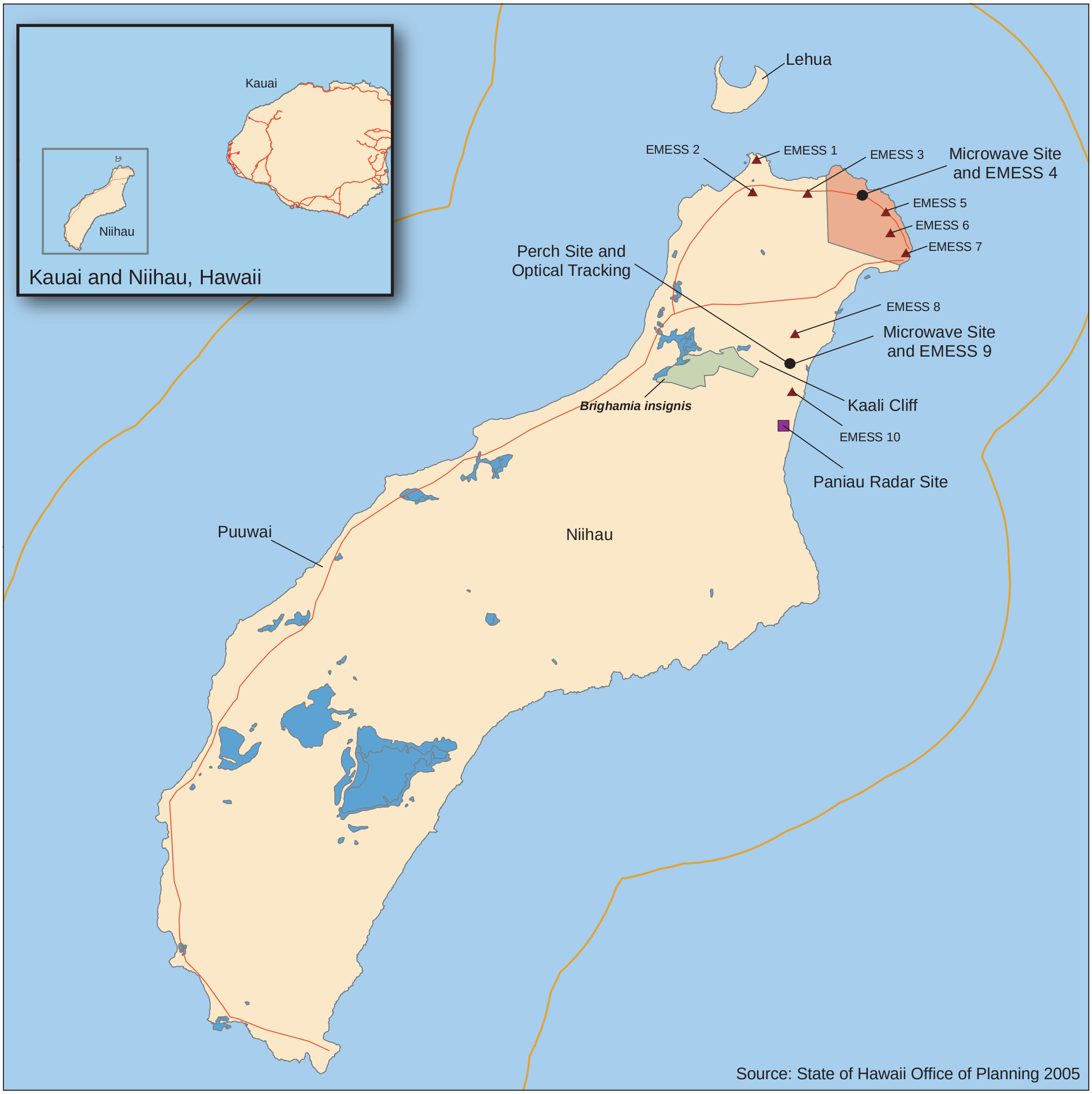
PMRF does maintain two aboveground diesel fuel storage tanks on Niihau to operate the electrical generators for the radar site and EW site. These fuel storage tanks consist of a 1,000-gal tank for the radar site and a 100-gal tank for the EW site. There are no radon issues associated with operation of range facilities on Niihau, and there are no IRP sites. There are no PCB-containing devices in any of the radar or power-related components at Niihau.

3.3.2.9.3 Health and Safety—Niihau

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for health and safety is Niihau.



EXPLANATION

- Microwave and EMESS Site
- Radar Site
- Electro-magnetic Environmental System Simulator (EMESS) Site
- Road
- 3-Nautical Mile Line
- Leased Area
- Critical Habitat
- Wetland Area
- Land

NORTH

0 1 2 4 Miles

Critical Habitat - Niihau, Hawaii

Niihau, Hawaii

Figure 3.3.2.9.1-1

Affected Environment

Niihau is a privately owned island, that through agreements with the owners, PMRF uses to support range operations. The primary health and safety concern for the residents of Niihau is the potential for a fire on the island. Due in part to the dry climate and kiawe vegetation that dominates the island, there is the potential for very large fires to occur. Currently, the island does not have any firefighting equipment. Emergency medical evacuation service can be provided by the helicopter owned by the Robinson family.

PMRF operates a radar at Paniau that is remotely operated from PMRF/Main Base. The radar unit, which is located on top of a facility, presents no HERP hazards at ground level where any island resident could be affected. PMRF/Main Base also operates the Niihau Perch site EW system, which has a HERP EMR hazard of 12 ft in front of where the system is pointing. A warning light and warning signs are placed in the area when the system is operating. In addition, PMRF flies AEGIS drone targets along the east coast of the island away from inhabited areas. Presently, helicopters are airborne with buckets during nearland/overland range operations occurring on or near Niihau to deal with potential fire hazards.

3.3.2.10 KAULA

Kaula is approximately 108 acres of federally owned and controlled land. The Navy uses a small portion of Kaula for aircraft gunnery and inert ordnance target practice. The ordnance impact area is limited to about 10 acres on the south end of the island. The island is not inhabited, and there are no structures. Access to the island is restricted.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Kaula. Of the 13 resources considered for analysis, air quality, noise, hazardous materials and waste, socioeconomics, transportation, utilities, and water resources are not addressed.

3.3.2.10.1 Airspace—Kaula

Appendix C includes a detailed description of airspace. Kaula is included in the region of influence for PMRF/Main Base. See Section 3.3.2.1.2 for the airspace affected environment that includes Kaula.

3.3.2.10.2 Biological Resources—Kaula

Kaula is located approximately 60 miles southwest of PMRF. It is approximately 1 mi long and 0.25 mi wide (an area of 0.25 mi^2 or 160 acres). The island is crescent shaped and generally comprised of steep cliffs on all sides ranging from 100 to 150 ft above mean sea level with no beaches. Kaula is covered by a sparse grass landscape and earthen/rock outcrops, and is reportedly underlain by a relatively thin soil layer with highly weathered limestone bedrock. The southern end of the island is used as a range for inert ordnance. The majority of the island is left undisturbed with a portion designated as a bird sanctuary. Kaula is used by the Navy for aircraft gunnery and inert ordnance target practice. Appendix C includes a definition of biological resources and the main regulations and laws that govern their protection.

Region of Influence

The region of influence for biological resources associated with Kaula includes the island and offshore area.

Affected Environment

Vegetation

Due to strong, dry, and continuous winds, the vegetation on Kaula is very sparse. The dominant vegetation is low-growing shrubs or herbs that belong to a semi-arid and strand flora. A small number of koa haole have been noted on the island. Common plants that inhabit the sandy beach intertidal habitat include beach morning glory, beach heliotrope, milo, and hau (Maragos, 1998). The vegetation composition includes 5 endemic Hawaiian species, 10 indigenous species, and 14 introduced (exotic) species. Native ilima and ihi are the most abundant species. (Pacific Missile Range Facility, 2001; Offshore Island Restoration Committee, undated)

Threatened and Endangered Plant Species

Endangered plants located on Kaula are listed in Table 3.3.2.10.2-1.

Table 3.3.2.10.2-1. Listed Species Known or Expected to Occur on Kaula

Scientific Name	Common Name	Federal Status
Plants		
Amaranthus brownii	No common name	E
Pritchardia aylmer-robinsonii	Lo`ulu	E
Schiedea verticellata	No common name	E
Sesbania tomentosa	`Ohai	E
Reptiles		
Chelonia mydas	Green turtle	T
Eretmochelys imbricata	Hawksbill turtle	E
Mammals		
Monachus schauinslandi	Hawaiian monk seal	E

Source: U.S. Fish and Wildlife Service, 2007a

Key to Federal Status:
T = Threatened
E = Endangered

Wildlife

Twenty-six different species of seabirds have been observed on Kaula. An estimated 18 species of seabirds currently nest on the island (Offshore Island Restoration Committee, undated). These species appear to be healthy and are reproducing normally. The species include three species of migratory shorebirds that occasionally stop on Kaula seasonally and small numbers of six species of exotic (introduced) land birds. The sooty tern (*Sterna fuscata*), brown noddy, red-footed booby, and masked booby are some of the more common species observed. No other terrestrial wildlife is known to occur on Kaula, and none is expected. (Pacific Missile Range Facility, 2001; Offshore Island Restoration Committee, undated)

Threatened and Endangered Wildlife Species

None of the species of birds Federally listed as threatened or endangered occur on Kaula. Coastal waters off Kaula are considered viable foraging habitat for green turtles, but no sightings of sea turtles have been documented. (Pacific Missile Range Facility, 2001)

Three Hawaiian monk seals were observed on a shelf off Kaula in a 2000 aerial survey (Baker and Johanos, 2004). Fifteen Hawaiian monk seals were counted during a 4-hour period hauled out on Kaula during a 2006 cruise (National Marine Fisheries Service, 2007b).

Environmentally Sensitive Habitat

According to the Hawaii Department of Land and Natural Resources, the Hawaii State Seabird Sanctuary consists of and includes 40 State-owned or controlled islands, islets, and rocks (Hawaii Department of Land and Natural Resources, 1981). Kaula was listed erroneously by the State as one of these islands; it remains Federally owned and controlled.

3.3.2.10.3 Cultural Resources—Kaula

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The region of influence for cultural resources at Kaula encompasses the southwestern tip of the island where there is an existing, heavily disturbed ordnance impact area (see Figure 2.1-2). There are no known historic properties within the impact area; however, due to the presence of unexploded ordnance, only a portion has been surveyed (U.S. Department of Defense, 2006).

Proposed or ongoing training events with the potential to affect cultural resources on Kaula and within Warning Area W-187 include BOMBEX and GUNEX. Both BOMBEX and GUNEX (Air-to-Ground) involve the islet only and not the surrounding waters.

Affected Environment

Archaeological Resources (Prehistoric and Historic)

Kaula has no evidence of extensive human habitation, although six archaeological sites located in the northern portion of the islet indicate some level of visitation (U.S. Department of the Navy, Commander, Third Fleet, 2006).

Historic Buildings and Structures

Two stone features (possibly heiaus); a sea cave with a low man-made wall; and the remains of a small unmanned light station, derrick, and shelter constructed by the U.S. Lighthouse Service in 1932 are the only structures mentioned in the literature for Kaula (Resture, 2006; Columbia Gazetteer of North America, 2000).

Traditional Resources

References to Kaula have been noted in Hawaiian oral traditions; however, there are no recorded traditional Hawaiian sites on the islet.

3.3.2.10.4 Geology and Soils—Kaula

Region of Influence

The region of influence for geology and soils is the southern end of Kaula, specifically, the southernmost 10 acres, currently used by the Navy for airborne ordnance training.

Affected Environment

Physiography

Kaula is a small, crescent-shaped volcanic island located southwest of Niihau. The island is the remnant of a breached volcanic cone that has been heavily eroded. The island is fairly symmetrical, with the highest elevation achieved near the center of the island at slightly greater than 500 ft. Steep sea cliffs occur around the island perimeter; however, the remnants of a narrow wave-cut terrace, cut 8 to 10 ft above current sea level, are evident on the eastern shore. Near the northwest end of the convex (leeward) side of the island, slopes are the steepest, reaching approximately 140 percent and greater. In general, the sea cliffs are relatively smooth; however, in some areas, joints and fissures in the rock have promoted large blocks of ash to erode, making elongated sea caves (U.S. Department of the Navy, 1980). On the concave windward side, upland slopes generally range from 75 to 125 percent. Gullies on the leeward slopes are relatively few and small, whereas those on the windward slopes tend to be more numerous and larger (U.S. Department of the Navy, 1980).

Geology

The distance and water depth between Kaula and Niihau suggest that Kaula was an independent volcanic center (U.S. Department of the Navy, 1980). Earlier geologic surveys reported by Palmer (1927) indicate a geologic history typical of other islands in the Hawaiian chain. Kaula was raised to sea level, or near sea level, during a major period of Tertiary volcanism when large volumes of lava were deposited. An erosional unconformity ensued, during which coral reefs developed on the summit of the submerged volcano or the beveled base of the subaerial mountain. A second eruptive epoch followed, during which a tuff crater was formed. The crater was probably unsymmetrical, with the leeward side being the highest and the windward side considerably lower, possibly not above sea level. The tuff crater was subsequently eroded by wind, waves, and runoff, and a submarine terrace was cut around most of the island. The sea has since receded to about 15 ft below the wave cut terrace.

Volcanic rock on Kaula is reported as a light brownish-gray tuff (U.S. Department of the Navy, 1980). Embedded in the tuff are olivine nodules, which may be the same age as the tuff. Other inclusions encompass fragments of older lava and reef limestone, which suggest that the last phase of volcanic activity dislodged and incorporated these materials during violent eruptions (U.S. Department of the Navy, 1980).

Soils

Soil on Kaula is primarily composed of water-lain detritus, which mantles the wave cut terrace on the leeward side of the island. The detritus is fine- to coarse-grained tuffaceous material and has not been reworked; therefore, the grains are generally angular. The coarsest grains are composed of fresh to decomposed volcanic glass, fine grained basalt, and fragments of bird bones along with a few olivine fragments (U.S. Department of the Navy, 1980). The relicts in the finer-grained material suggest that the parent material was of basaltic composition. Augite and feldspar, common elements of Hawaiian basalts, however, have been weathered out (U.S. Department of the Navy, 1980).

3.3.2.10.5 Health and Safety—Kaula

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for health and safety is Kaula and the immediate surface danger zone around the island.

Affected Environment

The primary health and safety issue concern associated with Kaula is the aerial inert bombing/aircraft gunnery impact area; no other hazardous operations occur on the island. To minimize health and safety risks, a Surface Danger Zone surrounding Kaula was established for the primary purpose of ensuring an adequate margin of safety to both personnel and equipment during the conduct of gunnery training events by the military. In addition, because of the potential for unexploded ordnance to be present on and just below the surface of the island and adjacent waters, the island and tidal shoreline are closed to unauthorized personnel at all times. Prior to any bombing training events, an aircraft flies over the island and determines if it is safe to conduct the mission.

To allow some fishing use of the waters surrounding the island (excluding the tidal zone), the Navy does open the surface danger zone on weekends and holidays for fishing by notifying the appropriate State agency. The Commander Fleet Air Hawaii, as the controlling and scheduling agency for the military use of Kaula, is responsible for notifying the Hawaii Department of Land and Natural Resources, Division of Fish and Game, and Commander Fourteenth Coast Guard District, in writing, of the period of time the Surface Danger Zone will be opened for fishing.

3.3.2.10.6 Land Use—Kaula

Appendix C includes a definition of land use and laws and regulations that pertain to it.

Region of Influence

The region of influence is the southern end of Kaula, specifically, the southernmost 10 acres, currently used by the Navy for airborne ordnance training. The Navy has no intention of expanding land holdings at this location. Kaula is federally owned and controlled.

Affected Environment

Kaula is a 108-acre island southwest of Niihau and is part of Kauai County (Figure 2.1-2). There are no recreational activities associated with or occurring on Kaula. Ordnance delivery is limited to the southeastern tip of the island (U.S. Department of Defense, 2006). The State Land Use classification for Kaula is Conservation Land, and there is no County land use designation for Kaula.

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3.4 OAHU

Oahu serves as the main commerce port for all of Hawaii. It is the third largest of the Hawaiian Islands in size and the largest in population, with roughly 75 percent of the State's residents. Honolulu County encompasses the entire island of Oahu; its county seat is the city of Honolulu. Current and proposed Hawaii Range Complex (HRC) training and research, development, test, and evaluation (RDT&E) activities offshore or onshore of Oahu addressed in this Environmental Impact Statement (EIS)/Overseas EIS (OEIS) are located at Puuloa Underwater Range, Naval Defensive Sea Area, U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport, Marine Corps Base Hawaii (MCBH), Marine Corps Training Area–Bellows (MCTAB), Makua Military Reservation, Dillingham Military Reservation, Ewa Training Minefield, Barbers Point Underwater Range, Naval Undersea Warfare Center (NUWC) Range Shipboard Electronic Systems Evaluation Facility (SESEF), NUWC Fleet Operational Readiness Accuracy Check Site (FORACS), Naval Station Pearl Harbor, Ford Island, Naval Inactive Ship Maintenance Facility Pearl Harbor, Explosive Ordnance Disposal (EOD) Land Range–Naval Magazine (NAVMAG) Pearl Harbor West Loch, Lima Landing, Hickam Air Force Base (AFB), Wheeler Army Airfield, Kahuku Training Area, Keehi Lagoon, Kaena Point, Mt. Kaala, Wheeler Network Segment Control/Pacific Missile Range Facility (PMRF) Communication Sites, Mauna Kapu Communication Site, and Makua Radio/Repeater/Cable Head.

3.4.1 OAHU OFFSHORE

Oahu Offshore addresses ocean areas within 12 nautical miles (nm) of Oahu, including ranges and training areas where activities are performed by the Navy. Discussions include Puuloa Underwater Range, Naval Defensive Sea Area, MCBH, MCTAB, Makua Military Reservation, Dillingham Military Reservation, Ewa Training Minefield, Barbers Point Underwater Range, NUWC SESEF, and NUWC FORACS. These offshore areas are not within the Hawaiian Islands Humpback Whale National Marine Sanctuary.

3.4.1.1 PUULOA UNDERWATER RANGE—OFFSHORE

The Puuloa Underwater Range is 2 square nautical miles (nm^2) and oriented parallel to the shore at Ewa Beach, west of the mouth of Pearl Harbor. Water depths range from about 9 feet (ft) near shore to a maximum depth approaching 228 ft in the southwest corner. The majority of the range is less than 39 ft in depth. The Puuloa Underwater Range supports underwater demolition activities.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Puuloa Underwater Range Offshore. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.1.1.1 Biological Resources—Puuloa Underwater Range—Offshore

Section 3.1.2 provides a detailed description of marine biological resources.

Region of Influence

The region of influence includes the underwater range and adjacent waters.

Affected Environment

Vegetation

Several hundred species of marine algae (seaweed) have been collected in Hawaiian waters (MacCaughey, 1916). Seaweed, mainly alien forms such as *Acanthophora spicifera and Hypnea musciformis,* is still very abundant in the offshore areas of Oahu (U.S. Department of the Navy, 2002a). *A. spicifera* is the most widespread and successful alien alga in Hawaii. Its adaptability has enabled it to spread throughout the state where it is found in brackish water ponds, salty tidepools, on basalt ledges and in sandy bottomed habitats attached to coral rubble. It is now found on all of the Main Hawaiian Islands and is a common component of the intertidal environment throughout the state. Soon after the introduction of *H. musciformis*, it was identified as a food source for the green sea turtle. *H. musciformis* can make up a significant part of their diet, sometimes representing 99 to 100 percent of the seaweed found in their stomachs. *Avarainvillea amadelpha* can be found in abundance on the shallow reef flats on Oahu's south shore where it competes directly with the Islands' only native seagrass on sandy bottoms off south Oahu. Specimens have been collected from deeper water up to 90 meter (m) depth. It is not known if this alga has been introduced or is a native. (University of Hawaii, undated)

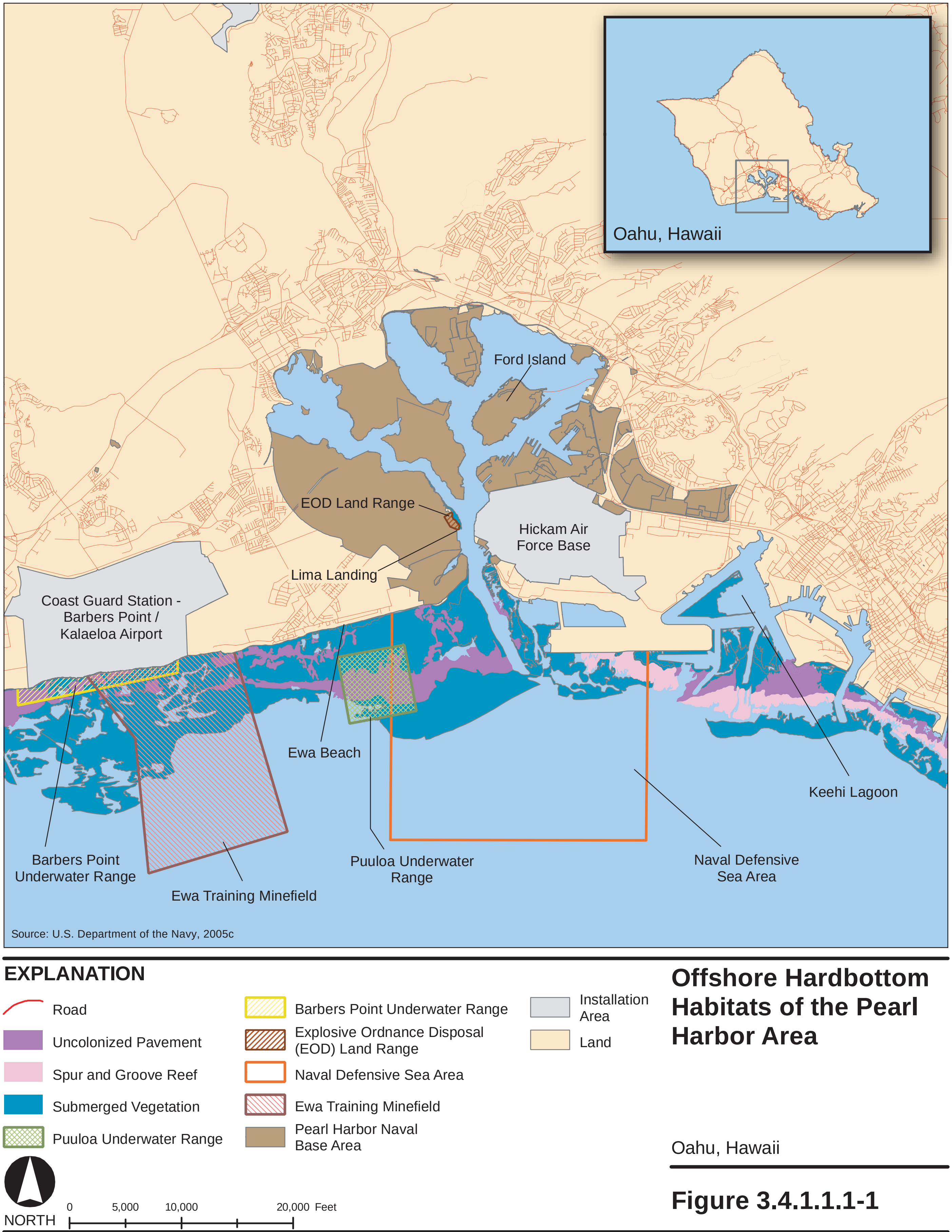
<u>Threatened and Endangered Plant Species</u>

No threatened or endangered plant species have been observed in the region of influence.

Wildlife

A description of coral reef area associated with the Hawaiian Islands and its management by both the State of Hawaii and the Federal government is provided in Section 3.1.2.1. A benthic survey conducted in 2001 close to and with a similar depth range to the Puuloa Underwater Range indicated that corals ranged from locally abundant on the northern inshore reef slope at Ewa Beach (Figure 3.4.1.1.1-1) to uncommon on the broad sandy slopes on the south (seaward) side of the surveyed area. Coral coverage ranged from 80 to 90 percent at depths between 9.7 and 13 fathoms to less than 1 percent in water depths from 13 to 20 fathoms. The coral community was dominated by rose or cauliflower coral (*Pocillopora meandrina*), lobe coral (*Porites lobata*)*,* and finger coral (*Porites compressa*)*.* (U.S. Department of the Navy, 2002a)

Coastal waters of the Ewa Plain receive nutrient rich water from springs below sea level. The nutrients in this water come from upland agricultural fertilization, leaching from cesspools and septic tanks, domestic waste injection wells, and urban application of fertilizers. These extra nutrients promote the growth of benthic algae (limu). A few species of reef fish are present in low numbers in the littoral waters. (U.S. Department of the Navy, 2002a)



Offshore Hardbottom Habitats of the Pearl Harbor Area

Oahu, Hawaii

Figure 3.4.1.1.1-1

Fish species are diverse and abundant and generally associated with the deeper (greater than 20 fathoms) areas containing coral coverage and vertical relief. This type of area has been designated by the National Oceanic and Atmospheric Administration (NOAA) as Habitat Areas of Particular Concern (HAPC). The most common families represented are surgeonfishes (acanthurids), butterflyfishes (chaetodontids), damselfishes (pomacentrids), wrasses (labrids), triggerfishes (balistids), and moorish idols (zanclids). (U.S. Department of the Navy, 2002a) Section 3.1.2.2.1 includes a description of Essential Fish Habitat (EFH); however, a detailed description, including status, distribution, and habitat preference of managed fisheries, is provided in the Navy's *Final Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007a).

A variety of whales and dolphins not listed as threatened or endangered are found around the Hawaiian Islands, including the minke whale (*Balaenoptera acutorostrata*) and Bryde's whale (*Balaenoptera edeni*). These whales have been identified both by visual sighting and by acoustic surveys. More than 20 species of toothed whales and dolphins are known to exist around the islands, including those most frequently seen: spinner dolphin (*Stenella longirostris*), spotted dolphin (*Stenella attenuata*), bottlenose dolphin (*Tursiops truncatus*), short finned pilot whale (*Globicephala macrorynchus*), and false killer whale (*Pseudorca crassidens*). The spinner dolphin is commonly seen on the leeward side of all of the Main Hawaiian Islands. Spotted dolphins are usually located near the spinners in deeper waters, while the bottlenose dolphins frequent both shallow and deep areas. (U.S. Department of the Navy, 2002a)

Threatened and Endangered Species

Table 3.4.1.1.1-1 provides a list of threatened and endangered species that are known or expected to occur in the vicinity of Puuloa Underwater Range. Transitory humpback whales (*Megaptera novaeangliae*) are occasionally reported in the area outside of the Pearl Harbor Entrance Channel but are not resident in the area (Smith et al., 2006). Hawaiian monk seals (*Monachus schauinslandi)* are resident on Oahu and have been sighted near the Pearl Harbor Entrance Channel. The green turtle (*Chelonia mydas*) is commonly sighted in this area (Smith et al., 2006).

Nine marine wildlife species listed as Federal and State threatened or endangered species are known or suspected to exist in Hawaiian waters. These species include the Hawaiian monk seal, blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), humpback whale, sei whale (*Balaenoptera borealis*), sperm whale (*Physeter macrocephalus*), hawksbill turtle (*Eretmochelys imbricata*), green turtle, and loggerhead turtle (*Caretta caretta*). Section 3.1.2 includes a description of these listed species. (U.S. Department of the Navy, 2002a)

Environmentally Sensitive Habitat

No environmentally sensitive habitat has been identified.

Hawaiian Islands Humpback Whale National Marine Sanctuary

Hawaiian Islands Humpback Whale National Marine Sanctuary areas are located off the northern and southeastern coastlines of Oahu. No current HRC activities are being performed within portions of the Hawaiian Islands Humpback Whale National Marine Sanctuary offshore of Oahu, and none are being proposed.

Table 3.4.1.1.1-1. Listed Species Known or Expected to Occur in the Vicinity of Puuloa Underwater Range

Scientific Name	Common Name	Federal Status
Reptiles		
Caretta caretta	Loggerhead turtle	T
Chelonia mydas	Green turtle	T
Eretmochelys imbricata	Hawksbill turtle	E
Mammals		
Monachus schauinslandi	Hawaiian monk seal	E
Balaenoptera borealis	Sei whale	E
Balaenoptera musculus	Blue whale	E
Balaenoptera physalus	Fin whale	E
Megaptera novaeangliae	Humpback whale	E
Physeter macrocephalus	Sperm whale	E

Source: U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a; U.S. Department of the Navy, 2002a; U.S. Fish and Wildlife Service, 2006b.

Key to Federal Status:
E = Endangered
T = Threatened

3.4.1.1.2 Cultural Resources—Puuloa Underwater Range—Offshore

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The region of influence for the Puuloa Underwater Range encompasses areas where EOD would occur.

Affected Environment

Underwater Cultural Resources

There are no known submerged archaeological resources within the Puuloa Underwater Range region of influence (e.g., fishponds or shipwrecks).

3.4.1.1.3 Hazardous Materials and Waste—Puuloa Underwater Range—Offshore

Appendix C includes a discussion of hazardous materials and waste resource laws and regulations.

Region of Influence

The region of influence for hazardous materials and wastes includes the range and adjacent ocean waters.

Affected Environment

Hazardous Materials

Puuloa Underwater Range is used for underwater demolition training using small underwater detonations. Training on Puuloa Underwater Range involves transporting (by vehicle and boat), handling, and using small quantities of hazardous materials (e.g., explosives). Explosives charges up to 20 pounds (lb) (net explosive weight) may be detonated on this range.

Hazardous Waste

The detonations of explosives generate small quantities of explosives residues, metals, and inorganic salts. These hazardous constituents generally disperse into the water column, but some may remain in bottom sediments. The annual quantities of hazardous materials consumed on this range are very small, however, and have no known offsite effects.

3.4.1.1.4 Health and Safety—Puuloa Underwater Range—Offshore

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for public health and safety includes the footprint of the range and adjacent ocean areas.

Affected Environment

Puuloa Underwater Range is a 2 nm^2 area in the open ocean outside and to the west of the entrance to Naval Station Pearl Harbor. The range lies well offshore under the Surface Danger Zone of the Marine Corps' Puuloa Firing Range. The range is used for training in underwater demolition and Special Warfare Operations (SPECWAROPS).

Public health and safety risks associated with this training activity include the possible dispersal of hazardous explosives residues in ocean waters, re-suspension of bottom sediment contaminants, and possible public proximity to an underwater detonation.

Public uses are not permitted within the range. Procedures for approving an underwater detonation include filing a "Request for Detonation of Underwater Ordnance" with Commander, Naval Station Pearl Harbor to determine whether the proposed detonation would constitute any danger. Upon concurrence by appropriate commands, Commander, Naval Surface Force, Pacific grants permission to conduct the underwater detonations and concurrently requests issuance of a local Notice to Mariners by the appropriate U.S. Coast Guard District. Thus, current underwater EOD training at Puuloa Underwater Range poses no risk to public safety.

3.4.1.2 NAVAL DEFENSIVE SEA AREA—OFFSHORE

The Naval Defensive Sea Area is a restricted area at Naval Station Pearl Harbor established by Executive Order 8143 of May 26, 1939 and controlled by the Navy. The Naval Defensive Sea Area encompasses areas where underwater training for HRC training and RDT&E activities would occur. Access to the area is restricted.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for the Naval Defensive Sea Area. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.1.2.1 Biological Resources—Naval Defensive Sea Area—Offshore

Section 3.1.2 provides a detailed description of marine biological resources.

Region of Influence

The region of influence includes the Naval Defensive Sea Area offshore waters.

Affected Environment

Vegetation

Seaweed is very abundant in the offshore areas as described in Section 3.4.1.1.1 (U.S. Department of the Navy, 2002a).

<u>Threatened and Endangered Plant Species</u>

No threatened or endangered plant species have been observed in the region of influence.

Wildlife

A fairly large spur-and-groove reef is found adjacent to the runway of the Honolulu International Airport and on the insular shelf beyond the fore reef. The reef is oriented east-west and is approximately 9,190 ft long and 1,770 ft wide. This reef extends further eastward from the airport area toward Waikiki Beach covering an approximate distance of 5.4 miles. Contrary to earlier data, moderately developed spur and groove reefs do occur on either side of the Naval Station Pearl Harbor entrance channel, including Tripod Reef and Ahua Reef. (U.S. Department of the Navy, 2005b)

A visual inspection of two proposed positions outside the Pearl Harbor channel entrance was performed as part of a Pearl Harbor West Loch reconnaissance survey in 2007. The preferred location for the Mobile Diving and Salvage Unit Training Area (Site B) was observed to be 85 percent hard bottom, 10 percent coral, and 5 percent shallow sand patches. The topography is flat at a depth of 65 ft. Site C was observed to be 24 percent hard bottom, 75 percent sand, and 1 percent coral. The topography of the site is flat at a depth of 45 ft. (National Oceanic and Atmospheric Administration Pacific Islands Region, 2007)

Coastal waters of the Ewa Plain receive nutrient rich water from springs below sea level. The nutrients in this water come from upland agricultural fertilization, leaching from cesspools and septic tanks, domestic waste injection wells, and urban application of fertilizers. These extra nutrients promote the growth of benthic algae (limu). A few species of reef fish are present in low numbers in the littoral waters. (U.S. Department of the Navy, 2002a)

Fish species are diverse and abundant and generally associated with the deeper (greater than 20 fathoms) areas containing coral coverage and vertical relief. This type of area has been designated by NOAA as HAPC. The most common families represented are surgeonfishes, butterflyfishes, damselfishes, wrasses, triggerfishes, and moorish idols. (U.S. Department of the Navy, 2002a) Section 3.1.2.2.1 includes a description of EFH; however, a detailed description, including status, distribution, and habitat preference of managed fisheries is available in the Navy's *Final Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007a).

Threatened and Endangered Species

Nine marine wildlife species listed as Federal and State threatened or endangered species (Table 3.4.1.1.1-1) are known or suspected to exist in Hawaiian waters and could transit through the Naval Defensive Sea Area. These species include the Hawaiian monk seal, blue whale, fin whale, humpback whale, sei whale, sperm whale, hawksbill turtle, green turtle, and loggerhead turtle. Section 3.1.2 includes a description of these listed species. (U.S. Department of the Navy, 2002a)

Transitory humpback whales are occasionally reported in the area outside of the Pearl Harbor Entrance Channel but are not resident in the area (Smith et al., 2006). Hawaiian monk seals are resident on Oahu and have been sighted near the Pearl Harbor Entrance Channel.

Environmentally Sensitive Habitat

No environmentally sensitive habitat has been identified within the region of influence.

3.4.1.2.2 Cultural Resources—Naval Defensive Sea Area—Offshore

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The cultural resources region of influence for the Naval Defensive Sea Area encompasses an underwater training area where Mobile Diving and Salvage Unit ONE can conduct military diving and salvage training.

Affected Environment

Underwater Cultural Resources

There are no known submerged archaeological resources within the Naval Defensive Sea Area region of influence (e.g., fishponds or shipwrecks).

3.4.1.2.3 Health and Safety—Naval Defensive Sea Area—Offshore

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for public health and safety includes the footprint of the Naval Defensive Sea Area and adjacent ocean areas.

Affected Environment

Naval Station Pearl Harbor is a restricted area. No vessels are allowed into Naval Station Pearl Harbor without permission of Commander Naval Region Hawaii. The restricted area extends outward from the mouth of the harbor and is defined by a rectangular-shaped boundary known as the Naval Defensive Sea Area. The Navy regulates recreational fishing and boating in Pearl Harbor, and allows active duty and retired military personnel in specified areas of the harbor for such purposes. Fishing from boats is limited to permitted vessels and to non-prohibited areas within Naval Station Pearl Harbor. Permission to enter Naval Station Pearl Harbor must be obtained in advance from Commander, Naval Station Pearl Harbor, Hawaii.

3.4.1.3 MARINE CORPS BASE HAWAII (MCBH)—OFFSHORE

MCBH is a 2,951-acre reservation on Mokapu Peninsula on the northeast side of the island of Oahu. The base is bounded by water on three sides: Kaneohe Bay, the Pacific Ocean, and Kailua Bay. MCBH Offshore includes areas used for HRC training 0 to 12 nm from MCBH (Figure 2.1-3).

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for MCBH Offshore. Of the 13 environmental resources considered for analysis, airspace, air quality, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.1.3.1 Biological Resources—MCBH—Offshore

Section 3.1.2 provides a detailed description of marine biological resources.

Region of Influence

The region of influence consists of the MCBH offshore areas.

Affected Environment

Vegetation

Seagrass (*Halophila ovalis*) is located in the Hale Koa Beach/West field area. At Fort Hase Beach, the seafloor is composed of a flat limestone platform dominated by brown algae (*Distyopteris australis*). (U.S. Department of the Navy, 2002a)

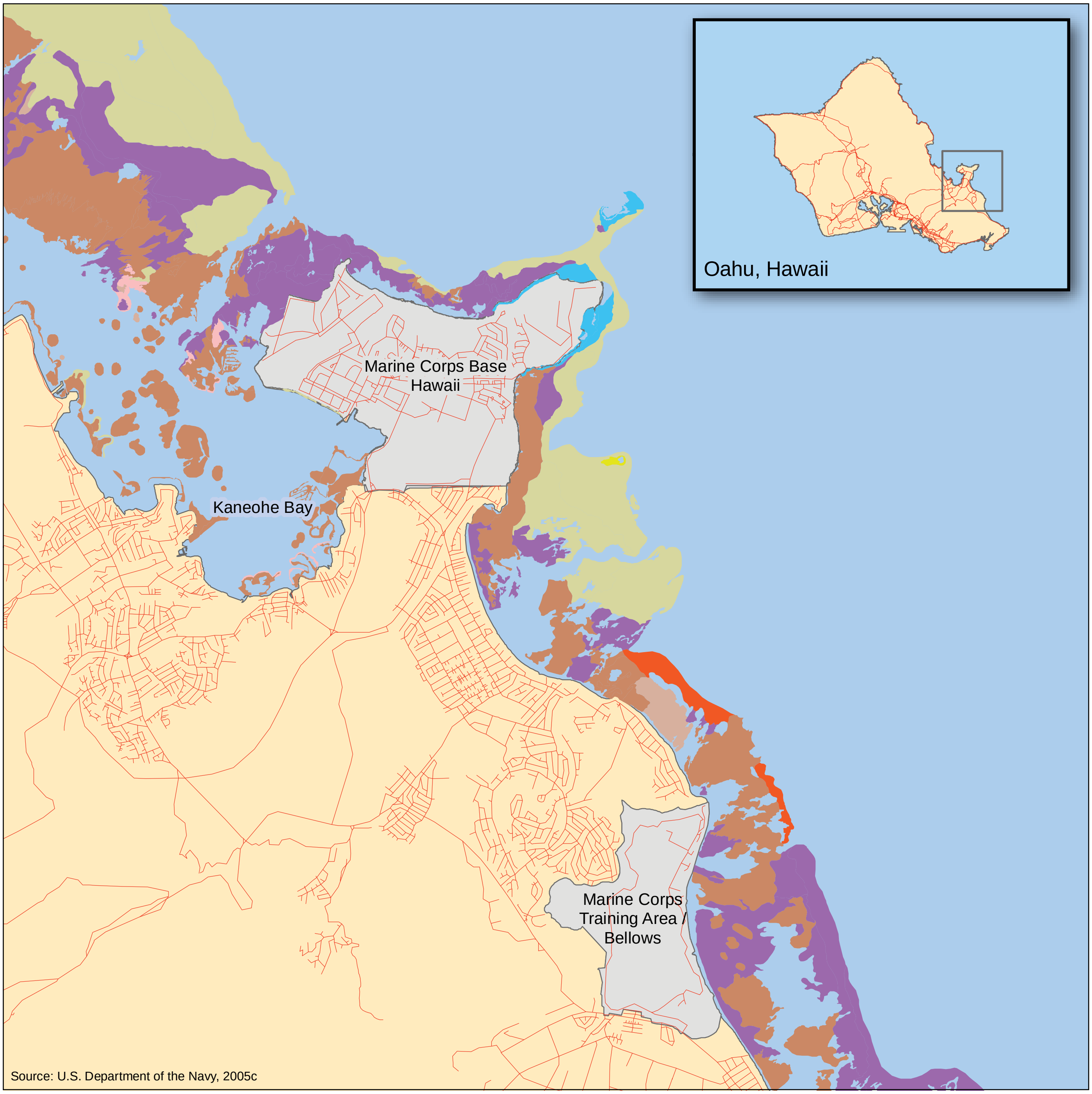
<u>Threatened and Endangered Plant Species</u>

No threatened or endangered plants have been observed offshore of MCBH.

Wildlife

The offshore area at Pyramid Rock Beach is composed primarily of sand and exposed, barren basalt with limited coral coverage by small colonies of cauliflower coral (*Pocillopora meandrina*). The Expeditionary Assault landing site is within an area with a wide sand channel that extends several hundred yards offshore. Sparse colonies of live coral (less than 10 percent coverage) occur in deeper waters offshore. (U.S. Department of the Navy, 2002a)

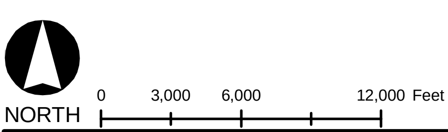
The following information on corals is summarized from the more extensive data provided in the *Marine Resources Assessment for the Hawaiian Islands Operating Area* (U.S. Department of the Navy, 2005b). In Kaneohe Bay a narrow reef crest is located approximately 0.5 nm offshore that consists of uncolonized pavement (Figure 3.4.1.3.1-1). Seaward of the reef crest a fore reef and slope are covered by colonized pavement. The colonized pavement is approximately 3.8 nm long and 1 nm wide running more or less parallel to the shoreline in a northwest to southeast direction. Aggregated coral heads are located on the back reef, and isolated patch reefs occur on the reef flat shoreward of the back reef. The patch reefs range in size from 230



Source: U.S. Department of the Navy, 2005c

EXPLANATION

- Road
- 3-Nautical Mile Line
- Uncolonized Volcanic Rock/Boulder
- Aggregated Coral
- Colonized Volcanic Rock/Boulder
- Submerged Vegetation
- Spur and Groove Reef
- Colonized Pavement
- Scattered Coral/Rock in Unconsolidated Sediment
- Uncolonized Pavement
- Installation Area
- Land



Offshore Hardbottom Habitats of Marine Corps Base Hawaii and Marine Corps Training Area / Bellows

Oahu, Hawaii

Figure 3.4.1.3.1-1

ft in diameter to an area of 2,953 ft by 1,968.5 ft. Three of the patch reefs encircle Kapapa Island, Ahu o Laka Island, and Mokuoloe Island. The largest patch reef encircles Mokuoloe Island. At the southern end of Kaneohe Bay off of Kokokahi and Keaalu, there are three narrow reefs (each approximately 131 ft wide) made of aggregated coral heads. The lengths of these reefs range from 1,148 to 2,297 ft. The back reef zone to the northeast of the Kaneohe Marine Corps Airfield contains three reefs made of aggregated coral heads located approximately 2,297 to 3281 ft from the shore and the reef farthest north measures approximately 328 ft by 1,640 ft. The other two reefs are relatively narrow (less than 98 to 328 ft wide and up to 4,593 ft long).

In 1998, the most common coral species within the Kaneohe Bay was *Porites compressa*, a species that since it is not wave resistant occurs in protected embayments. Other common coral species of Kaneohe Bay are *Montipora verrucosa*, *Pocillopora damicornis*, *Cyphastrea ocellina*, *Pavona varians*, and *Fungia scutaria*. The most common coral species on the seaward side of the barrier reef of Kaneohe Bay are *Porites lobata* and *Pocillopora meandrina*. Both species are resistant to high-energy environments; mean coral cover on the barrier reef ranges from 5 to 10 percent. In 2002, the overall range of coral cover at six sites of Kaneohe Bay was 2.5 percent to 67.5 percent.

Seabirds, including the great frigate bird (`iwa) and brown noddy have been seen foraging offshore. (U.S. Department of the Navy, 2002a)

Threatened and Endangered Wildlife Species

Threatened and endangered species known or expected to occur offshore of Marine Corps Base Hawaii are listed in Table 3.4.1.3.1-1. Threatened green turtles frequent the inshore waters at all three landing beaches, and are especially abundant in the Hale Koa Beach/West field area where they forage on seagrass (*Halophila ovalis*). The endangered Hawaiian monk seal occurs in the area. Migrating endangered humpback whales occur in deeper offshore waters during winter months, often coming close to shore at Pyramid Rock Beach. (U.S. Department of the Navy, 2002a)

Table 3.4.1.3.1-1. Listed Species Known or Expected to Occur Offshore of Marine Corps Base Hawaii

Scientific Name	Common Name	Federal Status
Reptiles		
Chelonia mydas	Green turtle	T
Eretmochelys imbricata	Hawksbill turtle	E
Mammals		
Monachus schauislandii	Hawaiian monk seal	E
Megaptera novaeangliae	Humpback whale	E

Source: U.S. Department of the Navy, 2002a

Key to Federal Status:
T = Threatened
E = Endangered

3.4.1.3.2 Cultural Resources—MCBH—Offshore

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

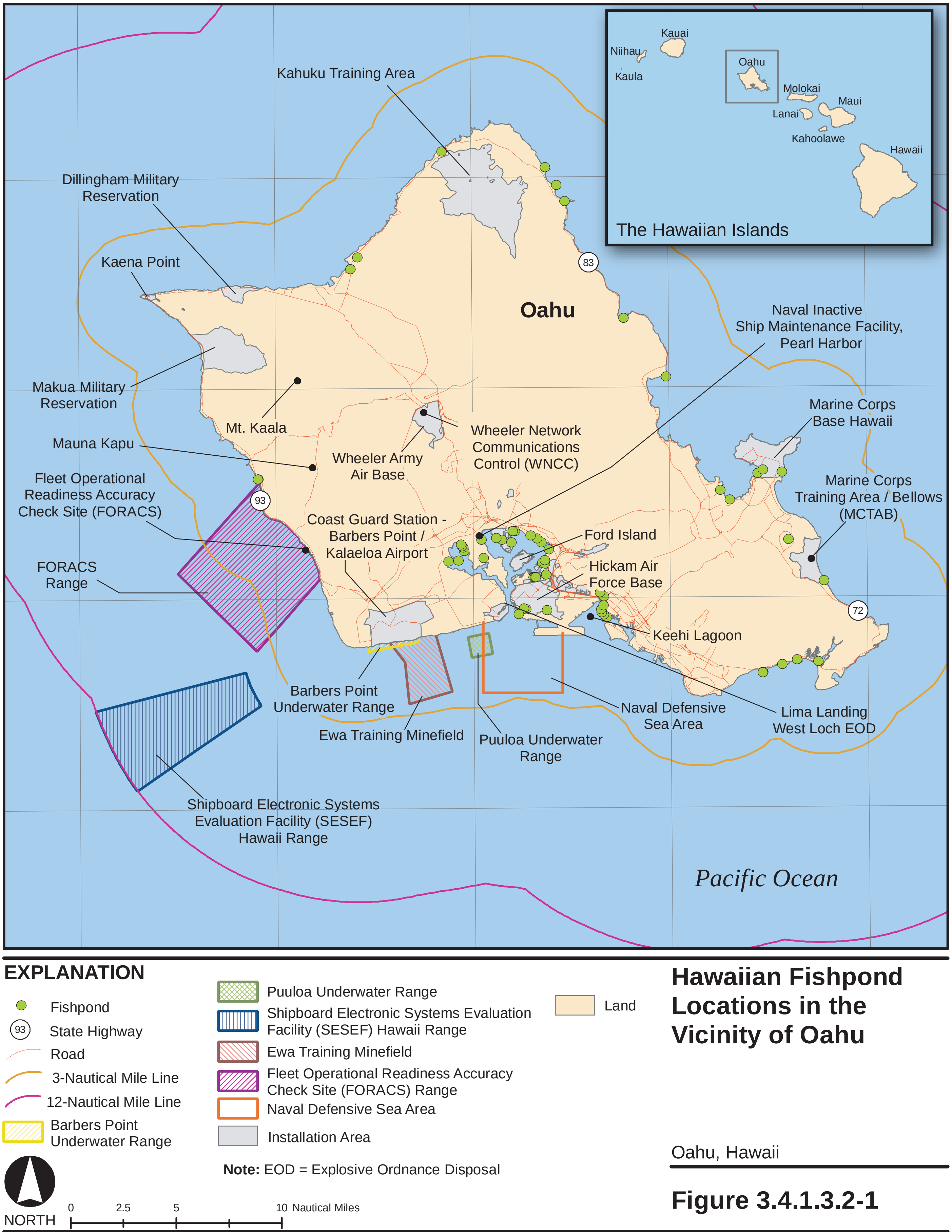
Region of Influence

The region of influence for cultural resources at MCBH encompasses locations where Humanitarian Assistance/Disaster Relief Operations will occur.

Affected Environment

Underwater Cultural Resources

Underwater archaeological resources within the offshore waters of MCBH include shipwrecks and several Hawaiian fishponds (see Figures 3.1.3-2 and 3.4.1.3.2-1).



Hawaiian Fishpond Locations in the Vicinity of Oahu

Oahu, Hawaii

Figure 3.4.1.3.2-1

3.4.1.4 MARINE CORPS TRAINING AREA/BELLOWS (MCTAB)—OFFSHORE

MCTAB covers 1,078 acres on the southeastern portion of Oahu. The inactive airfield in the center of the site is limited to rotary wing activity, and is occasionally used for U.S. Marine Corps helicopter training. MCTAB Offshore includes areas used for HRC training 0 to 12 nm from MCTAB (Figure 2.1-3).

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for MCTAB. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.1.4.1 Biological Resources—MCTAB—Offshore

Section 3.1.2 provides a detailed description of marine biological resources.

Region of Influence

The region of influence consists of the MCTAB offshore areas.

Affected Environment

Vegetation

Threatened and Endangered Plant Species

No threatened or endangered plants have been observed offshore of MCTAB.

Wildlife

There are no live coral colonies in the offshore areas as a result of redistribution of sand and scouring caused by wave action. The seafloor out to a distance of 492 ft from the beach consists of a sand flat, beyond which a low-relief fossil reef platform becomes interspersed with the sand. The outer barrier reef crest (see Figure 3.4.1.3.1-1) is an actively accreting coral reef habitat comprising predominantly the genera *Pocillopora, Porites, and Montipora*. There are two well-defined sand channels that extend from the shoreline through the barrier reef to the open ocean beyond. (U.S. Department of the Navy, 2002a) Section 3.1.2.2.1 includes a description of EFH; however, a detailed description, including status, distribution, and habitat preference of managed fisheries, is provided in the Navy's *Final Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007a).

Threatened and Endangered Wildlife Species

Threatened and endangered species known or expected to be in offshore MCTAB are the same as those listed in Table 3.4.1.3.1-1. Green turtles occur frequently in the offshore water. Also occasionally feeding in these waters are hawksbill turtles (U.S. Department of the Navy, 2005b). Hawaiian monk seals have been sighted in the area (U.S. Department of the Navy, 2005b). Waimanalo Bay is expected to be too shallow for whales, such as the humpback whale, which winters in the Hawaiian Islands. However, it is possible that an occasional humpback whale could use Waimanalo Bay. (U.S. Pacific Command, 1995)

3.4.1.4.2 Cultural Resources—MCTAB—Offshore

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The region of influence for underwater cultural resources at MCTAB includes locations where Expeditionary Assault (amphibious training), Mine Neutralization, Swimmer Insertion/Extraction, and SPECWAROPS would occur (see Figure 2.1-3).

Affected Environment

Underwater Cultural Resources

Offshore features within the region of influence for MCTAB include a shoreline burial complex (Site 4854) and several Hawaiian fishponds (Figure 3.4.1.3.2-1) (U.S. Army Corps of Engineers, Honolulu Engineer District, 2005). As shown on NOAA maps, there are also several shipwrecks in the MCTAB vicinity (Figure 3.1.3-2).

3.4.1.5 MAKUA MILITARY RESERVATION—OFFSHORE

Makua Military Reservation is a Department of the Army reservation containing a total of 4,190 acres in the Makua Valley on the northwestern side of Oahu. Makua Military Reservation extends from the Farrington Highway along the west coast eastward to the ridgeline of the Waianae Mountains. Makua Military Reservation Offshore includes areas used for HRC training 0 to 12 nm from Makua Military Reservation (Figure 2.1-3).

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Makua Military Reservation. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.1.5.1 Biological Resources—Makua Military Reservation—Offshore

Section 3.1.2 provides a detailed description of marine biological resources.

Region of Influence

The region of influence consists of the Makua Military Reservation offshore areas.

Affected Environment

Vegetation

Threatened and Endangered Plant Species

No threatened or endangered plants have been observed offshore of Makua Military Reservation.

Wildlife

The National Centers for Coastal Ocean Science/NOAA benthic habitat maps show no coral reefs along the western side of Oahu from the Naval Reservation to the Makua Military Reservation. (U.S. Department of the Navy, 2005b)

Non-listed marine mammals present in the region of influence include the bottlenose dolphin, spotted dolphin, and spinner dolphin, which are common along the coastline (U.S. Department of the Navy, 2005b; U.S. Department of the Army, 2005). Spinner dolphins are regularly seen in Makua Bay where they use the sandy-bottom habitat for resting and socializing (National Marine Fisheries Service, 2007a).

Threatened and Endangered Wildlife Species

Threatened and endangered species known or expected to occur offshore of Makua Military Reservation are the same as those provided in Table 3.4.1.3.1-1, with the exception of the leatherback turtle. The only threatened and endangered marine mammals potentially present in the region of influence are the Hawaiian monk seal and the humpback whale (U.S. Department of the Navy, 2005b). Of the five species of sea turtles that occur in Hawaiian waters, only the green turtle, hawksbill turtle, and rarely the leatherback turtle (which prefers deep ocean water) are likely to be in the region of influence (U.S. Department of the Army, 2005).

3.4.1.5.2 Cultural Resources—Makua Military Reservation—Offshore

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The cultural resources region of influence for Makua Military Reservation encompasses all areas where Live Fire Exercise (LFX) events (including major ground troop and artillery movement and munitions detonation [e.g., mortars, heavy artillery]) could be conducted (see Figure 2.1-3).

Affected Environment

Underwater Cultural Resources

Underwater archaeological resources within the offshore Makua Military Reservation region of influence include several shipwrecks (see Figure 3.1.3-2).

3.4.1.6 DILLINGHAM MILITARY RESERVATION—OFFSHORE

Dillingham Military Reservation is a 664-acre training area with a beach and an airfield on the northwestern shore of Oahu. It is on a narrow, sloping plain between the Waianae Range and the sea. Dillingham Military Reservation Offshore includes areas used for HRC training 0 to 12 nm from Dillingham Military Reservation (Figure 2.1-3).

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Dillingham Military Reservation. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.1.6.1 Biological Resources—Dillingham Military Reservation—Offshore

Section 3.1.2 provides a detailed description of marine biological resources.

Region of Influence

The region of influence consists of the Dillingham Military Reservation offshore areas.

Affected Environment

Vegetation

Threatened and Endangered Plant Species

No threatened or endangered plants have been observed offshore of Dillingham Military Reservation.

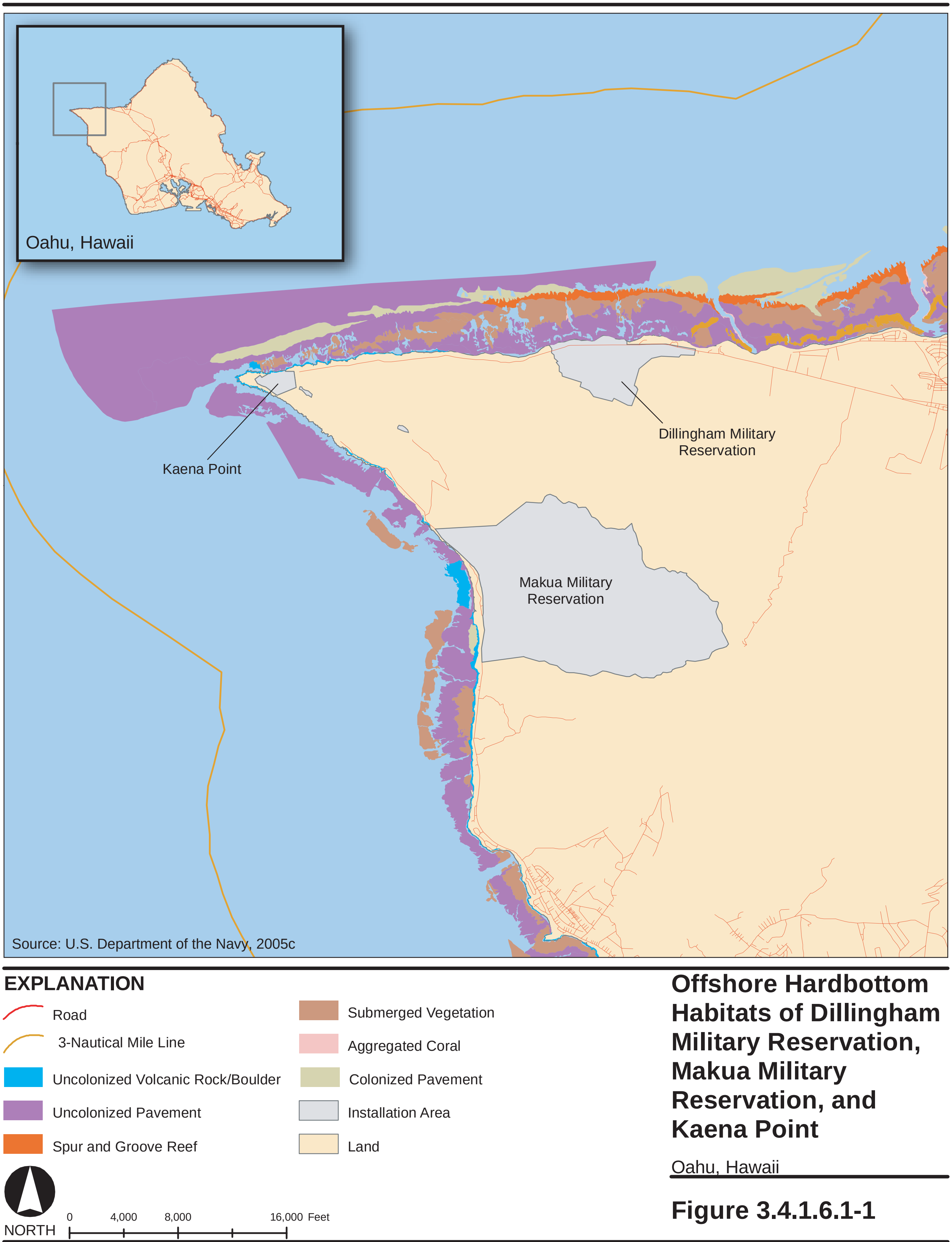
Wildlife

There are coral reefs within 0.5 mile (mi) of the shoreline. Spur-and-groove reefs are found along the northern shoreline of Oahu (from Dillingham Airfield to Kaena Point) (Figure 3.4.1.6.1-1). There are no specific coral reefs of management concern. (U.S. Department of the Army, 2004)

Non-listed marine mammals potentially present in the region of influence include the bottlenose dolphin, spotted dolphin, and spinner dolphin, which are common along the coastline (U.S. Department of the Army, 2004).

Threatened and Endangered Wildlife Species

Threatened and endangered species known or expected to occur offshore of Dillingham Military Reservation are the same as those listed in Table 3.4.1.3.1-1. Since Dillingham Military Reservation is adjacent to a small segment of beachfront, a portion of the region of influence extends to the offshore waters. This area is outside the Hawaiian Islands Humpback Whale National Marine Sanctuary. The humpback whale and several dolphin species are marine mammals most likely to be present in the region of influence (U.S. Department of the Navy, 2005b). The Hawaiian monk seal is likely to occur since the area of Kaena Point is used by monk seals to haul-out, pup, and rear young (National Marine Fisheries Service, 2007a). No



Offshore Hardbottom Habitats of Dillingham Military Reservation, Makua Military Reservation, and Kaena Point

Oahu, Hawaii

Figure 3.4.1.6.1-1

sea turtle nesting has been observed in the region of influence, although the green turtle is expected to occur in the region of influence. (U.S. Department of the Army, 2004)

3.4.1.6.2 Cultural Resources—Dillingham Military Reservation—Offshore

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The cultural resources region of influence for Dillingham Military Reservation encompasses areas where Navy and Marine Corps SPECWAROPS under the Rim of the Pacific (RIMPAC) Exercise and small unit maneuvers by the Army occur (e.g., reconnaissance insertions and search and rescue). (See Figure 2.1-3.)

Affected Environment

Underwater Cultural Resources

Underwater archaeological resources within the offshore Dillingham region of influence include scattered shipwrecks.

3.4.1.7 EWA TRAINING MINEFIELD—OFFSHORE

Ewa Training Minefield is an offshore area extending from Ewa Beach approximately 2 nm toward Barbers Point, and out to sea approximately 4 nm (Figure 2.1-3). This area is defined and restricted by 33 Code of Federal Regulations (CFR) 334.1400 and has been used for surface ship mine avoidance training.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Ewa Training Minefield. Of the 13 environmental resources considered for analysis, air quality, airspace, cultural resources, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.1.7.1 Biological Resources—Ewa Training Minefield—Offshore

Section 3.1.2 provides a detailed description of marine biological resources.

Region of Influence

The region of influence is the area that can be affected by mine avoidance training.

Affected Environment

Vegetation

The Ewa Beach area is a popular seaweed harvesting area on Oahu (U.S. Department of the Navy, 2002a).

Threatened and Endangered Plant Species

No threatened or endangered plant species have been identified in the region of influence.

Wildlife

Organisms offshore of Ewa Beach include corals, several species of sea cucumber, sea urchins, and colonial soft corals. A few species of reef fish are also present in low numbers in the littoral waters. A benthic survey conducted in 2001 indicated that corals were locally abundant on the northern inshore reef slope at Ewa Beach (Figure 3.4.1.1.1-1). (U.S. Department of the Navy, 2002a) Section 3.1.2.2.1 includes a description of EFH; however, a detailed description, including status, distribution, and habitat preference of managed fisheries is provided in the Navy's *Final Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007a).

Threatened and Endangered Wildlife Species

Green turtles are common in the region of influence. Threatened and endangered species potentially occurring in the region of influence would be the same as those listed in Table 3.4.1.1.1-1.

Environmentally Sensitive Habitat

No environmentally sensitive habitat has been identified.

3.4.1.7.2 Hazardous Materials and Waste—Ewa Training Minefield—Offshore

Appendix C includes a discussion of hazardous materials and waste resource laws and regulations.

Region of Influence

The region of influence for hazardous materials and wastes includes the range and adjacent ocean waters.

Affected Environment

Ewa Training Minefield is an ocean area extending from Ewa Beach approximately 2 nm toward Barbers Point, and out to sea approximately 4 nm. This restricted area has been used in the past for surface ship mine avoidance training. Although the area is not used for this training mission, the Navy may use it in the future, and retains control over it. No hazardous materials are used on this range, and no hazardous wastes are normally generated. Bottom sediments within the range may harbor some residual contamination from past uses of the area.

3.4.1.7.3 Health and Safety—Ewa Training Minefield—Offshore

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for public health and safety includes the footprint of the range and adjacent ocean areas.

Affected Environment

Because there are no current public health and safety concerns, there are no restrictions on commercial or recreation activities at Ewa Beach. Ocean activities occurring at Ewa Beach include netting, fishing, tropical fish collecting, surfing, scuba diving, paddling, kayaking, and shelling. A commercial net pen cage aquaculture site is located near the western range boundary (U.S. Department of the Navy, 2000).

3.4.1.8 BARBERS POINT UNDERWATER RANGE—OFFSHORE

The Barbers Point Underwater Range is a restricted area established by 33 CFR 334. The range encompasses a narrow offshore strip water directly in front of the U.S. Coast Guard Air Station/Kalaeloa Airport. The Barbers Point Underwater Range includes areas used for HRC training (Figure 2.1-3).

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Barbers Point Underwater Range. Of the 13 environmental resources considered for analysis, air quality, airspace, cultural resources, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.1.8.1 Biological Resources—Barbers Point Underwater Range—Offshore

Section 3.1.2 provides a detailed description of marine biological resources.

Region of Influence

The region of influence includes the underwater range and adjacent waters.

Affected Environment

Vegetation

Seaweed is abundant in the offshore areas (U.S. Department of the Navy, 2002a).

Threatened and Endangered Plant Species

No threatened or endangered plant species have been observed in the region of influence.

Wildlife

Biological resources are similar to those described previously for the Puuloa Underwater Range (Section 3.4.1.1.1). A variety of whales and dolphins not listed as threatened or endangered are found around the Hawaiian Islands, including the minke whale and Bryde's whale. Spinner dolphin, spotted dolphin, bottlenose dolphin, short finned pilot whale, false killer whale, and sperm whale are seen in the area most frequently. (U.S. Department of the Navy, 2002a)

Coral coverage ranges from 80 to 90 percent at depths between 9.7 and 13 fathoms to less than 1 percent in water depths from 13 to 20 fathoms. The coral community (Figure 3.4.1.1.1-1) is dominated by *Pocillopora meandrina*, *Porites lobata,* and *Porites compressa*. (U.S. Department of the Navy, 2002a)

The most common fish families represented are surgeonfishes (acanthurids), butterflyfishes (chaetodontids), damselfishes (pomacentrids), wrasses (labrids), triggerfishes (balistids) and moorish idols (zanclids) (U.S. Department of the Navy, 2002a). Section 3.1.2.2.1 includes a description of EFH; however, a detailed description, including status, distribution, and habitat preference of managed fisheries, is provided in the Navy's *Final Essential Fish Habitat and*

Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS (U.S. Department of the Navy, 2007a).

Threatened and Endangered Species

Threatened and endangered species known or expected to occur in the vicinity of Barbers Point Underwater Range are the same as those listed in Table 3.4.1.1.1-1. Nine marine wildlife species listed as Federal and State threatened or endangered species are known or suspected to exist in Hawaiian waters, although the offshore environment may be too shallow for frequent use. These species include the Hawaiian monk seal, blue whale, fin whale, humpback whale, sei whale, sperm whale, hawksbill turtle, green turtle, and loggerhead turtle. A description of these listed species is provided in Section 3.1.2. (U.S. Department of the Navy, 2002a)

Environmentally Sensitive Habitat

No environmentally sensitive habitat has been identified.

3.4.1.8.2 Hazardous Materials and Waste—Barbers Point Underwater Range—Offshore

Appendix C includes a discussion of hazardous materials and waste resource laws and regulations.

Region of Influence

The region of influence for hazardous materials and wastes includes the range and adjacent ocean waters and shoreline.

Affected Environment

Barbers Point Underwater Range comprises a narrow strip of offshore ocean that directly fronts the entire southern boundary of the former Naval Air Station Barbers Point. Naval Air Station Barbers Point was closed as part of the Base Realignment and Closure in July 1998 and renamed the Kalaeloa Airport. The northern range boundary is the high-water mark of the beach at Kalaeloa Airport. It aligns with what was once the station boundary of the closed Naval Air Station Barbers Point. The U.S. Coast Guard Air Station Barbers Point is across the street from the beach and covers a third of the shore of the original installation. No hazardous materials are used on this range, and no hazardous wastes are normally generated. Bottom sediments within the range may harbor some residual contamination from past uses of the area.

3.4.1.8.3 Health and Safety—Barbers Point Underwater Range—Offshore

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for public health and safety includes the range and adjacent shore and ocean areas.

Affected Environment

Currently there are no public health and safety concerns at Barbers Point Underwater Range. Therefore beach activities, including netting, fishing, topical fish collecting, surfing, scuba diving, paddling, kayaking, and shelling, are not constrained.

3.4.1.9 NAVAL UNDERSEA WARFARE CENTER (NUWC) SHIPBOARD ELECTRONIC SYSTEMS EVALUATION FACILITY (SESEF)—OFFSHORE

The NUWC SESEF range, located off Barbers Point on Oahu (Figure 2.1-3), provides state-of-the-art testing and evaluation of combat systems which emit or receive electromagnetic radiation (EMR). Ships operate and maneuver in this area as necessary to remain within electronic signal reception range of the Fleet Technical Evaluation Center onshore. Offshore RDT&E activities associated with SESEF include the SESEF Quick Look Tests and the SESEF System Performance Tests.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for SESEF. Of the 13 environmental resources considered for analysis, airspace, air quality, cultural resources, geology and soils, hazardous materials and hazardous waste, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.1.9.1 Biological Resources—SESEF—Offshore

Section 3.1.2 provides a detailed description of marine biological resources.

Region of Influence

The region of influence is the ocean area that could be affected by RDT&E activities.

Affected Environment

Wildlife

Wildlife in the SESEF range would be to the same as those discussed in Section 3.1.2, Biological Resources (Marine)—Open Ocean Area.

<u>Threatened and Endangered Wildlife Species</u>

Threatened and endangered species would be the same as those discussed in Section 3.1.2, Biological Resources (Marine)—Open Ocean Area.

Environmentally Sensitive Habitat

Environmentally sensitive habitat would be to the same as that discussed in Section 3.1.2, Biological Resources (Marine)—Open Ocean Area.

3.4.1.9.2 Health and Safety—SESEF—Offshore

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for public health and safety includes the footprints of the range and adjacent ocean areas.

Affected Environment

Land areas associated with NUWC ranges are minimal and are for range operations facilities only. NUWC's SESEF area provides state-of-the-art testing and evaluation of combat systems which emit or receive EMR. At present, an average of about 3,910 events—or about 15 per day—take place on the SESEF range.

The potential public health risks of these training events include public exposure to excessive densities of EMR. The potential public safety risks include conflicts between Navy vessels and other vessels on the range.

The sea space where SESEF tests are conducted is unrestricted and is not controlled by NUWC or the Navy. Ships underway for SESEF tests maintain safe separation from other vessels without direct control by SESEF operators.

Communications and electronic devices such as radar, electronic jammers, and other radio transmitters produce EMR. Equipment that produces an electromagnetic field has the potential to generate hazardous levels of EMR. An EMR hazard exists when transmitting equipment generates electromagnetic fields that induce currents or voltages great enough to trigger electro-explosive devices in ordnance, cause harmful effects on people or wildlife, or create sparks that can ignite flammable substances in the area.

EMR fields generally decrease rapidly in intensity with increasing distance from the source, so hazards are reduced or eliminated by establishing minimum distances from EMR emitters for people, ordnance, and fuels. Furthermore, ground-level EMR levels that are generally safe for military personnel aboard ship for long-term exposure are generally safe for transient exposure of individuals at greater distances from the source. Thus, EMR emissions from Navy vessels conducting RDT&E activities on the NUWC ranges are not a public health concern.

NUWC's SESEF area provides state-of-the-art testing and evaluation of combat systems which radiate or receive electromagnetic energy. The sea space where SESEF tests are conducted is unrestricted and is not controlled by NUWC or the Navy. Ships underway for SESEF tests maintain safe separation from other units without direct control by SESEF operators. If the range is fouled by non-participants, the NUWC Range Control Officer determines if and when range operations can continue.

3.4.1.10 NAVAL UNDERSEA WARFARE CENTER (NUWC) FLEET OPERATIONAL READINESS ACCURACY CHECK SITE (FORACS)—OFFSHORE

The offshore area where NUWC FORACS tests are conducted is unrestricted and is not controlled by NUWC or the Navy (Figure 2.1-3). The NUWC Range Control Officer conducts visual lookout and radar searches of the FORACS range to identify any transient, non-participating vessels.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for FORACS. Of the 13 environmental resources considered for analysis, air quality, airspace, cultural resources, geology and soils, hazardous materials and hazardous waste, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.1.10.1 Biological Resources—FORACS—Offshore

Section 3.1.2 provides a detailed description of marine biological resources.

Region of Influence

The region of influence is that area of the range that could be affected by current or proposed RDT&E activities.

Affected Environment

Vegetation

A filamentous green algae (*Neomeris annulata)* that grows upright is common over wide areas of sandy substrate at depths between about 12.5 and 15 fathoms (Commander in Chief Pacific Fleet, 2001).

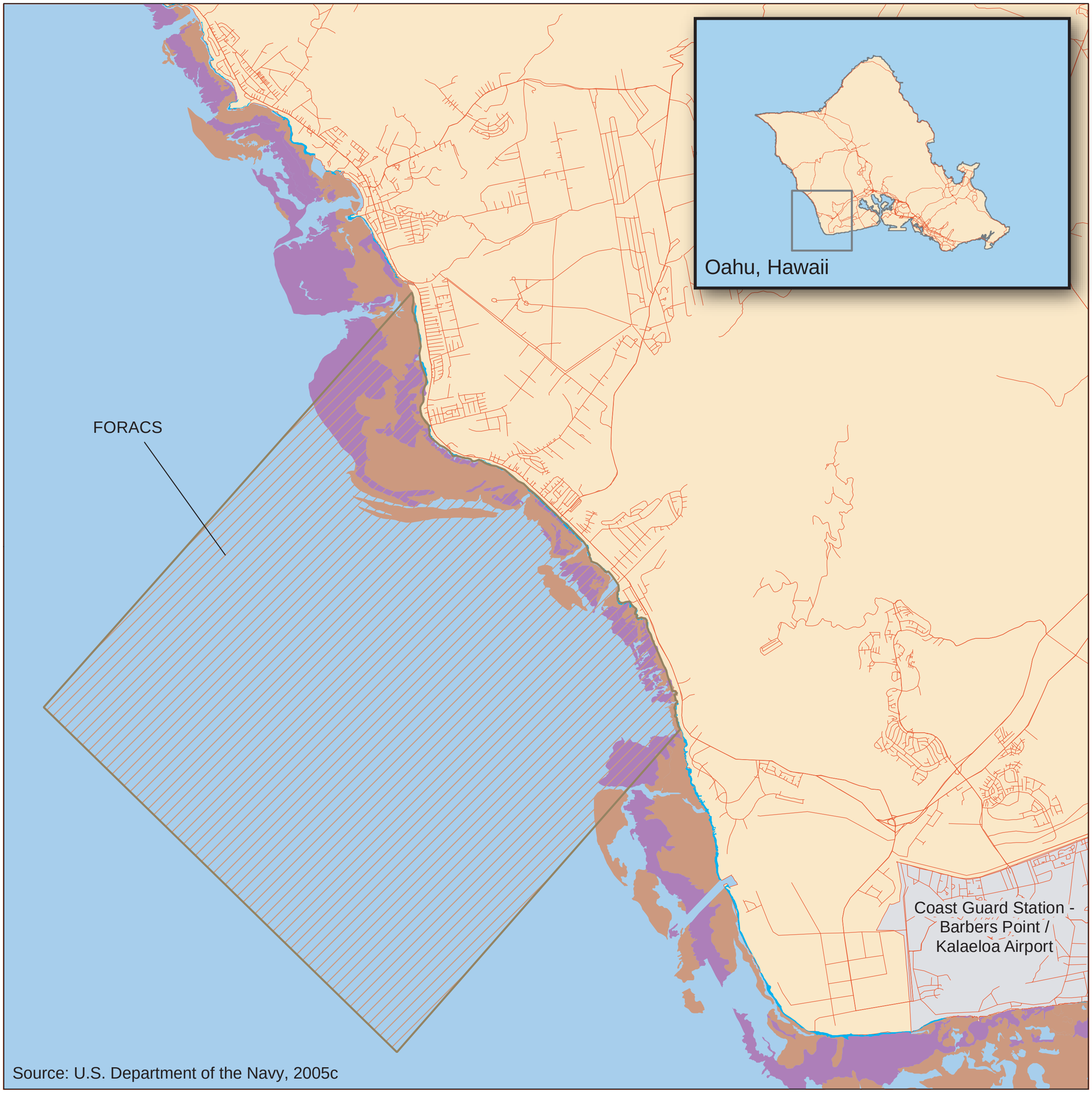
<u>Threatened and Endangered Plant Species</u>

No threatened or endangered plants have been identified in the region of influence.

Wildlife

Inshore areas at depths of about 7 to 12 fathoms have a modestly diverse coral community. *Pocillopora meandrina*, *Porites lobata,* and *Porites compressa* are dominant species of coral. Coral coverage (Figure 3.4.1.10.1-1) declines markedly at depths below 12.5 fathoms with gently sloping sand flats. (Commander in Chief Pacific Fleet, 2001)

Fish are generally rare, except where a coral colony or ocean floor debris provides habitat. The Hawaiian dascyllus is often abundant in these areas. Small schools of pennantfish, Hawaiian cleaner wrasses, Moorish idols, damselfish, and surgeonfish are also present. Common invertebrates include black sea urchins and sea cucumbers. (Commander-in-Chief Pacific Fleet, 2001)



EXPLANATION

- Road
- Fleet Operational Readiness Accuracy Check Site (FORACS)
- Uncolonized Pavement
- Uncolonized Volcanic Rock/Boulder
- Submerged Vegetation
- Installation Area
- Land

NORTH

0 3,700 7,400 14,800 Feet

Offshore Hardbottom Habitats Near Fleet Operational Readiness Accuracy Check Site

Oahu, Hawaii

Figure 3.4.1.10.1-1

A detailed description, including status, distribution, and habitat preference of managed fisheries, is provided in the Navy's *Final Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007a).

A variety of whales and dolphins not listed as threatened or endangered are found around the Hawaiian Islands, including the minke whale and Bryde's whale. Spinner dolphin, spotted dolphin, bottlenose dolphin, short finned pilot whale, false killer whale, and sperm whale are seen in the area most frequently. (U.S. Department of the Navy, 2002a)

<u>Threatened and Endangered Wildlife Species</u>

Green turtles are abundant in the area and frequently use caves and ledges along the fringing reef as resting areas (Commander-in-Chief Pacific Fleet, 2001). Nine marine wildlife species listed as Federal and State threatened or endangered species are known or suspected to exist in Hawaiian waters. These species include the Hawaiian monk seal, blue whale, fin whale, humpback whale, sei whale, sperm whale, hawksbill turtle, green turtle, and loggerhead turtle. A description of these listed species is provided in Section 3.1.2. (U.S. Department of the Navy, 2002a)

Environmentally Sensitive Habitat

No environmentally sensitive habitat has been identified.

3.4.1.10.2 Health and Safety—FORACS—Offshore

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for public health and safety includes the footprints of the range and adjacent ocean areas.

Affected Environment

Land areas associated with Naval NUWC ranges are minimal and are for range operations facilities only. At present, an average of about five events per year take place on the FORACS range.

The sea space where FORACS tests are conducted is unrestricted and is not controlled by NUWC or the Navy. The NUWC Range Control Officer conducts visual lookout and radar searches of the FORACS range to identify any transient, non-participating vessels. If the range contains non-participants, the NUWC Range Control Officer determines if and when range operations can continue. These measures have proved adequate for safe operation of the ranges, and the potential for public safety effects from current training on the NUWC ranges is considered to be negligible.

The potential health risks of these training events include exposure to excessive densities of EMR. As discussed in Section 3.4.1.9.2, EMR emissions from Navy vessels conducting RDT&E activities on the NUWC ranges are not a public health concern.

3.4.2 OAHU ONSHORE

3.4.2.1 NAVAL STATION PEARL HARBOR

Naval Station Pearl Harbor, on the southern shore of the island of Oahu, is a natural water body divided into three lochs by the Waipio and Pearl City peninsulas: West Loch, Middle Loch, and East Loch. Naval Station Pearl Harbor (Figure 2.1-3) encompasses land along the eastern and southern shorelines of East Loch and Ford Island under the Navy's exclusive control. A major portion of the operational area at Naval Station Pearl Harbor is used for maintenance and supply/storage largely located adjacent to ship berthing and repair areas.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Naval Station Pearl Harbor. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, transportation, utilities, and water resources are not addressed.

3.4.2.1.1 Biological Resources—Naval Station Pearl Harbor

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence includes the land area and waters adjacent to Naval Station Pearl Harbor that could be affected by current and proposed training.

Affected Environment

Vegetation

Exotic imported grasses and trees maintained by intensive landscaping efforts make up the majority of the vegetative community at Naval Station Pearl Harbor. Native vegetation, including grasses, trees, and shrubs, is present only in small areas. These areas of native vegetation provide erosion control except during the heaviest rainfall.

Vegetation along the shoreline and the intertidal zone is dominated by pickleweed (*Batis maritima*) and the alien red mangrove (*Rhizophora mangle*) at the heads of the three lochs. Red mangrove has been successful because there are no mangrove predators, herbivores and insects, or diseases. (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a)

<u>Threatened and Endangered Plant Species</u>

No threatened and endangered plant species have been identified at Naval Station Pearl Harbor. Recently, three endangered plants, ko`oloa`ula (*Abutilon menziesii*), ohai (*Sesbania tomentosa*), and loulu (*Pritchardia kaalae*) were established as mitigation for past projects at the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge. These three plants are at least 3 mi from the EOD Land Range and Lima Landing, the closest facilities along West Loch.

Wildlife

Fish and wildlife on and in the waters off of Naval Station Pearl Harbor are managed through its Integrated Natural Resources Management Plan in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the State of Hawaii. Feral dogs (*Canis familiaris*) and cats (*Felis catus*), mongooses (*Herpestes javanicus*), and rodents are present throughout the region of influence. The majority of forest birds at Naval Station Pearl Harbor are exotic or introduced species. The common myna (*Acridotheres tristis*), red-vented bulbul (*Pycnonotus cafer*), Japanese white-eye (*Zosterops japonicus*), house finch (*Carpodacus mexicanus*), and zebra dove (*Geopelia striata*) are among the most common. The State-threatened white tern (*Gygis alba rothschildi*) and the State-endangered pueo *(Asio flammeus sandwichensis)* are occasionally found in the Naval Station Pearl Harbor vicinity. (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a)

One resident indigenous bird, the black-crowned night heron (`auku`u) (*Nycticorax nycticorax*), and 46 migratory species occur in the Naval Station Pearl Harbor area. The migratory birds are dominated by wading birds including the wandering tattler (*Heteroscelus incanus*), ruddy turnstone (*Arenaria interpes*), and Pacific golden plover (*Pluvialis fulva*). (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a)

Introduced species of crustaceans, insects, fish, amphibians, and birds dominate the wildlife of Naval Station Pearl Harbor's wetlands, estuaries, springs, and the lowest reaches of streams. The numbers of native *Megalagrion* damselflies and the native o`opu nakea (goby) (*Awaous guamensis*) have been declining. Approximately 90 percent of the sea floor of the harbor is considered soft bottom with a layer of terrigenous (derived primarily from erosive action on land) mud and/or calcareous (composed of, containing, or resembling calcium carbonate, calcite, or chalk) sand. The remaining 10 percent is considered hard bottom, the limestone platform (Figure 3.4.1.1.1-1). (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a)

The following information on corals is summarized from the more extensive data provided in the *Marine Resources Assessment for the Hawaiian Islands Operating Area* (U.S. Department of the Navy, 2005b). Considerable reef development occurs in embayments and sheltered areas on Oahu including Kaneohe Bay and Hanauma Bay (Figure 3.4.1.1.1-1). Sediment-laden runoff and polluted runoff have impacted reefs of Oahu, specifically Pearl Harbor and Kaneohe Bay.

No reefs are shown along the southeastern end of the island (Kaloko to Wailea Point) (Figure 3.4.1.1.1-1). Fringing reefs are well developed on the southern side of Oahu from the Wailupe Peninsula to Kawaihoa Point and Hanauma Bay, while west of Kawaihoa Point, fringing reefs as well as spur-and-groove reefs are well developed. Other spur-and-groove reefs are found along the southern coastline (Wailupe Peninsula to Honolulu International Airport). (U.S. Department of the Navy, 2005b)

According to the National Centers for Coastal Ocean Science/NOAA, no coral reefs occur to the west of the airport runway, along the shoreline of the Fort Kamehameha Military Reservation, Hickam AFB, the Naval Reservation, or within Naval Station Pearl Harbor (Figure 3.4.1.1.1-1). Contrary to the National Centers for Coastal Ocean Science data, moderately developed spur and groove reefs do occur on either side of the Pearl Harbor entrance channel, including Tripod Reef and Ahua Reef. Tripod Reef is a spur-and-groove system where average coral cover is approximately 40 percent, and live coral cover on Ahua Reef is 40 percent, but in some parts of the reef, coral cover reaches 80 percent. Five species of stony corals occur within Pearl

Harbor: *Pocillopora damicornis*, *P. meandrina*, *Porites compressa*, *Leptastrea purpurea*, and *Montipora patula*. In 1996, the most common coral in Pearl Harbor was *L. purpurea,* and corals were most abundant at the entrance of the West Loch Channel. (U.S. Department of the Navy, 2005b)

A detailed study in 1974 found 90 species of fish in Pearl Harbor (Evans, et al., 1974). Some of the commercially important species are ama`ama (grey mullet) (*Mugil cephalus*), awa (milkfish) (*Chanos chanos*), o`io (bonefish) (*Albula vulpes*), kaku (barracuda) (*Sphyraena barracuda*), nenue (chub) (*Kyphosus* sp.), menpachi (soldierfish) (*Myripristis* spp.), and papio (jacks) (*Carangoides* spp.). Pearl Harbor appears to be very important in the life cycle of the scalloped hammerhead shark (*Sphyrna lewini*). All waters around Naval Station Pearl Harbor have been designated as EFH for eggs and larvae of a number of species. The harbor has not been designated as a HAPC. (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a)

Threatened and Endangered Wildlife Species

Four Federally endangered waterbirds (Table 3.4.2.1.1-1) are recognized as occurring on Naval Station Pearl Harbor: koloa maoli (Hawaiian duck) (*Anas wyvilliana)*, `alae ke`ok`o (Hawaiian coot) (*Fulica alai)*, alae ula (Hawaiian common moorhen) (*Gallinula chloropus sandvicensis)*, and ae`o (Hawaiian black-necked stilt) (*Himantopus mexicanus knudseni)*.

Table 3.4.2.1.1-1. Listed Species Known or Expected to Occur at Naval Station Pearl Harbor

Scientific Name	Common Name (Hawaiian Name)	Federal Status
Reptiles/Mammals		
Chelonia mydas	Green turtle	T
Lasiurus cinereus semotus	Hawaiian hoary bat	E
Monachus schauinslandi	Hawaiian monk seal	E
Birds		
Anas wyvilliana	Koloa maoli (Hawaiian duck)	E
Fulica alai	`Alae ke`oke`o (Hawaiian coot)	E
Gallinula chloropus sandvicensis	Alae ula (Hawaiian common moorhen)	E
Himantopus mexicanus knudseni	Ae`o (Hawaiian black-necked stilt)	E
Pterodroma phaeopygia sandwichensis	`Ua`u (Hawaiian dark-rumped petrel)	E
Puffinus auricularis newelli	`A`o (Newell's Townsend’s shearwater)	T

Source: U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a; U.S. Department of the Navy, 2002a; U.S. Fish and Wildlife Service, 2006b; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007.
Key to Federal Status:
E = Endangered
T = Threatened

According to the USFWS, the Hawaiian hoary bat is located within the region of influence for Naval Station Pearl Harbor (U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007). The green turtle has rarely been seen in Pearl Harbor, and no sandy beaches suitable for nesting exist inside the harbor. They have been seen routinely in the outer reaches of the Naval Station Pearl Harbor entrance channel (Smith et al., 2006). Although the Hawaiian monk seal has never been reported in the harbor, it has been recorded at Iroquois Point at the Naval Station Pearl Harbor entrance channel (Smith et al., 2006). An adult humpback and calf were once reported to have entered East Loch, but this was an unusual event. The pair left the harbor within 24 hours on their own volition. (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a)

Environmentally Sensitive Habitat

The Pearl Harbor National Wildlife Refuge (Figure 3.4.2.1.1-1) is comprised of the Honouliuli Unit (located on the northwestern tip of West Loch) and the Waiawa Unit (located on Pearl City Peninsula). The refuge provides primary wetland habitat for threatened and endangered waterbirds and other bird species in Naval Station Pearl Harbor. Mangrove wetlands are the most common type of wetland. (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a)

No critical habitat has been designated within Naval Station Pearl Harbor (Figure 3.4.2.1.1-1). Approximately 127 acres of jurisdictional wetlands are located on Navy properties in Naval Station Pearl Harbor. Wetland areas adjacent to Naval Station Pearl Harbor include mudflats, shallow ponds, small streams, pickleweed beds, kiawe forests, cattails (*Typha latifolia*), and watercress (*Rorippa microphylla*) and provide habitat for waterbirds. (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a)

3.4.2.1.2 Cultural Resources—Naval Station Pearl Harbor

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

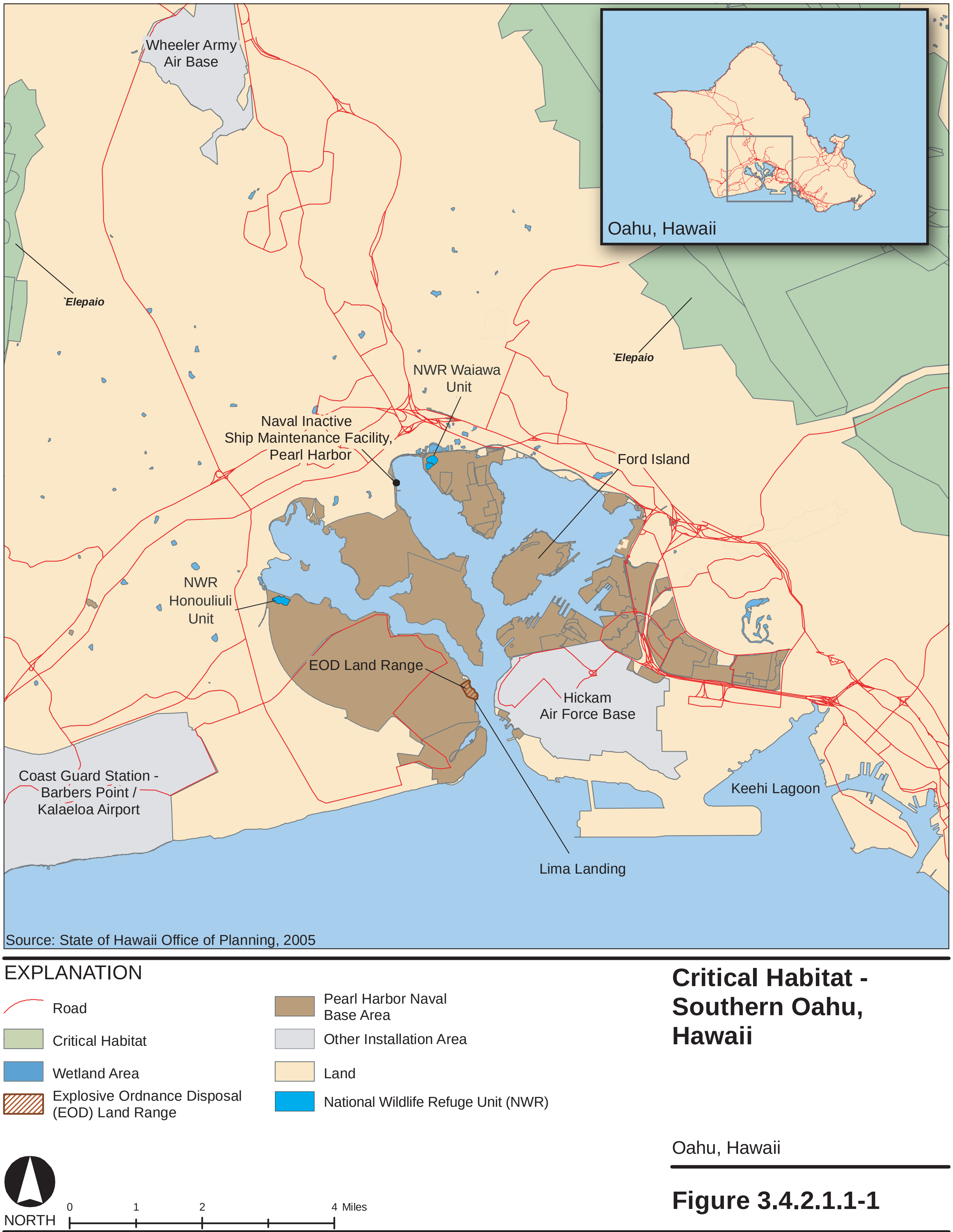
Region of Influence

The region of influence for proposed or ongoing training within Naval Station Pearl Harbor would include any location where Salvage Operations would occur.

Affected Environment

Underwater Cultural Resources

Submerged archaeological resources surrounding Oahu include numerous shipwrecks (see Figure 3.1.3-2), many of which, including *USS Arizona* and *USS Utah,* are within Naval Station Pearl Harbor and are National Historic Landmarks. *USS Arizona* lies in 40 ft of water and is the final resting place for many of the ship's 1,177 crewmen who lost their lives during the Japanese attack on December 7, 1941. The *USS Arizona* Memorial became a National Park Service unit in 1980, and the National Park Service conducts approximately 50 research and cultural preservation dives per year (National Park Service, 2006). *USS Utah* lies where she sank on the northern side of Ford Island. Naval Station Pearl Harbor contains the wrecks of other U.S. Warship remnant fields, Japanese midget submarines, and Japanese aircraft as well (Rosendahl, 2000).



Critical Habitat - Southern Oahu, Hawaii

Oahu, Hawaii

Figure 3.4.2.1.1-1

Other known wrecks surrounding Oahu include the largely intact wreck of the Sea Tiger, which was sunk in 1996 by a submarine company; a World War II-era Japanese midget submarine located in 2002; *Mahi*, a scuttled Navy minesweeper/cable layer located off the Waianae Coast, which now serves as an artificial reef; and the YO-257, which was a Navy yard oiler built in the 1940s and sunk off Waikiki in 1989 to create an artificial reef. There is also an aircraft crash site, which resulted from a Corsair ditching when it ran out of fuel along the south shore.

Only a few of the roughly 100 fishponds that once existed in the waters surrounding Oahu still remain (see Figure 3.4.1.3.2-1); however, four of them are located within Pearl Harbor. These include Loko Paaiau near McGrew Point in the East Loch; Loko Okiokiolepe, located northwest of the EOD Land Range; Loko Pamoku near the NAVMAG in West Loch, and Loko Laulaunui on Laulaunui Island in West Loch (see also Section 3.4.2.4.2) (U.S. Department of the Navy, Commander Navy Region Hawaii, 2002).

Loko Okiokiolepe Fishpond

The areas around the lochs of Naval Station Pearl Harbor were once used extensively for aquaculture. Historical maps and other sources indicate that there were as many as 25 fishponds, fish traps, and other kinds of aquacultural features along the shoreline of Pearl Harbor. Based on an overlay of historical maps with current facilities, 20 of these features were located wholly or partially within the boundaries of Naval Station Pearl Harbor. Although most of the original fishponds have been buried beneath fill and subsequently developed, archaeological and paleoenvironmental studies have shown that in some areas intact fishpond sediments are still present. Among the four extant fishponds listed above, Loko Okiokiolepe was officially listed in the National Register of Historic Places (NRHP) on March 14, 1973 (Hawaii State Historic Preservation Office, 2006; U.S. Department of the Navy, Commander Navy Region Hawaii, 2002). Most of the interior of the fishpond has been filled, but the seaward coral wall still remains intact (Naval Facilities Engineering Command, 2006).

3.4.2.1.3 Socioeconomics—Naval Station Pearl Harbor

Appendix C includes a general definition of socioeconomics.

Region of Influence

The region of influence for socioeconomic analysis is the island of Oahu. The County of Honolulu comprises the entire island of Oahu.

Affected Environment

Population and Income

In 2000, the population of Oahu was 876,156. The 2005 Bureau of Census Counties Profile estimates that the population of the county rose to 912,900 in 2005 (equal to 71 percent of the population of Hawaii), a change of almost 4.0 percent over the 5-year period. The estimated 2006 population for Oahu was 909,863 (U.S. Census Bureau, 2007b). The State of Hawaii Data Book 2006 indicates that the number of military personnel and dependence (Air Force, Army, Coast Guard, Marine Corps and Navy) is approximately 96,496. In 2006, military personnel and dependence accounted for 10.6 percent of the population of Oahu. The projected population for 5 and 10 years out is 952,650 people in 2010 and 995,550 people in 2015, which would be an increase of 4.5 percent (Hawaii, State of, 2004). Table 3.4.2.1.3-1 summarizes the demographics of the population of Oahu in 2006. Table 3.4.2.1.3-2 illustrates the age profile of those living in Honolulu County in 2006.

Table 3.4.2.1.3-1. Demographics of the Population of Oahu in 2006

Persons		**909,863**
	Male	455,051
	Female	454,812
Race	Asian	402,365
	White	201,795
	Native Hawaiian & Other Pacific Islander	72,053
	Hispanic/Latino	63,312
	Black/African American	25,103
	American Indian & Alaska Native	2,969
	Other	9,972

Source: U.S. Census Bureau, 2006a

Table 3.4.2.1.3-2. Age Profile of Honolulu County Residents in 2006

	Honolulu County		**Hawaii**	
Age group (years)	**Population**	**Percentage**	**Population**	**Percentage**
Under 5 years	63,084	6.9	87,179	6.8
18-64 years	700,359	77.0	988,265	76.9
65 and over	130,938	14.4	179,012	13.9

Source: U.S. Census Bureau 2006a & 2006b

The Department of Defense (DoD) is the second major source of revenue to the State of Hawaii; second only to tourism (Chamber of Commerce of Hawaii, Military Affairs Council, 2006). In fiscal year (FY) 2005 total defense expenditures and appropriations for Hawaii were $5.6 billion, an increase of 8.7 percent over FY 2004, and appropriations for FY 2006 defense projects totaled $767 million (Chamber of Commerce of Hawaii, Military Affairs Council, 2007). In January 2006, Congressman Neil Abercrombie announced that the Navy awarded $30 million to two Hawaii firms located on Oahu for repair, maintenance, and alterations to Navy ships. See Table 3.3.2.1.10-3 for the economic impact of the military in Hawaii.

Personal income in Oahu was estimated by the Department of Business, Economic Development and Tourism to be $30.4 billion in 2005, which represented 77 percent of the total personal income of Hawaii. The average per capita income in Honolulu County in 2004 was $34,911.00, while in the same year the average per capita income for the state was $32,625.00 (6.5 percent less) (Fedstats, 2007).

Housing

In the fall of 2006, housing supply was 2,005 single-family homes and 2,750 condominiums available. At the same time prices have remained fairly level with interest rates at a 6-month low (Honolulu Board of REALTORS®, 2006a). The number of owner-occupied homes has grown from 156,290 in 2000, to 173,182 in 2005 (Hawaii, State of, 2004, U.S. Census Bureau, 2000a). This change represents a 9.8 percent increase in the stock of owner-occupied homes, compared to a 6.7 percent growth in the State as a whole. Additionally, as shown in Table 3.4.2.1.3-3, renter-occupied homes increased 34.7 percent over a 6-year period.

Table 3.4.2.1.3-3. Renter Occupied Housing Units

Gross Monthly Rent	Number of Housing Units, 2000	Number of Housing Units, 2006
Less than $200	4,501	4,272
$200 to $299	3,324	4,423
$300 to $499	9,265	8,125
$500 to $749	30,991	17,505
$750 to $999	28,973	32,420
$1000 or more	33,801	91,348
No cash rent	19,052	16,940
Total	129,907	175,033
Median rent	$802	$1,116

Source: U.S. Census Bureau, 2000a and 2006c.

Employment

In 2001, the U.S. military employed 64,074 people in the State of Hawaii. The number employed by the Navy and Marine Corps was 24,654 (38 percent of military). Major locations for the active duty military and civilian personnel on Oahu in 2001 were: Schofield Barracks (12,699 jobs), Naval Station Pearl Harbor (12,407 jobs), Kaneohe (6,847 jobs), Hickam AFB (5,374 jobs), Tripler Army Medical Center (2,826 jobs), Fort Shafter (2,337 jobs), Honolulu (1,879 jobs), Wheeler AFB (1,816), Kunia (1,495 jobs) and Camp H.M. Smith (1,045). Naval Station Pearl Harbor is the largest industrial employer in Hawaii (Enterprise Honolulu, 2007). Table 3.4.2.1.3-4 shows the number of individuals employed in the main sectors of the economy of Oahu, and within Hawaii as a whole.

Tourism, tourism-related services, and government continue to be the main employment generators (U.S. Department of the Navy, 1998a). Natural resources and mining, mainly consisting of the agriculture, forestry, and fishing industry will add the fewest number of jobs and will continue to employ only 1 percent of the workforce (Department of Labor and Industrial Relations, 2006).

Unemployment on Oahu has fluctuated from a low of 2.0 percent in 1991 to a high of 4.9 percent in 1996 and 1998. In 2001, the rate was 4.1 and has steadily declined to 2.7 percent in 2005. This is the lowest the rate has been in over 12 years. During the same period, the total labor force has increased from 435,300 in 2001 to 445,150 in 2005—a 2.2 percent increase. In the last 5 years, Honolulu County's unemployment rate has been within 0.1 to 0.2 percentage points of the State-wide rate (Hawaii, State of, 2005a).

Table 3.4.2.1.3-4. Employment on Oahu and in Hawaii

Employment Sector	Oahu		State of Hawaii	
	Number of Employees	Percent of Total	Number of Employees	Percent of Total
Agriculture, forestry, fishing, hunting, and mining	3,456	0.83	9,864	1.6
Construction	30,583	7.4	51,174	8.4
Manufacturing	12,565	3.1	16,851	2.8
Transportation and warehousing and utilities	25,659	6.2	33,654	5.5
Wholesale trade	13,213	3.2	18232	3.0
Retail trade	45,952	11.1	72,383	11.9
Finance, insurance and real estate and rental and leasing	29,681	7.2	41089	6.7
Information	9,744	2.4	13,091	2.1
Professional, scientific, management, administrative and waste management services	42,990	10.4	62,291	10.2
Education services, health care, and social assistance	87,448	21.0	119,906	19.6
Arts, entertainment, recreation, accommodation and food services	50,090	12.0	90,241	14.8
Public Administration	44,531	10.8	54,046	8.9
Other services, except public administration	18,122	4.4	27572	4.5
Total	**414,034**	**100**	**610,394**	**100**

Source: U.S. Census Bureau, 2006d and 2006e.

Agriculture

The number of farms on Oahu has decreased from 900 in 1994 to 800 in 2004. Farm acreage has declined by about 28 percent over the same period. The number of self-employed farm operators and their unpaid family members stood at 2,300 persons in 2002. These operators and others employed 2,450 hired workers on Oahu (Hawaii, State of, 2005b).

Corresponding to the decline in farm land, sales of all crops decreased 10 percent from 2002 to 2004. Sugar cane (unprocessed cane) and pineapple accounted for 70.3 percent of all crop sales in 1994 at $84.3 million. By 2004, however, sugar cane was no longer a crop and pineapple only accounted for 37.6 percent of all crop sales, at $51.96 million. Livestock sales have declined by 38.4 percent over the 10-year period from 1994 to 2004. The reduction in sugar, pineapple, and livestock sales has been offset by increases in other crops with sales of $86.1 million in 2004, a 41 percent increase from 1994. The diversification of crops includes the production of coffee, seed corn, vegetables and melons, fruits, macadamia nuts, taro, field crops, and flowers and nursery products. This diversification of crops has been, and still is, a goal of Oahu in order to strengthen, sustain, and maintain the agricultural segment of the economy, thus making it less susceptible to short-term conditions which could negatively impact agriculture (Hawaii, State of, 2005b). Additionally, the aquaculture industry is on the rise as well, increasing from 40 operations with $4.67 million in sales in 2003 to 46 operations with $5.20 million in sales in 2004, which is an 11 percent increase (Hawaii, State of, 2005b).

Subsistence Fishing

The overall level of subsistence fishing activity on Oahu and all other islands is difficult to assess, due to a lack of detailed catch data. There has been no attempt to formally assess the subsistence fishing contribution to island economies, but the value to consumers is known to be substantial. In particular, subsistence fishing is an important supplement to cash income in many rural communities despite increasing commercialization of the catch in these areas (Western Pacific Regional Fishery Management Council, 1999). See Section 3.3.1.1.3 for a detailed discussion on subsistence fishing.

Tourism

The tourism industry has been the economic mainstay of the Hawaiian Islands since statehood in 1959. The industry accounts for 22.3 percent of all jobs in Hawaii (Kauai, County of, 2005). Oahu's share of the Hawaii visitor market was 64.6 percent in 2004. Despite terrorism threats and periodic economic slumps, the tourism industry on Oahu has remained strong, with the number of visitors consistently over 4 million per year over the past 5 years (State of Hawaii Department of Business, Economic Development & Tourism, 2006). Estimated visitor expenditures in 2005 were $11.9 billion, a 9.6 percent increase from 2004 (State of Hawaii Department of Business, Economic Development & Tourism, 2006). The numbers of visitors to Oahu from 2000 through 2006 are shown in Table 3.4.2.1.3-5.

Table 3.4.2.1.3-5. Visitors to Oahu (2000–2006)

Year	Oahu Visitors	State of Hawaii Visitors
2000	4,719,244	6,948,594
2001	4,257,536	6,303,790
2002	4,276,077	6,389,058
2003	4,090,483	6,380,439
2004	4,469,278	6,917,166
2005	4,731,843	7,416,574
2006	4,627,484	7,461,299

Source: State of Hawaii Department of Business, Economic Development & Tourism, 2006.

The accommodation inventory for Oahu declined 5.9 percent between 2000 and 2005, with 222 properties providing 34,167 rooms. This is 12 percent less than the peak capacity in 1986 of 39,010 rooms. Despite this short-term trend, the capacity is projected to increase 1.2 percent annually, which translates into 2,100 additional units by 2010 (Department of Planning and Permitting, 2006).

3.4.2.2 FORD ISLAND

Ford Island is a 450-acre site in the heart of Naval Station Pearl Harbor, about 1 mi long by 0.25-mi wide. It is connected to the main island by the Ford Island Bridge. The island houses several naval facilities.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Ford Island. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, and utilities are not addressed.

3.4.2.2.1 Biological Resources—Ford Island

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence is Ford Island and its adjacent waters.

Affected Environment

Vegetation

Vegetation on Ford Island consists mainly of non-native grasses, shrubs, and trees such as kiawe, mangrove, koa haole, Cuban jute (*Sida rhombifolia*), and pitted beardgrass (*Bothriochloa pertusa*). Non-native ornamental plants are used in housing area landscaping. There are a small number of native plants on the island such as \`ilima, milo (*Thespesia populnea*), and \`uhaloa (*Waltheria indica*). (National Oceanic and Atmospheric Administration, 2006d)

<u>Threatened and Endangered Plant Species</u>

No threatened and endangered plant species have been reported on Ford Island. (National Oceanic and Atmospheric Administration, 2006d)

Wildlife

Wildlife similar to that described at Naval Station Pearl Harbor is likely to be found on Ford Island. Two indigenous bird species are found on Ford Island: the black-crowned night heron (\`auku\`u) and the Pacific golden plover. (National Oceanic and Atmospheric Administration 2006d) Non-native birds such as the myna, house finch, and zebra dove are also found on the island. Mongoose and rodents are present in the region of influence.

Ghost shrimp (*Myrichthys maculosus*), mantis shrimp (*Odontodactylus scyllarus)*, Samoan crabs (*Scylla serrata*), and clams are members of the soft bottom community. These species are eaten by fish such as the weke pueo (bandtail goatfish) (*Upeneus arge*), hailepo (spotted eagle ray) (*Aetobatus narinari*), and pakii (panther flounder) (*Bothus pantherinus*). Piers and pilings around Ford Island are habitat for species such as pualo and manini (surgeonfish) *Acanthurus* spp.), butterflyfish (*Chaetodon* spp.*)*, and goby. The largest concentrations of fish are found around the seaplane ramps along the southeastern corner of the island and around

USS Utah. The region of influence contains EFH for juvenile, adult, egg, and larvae life stages for all pelagic and bottom fish and crustaceans. However, no HAPC has been designated. (National Oceanic and Atmospheric Administration, 2006d) Section 3.1.2.2.1 includes a description of EFH; however, a detailed description, including status, distribution, and habitat preference of managed fisheries, is provided in the Navy's *Final Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007a).

During surveys conducted in 1999 and 2000, colonies of *Montipora* spp., *Pocillopora damicornis,* and *Leptastrea purpurea* were found at a few scattered locations in the region of influence. While these corals do not constitute a coral reef, they are indicative of improved water quality within the harbor. (National Oceanic and Atmospheric Administration, 2006d)

Threatened and Endangered Wildlife Species

There are no threatened or endangered terrestrial wildlife on the island. In the past 10 years, there have been four documented green turtle sightings within Pearl Harbor and one hawksbill turtle carcass was collected from the island. There are no reported sightings of live hawksbill turtles and no suitable sea turtle nesting habitat within the region of influence (Smith et al., 2006). There has only been one case of humpback whales in the region of influence, which is mentioned in Section 3.4.2.1.1, Naval Station Pearl Harbor. (National Oceanic and Atmospheric Administration, 2006d)

Environmentally Sensitive Habitat

No critical habitat has been designated in the region of influence.

3.4.2.2.2 Cultural Resources—Ford Island

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The cultural resources region of influence for Ford Island encompasses the area where a new open-water Acoustic Test Facility would be constructed.

Affected Environment

Underwater Cultural Resources

Ford Island is one of Naval Station Pearl Harbor's Historic Management Zones. Historically, the development and use of Ford Island served one military purpose: aviation. The island is the only area at Naval Station Pearl Harbor specifically associated with that "theme" or activity. As a result, the Ford Island Management Zone encompasses all of Ford Island, including the shallow reef areas and coral islets at the northern end of the island, and the associated wharves and docks that are attached to the island. It also includes the mooring quays just offshore and the submerged resources near the island such as *USS Utah* and *USS Arizona*. (U.S. Department of the Navy, Commander Navy Region Hawaii, 2002)

Archaeological Resources

There is very little specific archival or archaeological information concerning traditional land use or pre-contact events on Ford Island, although some inferences can be made. Given the island's lack of water, there was probably little pre-contact habitation, except short-term occupation for fishing, collecting pili grass, and possible seasonal cultivation of dryland crops, such as gourd and sweet potato. Fisheries adjacent to the island were probably associated with land units on the island, which at the time of the Great Mahele, were divided between the ahupua`a of Waimalu and Kalauao (U.S. Department of the Navy, Commander Navy Region Hawaii, 2002).

Based on previous land use and/or historical information, three areas within Naval Station Pearl Harbor may contain intact subsurface deposits beneath historically deposited fill. Although the presence of intact deposits at these locations has not been confirmed through archaeological testing, the three areas include the original lands of Ford Island (including the area where the new Acoustic Test Facility would be constructed), the northwestern portion of Pearl City Peninsula, and the Navy's Bishop Point parcel (U.S. Department of the Navy, Commander Navy Region Hawaii, 2002).

Historic Buildings and Structures. Within the Ford Island Management Zone there are numerous historic buildings and structures. The facilities are associated with aviation, housing, and recreation. Subtypes include airfield facilities (e.g., control tower, hangars), Officer's Quarters, barracks, a theater, and a Plantation-era seawall in the vicinity of the planned Acoustic Test Facility.

Traditional Resources. Ethnographic information identifies the Pearl Harbor lagoon as a place that was rich in resources and a place associated with sharks; as deities, as a food source, and as a family `aumakua (family or personal god). Several contemporary Hawaiian sources characterize the lagoon as a "breadbasket" in ancient times, and one source describes Mokuumeume (Ford Island) as the piko or umbilical cord located in the middle of Ka-awa-lau-o-pu`uloa, transferring mana (supernatural or divine power) from one generation to the next. There is one historical reference to the use of the island as a burial place (U.S. Department of the Navy, Commander Navy Region Hawaii, 2002)

3.4.2.2.3 Water Resources—Ford Island

Appendix C includes a description of the primary laws and regulations regarding water resources.

Region of Influence

The region of influence for water resources includes Ford Island and the adjacent waters.

Affected Environment

Ford Island is located within Naval Station Pearl Harbor, which differs from most industrialized harbors in that the surface waters are entirely under the jurisdiction of the Navy, and are dominated by a significant homeport presence of surface ships, submarines, and inactive and reserve vessels. A large shore-based infrastructure has developed around the harbor in response to a historical build-up of the area as a major support base for fleet activities (U.S. Department of the Navy, 1998a).

Water temperatures in Pearl Harbor range from an average low of 76°F in the winter to 81°F in September and October (National Oceanic and Atmospheric Administration, 2006a). The mean tidal range in the harbor is 1.28 ft. The relatively high water temperatures and low volume of tidal exchange combine to result in low dissolved oxygen concentrations within the harbor.

The Department of Health has classified Pearl Harbor as a “Water Quality Limited Segment” due to its high levels of nutrients, suspended solids, and turbidity (Department of Health, 2001) and its chronic inability to meet the State’s Water Quality Standards.

3.4.2.3 NAVAL INACTIVE SHIP MAINTENANCE FACILITY, PEARL HARBOR

The Naval Inactive Ship Maintenance Facility, Pearl Harbor inactivates, performs custodial and maintenance duties, and disposes of Naval vessels in the Pacific. Its ship moorings are located in Middle Loch, Pearl Harbor. Figure 2.2.3.6.1-1 shows the location of Naval Inactive Ship Maintenance Facility, Pearl Harbor. The proposed demolition location in Middle Loch is approximately 1,100 ft from the nearest shoreline (Waipio Peninsula).

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for the Naval Inactive Ship Maintenance Facility, Pearl Harbor. Of the 13 environmental resources considered for analysis, air quality, airspace, cultural resources, geology and soils, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.2.3.1 Biological Resources—Naval Inactive Ship Maintenance Facility, Pearl Harbor

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence includes Naval Inactive Ship Maintenance Facility, Pearl Harbor and its adjacent waters.

Affected Environment

The Waiawa Unit of the Pearl Harbor National Wildlife Refuge is located on the western boundary of Pearl City Peninsula, adjacent to Middle Loch. The Waiawa Unit is located approximately 2,360 ft northeast of the demolition location. The Honouliuli Unit of the Pearl Harbor National Wildlife Refuge is located along the western shoreline of West Loch, over 2 mi from the location of the proposed demolition at Naval Inactive Ship Maintenance Facility, Pearl Harbor. Waipio Peninsula is located between the proposed demolition location and the Honouliuli Unit. Both the Waiawa and Honouliuli Units are managed under a cooperative use agreement between the USFWS and the Navy for enhancement of endangered waterbirds. The affected environment of the Naval Inactive Ship Maintenance Facility is similar to that described for Naval Station Pearl Harbor.

3.4.2.3.2 Hazardous Materials and Waste—Naval Inactive Ship Maintenance Facility, Pearl Harbor

Appendix C includes a discussion of hazardous materials and waste resource laws and regulations.

Region of Influence

The region of influence for hazardous materials and wastes includes the Naval Inactive Ship Maintenance Facility, and the waters adjacent to the facility.

Affected Environment

Naval Inactive Ship Maintenance Facility, Pearl Harbor inactivates, performs custodial and maintenance duties, and disposes of U.S. Naval vessels in the Pacific. Its ship moorings are located in Middle Loch, Pearl Harbor. Navy ships brought to the Naval Inactive Ship Maintenance Facility, Pearl Harbor are defueled upon decommissioning and towed in. Residual fuels remain in the tanks of the ships, with the exception of those that are to be used in Sinking Exercises or artificial reefs. The residual fuel in the tanks and pipes of these ships are removed and disposed of in accordance with Naval Station Pearl Harbor Standard Operating Procedures. In addition, some decommissioned ships contain hazardous materials that are part of the structure of the ship. These materials are also removed and disposed of in accordance with Naval Station Pearl Harbor Standard Operating Procedures. The demolition location in Middle Loch is approximately 1,100 ft from the nearest shoreline (Waipio Peninsula).

3.4.2.3.3 Water Resources—Naval Inactive Ship Maintenance Facility, Pearl Harbor

Appendix C includes a description of the primary laws and regulations regarding water resources.

Region of Influence

The region of influence for water resources includes the Naval Inactive Ship Maintenance Facility, and the waters adjacent to the facility.

Affected Environment

Pearl Harbor is a natural marine water body located on the southern shore of the island of Oahu. It is divided into three lobes or bays, East Loch, Middle Loch, and West Loch. The Naval Inactive Ship Maintenance Facility is located in the Middle Loch, and the demolition location is approximately 1,100 ft from the nearest shoreline.

Pearl Harbor receives inflow from eight streams that enter the harbor from the highly urbanized areas of Honolulu and its suburban areas. The upstream reaches of these streams include multiple uses: agriculture, residential development, commercial and industrial, and storm water discharge. Each of these streams carries a load of sediment, nutrients, and pollutants, depending on the land use and storm water management activities that occur in the watershed. In addition, Pearl Harbor is affected by releases of partially treated sewage effluent.

The Department of Health has classified Pearl Harbor as a “Water Quality Limited Segment” due to its high levels of nutrients, suspended solids, and turbidity (Department of Health, 2001) and its chronic inability to meet the State’s Water Quality Standards. The Department of Health lists several locations within Pearl Harbor as impaired waters due to high concentrations of nutrients (nitrogen and phosphorus), turbidity (suspended sediment), and polychlorinated biphenyls. The Navy reported in 1998 and 2001 that copper and nutrient loading were of concern in the harbor, in addition to leachate from anti-fouling paint widely used on ship hulls. The presence of these pollutants can be directly linked to the Navy’s long-term use of the harbor and nearby shore facilities (U.S. Department of the Navy, 1998a, 2001a).

Groundwater

Groundwater aquifers on the island typically consist of deep lenses of fresh water within the basalt bedrock that float on top of a saltwater lens. The two layers remain separate due to the difference in density between fresh water and seawater. Aquifer recharge occurs through infiltration of precipitation, return of irrigation water, and exchange between the underground aquifers.

Groundwater accounts for about 90 percent of the water consumed on Oahu for municipal, industrial, agricultural, and military uses. The numerous hydrogeologic units and aquifer basins yield over 635 million gallons per day. Oahu is more dependent on groundwater than the other Hawaiian Islands (U.S. Department of the Army, 2004). There are no groundwater resources in Naval Station Pearl Harbor.

3.4.2.4 EXPLOSIVE ORDNANCE DISPOSAL (EOD) LAND RANGE—NAVAL MAGAZINE (NAVMAG) PEARL HARBOR WEST LOCH

The EOD Land Range is a 2.75-acre facility located within NAVMAG, West Loch, Pearl Harbor where land demolition of ordnance occurs.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for the EOD Land Range. Of the 13 environmental resources considered for analysis, air quality, airspace, hazardous materials and hazardous waste, land use, noise, socioeconomics, transportation, and utilities resources are not addressed.

3.4.2.4.1 Biological Resources—EOD Land Range—NAVMAG Pearl Harbor West Loch

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence is within and adjacent to the EOD Land Range.

Affected Environment

This flat, 2.75-acre tract of land is located at an elevation of about 0 to 10 ft above mean sea level, adjacent to Naval Station Pearl Harbor. Portions of the site are paved or disturbed.

Vegetation

The vegetation consists of an overstory primarily of non-native kiawe trees (*Prosopis pallida*) with an understory of non-native grasses, primarily buffelgrass (*Cenchrus ciliaris*). Other introduced species in this plant community include koa haole (*Leucaena leucocephala*), panic grasses (*Panicum* sp.), and other non-native grasses such as hurricane grass (*Dicanthium pertusum*) and natal redtop (*Melinus repens*). (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001b)

<u>Threatened and Endangered Plant Species</u>

The property has been well-surveyed, and no plants listed as threatened or endangered under the Federal Endangered Species Act have ever been reported for the site (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001b).

Wildlife

The wildlife community at West Loch is typical of disturbed vacant lands in Hawaii. A comprehensive bird survey in 1985 identified 21 species on the site, of which only two Pacific golden plover (Pluvialis fulva) and Hawaiian short-eared owl (Asio flammeus sandwichensis), or pueo, are native species. Mammals found on the property include the mongoose, rat, house mouse, feral dog, and feral cat, all of which are non-native pests. (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001b)

Threatened and Endangered Wildlife Species

No animal species listed as threatened or endangered under the Federal Endangered Species Act are known to inhabit the site. The Oahu population of pueo is listed by the State of Hawaii as endangered.

Environmentally Sensitive Habitat

No critical habitat has been designated in the region of influence (Figure 3.4.2.1.1-1).

3.4.2.4.2 Cultural Resources—EOD Land Range—NAVMAG Pearl Harbor West Loch

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The region of influence for the EOD Land Range encompasses a 2.75-acre area where land demolition of ordnance occurs (see Figure 2.2.3.6.1-1). The range falls within the boundary of the Pearl Harbor National Historic Landmark Boundary (International Archaeological Resources Institute, Inc., 2005).

Affected Environment

Archaeological Resources (Prehistoric and Historic)

The EOD Land Range is situated within the greater NAVMAG, West Loch, Pearl Harbor area. The NAVMAG area was surveyed for archaeological resources in 1997 (Jensen, et al., 1997). Undeveloped lands at West Loch contain a wide range of archaeological sites including stone walls, enclosures, mounds, platforms, and modified outcrops and sinkholes; however, the area of the EOD Land Range was determined to be devoid of archaeological sites. (International Archaeological Resources Institute, Inc., 2005; Jensen, et al., 1997)

Historic Buildings and Structures

The EOD Land Range consists of two concrete blast chambers and one concrete safety bunker. Although historic buildings and structures have been identified within the greater NAVMAG area, which is managed as a Pearl Harbor World War II-era Historic Management Zone, the three EOD Land Range facilities are south of the Management Zone and are not among the identified historic properties (International Archaeological Resources Institute, Inc., 2005).

Traditional Resources

Archaeological, historical, and paleoenvironmental studies conducted within Naval Station Pearl Harbor have documented sites associated with traditional Hawaiian aquaculture, agriculture, and habitation-related activities; early historic land use activities; and historic military activities (International Archaeological Resources Institute, Inc., 2005). In addition to the types of archaeological sites described above (which could also be considered traditional Hawaiian resources), identified site types include fishponds and former taro/rice fields. The closest identified traditional Hawaiian site is the NRHP-listed Okiokiolepe fishpond located along the shoreline approximately 0.5 mi northwest of the EOD Land Range. (International Archaeological Resources Institute, Inc., 2005)

3.4.2.4.3 Geology and Soils—EOD Land Range—NAVMAG Pearl Harbor West Loch

Appendix C includes a description of geology and soils.

Region of Influence

The region of influence for the EOD Land Range includes the surface soils and subsurface geology of the site.

Affected Environment

The ground surface at West Loch is the top of a fossil reef, which has consolidated into limestone. The fossil reef is highly permeable and serves as an aquifer. Below the reef, caprock consisting of terrestrial and marine sediments extends to the top of the basement rock, Koolau basalt. The overall permeability of the caprock is very low, preventing upward seepage of groundwater. The Koolau basalt is composed of layered lava flows. The Hawaiian Agronomics' 1986 report identifies the predominant soils of the West Loch area as Mamala series, or Coral outcrop.

Surface soils on the EOD Land Range have not been tested. Soils within the EOD pit itself are assumed to be contaminated with detectable concentrations of typical explosives such as Royal Demolition Explosive (RDX) (cyclotrimethylenetrinitramine) and TNT (trinitrotoluene) (and their degradation products), and perhaps with other ordnance constituents or byproducts such as heavy metals or perchlorate. The surface topography is such that surface flows are unlikely to convey constituents of concern to nearby surface waters. The caprock under the site limits downward migration of contaminants, effectively containing any such materials in the surface soils.

3.4.2.4.4 Health and Safety—EOD Land Range—NAVMAG Pearl Harbor West Loch

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for public health and safety of the EOD Land Range includes the range and adjacent land and water (Pearl Harbor) areas.

Affected Environment

Navy training at the EOD Land Range could affect public health through releases to the environment (e.g., air, soil, or water) of hazardous constituents. EOD training could affect public safety through inappropriate public proximity to EOD events. The EOD Land Range is located within NAVMAG Pearl Harbor, West Loch; however, the public already is excluded due to larger safety concerns associated with the bulk storage of munitions. At present, about 85 training events are held per year on this range, or about one to two events per week.

Explosive Safety Quantity Distance Arcs and Explosives

The types and amounts of explosives materials that may be stored in an area are determined by the quantity-distance requirements established by the DoD Explosives Safety Board. Explosive safety quantity-distance (ESQD) arcs, defined by the Naval Sea Systems Command, are used to establish the minimum safe distance between munitions storage areas and habitable structures. To ensure safety, personnel movements are restricted in areas surrounding a magazine or group of magazines. ESQD arcs have been developed for the Navy's munitions storage facilities at NAVMAG Pearl Harbor.

Baseline Conditions

NAVMAG West Loch Branch constrains large land and water areas because its ordnance storage and transfer activities require large ESQD arcs. Land use and personnel occupancy of the lands encumbered by the arcs are strictly limited, particularly around West Loch (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a). During land training, gates are locked to secure the area, and warning flags are raised.

The EOD Land Range is within NAVMAG, West Loch. Land demolition training takes place on this range. Training materials, including small quantities of explosives, are brought to the facility as needed for each training session. The demolition pit consists of two concrete blast chambers and one concrete safety bunker. The safety arc for the demolition pit is contained entirely within the Land Range and adjacent, Navy-controlled waters of Pearl Harbor. Current EOD training thus has no effect on public safety in the nearest public use areas.

3.4.2.4.5 Water Resources—EOD Land Range—NAVMAG Pearl Harbor West Loch

Appendix C includes a description of the primary laws and regulations regarding water resources.

Region of Influence

The region of influence for water resources of the EOD Land Range includes the range and adjacent land and water (Pearl Harbor) areas.

Affected Environment

Water resources at the EOD Land Range consist primarily of storm water infiltration and runoff from the site. No streams or other surface water features are present at the site, no well-defined surface hydrology features (e.g., drainage swales) exist, and no potable groundwater aquifer is known to exist there. Rainfall in the Honolulu–Pearl Harbor area averages about 32 inches per year. In an average year, about 7.3 acre-ft of rain water (2.5 ft of rainfall x 2.75 acres) falls on the site. Surface water which does not evaporate or get taken up by vegetation either percolates into the soil or flows off the site into Pearl Harbor. Surface water flows from the site drain into Pearl Harbor. An impermeable capstone limits the downward movement of groundwater, so storm water entering the shallow aquifer under the site tends to move horizontally into Pearl Harbor.

3.4.2.5 LIMA LANDING

Lima Landing range is at the southernmost tip of the EOD Land Range and within the Naval Station Pearl Harbor. Lima Landing is a small underwater area used for underwater demolition training using small underwater detonations.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Lima Landing. Of the 13 environmental resources considered for analysis, airspace, air quality, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.2.5.1 Biological Resources—Lima Landing

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence for Lima Landing encompasses areas where EOD would occur.

Affected Environment

Vegetation

Exotic imported grasses and trees maintained by intensive landscaping efforts make up the majority of the vegetative community in the vicinity of Naval Station Pearl Harbor. Native vegetation, including grasses, trees, and shrubs are present only in small areas. These areas of native vegetation provide control for erosion except under the heaviest rainfall conditions. (U.S. Department of the Navy, 2002a)

Threatened and Endangered Plant Species

No threatened or endangered plant species have been identified in the region of influence.

Wildlife

A cooperative agreement for the conservation and management of terrestrial and aquatic resources within Naval Station Pearl Harbor has been developed with the Navy, USFWS, National Marine Fisheries Service, and the Hawaii Department of Land and Natural Resources. There are no HAPC in Naval Station Pearl Harbor. (U.S. Department of the Navy, 2002a) Section 3.1.2.2.1 includes a description of EFH; however, a detailed description, including status, distribution, and habitat preference of managed fisheries, is provided in the Navy's *Final Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007a).

Threatened and Endangered Wildlife Species

Green turtles have been seen in the entrance to Pearl Harbor (Smith et al., 2006). Monk seals have been reported hauled-out on the beach at Iroquois Point housing area. There was a report of a humpback whale and calf entering Pearl Harbor in 1998, which is mentioned in Section 3.4.2.1.1. (U.S. Department of the Navy, 2002a)

Threatened and endangered terrestrial species that may occur in the region are similar to those provided in Table 3.4.2.1.1-1.

Environmentally Sensitive Habitat

No environmentally sensitive habitat has been identified in the region of influence.

3.4.2.5.2 Cultural Resources—Lima Landing

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The region of influence for Lima Landing encompasses areas where EOD would occur. The range is at the southernmost tip of the EOD Land Range (see Figure 2.2.3.6.1-1) and is within the Pearl Harbor National Historic Landmark Boundary.

Affected Environment

Underwater Cultural Resources

There are no known submerged cultural resources within the Lima Landing region of influence.

3.4.2.5.3 Hazardous Materials and Waste—Lima Landing

Appendix C includes a discussion of hazardous materials and waste resource laws and regulations.

Region of Influence

The region of influence for hazardous materials and wastes includes Lima Landing, and the waters adjacent to the range.

Affected Environment

Hazardous Materials

Lima Landing is a small underwater area used for underwater demolition training using small underwater detonations. Training at Lima Landing involve transporting (by vehicle and boat), handling, and using small quantities of hazardous materials (e.g., explosives). Explosives charges of up to 0.25 lb (net explosive weight) may be detonated on this range. Baseline training consists of about five training events per year, resulting in the detonation of about 1.25 lb per year.

Hazardous Waste

The detonations of explosives generate small quantities of explosives residues, metals, and inorganic salts. These hazardous constituents generally disperse into the water column, but some may remain in bottom sediments. The annual quantities of hazardous materials consumed on this range are minute, however, and have no known offsite effects.

3.4.2.5.4 Health and Safety—Lima Landing

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for Lima Landing for public health and safety includes the range and adjacent portions of Naval Station Pearl Harbor.

Affected Environment

Lima Landing is a small underwater area just off an abandoned concrete pier at the approach to Pearl Harbor near the entrance of West Loch. Access to the range is via small boats. Underwater demolition training on this range uses small underwater detonations. At present, about five training events per year occur on this range, or about one every other month.

Procedures for approving an underwater detonation include filing a “Request for Detonation of Underwater Ordnance” with Commander, Naval Station Pearl Harbor to determine whether the proposed detonation would constitute any danger. Upon concurrence by appropriate commands, Commander, Naval Surface Force, Pacific grants permission to conduct the underwater detonations and concurrently requests issuance of a local Notice to Mariners by the appropriate U.S. Coast Guard District.

Public health and safety risks associated with this training activity include the possible dispersal of hazardous explosives residues in the bay waters, re-suspension of bay sediment contaminants, and possible public proximity to an underwater detonation. The Navy regulates recreational fishing and boating in Pearl Harbor, and allows active duty and retired military personnel in specified areas of the harbor for such purposes. In addition, eligible DoD personnel may launch their own boats from Rainbow Bay, Iroquois Point, or Hickam Marinas, with a permit from the Navy's Pass and Identification office. The Navy permits shore fishing from Navy property by authorized personnel (military and civilian employees of the DoD and their dependents, relatives, and guests) from sunrise to sunset. Fishing from boats is limited to permitted vessels and to non-prohibited areas within Pearl Harbor. Prohibited areas identified in the instruction include West Loch (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a).

Current underwater EOD training events at Lima Landing thus pose no risk to public safety. Public uses are not permitted within or adjacent to the range, the proximity of authorized personnel is managed and restricted, and range activities are planned and executed so as to contain all effects within the boundaries of the range.

3.4.2.6 U.S. COAST GUARD AIR STATION BARBERS POINT/KALAELOA AIRPORT

U.S. Coast Guard Air Station Barbers Point is located on Kalaeloa Airport, which was formerly the active airfield portion of Naval Air Station Barbers Point. Kalaeloa Airport is a general aviation facility that uses 750 acres of the former Naval facility. The state operates the three runways at the airport, the control tower and support facilities. Aircraft Support Operations are associated with U.S. Coast Guard Air Station Barbers Point.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for the U.S. Coast Guard Air Station Barbers Point. Of the 13 environmental resources considered for analysis, air quality, cultural resources, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.2.6.1 Airspace—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport

Appendix C includes a detailed description of airspace.

Region of Influence

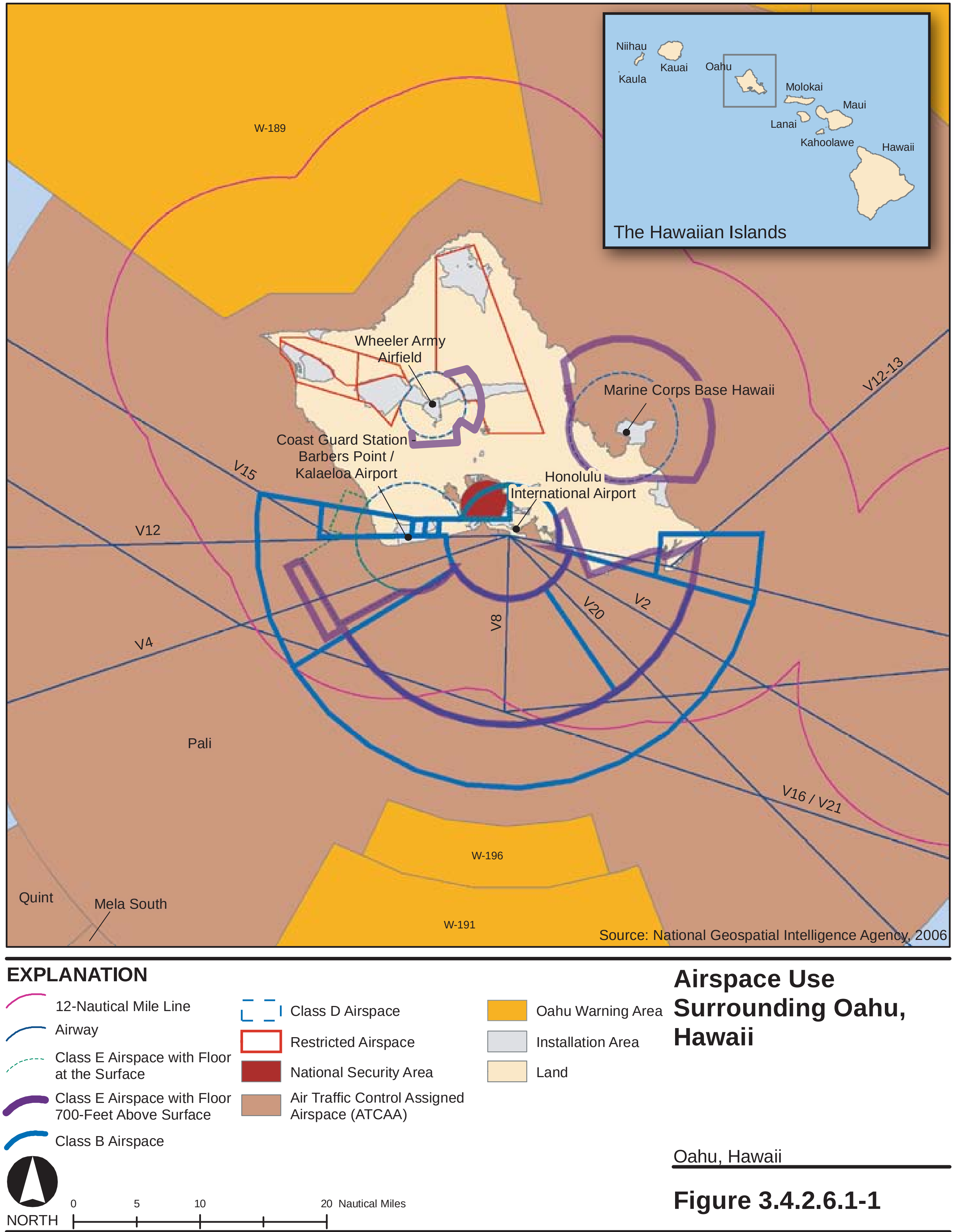
Based on the RIMPAC Exercise, air operations include space for the various types of aircraft and equipment for refueling and maintenance. The use of U.S. Coast Guard Air Station Barbers Point by aircraft during RIMPAC would be secondary and would fall within the day-to-day coordination for the movement of equipment and supplies.

The use of U.S. Coast Guard Air Station Barbers Point by aircraft during RIMPAC would be coordinated as part of the biennial planning process during three planning conferences leading up to the RIMPAC Exercise. Due to the level and extent of planning involved, and the minimal potential for significant impacts, airspace has not been evaluated under the RIMPAC Environmental Assessments (EAs) (U.S. Department of the Navy, 2006a; 2002a; 2000 and U.S. Department of the Navy, Commander Third Fleet, 2004).

The region of influence is the airspace above U.S. Coast Guard Air Station Barbers Point and Kalaeloa Airport. This area is within the area described for Hickam AFB. Figure 3.4.2.6.1-1 shows a view of the airspace above Oahu including U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport.

Affected Environment

Search and rescue is the primary mission of U.S. Coast Guard Air Station Barbers Point within the Pacific Maritime Region. As the sole U.S. Coast Guard Air unit in this area of the Pacific, U.S. Coast Guard Air Station Barbers Point is responsible for a vast area, including such island chains as the Hawaiian, Marianas, Caroline, and Marshalls. To accomplish its assigned missions, the U.S. Coast Guard uses four Aerospatiale HH-65A “Dolphin” short-range recovery helicopters and four Lockheed HC-130H “Hercules” long-range search aircraft.



Airspace Use Surrounding Oahu, Hawaii

Oahu, Hawaii

Figure 3.4.2.6.1-1

The affected airspace use environment in the U.S. Coast Guard Air Station Barbers Point region of influence is described below in terms of its principal attributes: controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields. There are no military training routes in the region of influence.

Controlled and Uncontrolled Airspace

The airspace within the region of influence consists of the airspace above Kalaeloa Airport which includes Class D, surface Class E, and Class E airspace with a floor 700 ft above the surface (see Figure 3.4.2.6.1-1). Honolulu International Airport Class B airspace is located partially within and above the Kalaeloa airport airspace.

Special Use Airspace

The only special use airspace in the region of influence (see Figure 3.4.2.6.1-1) is the Pali Air Traffic Control Assigned Airspace that is in effect above the entire Oahu area from flight level (FL) 250 (25,000 ft) to unlimited. The Pali airspace is scheduled through the Navy Fleet Area Control and Surveillance Facility (FACSFAC) Pearl Harbor who then coordinates with the Federal Aviation Administration (FAA) Honolulu Combined Facility.

En Route Airways and Jet Routes

The closest instrument flight rules (IFR) en route low altitude airways are V12 and V15, which pass directly over the airfield and V4, which passes above the Kalaeloa Class D and E airspace.

Airports and Airfields

Wheeler Army Airfield is located 10 nm to the north and Honolulu International Airport is located 8 nm to the east.

3.4.2.6.2 Biological Resources—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence includes the installation and its offshore waters.

Affected Environment

Vegetation

U.S. Coast Guard Air Station Barbers Point occupies a portion of the 750-acre Kalaeola Airport. As such, there are few biological resources associated directly with the facility. Open areas are grassed and maintained. Pua pilo (*Capparis sandwichiana* var. *zoharyi*), a Federal species of concern endemic shrub, is located in the southwestern corner of Kalaeloa on the USFWS Pearl Harbor National Wildlife Refuge, Kalaeloa Unit (State of Hawaii, 2006).

Threatened and Endangered Plant Species

The endemic, endangered `akoko shrub (*Chamaesysce skottsbergii var. kalaeloana*) (Table 3.4.2.6.2-1) occurs in at least three locations at the former Barbers Point Naval Air Station. The endangered round-leafed chaff-flower or ewa hina hina (*Achyranthes splendens* var. *rotundata*) is located in the southwestern corner of Kalaeloa. (State of Hawaii, 2006)

Table 3.4.2.6.2-1. Listed Species Known or Expected to Occur in the Vicinity of U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport

Scientific Name	Common Name	Federal Status
Plants		
Achyranthes splendens var. *rotundata*	Ewa hina hina (Round-leafed chaff-flower)	E
Chamaesysce skottsbergii var. kalaeloana	`Akoko (Coastal sandmat)	E
Birds		
Himantopus mexicanus knudseni	Ae`o (Hawaiian black-necked stilt)	E

Source: U.S. Fish and Wildlife Service, 2005a; b; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007

Key to Federal Status:
E = Endangered

Wildlife

The Kalaeloa Airport is used by birds, feral dogs and cats, rodents, and mongooses. Birds are the most common form of wildlife on the site and include the black-crowned night heron, great frigate bird, Pacific golden plover, sanderling (*Calidris alba*), wandering tattler, ruddy turnstone, zebra dove, Japanese white-eye, northern cardinal, red-crested cardinal (*Paroaria coronata*), and red-vented bulbul. (U.S. Department of the Navy, 2002a; State of Hawaii, 2001)

The State endangered Hawaiian short-eared owl, which is Federally listed as a Species of Concern, may transit through the region of influence (State of Hawaii, 2006).

Threatened and Endangered Wildlife Species

Ordy Pond, an anchialine (marine) pond east of the airfield; the coastal salt flats between Runway 4R-22L and Taxiway K; and also the western boundary of Kalaeloa are frequented by the endangered Hawaiian black-necked stilt and migratory birds. (State of Hawaii, 2006)

Environmentally Sensitive Habitat

The Kalaeloa Unit, which was once part of the former Barbers Point Naval Air Station, has been added to the Pearl Harbor National Wildlife Refuge. The Kalaeloa Unit supports the second largest population of endangered ewa hina hina. (U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007)

3.4.2.7 MARINE CORPS BASE HAWAII (MCBH)

MCBH is a 2,951-acre reservation on Mokapu Peninsula on the northeast side of the Island of Oahu. The base is bounded by water on three sides: Kaneohe Bay, the Pacific Ocean, and Kailua Bay. The Nu`upia Pond Wildlife Management Area lies in the isthmus between the base and the mainland.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for MCBH. Of the 13 environmental resources considered for analysis, air quality, geology and soils, hazardous materials and hazardous waste, health and safety, land use, transportation, utilities, and water resources are not addressed.

3.4.2.7.1 Airspace—MCBH

Appendix C includes a detailed description of airspace.

Region of Influence

Based on RIMPAC, aircraft support includes space for the various types of aircraft and equipment for refueling and maintenance. U.S. and foreign aircraft (fixed wing, rotary, and airship) would be supported from several locations. For a typical RIMPAC, approximately 20 aircraft would be supported at MCBH. Housing would be provided at the installation.

The use of MCBH by aircraft during RIMPAC would be coordinated as part of the biennial planning process during three planning conferences leading up to the RIMPAC Exercise. Due to the level and extent of planning involved, and the minimal potential for significant impacts, airspace has not been evaluated under the RIMPAC EAs (U.S. Department of the Navy, 2006a; 2002a; 2000 and U.S. Department of the Navy, Commander Third Fleet, 2004).

The MCBH region of influence includes the Class D and Class E airspace (defined in Appendix C) above MCBH. Figure 3.4.2.6.1-1 shows a view of the airspace above Oahu including MCBH.

Affected Environment

The affected airspace use environment in the MCBH region of influence is described below in terms of its principal attributes: controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields. There are no military training routes in the region of influence.

Controlled and Uncontrolled Airspace

The airspace within the region of influence consists of the airspace above MCBH which includes Class D, and Class E airspace with a floor 700 ft above the surface. No Class B (U.S. terminal control areas) airspace, which usually surrounds the nation’s busiest airports, or Class C airspace is found in the MCBH region of influence.

Special Use Airspace

The only special use airspace in the region of influence (see Figure 3.4.2.6.1-1) is the Pali Air Traffic Control Assigned Airspace that is in effect above the entire Oahu area from FL 250 (25,000 ft) to unlimited. The Pali airspace is scheduled through the Navy FACSFAC Pearl Harbor, which then coordinates with the FAA Honolulu Combined Facility.

En Route Airways and Jet Routes

The closest IFR en route low altitude airways are V12-13 and V15, which pass outside the region of influence approximately 10 nm southeast of MCBH.

Airports and Airfields

MCBH is surrounded by Class D airspace that extends from the surface to 2,500 ft. The Class E airspace extension to the north and east has a floor 700 ft above the surface. Honolulu International Airport is located southeast of MCBH, outside the region of influence.

3.4.2.7.2 Biological Resources—MCBH

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence includes the installation and adjacent waters.

Affected Environment

Vegetation

Dune vegetation consists of naupaka (*Scaevola sericea*) thickets interspersed with clusters of sea grape. Along the seaward side of the naupaka is a mat of beach dropseed grass (aki`aki) (*Sporobolus virginicus*) and morning glory (pohuehue) (*Ipomoea pes-caprae*). Ironwood trees are also present at the Hale Koa/West Field landing area. The terrestrial habitat typically consists of sparse ground cover composed of indigenous grasses and shrubs. Most of the vegetation on MCBH is dominated by introduced species. (U.S. Department of the Navy, 2002a)

Threatened and Endangered Plant Species

No threatened or endangered plants have been observed at MCBH.

Wildlife

Migratory birds such as the Pacific golden-plover and ruddy turnstone have been observed foraging and resting on the landing beaches. Seabirds, including the great frigate bird (`iwa) and brown noddy have been seen foraging offshore. (U.S. Department of the Navy, 2002a)

A red-footed booby nesting colony consisting of over 3,000 birds is located on the cliffs of the 23-acre Ulupau Wildlife Management Area. Wedge-tailed shearwaters and black-crowned night herons (`auku`u) are also found in the area. (U.S. Fish and Wildlife Service, 2005a; Defense Environmental Network & Information eXchange, 2005; Sierra Club, not dated)

Threatened and Endangered Wildlife Species

Threatened and Endangered species in the MCBH region are listed in Table 3.4.2.7.2-1. The koloa maoli (Hawaiian duck), `alae ke`oke`o (Hawaiian coot), and `alae `ula (Hawaiian common moorhen) have been observed at the base wetlands. The ae`o (Hawaiian stilt) nests on mud mounds in the region of influence and feeds on insects, worms, and crustaceans uncovered by Marine amphibious assault vehicles. Marines of the amphibious-assault vehicle platoon churn up the mud of wetlands in the 482-acre Nuupia Ponds Wildlife Management Area once a year. These tracked vehicles flatten invasive pickleweed that threaten to choke off the ponds, creating the same terrain that is preferred by this endangered bird. (U.S. Department of the Air Force, 2003; Sierra Club, 2006)

Table 3.4.2.7.2-1. Listed Species Known or Expected to Occur in the MCBH Region

Scientific Name	Common Name	Federal Status
Reptiles		
Chelonia mydas	Green turtle	T
Eretmochelys imbricata	Hawksbill turtle	E
Birds		
Anas wyvilliana	Koloa maoli (Hawaiian duck)	E
Fulica alai	`Alae ke`oke`o (Hawaiian coot)	E
Gallinula chloropus sandvicensis	`Alae `ula (Hawaiian common moorhen)	E
Himantopus mexicanus knudseni	Ae`o (Hawaiian black-necked stilt)	E
Pterodroma phaeopygia sandwichensis	`Ua`u (Hawaiian dark-rumped petrel)	E
Puffinus auricularis newelli	`A`o (Newell's Townsend's shearwater)	T
Mammals		
Lasiurus cinereus semotus	Hawaiian hoary bat	E
Monachus schauinslandi	Hawaiian monk seal	E

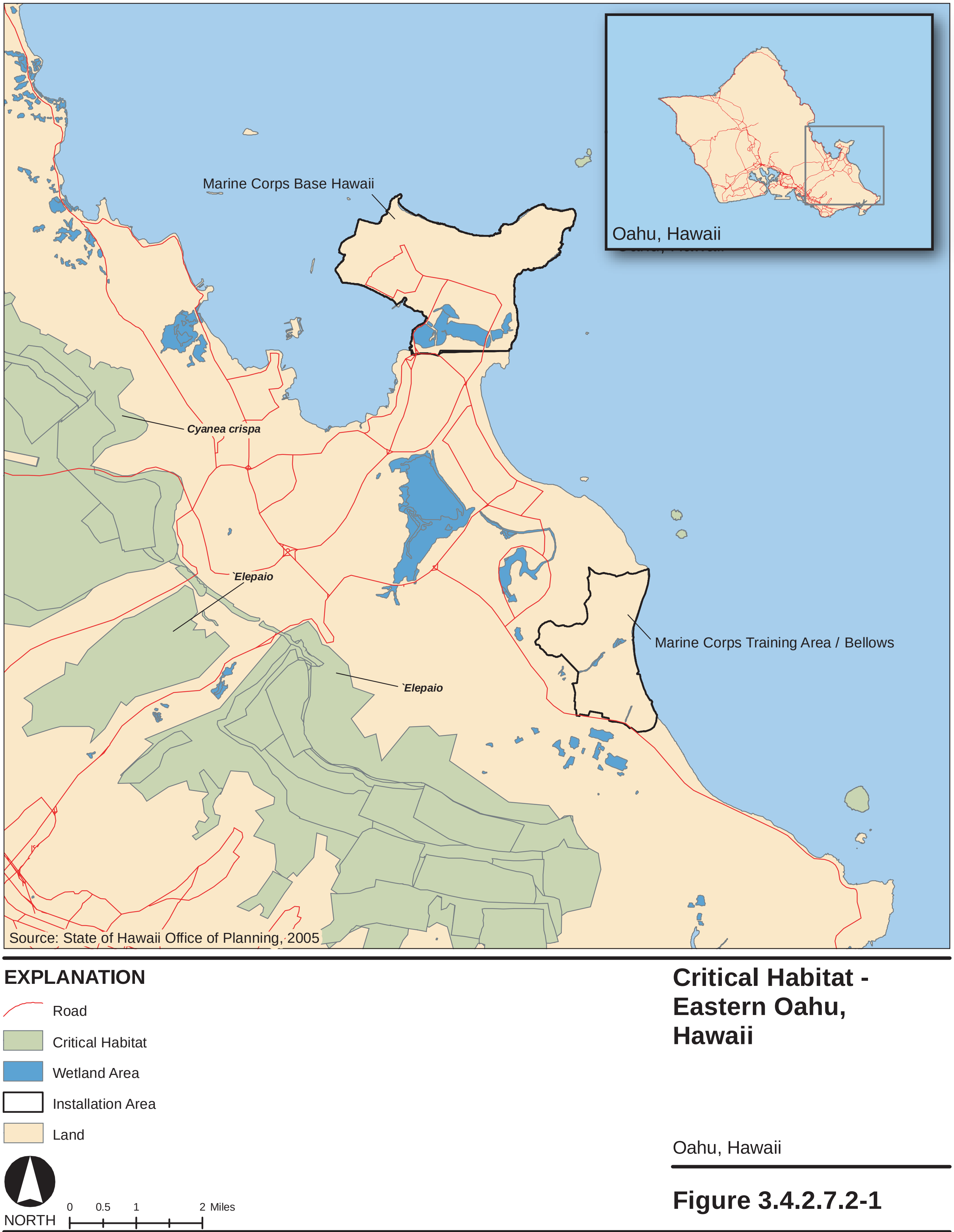
Source: U.S. Department of the Air Force, 2003; U.S. Fish and Wildlife Service, 2006b; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007

Key to Federal Status:
T = Threatened
E = Endangered

The endangered Hawaiian monk seal has occasionally hauled out on Pyramid Rock Beach. In 1996, a monk seal gave birth on a small beach near recreational cabins north of West Field. (U.S. Department of the Navy, 2002a)

Environmentally Sensitive Habitat

No critical habitat has been designated on MCBH (Figure 3.4.2.7.2-1). Wetlands include the Nuupia Ponds complex at the southern boundary of the base. Approximately 22 acres of invasive mangrove stands have been removed from Nuupia Pond since the early 1980s. There are also several ephemeral ponds and marshes that provide short-lived habitat for wildlife after rainfall. (U.S. Department of the Air Force, 2003)



Critical Habitat - Eastern Oahu, Hawaii

Oahu, Hawaii

Figure 3.4.2.7.2-1

3.4.2.7.3 Cultural Resources—MCBH

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The region of influence for cultural resources at MCBH encompasses locations where Humanitarian Assistance/Disaster Relief Operations will occur. About 700 acres of MCBH's total properties are the focus of cultural resources management. Approximately 550 of the 700 acres are at Mokapu, including the Nuupia Ponds and Mokapu Burial Area (Defense Environmental Network and Information eXchange, 1999).

Affected Environment

Archaeological Resources (Prehistoric and Historic)

Baseline cultural resources surveys completed in 1981 and 1986 were updated, and the data were included in the Mokapu Cultural Resources Management Plan (1997). As part of the update, a Cultural Resources Assessment of the MCBH was performed in May 1997. The report indicated that Hale Koa/West Field Beach was created with dredged fill during World War II and contains no cultural resources or human remains. Hale Koa/West Field's additional runway was created with fill as part of the World War II base expansion and has no potential for cultural resources or the discovery of human remains. The Pyramid Rock Beach landing and staging areas contain no known cultural resources or human remains. The landing and staging areas at Fort Hase Beach are within a zone classified as having a low archaeological sensitivity. A ground-penetrating radar survey of the landing and staging areas detected no cultural deposits or burials and confirmed that the areas were previously disturbed (Yamada, 2002; U.S. Department of the Navy, 2002a).

Archaeological sites identified at MCBH include the Nuupia Ponds; the Mokapu Burial Area, which is listed in the NRHP; approximately 27 pre-contact or early-contact Hawaiian sites; and 45 post-contact sites that cover the period from early Hawaiian through World War II (Defense Environmental Network and Information eXchange, 1999).

Historic Buildings and Structures

Historic buildings, structures, and other features under the control of MCBH include the following (Defense Environmental Network and Information eXchange, 1999):

- Hangar 101 and Seaplane Ramps. Located on the Kaneohe Bay shoreline, Hangar 101 and its associated seaplane ramps are a designated National Historic Landmark. The facilities once supported the Navy's PBY Catalina patrol plane fleet and were bombed minutes before the December 7, 1941 attack on Naval Station Pearl Harbor.
- Aircraft Parts. Kaneohe Bay waters and Ulupau Crater ravines harbor the wreckage of aircraft downed during the December 7, 1941 attack on Naval Station Pearl Harbor.
- Battery Pennsylvania at Ulupau Crater Head. Battery Pennsylvania is a World War II fortification that has been determined to be eligible for inclusion in the NRHP. Seven stories deep, this massive reinforced concrete gun emplacement supported a turret with 14-inch guns from the sunken battleship, *USS Arizona*.

Traditional Resources

Archival research and oral histories verify Mokapu as inspiration for many Hawaiian stories, songs, dance, and religious ceremonies. The exact translation of the word Mokapu is not confirmed; however, it could be a contraction of moku (district or island) and kapu (sacred or forbidden).

3.4.2.7.4 Noise—MCBH

Appendix C includes a definition of noise and the main regulations and laws that govern it.

Region of Influence

The region of influence for MCBH is the area within and surrounding MCBH in which humans and wildlife may suffer annoyance or disturbance from noise levels from the proposed training at MCBH.

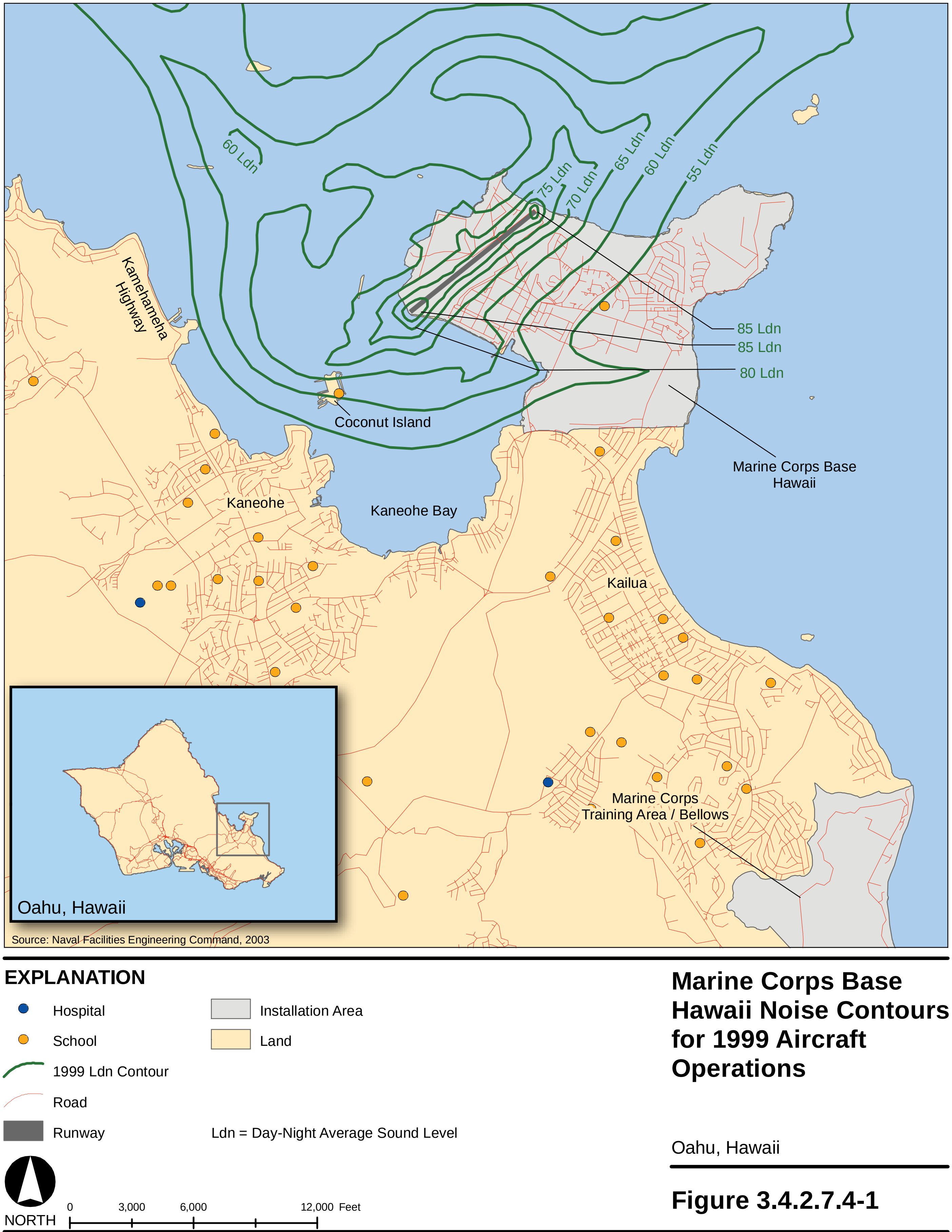
Affected Environment

The primary source of noise at MCBH is the neighboring military landing field that serves both fixed-wing and helicopter events. Helicopter and aircraft activities and amphibious training occur regularly at the landing field. During active runway use or amphibious training, noise levels typically range between 70 and 75 dBA. During periods of no runway use or training, the noise levels are equal to or less than 55 dBA during the day and fall to less than 45 dBA during the evening and night hours. The nearest sensitive noise receptor is Hale Koa Beach, approximately 328 ft southeast of helicopter landing areas and 2,198 ft northwest of an active runway. Noise levels at Hale Koa Beach are similar to the noise levels described at MCBH. (U.S. Department of the Navy, 2002a)

MCBH has established noise controls to protect base personnel and the community, including establishing flight patterns and airfield operation schedules that satisfy the community and support mission activities. In addition, a community notification plan for all short-term training that may increase noise levels is followed. (U.S. Department of the Navy, 2002a)

Figure 3.4.2.7.4-1 depicts noise contours based on annual events for MCBH in 1999, which includes 163,390 flight events during the day and 13,460 night flight events. Aircraft at MCBH include, but are not limited to P-3s, C-130s, C-17s, F/A-18s, CH-53Ds, SH-60s, and C-20Gs. The *MCBH Kaneohe Bay Air Installation Compatible Use Zones* (Naval Facilities Engineering Command, 2003) determined that the only off-base land areas that would be impacted by noise levels greater than Day-Night Level (DNL) 60 are Coconut Island and other small uninhabited islands. Land uses within the DNL 65 noise contour on-base include the industrial area near the runway, maintenance facilities, portions of the officers' family housing and bachelor enlisted quarters, a portion of the golf course, beach areas, operational and maintenance uses on both sides of the runway, and the runway itself. (Naval Facilities Engineering Command, 2003)

Wildlife receptors for the MCBH area are described in Section 3.4.2.7.2, Biological Resources.



Marine Corps Base Hawaii Noise Contours for 1999 Aircraft Operations

Oahu, Hawaii

Figure 3.4.2.7.4-1

3.4.2.7.5 Socioeconomics—MCBH

Appendix C includes a general definition of socioeconomics.

Region of Influence

The region of influence for socioeconomic analysis is MCBH. The County of Honolulu comprises the entire island of Oahu. The base is bounded by water on three sides: Kaneohe Bay, the Pacific Ocean, and Kailua Bay.

Affected Environment

The closest civilian community to MCBH is Kaneohe. Kaneohe is considered a single-family suburban "bedroom community" and is likely to be affected by MCBH airfield operations due to the nearby major flight tracks. In addition airfield operations are visible to Kaneohe residents. Kaneohe has a population of approximately 55,800, and the average household income is about $80,000 (American Dream Realty, 2006). In addition to residential land use, there are several other significant uses of the Kaneohe Bay area, including major commercial activities along Kamehameha Highway and several light industries. Kaneohe is a town and census-designated place included in the City and County of Honolulu and located in Hawaii, on the island of Oahu (Honolulu Board of Realtors, 2006b). Section 3.4.2.1.3 discusses the socioeconomic characteristic of Oahu, which encompasses the Kaneohe community.

There are several small islands within Kaneohe Bay. Coconut Island, the only inhabited island, comprises approximately 29 acres. Approximately half of this area is landfill formed by dredged materials form the main Kaneohe Bay channel, deposited on the perimeter of the island. The University of Hawaii Institute of Marine Biology, a research facility, is the primary activity on the island. The former privately owned area in the central area of the island is now owned by the University of Hawaii Foundation and leased to the University of Hawaii for the Hawaii Institute of Marine Biology's long-term use. Daytime staffing ranges from 50 to 100 personnel. There are about 17 full-time residents on the island, which include institute staff members and their families. There are also several temporary lodging facilities on the island that are used by visiting researchers. Three other small uninhabited islands are located near MCBH Kaneohe Bay. These islands are seabird sanctuaries managed by the State of Hawaii. (Naval Facilities Engineering Command, 2003)

3.4.2.8 MARINE CORPS TRAINING AREA/BELLOWS (MCTAB)

MCTAB covers 1,078 acres on the southeastern portion of Oahu. The inactive airfield in the center of the site is limited to rotary wing activity, and is occasionally used for Marine Corps helicopter training.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for MCTAB. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.2.8.1 Biological Resources—MCTAB

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence includes those areas on or adjacent to MCTAB that could be affected by existing or proposed training.

Affected Environment

Vegetation

Virtually all native vegetation on MCTAB has been replaced by exotic species. Extensive second-growth forest is dominated by koa haole, Christmas berry (*Schinus terebinthifolius*), and ironwood. (U.S. Air Force 15th Airlift Wing, 2005) Only 12 percent of the species recorded were native species (U.S. Department of the Navy, 2002a). However, sea cliffs and sand dunes at MCTAB support unique strand vegetation (Defense Environmental Network & Information eXchange, 2001).

<u>Threatened and Endangered Plant Species</u>

No rare, threatened, or endangered plant species are known to occur on or near MCTAB (U.S. Air Force 15th Airlift Wing, 2005).

Wildlife

Shorebirds observed in the vicinity of MCTAB include the Pacific golden plover, wandering tattler, ruddy turnstone, and sanderling. The Hawaiian short-eared owl has also been seen on the station's perimeter.

<u>Threatened and Endangered Wildlife Species</u>

Threatened and endangered species observed or potentially occurring at MCTAB (Table 3.4.2.8.1-1) include the endangered koloa maoli (Hawaiian duck), `alae ke`ok`o (Hawaiian coot), alae ula (Hawaiian common moorhen), and ae`o (Hawaiian black-necked stilt). Forty to sixty percent of the statewide population of the ae`o (Hawaiian black-necked stilt) is found on Oahu. According to the USFWS, the Hawaiian dark-rumped petrel and Newell's shearwater have the potential to occur on the base (U.S. Fish and Wildlife Service, 2007a). Oahu also has the largest population of `alae ke`ok`o (Hawaiian coot) in the islands. The endangered Hawaiian hoary bat may also use the habitat at MCTAB. (U.S. Air Force 15th Airlift Wing, 2005)

Table 3.4.2.8.1-1. Listed Species Known or Expected to Occur at Marine Corps Training Area/Bellows

Scientific Name	Common Name	Federal Status
Reptiles		
Chelonia mydas	Green turtle	T
Eretmochelys imbricata	Hawksbill turtle	E
Birds		
Anas wyvilliana	Koloa maoli (Hawaiian duck)	E
Fulica alai	`Alae ke`oke`o (Hawaiian coot)	E
Gallinula chloropus sandvicensis	Alae ula (Hawaiian common moorhen)	E
Himantopus mexicanus knudseni	Ae`o (Hawaiian black-necked stilt)	E
Pterodroma phaeopygia sandwichensis	`Ua`u (Hawaiian dark-rumped petrel)	E
Puffinus auricularis newelli	`A`o (Newell's Townsend's shearwater)	T
Mammals		
Lasiurus cinereus semotus	Hawaiian hoary bat	E
Monachus schauinslandi	Hawaiian monk seal	E

Source: U.S. Department of the Navy, 2002a; U.S. Fish and Wildlife Service, 2006b; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007

Key to Federal Status:

E = Endangered

T = Threatened

Environmentally Sensitive Habitat

Critical habitat for the endangered Oahu `elepaio (*Chasiempis sandwichensis ibidis*) is located approximately 2 mi west of MCTAB (Figure 3.4.2.7.2-1). No critical habitat has been designated on MCTAB. Wetland acreage on MCTAB is located along the Waimanalo stream, which provides habitat for native waterbirds and aquatic species (Defense Environmental Network & Information eXchange, 2001; National Wetlands Inventory, 2007).

3.4.2.8.2 Cultural Resources—MCTAB

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The region of influence for terrestrial and underwater cultural resources at MCTAB includes locations where Expeditionary Assault (amphibious training), Swimmer Insertion/Extraction, Humanitarian Assistance Operations/Non-Combatant Evacuation Operations, SPECWAROPS, and Humanitarian Assistance/Disaster Relief Operations would occur (see Figure 2.1-3).

Affected Environment

Archaeological Resources (Prehistoric and Historic)

Located on the windward coast of Oahu, MCTAB has a long history of human occupation and exploitation. Archaeological studies reveal extensive prehistoric use of beach ridges and swales for campsites, tool making, and as burial areas and, in some locations (particularly along streams and near the coast), cultural deposits are relatively thick. (Desilets, 2002)

At the time of the Great Mahele (in 1848), most of the area now encompassed by MCTAB was in the ahupuaa of Waimanalo, which during the mid 1800s was part of the Crown Lands of Kamehameha III. In 1850, the area was leased for cattle, horse, and sheep ranching, but by the late 1870s, ranching had been replaced by sugar cane fields (in non-beach areas).

In 1917, the Waimanalo Military Reservation was established with boundaries nearly identical to those of present day MCTAB. Significant use of the area by the military did not occur until 1933 when the name of the installation was changed to Waimanalo Military Reservation, Bellows Field. At the time of the Japanese attack on Naval Station Pearl Harbor, new runways were already under construction. Along with many other facilities, the runways were completed during World War II and the installation was used as an airfield. After World War II, Bellows Field transitioned from an airfield to a training, recreation, and communications facility. A Nike/Hercules missile site was added to the facility during the Cold War era, and interior areas were leased for cattle ranching. (Desilets, 2002)

Approximately 20 archaeological sites have been identified at MCTAB, several of which are located within the runway complex. There is also a high probability for additional subsurface sites to exist, particularly along stream banks and in dune areas (U.S. Air Force, 15th Airlift Wing, 2005; U.S. Department of Defense, 2006). Most of the archaeological sites at MCTAB are subsurface, including both identified and potential burial sites at isolated locations. Many of the identified sites, including Site 4852 (Bellows Dune Site), are eligible for inclusion in the NRHP. (U.S. Pacific Command, 1995; U.S. Department of the Navy, 2002a; U.S. Army Corps of Engineers, Honolulu Engineer District, 2005) A list of archaeological and traditional resources sites at MCTAB is provided in Appendix H.

Historic Buildings and Structures

A complete inventory of potential historic buildings and structures was completed for MCTAB in 2002 (U.S. Army Corps of Engineers, Honolulu Engineer District, 2005). Properties were identified as eligible for inclusion in the NRHP, including World War II-era aircraft revetments for the B-17 aircraft and Pursuit Planes, runways, and taxiways. (U.S. Army Corps of Engineers, Honolulu Engineer District, 2005)

Traditional Resources

Although traditional Hawaiian resources information is scant for the MCTAB area, there are several associated legend sites that have been identified and determined to be eligible for inclusion in the NRHP as Traditional Cultural Properties. These include the area of the Battle of Kukui (a 2-day battle between Kalanikupule [the ruler of Oahu in 1794] and his Uncle Kaeokulani [ruler of Kauai]) (Archaeological Site No. 4858); the legend of *Haununaniho,* a small hill (puuhonua), which is said to have once been a place of refuge (Archaeological Site No. 383); and the legend of the black stone (Pohaku-paakiki), which is believed to have been a shrine built by sweet potato growers who used it to place offerings to their shark god, Kamohoalili. This same area is also associated with a legend about a stone watch tower and small house used to guard Oahu from approaching canoes. Archaeological Site No. 4852 (Bellows Dune Site) and three areas of nearby excavations have been listed in the NRHP. In addition, 49 burials have been recorded. (U.S. Army Corps of Engineers, Honolulu Engineer District, 2005)

3.4.2.9 HICKAM AIR FORCE BASE (AFB)

Hickam AFB is located on the south side of Oahu next to the Honolulu International Airport and consists of 2,850 acres of land and facilities. Hickam AFB, Hawaii is home to the 15th Airlift Wing and 67 partner units including Pacific Air Forces Headquarters and the Hawaii Air National Guard.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Hickam AFB. Of the 13 environmental resources considered for analysis, air quality, cultural resources, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.2.9.1 Airspace—Hickam AFB

Appendix C includes a detailed description of airspace.

Region of Influence

Based on RIMPAC, aircraft support includes space for the various types of aircraft and equipment for refueling and maintenance. U.S. and foreign aircraft (fixed wing, rotary, and airship) would be supported from several locations. For a typical RIMPAC, approximately 50 aircraft would be supported at Hickam AFB. Housing would be provided at the installation.

The use of Hickam AFB by aircraft during RIMPAC would be coordinated as part of the biennial planning process during three planning conferences leading up to the RIMPAC Exercise. Due to the level and extent of planning involved, and the minimal potential for significant impacts, airspace has not been evaluated under the RIMPAC EAs (U.S. Department of the Navy, 2006a;; 2002a; 2000 and U.S. Department of the Navy, Commander Third Fleet, 2004).

The Hickam AFB region of influence includes the airspace above and south of Honolulu International Airport. Figure 3.4.2.6.1-1 shows a view of the airspace above Oahu including Hickam AFB/Honolulu International Airport.

Affected Environment

The affected airspace use environment in the Hickam AFB region of influence is described below in terms of its principal attributes: controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields. There are no military training routes in the region of influence.

Controlled and Uncontrolled Airspace

The airspace within the region of influence consists of the airspace above Hickam AFB/Honolulu International Airport as shown on Figure 3.4.2.6.1-1. Hickam AFB shares its runways with the adjacent Honolulu International Airport. Hickam AFB and the Honolulu International Airport constitute a single airport complex operated under a joint-use agreement.

The Class B airspace that lies above Hickam AFB consists of a core surface area surrounded by several layers of varying floor altitudes (FL 10, 15, 20, 30, 40) but the same ceiling altitude of FL 90. Below the Class B layers is Class E airspace with a floor 700 ft above the surface. Honolulu Combined Facility, more specifically, the Honolulu Control Tower, controls the movement of aircraft within the region of influence.

Special Use Airspace

The Pali Air Traffic Control Assigned Airspace is in effect above the entire Oahu area from FL 250 (25,000 ft) to unlimited. The Pali airspace is scheduled through the Navy FACSFAC Pearl Harbor who then coordinates with the FAA Honolulu Combined Facility.

There is also a National Security Area above a portion of Naval Station Pearl Harbor as shown on Figure 3.4.2.6.1-1. For reasons of national security, pilots are requested not to fly below 5,000 ft in this area.

En Route Airways and Jet Routes

Several IFR en route low altitude airways enter or transect the region of influence. These airways are Class E airspace corridors with centerlines established by navigational aids.

Airports and Airfields

The Hickam AFB/Honolulu International is the primary airport within the region of influence. Kalealoa Airport is located approximately 8 nm west of Hickam AFB, Wheeler Army Airfield is located 12 nm northwest, and Kaneohe Bay Marine Corps Airfield at MCBH is located 12 nm northeast.

3.4.2.9.2 Biological Resources—Hickam AFB

Region of Influence

The region of influence includes the base and adjacent waters.

Affected Environment

Vegetation

Vegetation on Hickam AFB has been disturbed or removed, and there are no significant, naturally occurring, native plant communities. Native plants are occasionally used in landscaping. Managed vegetation consists of herbaceous ruderal vegetation. Unmanaged vegetation exists in the southern part of the base and includes buffelgrass/kiawe woodland, kiawe forest, pickleweed flats, and mangrove. (U.S. Department of the Air Force, 2003)

Threatened and Endangered Plant Species

No threatened or endangered plants have been identified on base.

Wildlife

Fish and wildlife on Hickam AFB are managed through its Integrated Natural Resources Management Plan in cooperation with the USFWS and the State of Hawaii. Terrestrial wildlife on the base includes feral cats and mongoose. Shoreline wetlands provide a limited amount of cover, nesting, and feeding habitat for songbirds. Wedge-tailed shearwaters have been downed by lights on the base. The State endangered pueo (Hawaiian short-eared owl) has been observed on base. (U.S. Department of the Air Force, 2003)

Threatened and Endangered Wildlife Species

Threatened and endangered wildlife species on or in the area of Hickam AFB are listed in Table 3.4.2.9.2-1. The ae`o (Hawaiian stilt) has been observed in the Reef Runway Lagoon, near the Manuwai Canal, and in ephemeral ponds on other parts of the base. Federally endangered Hawaiian waterbirds, primarily Hawaiian stilts, are regular visitors to Hickam AFB, having been observed foraging and nesting on base and adjacent to the runway. On March 2006, at least two separate stilt pairs nested adjacent to the runway where dewatering ponds were in place on Hickam AFB. (U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007) Habitat for the `alae ke`oke`o (Hawaiian coot) and the `alae`ula (Hawaiian common moorhen) exists at the Manuwai Canal, but these birds have not been recorded at this location. The koloa maoli (Hawaiian duck) has been observed on the Waipio Peninsula, which is 2 to 3 mi from Hickam AFB. The Hawaiian hoary bat, which is usually found on Kauai and Hawaii, could use portions of Hickam AFB since a few scattered sightings on Oahu have been reported. (U.S. Department of the Air Force, 2003)

Green turtles, resting Hawaiian monk seals, and transitory humpback whales are known to occur or could occur in waters off Hickam AFB.

Table 3.4.2.9.2-1. Listed Species Known or Expected to Occur in the Hickam AFB Region

Scientific Name	Common Name	Federal Status
Reptiles		
Chelonia mydas	Green turtle	T
Birds		
Anas wyvilliana	Koloa maoli (Hawaiian duck)	E
Fulica alai	`Alae ke`oke`o (Hawaiian coot)	E
Gallinula chloropus sandvicensis	Alae ula (Hawaiian common moorhen)	E
Himantopus mexicanus knudseni	Ae`o (Hawaiian black-necked stilt)	E
Mammals		
Lasiurus cinereus semotus	Hawaiian hoary bat	E
Monachus schauinslandi	Hawaiian monk seal	E

Source: U.S. Department of the Air Force, 2003; U.S. Fish and Wildlife Service, 2006b; 2007

Key to Federal Status:
T = Threatened
E = Endangered

Environmentally Sensitive Habitat

Most of the wetlands on Hickam AFB are located in the southern part of the base in flat or depressed areas, along the coast, and along the edges of canals (National Wetlands Inventory, 2007). Most wetlands, except for the coastal mangrove shrubland and sand beaches, are disturbed by human activities and are of little value to wildlife.

3.4.2.10 WHEELER ARMY AIRFIELD

Wheeler Army Airfield consists of approximately 1,389 acres of land adjacent to Schofield Barracks. Wheeler Army Airfield is home to a variety of DoD activities including the Defense Communications Agency, the Air Force's 6010th Aerospace Defense Group, the Hawaii Army National Guard's Aviation Support Facility, and the 25th Infantry Division (Light) Aviation Brigade.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Wheeler Army Airfield. Of the 13 environmental resources considered for analysis, air quality, cultural resources, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.2.10.1 Airspace—Wheeler Army Airfield

Appendix C includes a detailed description of airspace.

Region of Influence

Based on RIMPAC, aircraft support includes space for the various types of aircraft and equipment for refueling and maintenance. The use of Wheeler Army Airfield by aircraft during RIMPAC is secondary and falls within the day-to-day coordination for the movement of equipment and supplies.

The use of Wheeler Army Airfield by aircraft during RIMPAC would be coordinated as part of the biennial planning process during three planning conferences leading up to the RIMPAC Exercise. Due to the level and extent of planning involved, and the minimal potential for significant impacts, airspace has not been evaluated under the RIMPAC EAs (U.S. Department of the Navy, 2006b;; 2002a; 2000 and U.S. Department of the Navy, Commander Third Fleet, 2004).

The region of influence is defined as the area affected by the ongoing No-action Alternative and the proposed training. Figure 3.4.2.6.1-1 shows a view of the airspace above Oahu, including Wheeler Army Airfield. The region of influence includes the Class D and Class E airspace above Wheeler Army Airfield.

Affected Environment

The affected airspace use environment in the Wheeler Army Airfield region of influence is described below in terms of its principal attributes: controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields. There are no military training routes in the region of influence.

Controlled and Uncontrolled Airspace

The airspace within the region of influence consists of the airspace above Wheeler Army Airfield which includes Class D airspace from the surface to FL 33, and Class E airspace with a floor 700 ft above the surface.

No Class B (U.S. terminal control areas) airspace, which usually surrounds the nation's busiest airports, or Class C airspace is found in the region of influence.

Special Use Airspace

Several restricted airspace areas (3109 A, B, C and 3110 A, B, C) are located immediately northwest of the Wheeler Army Airfield Class D airspace. These areas are outside the region of influence for Wheeler Army Airfield.

The Pali Air Traffic Control Assigned Airspace is in effect above the entire Oahu area from FL 250 (25,000 ft) to unlimited. The Pali airspace is scheduled through the Navy FACSFAC Pearl Harbor, which then coordinates with the FAA Honolulu Combined Facility.

En Route Airways and Jet Routes

The closest IFR en route low altitude airways are located outside the region of influence, south of Oahu.

Airports and Airfields

MCBH is located 15 nm to the east and Honolulu International Airport is located 12 nm to the southeast, both outside the region of influence.

3.4.2.10.2 Biological Resources—Wheeler Army Airfield

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence includes the installation and adjacent land.

Affected Environment

Vegetation

Wheeler Army Airfield is a developed area that contains mostly non-native urban vegetation (U.S. Department of the Army, 2004).

Threatened and Endangered Plant Species

No threatened or endangered plants have been identified on Wheeler Army Airfield.

Wildlife

There are no native terrestrial amphibians or reptiles on the Hawaiian Islands. Non-native amphibians and reptiles that have the potential to occur on Wheeler Army Airfield include the green and black poison dart frog, (*Dendrobates auratus*), bullfrog (*Rana catesbeiana*), giant toad (*Bufo marinus*), Cuban tree frog (*Osteopilus septentrionalis*), green anole (*Anolis carolinensis*), mourning gecko (*Lepidodactylus lugubris*), house gecko (*Hemidactylus frenatus*), metallic skink (*Lampropholis delicata*), and island blind snake (*Rhamphotyphlopys braminus*). (U.S. Department of the Army, 2004)

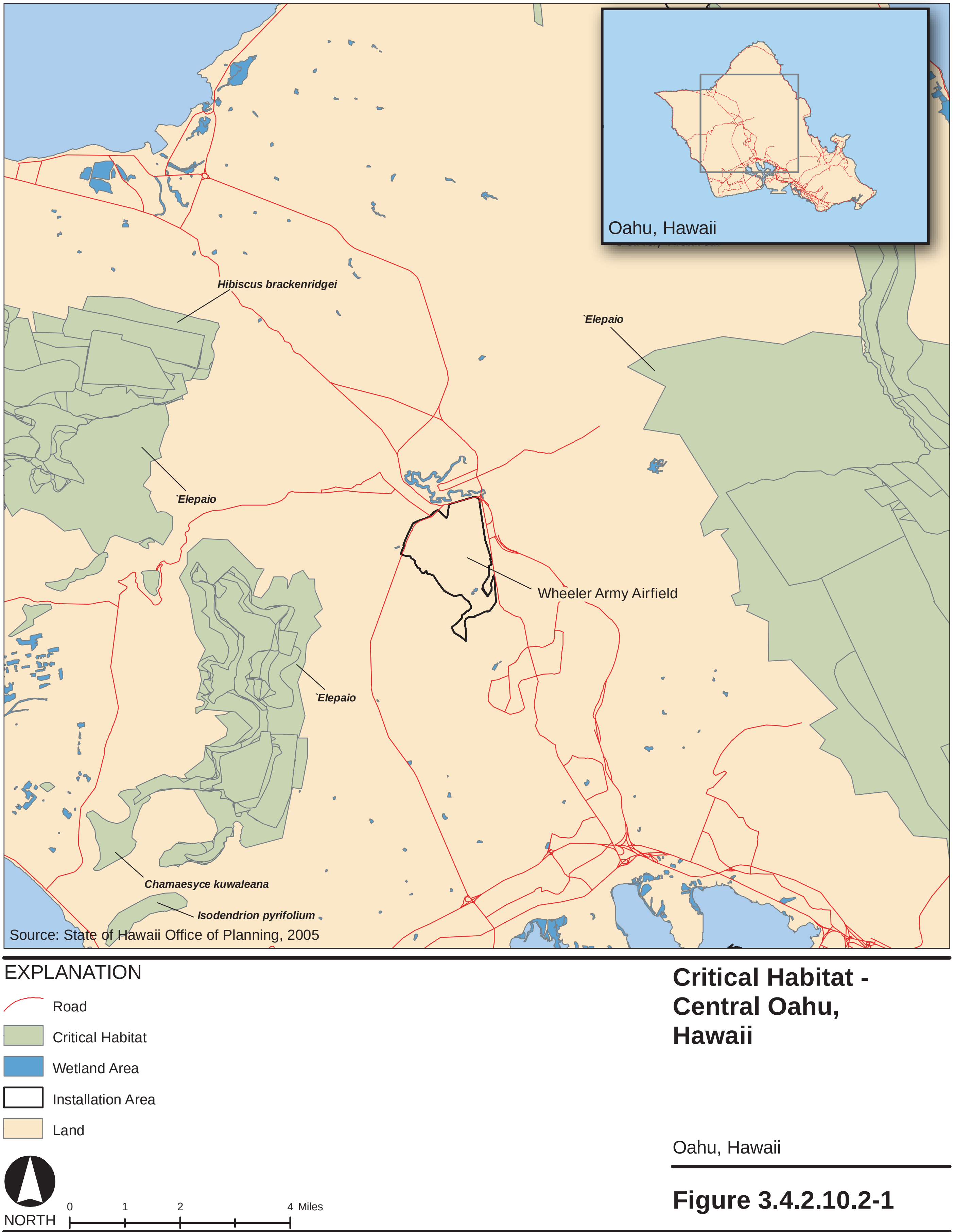
Several species of native and non-native birds are located in the region of influence. The black-crowned night heron, Pacific golden plover, and white-tailed tropicbird (*Phaethon lepturus*) are indigenous birds that are in the region of influence. Non-native birds in the region include, but are not limited to, the rock dove (*Columba livia*), zebra dove, common myna, and red-vented bulbul. (U.S. Department of the Army, 2004)

Threatened and Endangered Wildlife Species

The Hawaiian hoary bat may occur at or in the vicinity of the airfield.

Environmentally Sensitive Habitat

No critical habitat has been designated in the region of influence (Figure 3.4.2.10.2-1).



Critical Habitat - Central Oahu, Hawaii

Oahu, Hawaii

Figure 3.4.2.10.2-1

3.4.2.11 MAKUA MILITARY RESERVATION

Makua Military Reservation is a Department of the Army reservation containing a total of 4,190 acres in the Makua Valley on the northwestern side of Oahu. Makua Military Reservation extends from the Farrington Highway along the west coast eastward to the ridgeline of the Waianae Mountains. The Navy would only use the Makua Military Reservation if approved by the Army.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Makua Military Reservation. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, hazardous materials and hazardous waste, land use, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.2.11.1 Biological Resources—Makua Military Reservation

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence includes Makua Military Reservation and adjacent waters.

Affected Environment

Vegetation

Three ecological zones have been identified within Makua Military Reservation. The Army delineated these zones based on elevation, topography, and prevailing climatic conditions within the Reservation, resulting in three designations: Ridge Crest Vegetation Zone, Native Shrub on Cliff and Slope Zone, and Lowland Native Forest Zone. The ecological subzones and plant and animal biota within each of these have also been well documented. Guinea grass and molasses grass are two examples of alien plant species occurring on the installation. (U.S. Department of the Army, 2005)

<u>Threatened and Endangered Plant Species</u>

Records dating back to 1970 indicate that there are 32 endangered plants on Makua Military Reservation (Table 3.4.2.11.1-1). The majority of these plants are found along the southern and northeastern boundaries of the reservation. The removal of wild goats on the range has been beneficial to the management of the endangered plants. Another primary threat to the endangered plants on the range is fire. Recent fires have burned acreage containing some of these plants. (U.S. Department of the Army, 2005)

Wildlife

In addition to native species, introduced nuisance species such as pigs, rats, and goats adversely affect range habitat. The Army has implemented measures, including more than 7 mi of fencing, to control the movement of pigs and goats onto the Makua Military Reservation. (U.S. Department of the Army, 2005)

Table 3.4.2.11.1-1. Listed Species Known or Expected to Occur at Makua Military Reservation

Scientific Name	Common Name	Federal Status
Plants		
Abutilon sandwicense	Flowering maple	E
Achyranthes splendens var. *rotundata*	Round-leafed chaff-flower	E
Alectryon macrococcus	Mahoe	E
Alsinidendron obovatum	No common name	E
Bonamia menziesii	No common name	E
Cenchrus agrimonioides	Kamanomano	E
Centaurium sebaeoides	Awiwi, (Hawaiian century-plant)	
Chamaesyce celastroides var. keanana	`Akoko	E
Ctenitis squamigera	Pauoa	E
Cyanea superba	Haha	E
Cyrtandra dentata	Ha`iwale	E
Delissea subcordata	No common name	E
Diellia falcata	No common name	E
Dubautia herbstobatae	Na`ena`e	E
Euphorbia haeleeleana	`Akoko	E
Flueggea neowawraea	Mehamehame	E
Hedyotis degeneri	No common name	E
Hedyotis parvula	No common name	E
Hesperomannia arborescens	Lanai island-aster	E
Hibiscus brackenridgei	Ma`o hau hele	E
Isodendrion laurifolium	Aupaka (Rockcliff isodendrion)	E
Isodendrion pyrifolium	Wahine noho kula	E
Lepidium arbuscula	`Anaunau	E
Lipochaeta tenuifolia	Nehe	E
Lobelia niihauensis	No common name	E
Lobelia oahuensis	No common name	E
Mariscus pennatiformis	No common name	E
Neraudia angulata	Ma`loa (angularfruit)	E
Nototrichium humile	Kulu`i	E
Peucedanum sandwicense	Makou	E
Phyllostegia kaalaensis	No common name	E
Plantago princeps	Ale	E
Prichardia kaalae	Loulu	E
Sanicula mariversa	Waianae Range black snakeroot	E
Schiedea hookeri	Sprawling schiedea	E
Schiedea kaalae	Ma`oli`oli	E
Schiedea nuttallii	Valley schiedea	E

Table 3.4.2.11.1-1. Listed Species Known or Expected to Occur at Makua Military Reservation (Continued)

Scientific Name	Common Name	Federal Status
Plants (Continued)		
Schiedea obovatum	No common name	E
Sesbania tomentosa	‘Ohai	E
Silene lanceolata	Kauai catchfly	E
Solanum sandwicense	Popolo`aiakeakua	E
Spermolepis hawaiiensis	Hawaii scaleseed	E
Tetramolopium filiforme	No common name	E
Tetramolopium lepidotum ssp. lepidotum	No common name	E
Vigna owahuensis	Mohihihi	E
Viola chamissoniana ssp. chamissoniana	Pamakani	E
Invertebrates		
Achatinella mustelina	Oahu tree snail	E
Reptiles		
Chelonia mydas	Green turtle	T
Dermochelys coriacea	Leatherback turtle	E
Birds		
Chasiempis sandwichensis ibidis	Oahu `elepaio	E
Paroreomyza maculata	`Alauahio (Oahu creeper)	E
Mammals		
Lasiurus cinereus semotus	Hawaiian hoary bat	E
Monachus schauinslandi	Hawaiian monk seal	E

Source: U.S. Department of the Navy, 2002a; U.S. Department of the Army, 2005; U.S. Fish and Wildlife Service, 2006b.
Key to Federal Status: U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007
E Endangered
T Threatened

Threatened and Endangered Wildlife Species

Records dating back to 1970 indicate that there are two endangered birds, one endangered terrestrial mammal, and one endangered snail (*Achatinella mustelina*, Oahu tree snail) on Makua Military Reservation (Table 3.4.2.11.1-1). (U.S. Department of the Army, 2005)

Section 7 consultation has been conducted with USFWS to determine if routine military training at Makua Military Reservation would jeopardize the continued existence of endangered species. In 1999, the USFWS issued a Biological Opinion concluding that the routine military training would not jeopardize the endangered species if certain conditions were met. These include restrictions to military training, and preparation and implementation of a Wildland Fire Management Plan. The *Integrated Wildland Fire Management Plan Oahu and Pohakaloa Training Areas* was completed in 2003 (U.S. Army, Hawaii and 25th Infantry Division [Light], 2003). The Army also completed an Implementation Plan in 2003 to stabilize the targeted plant and animal populations. An Addendum was submitted to the USFWS in 2005 that emphasized management of three population units per plant taxon. The consultation completed in 1999 for Makua Military Reservation has been reinitiated three times, most recently in June 2007. (U.S.

Department of the Navy, 2002a; U.S. Army Garrison, Hawaii, 2005; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007)

Environmentally Sensitive Habitat

The USFWS designated critical habitat on Makua Military Reservation in 2001 for the Oahu `elepaio (Figure 3.4.2.11.1-1). The USFWS determined that lands on Oahu that fall under Army jurisdiction do not meet the definition of critical habitat under the ESA for the listed plant species shown in Table 3.4.2.11.1-1, based on the Army's continuing commitment to management and stabilization of sensitive species through their Integrated Natural Resources Management Plan, Integrated Wildland Fire Management Plan, Ecosystem Management Plan, and Endangered Species Management Plan. These documents/plans outline specific strategies and programs in place to stabilize species and habitats on Army land. (U.S. Department of the Army, 2005) Critical plant habitat is however, located outside the boundaries of Makua Military Reservation.

Although potential estuarine wetlands have been observed on Makua Military Reservation, no formal identification or designation has been made (U.S. Department of the Navy, 2002a). According to the 2005 *Draft Environmental Impact Statement Military Training Activities at Makua Military Reservation,* aquatic natural communities on the installation include intermittent streams and gulches, such as Punapohaku Stream, Makua Stream, and Kalena Stream. Although potential estuarine wetlands (muliwai or small ponds) have been noted, there has been no formal identification or designation of them (U.S. Department of the Army, 2005). The intermittent Kalena Stream with head waters in Koiahi Gulch crosses through part of the proposed managed area on the south side of Makua Valley. Intermittent streams on the reservation fit the state definition of Class 2 Inland Freshwaters, which are waters used for recreational purposes, the support and propagation of aquatic life, agricultural and industrial water supplies, shipping, and navigation. (U.S. Department of the Army Headquarters, and U.S. Department of the Army, 2006)

3.4.2.11.2 Cultural Resources—Makua Military Reservation

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

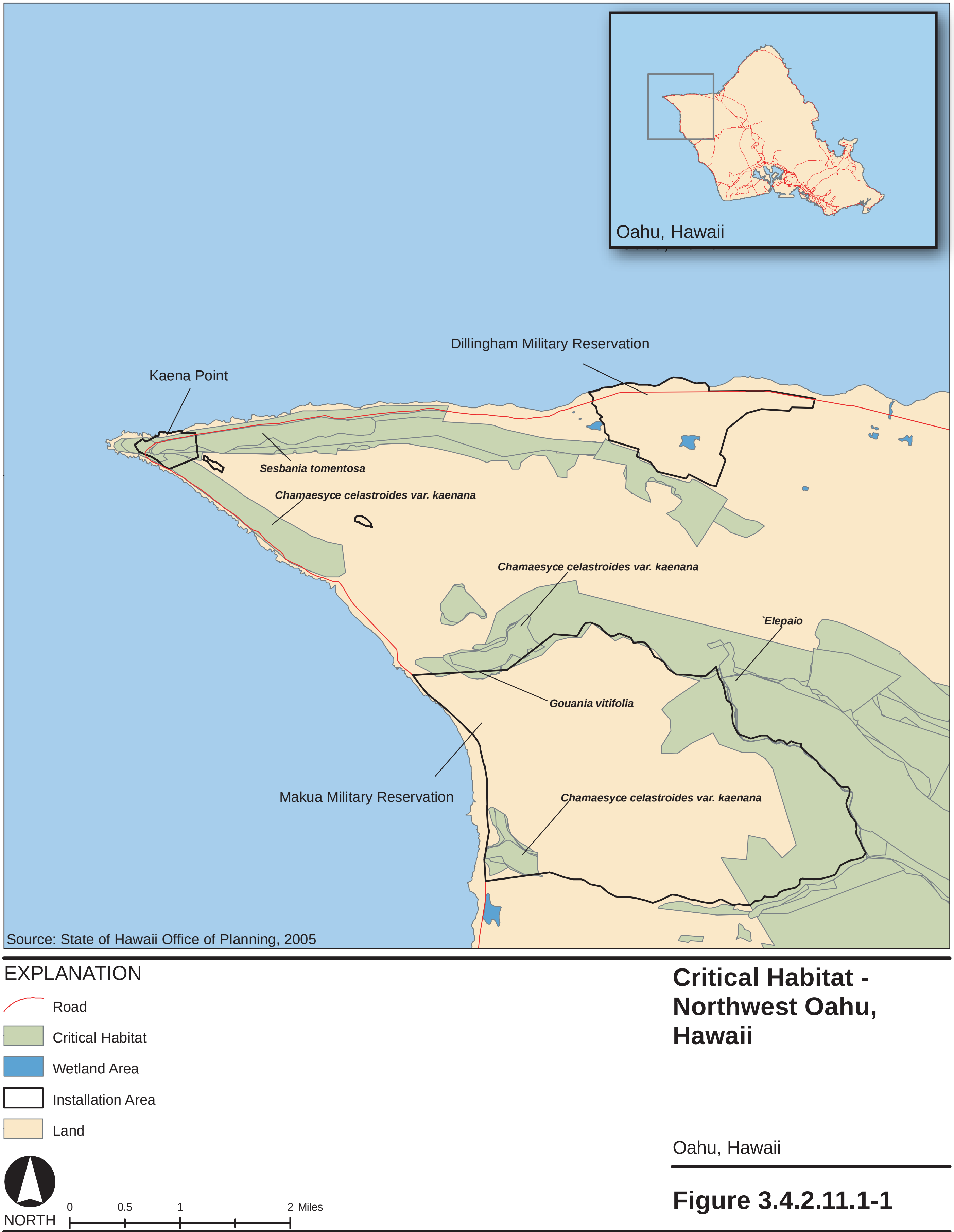
Region of Influence

The cultural resources region of influence for Makua Military Reservation (Figure 2.1-3) encompasses all areas where LFX events (including major ground troop and artillery movement and munitions detonation [e.g., mortars, heavy artillery]) could be conducted.

Affected Environment

Archaeological Resources (Prehistoric and Historic)

Archaeological evidence indicates that Makua Valley once supported both a coastal population (historically known as Makua Village), and permanent occupation in the middle and upper elevations. Archaeologists hypothesize that Makua has similar settlement patterns to the Makaha, Waianae, and Lualualei valleys, with more people living in the back of the valley, at the higher elevations where rainfall was more abundant. Data infer that by the mid-1800s, the middle area was claimed only as community kula (pasture) lands that had once been habitation



Critical Habitat - Northwest Oahu, Hawaii

Oahu, Hawaii

Figure 3.4.2.11.1-1

sites abandoned early in the post-contact period (Williams and Patolo, 2000). Early missionary accounts of Makua Valley note that there was a large school, suggesting more population than just the coastal village. (The Onyx Group, 2001)

Sandalwood harvesting began in Makua Valley as early as 1815, but as the wood was exhausted, ranching and agriculture (particularly sweet potatoes) became the more common land use practices. After the Great Mahele of 1848 (a system of private land division/ownership), land in Makua Valley was awarded to various claimants, including a large portion to the Hawaiian government. The lands remained under private or government ownership or lease until the Army's use of the land in 1941. (The Onyx Group, 2001)

Since the early 1900s, a number of archaeological surveys have been conducted in the Makua Valley. Among these are Thrum (1906); McAllister (1933); Rosendahl for the Bishop Museum (1977); and Williams and Patolo (2000). Additional surveys and subsurface testing were undertaken at Makua Military Reservation by archaeologists from the Environmental Division of the Department of Public Works in 2000 and 2007. Among the identified site types are heiaus, shrines, trails, stone walls, and enclosures, terraces, platforms, and habitation sites. One site, the Ukanipo Heiau, is listed in the NRHP and other sites may qualify (Pilia`au Range Complex and Makua Military Reservation, 2006). A list of recorded archaeological sites is provided in Appendix H (The Onyx Group, 2001; U.S. Department of the Navy, 2002a).

On September 18, 2000, a Section 106 Programmatic Agreement was finalized with the Hawaii State Historic Preservation Officer and the Advisory Council on Historic Preservation. The Programmatic Agreement was developed by the Army in consultation with Native Hawaiian groups and regulatory agencies over a period of 2 years. It contains specific programs and efforts to protect and mitigate impacts on cultural resources at Makua Military Reservation. (The Onyx Group, 2001) A copy of the Programmatic Agreement is provided as Appendix H.

Historic Buildings and Structures

Makua Military Reservation is a large training range. There are no identified historic buildings and structures.

Traditional Resources

Makua Military Reservation is associated with a number of legends and traditional Hawaiian deities, and has significant religious and social value to local inhabitants. Among other important resources, a comprehensive investigation of the traditional complexion and resources of Makua Military Reservation entitled *Cultural History Report of Makua Military Reservation, Makua Valley, Oahu, Hawaii*, was prepared in 1977 by Kelley and Quintal. The report presents the history, traditional accounts, and legends of Makua Valley. (The Onyx Group, 2001)

The 2000 Programmatic Agreement described above includes provisions for access for members of the Native Hawaiian community to Ukanipo Heiau. This access is independent of training in the valley. Access to other sites within the valley has been given on a case-by-case basis, as is consistent with training and safety concerns. The potential for increased access to other sites within Makua Military Reservation is being examined (see Appendix H). (The Onyx Group, 2001)

3.4.2.11.3 Health and Safety—Makua Military Reservation

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence for potential impact related to the health and safety of personnel and the public includes areas associated with training events at Makua Military Reservation and those off-base areas affected by training.

Affected Environment

Makua Military Reservation takes every precaution during planning and execution of training events to prevent injury to human life or property. Standard Operating Procedures for LFX outline assets, personnel, safety requirements, and procedures to be used during each event. Use of the range is scheduled through the Range Division—Hawaii Scheduling Office, and Makua Range Control monitors all communications during training.

For each training event, a detailed surface danger zone is determined, in accordance with Army Regulation 385-64, *Ammunition and Explosives Safety Standards.* A surface danger zone ensures a proper buffer zone to the range and ordnance impact area, which prevents accidental injury and exposure to live weapons outside the designated training area. Upon completion of the training event, every effort is made to restore the range to its condition prior to use, including explosive ordnance disposal specialists destroying all identifiable unexploded ordnance.

An additional concern at Makua Military Reservation is accidental wildfires due to military training. A majority of the fires that have started on Makua Military Reservation have been contained with the boundaries of the installation. However, some fires have burned onto the adjacent land of Albert Silva, the Kuaokala Game Management Area, and the Air Force Kaena Point Satellite Tracking Station. (U.S. Department of the Army, 2005)

Fire prevention at Makua Military Reservation includes planning, managing fuels, using prescribed fire, planning water resources, and training firefighters. Makua Military Reservation has a fire danger rating system that uses the following three colors to characterize fire threat conditions:

- Green (indicating normal caution during training). Weather conditions are favorable for all authorized munitions, and smoking is permitted.
- Yellow (indicating caution because fires will start easily). For this fire danger period, smoking is permitted only in designated areas, and only ball ammunition, mortar, artillery, hand grenades, and smoke grenades are allowed.
- Red (indicating extreme caution because a fire would be difficult to control). No smoking is permitted on the ranges and no munitions or pyrotechnics are allowed. In other words, no live fire training is allowed, and the ranges are closed. (U.S. Department of the Army, 2005)

3.4.2.11.4 Noise—Makua Military Reservation

Appendix C includes a definition of noise and the main regulations and laws that govern it.

Region of Influence

The region of influence for Makua Military Reservation is the area within and surrounding Makua Military Reservation in which humans and wildlife may suffer annoyance or disturbance from noise levels from proposed training at Makua Military Reservation and those off-base areas affected by training events.

Affected Environment

Noise is generated at the Makua Military Reservation from military activities, including infantry and helicopter gunnery training events. Other noise sources include low background noise levels from wind, surf, birds, insects, and light highway traffic. Ambient noise levels at Makua Beach are estimated to be between 40 and 50 dBA, with peaks reaching noise levels greater than 70 dBA during high tide and afternoon winds. Small arms, demolition, mortar, artillery, and aircraft gunnery events all generate noise at Makua Military Reservation. Noise level contributions from Makua Military Reservation training vary greatly, depending on whether LFX are in progress. Actual noise measurements in 1989, when the Army was conducting training, showed that noise levels at the reservation boundary would ordinarily not exceed the standards of the Oahu community noise rule. (U.S. Department of the Army, 2005; Tetra Tech, Inc., 2005)

The nearest housing is approximately 1,000 to 3,000 ft down the beach that is adjacent to the Makua Military Reservation. Most military training at the reservation occurs during early morning hours, when the number of beachgoers is small. There are no schools, day-care centers, hospitals, or nursing homes within 2 mi of Makua Military Reservation. When there are no training events in progress at Makua Military Reservation, noise conditions are dominated by wind, bird songs, and insects. Under these conditions, noise levels typically vary between approximately 25 dBA and 45 dBA. (U.S. Department of the Army, 2005)

Wildlife receptors in the Makua Military Reservation area are detailed in Section 3.4.2.11.1, Biological Resources.

3.4.2.12 KAHUKU TRAINING AREA

Kahuku Training Area consists of 9,355 acres of leased lands, most of which are in a state-designated conservation district. The Kahuku Training Area is one of the more widely used military training areas in Hawaii and fulfills a need for maneuver training on Oahu. Army Reserve, National Guard, and Marine Corps units also use this area.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Kahuku Training Area. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.2.12.1 Biological Resources—Kahuku Training Area

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence includes the training area and adjacent land.

Affected Environment

Vegetation

Parts of Kahuku Training Area contain valuable native vegetation communities. However, much of the lower-lying vegetation is composed of introduced and invasive plants such as Christmas berry, ironwood, and strawberry guava. Manuka (New Zealand tea tree) (*Leptospermum scoparium*) and moho (white moho) (*Heliocarpus popayanensis*) are two plants recently discovered in the region of influence that can be detrimental to the native communities of the Kahuku Training Area. (U.S. Department of the Army, 2004)

Montane wet, lowland wet, lowland forest, lowland moist, lowlands dry, and intermittent aquatic natural communities are the six general categories of native natural vegetation community types. (U.S. Department of the Army, 2004)

Makou (*Botrychium subbifoliatum*), `oha (*Cyanea lanceolata Ssp. calycina*), anini (*Eurya sandwicensis*), *Hedyotis fluviatilis*, *Lindsaea repens* var. *macraeana*, keahi (*Nesoluma polynesicum*), *Platydesma cornuta*, and kaulu (*Pteralyxia macrocarpa*) are species of concern that have been identified on the Kahuku Training Area. (U.S. Department of the Navy, 2002a)

<u>Threatened and Endangered Plant Species</u>

Eighteen rare plant types have been identified at Kahuku Training Area, of which 10 are Federally listed as endangered (Table 3.4.2.12.1-1). (U.S. Department of the Navy, 2002a)

Table 3.4.2.12.1-1. Listed Species Known or Expected to Occur at Kahuku Training Area

Scientific Name	Common Name	Federal Status
Plants		
Adenophorus periens	Pendant kihi fern	E
Chamaesyce rockii	`Akoko, koko, kokomalei	E
Cyanea grimesiana ssp. *grimesiana*	`Oha, haha, `ohawai	E
Cyanea koolauensis	`Oha, haha, `ohawai	E
Cyanea longiflora	`Oha, haha, `ohawai	E
Eugenia koolauensis	Nioi	E
Gardenia mannii	Nanu, na`u	E
Hesperomannia arborescens	Lanai island-aster	E
Phyllostegia hirsuta	No common name	E
Tetraplasandra gymnocarpa	`Ohe`ohe	E
Invertebrates		
Achatinella bulimoides	Oahu tree snail	E
Achatinella curta	Oahu tree snail	E
Achatinella dimorpha	Oahu tree snail	E
Achatinella elegans	Oahu tree snail	E
Achatinella sowerbyana	Oahu tree snail	E
Achatinella valida	Oahu tree snail	E
Birds		
Chasiempis sandwichensis ibidis	Oahu `elepaio	E
Paroreomyza maculata	`Alauahio (Oahu creeper)	E
Mammals		
Lasiurus cinereus semotus	Hawaiian hoary bat	E

Source: U.S. Department of the Navy, 2002a; U.S. Fish and Wildlife Service, 2006b; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007.

Key to Federal Status:

E = Endangered

Wildlife

The bullfrog, wrinkled frog (*Rana rugosa*), coqui frog (*Eleutherodactylus coqui*), and poison dart frog are non-native amphibians found on Oahu and potentially on Kahuku Training Area. Reptiles such as the green anole, gecko, and metallic skink may be found in the region of influence. Feral pigs, Indian mongoose, feral dogs, rats, and house mice are terrestrial mammals that may occur on Kahuku Training Area. The great frigate bird, Pacific golden plover, pueo (Hawaiian short-eared owl), and Oahu `amakihi are indigenous birds that have been observed on the training area. Several non-native bird species such as the white-rumped shama, zebra dove, and house finch are also in the area. (U.S. Department of the Army, 2004)

Threatened and Endangered Wildlife Species

The Kahuku Training Area was addressed in the 2003 Biological Opinion for routine and transformation training conducted by the Army (U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007). According to the USFWS, the Hawaiian hoary bat could be present on the installation (U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007). Eight rare wildlife species have been identified at the Kahuku Training Area. These include six varieties of endangered tree snails (*Achatinella* sp.) and two rare birds, including the Oahu `elepaio and `alauahio (Oahu creeper), species Federally listed as endangered (Table 3.4.2.12.1-1). (U.S. Department of the Navy, 2002a; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007)

Environmentally Sensitive Habitat

Critical habitat was officially designated for the Oahu `elepaio on 10 December 2001 that encompasses areas in the Koolau and Waianae Mountain Ranges on Oahu south of Kahuku Training Area (Figure 3.4.2.12.1-1). Five biologically significant areas occur in the southern and midwestern portion of the training area. (U.S. Department of the Navy, 2002a)

3.4.2.12.2 Cultural Resources—Kahuku Training Area

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The cultural resources region of influence for Kahuku Training Area encompasses all areas where Humanitarian Assistance/Disaster Relief Operations or any other ground disturbing or amphibious events would occur. These areas would include beach landing areas and well established trails that lead to predetermined buildings or temporary tent areas (see Appendix D).

Affected Environment

Underwater Cultural Resources

Underwater cultural resources within the Kahuku offshore region of influence include scattered shipwrecks and at least one Hawaiian fishpond (see Figures 3.1.3-2 and 3.4.1.3.2-1).

Archaeological Resources (Prehistoric and Historic)

Kahuku Training Area was occupied at least seasonally from the 14th century on and was used for agriculture beginning in the 15th century. Evidence of occupation prior to European contact includes rock shelters, burial sites, irrigation complexes, and habitation sites. (U.S. Department of the Army, 2004)

In 1890 James Campbell, James Castle, and Benjamin Dillingham formed the Kahuku Plantation Company and sugar cane began to replace pastureland. A sugar mill was established at Kahuku and the area of Kahuku Training Area was operated as a sugar plantation until the 1930s. Just prior to World War II, an airfield and radar station was constructed; after the war, additional land was purchased to support the Kahuku Training Area. A Nike Hercules missile battery was constructed in 1959. (U.S. Department of the Army, 2004)

EXPLANATION

Road

Critical Habitat

Wetland Area

Installation Area

Land

NORTH

0 0.5 1 2 Miles

Critical Habitat - Northern Oahu, Hawaii

Oahu, Hawaii

Figure 3.4.2.12.1-1

There have been several archaeological surveys of Kahuku Training Area (Anderson and Williams 1998; Davis 1981; Drolet 2000; McAllister 1933; Rosendahl 1977; Williams and Patolo 1998; and GANDA 2003) and the area has been divided into six separate archaeological management areas (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers 1998). Within the six areas approximately 100 archaeological sites have been identified, including prehistoric, historic, and military-era sites. Sites include the Hanakoae Heiau, which is listed in the NRHP; several rock shelters; a possible Plantation-period site; and hearth, dwelling, and agricultural sites. Historic sites include a house, irrigation features, foxholes, and bunkers (U.S. Department of the Army, 2004). Areas closest to the coast have the highest potential for archaeological resources (U.S. Department of the Navy, 2002a). A list of identified archaeological sites and historic buildings at Kahuku Training Area is provided in Appendix H.

Historic Buildings and Structures

Within the Kahuku Training Area, the World War II-era Opana Mobile Radar Station is listed in the NRHP and has been designated a National Historic Landmark. The site was operational on December 7, 1941, and is famous for its role in detecting the approaching Japanese aircraft just prior to the attack on Naval Station Pearl Harbor. (U.S. Department of the Army, 2004)

There are also 22 Cold War-era buildings and structures at Kahuku Training Area. The features are associated with the former Nike missile facility active in Hawaii between January 1961 and March 1970. The site is significant as an intact example of a Cold War Nike missile site and has been determined eligible for inclusion in the NRHP (International Archaeological Resources Institute, Inc, 2005). Preservation of the site was mandated as a result of consultation with the Hawaii State Historic Preservation Officer over the Nike site at Dillingham Military Reservation (U.S. Department of the Army, 2004).

Traditional Resources

The general area of Kahuku plays an important role in Hawaiian legends. Identified legend locations are in the off-shore and coastal areas but, to date, none of the legends have been tied to Kahuku Training Area land areas. There are, however, important Native Hawaiian sites within the Kahuku Training Area, including a terrace that may have been used for religious ceremonies and burials (Drolet, 2000).

In 1998, archival information concerning traditional cultural places in and around Kahuku Training Area was collected and reviewed (Anderson, 1998). Subsequently, the Army began a traditional cultural resources survey of Kahuku Training Area, which has resulted in the identification of several traditional sites.

3.4.2.13 DILLINGHAM MILITARY RESERVATION

Dillingham Military Reservation is a 664-acre training area with a beach and an airfield on the northwestern shore of Oahu. It is on a narrow, sloping plain between the Waianae Range and the sea.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Dillingham Military Reservation. Of the 13 environmental resources considered for analysis, air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.4.2.13.1 Biological Resources—Dillingham Military Reservation

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence consists of the Dillingham Military Reservation land and offshore areas.

Affected Environment

Vegetation

Dillingham Military Reservation contains native natural communities that are considered rare and globally imperiled. The area is composed primarily of stands of native forest and shrubland vegetation on the cliffs and talus slopes. Ecological surveys have identified four rare plant species of concern associated with the cliff ecological zone: `ahakea (*Bobea sandwicensis*), koki`o `ula`ula (*Hibiscus kokio* ssp. *kokio*), `anaunau (*Lepidium bidentatum* var. *o-waihiense*), and nehe (*Lipochaeta remyi*).

Threatened and Endangered Plant Species

Ecological surveys have identified eight rare plants associated with the cliff ecological zone, including four with endangered status (Table 3.4.2.13.1-1) (U.S. Department of the Navy, 2002a).

Wildlife

Field surveys on Dillingham Military Reservation have been limited to special-status wildlife, due mainly to the rugged terrain. Non-native amphibians that have the potential to occur on Dillingham Military Reservation include bullfrogs, green and black poison dart frogs, giant toads, and coqui frogs. Non-native reptiles could include green anoles, mourning geckos, tree geckos, and metallic skinks. Feral pigs, cats, and dogs; rats and house mice are mammals that may be found on the installation. (U.S. Department of the Army, 2004)

Table 3.4.2.13.1-1. Listed Species Known or Expected to Occur at Dillingham Military Reservation

Scientific Name	Common Name	Federal Status
Plants		
Cyperus trachysanthos	Pu`uka`a (Sticky flatsedge)	E
Hibiscus brackenridgei ssp. *Mokuleianus*	Ma`o hau hele (Mokulei rosemallow)	E
Nototrichium humile	Kulu`i (Kaala rockwort)	E
Schiedea kealiae	Ma`oli`oli	E
Reptiles		
Chelonia mydas	Green turtle	T
Dermochelys coriacea	Leatherback turtle	E
Birds		
Anas wyvilliana	Koloa maoli (Hawaiian duck)	E
Chasiempis sandwichensis ibidis	O`ahu `elepaio	E
Fulica alai	`Alae ke`oke`o (Hawaiian coot)	E
Gallinula chloropus sandvicensis	Alae ula (Hawaiian common moorhen)	E
Himantopus mexicanus knudseni	Ae`o (Hawaiian black-necked stilt)	E
Paroreomyza maculata	`Alauahio (Oahu creeper)	E
Mammals		
Lasiurus cinereus semotus	Hawaiian hoary bat	E
Monachus schauinslandi	Hawaiian monk seal	E

Source: U.S. Department of the Navy, 2002a; U.S. Department of the Army, 2004; U.S. Fish and Wildlife Service, 2006b
Key to Federal Status:
E = Endangered
T = Threatened

Threatened and Endangered Wildlife Species

The Dillingham Military Reservation was addressed in the 2003 Biological Opinion for routine and transformation training conducted by the Army (U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007). The endangered Hawaiian hoary bat has the potential to occur on Dillingham. The `alae ke`oke`o (Hawaiian coot), `alae`ula (Hawaiian moorhen), koloa maoli (Hawaiian duck), and ae`o (Hawaiian black-necked stilt) have been recorded on Dillingham Military Reservation. The Oahu `elepaio and `alauahio (Oahu creeper) are normally found in Native Hawaiian forest habitat. (U.S. Department of the Army, 2004)

Environmentally Sensitive Habitat

Army lands were excluded from the latest critical habitat for plants (Figure 3.4.2.11.1-1) since the Army has implemented a comprehensive program of endangered species management on its lands under the Integrated Natural Resources Management Plan process. A wetland delineated on the reservation is within the region of influence, but outside of the area used for maneuver training. (U.S. Department of the Army, 2004)

3.4.2.13.2 Cultural Resources—Dillingham Military Reservation

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The cultural resources region of influence for Dillingham Military Reservation (see Figure 2.1-3) encompasses areas where Navy and Marine Corps SPECWAROPS under RIMPAC and small unit maneuvers by the Army occur (e.g., reconnaissance insertions and search and rescue).

Affected Environment

Archaeological Resources (Prehistoric and Historic)

An extensive complex of agricultural and occupation features has been identified at Dillingham Military Reservation within the rocky sloping area between the airfield and the cliffs. Pre- and post-contact features have also been identified. These include platforms, boulder alignments, stone piles, walls, a ditch, and concrete foundations. There are three heiau temples also located within the Dillingham Military Reservation —two fishing shrines and “hidden waters” associated with Hawaiian legend (U.S. Army Garrison, Hawaii U.S. Army Corps of Engineers 1998; U.S. Department of the Navy, 2002a).

Historic Buildings and Structures

There are several World War II-era buildings at Dillingham Military Reservation; however, they have not been evaluated for eligibility for inclusion in the NRHP (U.S. Army Garrison, Hawaii, U.S. Army Corps of Engineers 1998; U.S. Department of the Navy, 2002a).

Traditional Resources

There are indications of pre-contact use of the coastal dune areas of Dillingham Military Reservation for burials. Burial remains in sand deposits would be considered significant as “properties of traditional religious and cultural importance” (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers 1998; U.S. Department of the Navy, 2002a).

3.4.2.14 KEEHI LAGOON

Keehi Lagoon is located on Oahu's southern shore, encompassing a triangular-shaped area between the Honolulu International Airport and Honolulu Harbor. Keehi Lagoon was originally a large shallow reef and subtidal area approximately 3 to 6.5 ft deep. The lagoon has changed over the passage of time into an almost completely artificial area. A review of the 13 environmental that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there were no impacts from HRC training at Keehi Lagoon.

3.4.2.15 KAENA POINT

The Kaena Point tracking radar used by PMRF and operated by the Air Force is on the island of Oahu within the Kaena Point Air Force Station. The radar used by PMRF is on a ridge overlooking the Pacific Ocean. Kaena Point tracking site has been in existence since 1959 (U.S. Department of the Air Force, 15th Airlift Wing, 2003). Kaena Point provides real-time telemetry data to PMRF. Metric and signature tracking data are also provided by the 30th Range Squadron located at Kaena Point. Training at this site consists of using an existing tracking radar operated by the Air Force. Kaena Point provides habitat for several listed plant species, nesting habitat for wedge-tailed shearwater (*Puffinus pacificus chlororhynchus)* and Laysan albatross (*Phoebastria immutabilis*), and resting areas for the endangered monk seal. A review of the 13 environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from HRC training at Kaena Point.

3.4.2.16 MT. KAALA

The Mt. Kaala site consists of leased building space only. Training at this site consists of radio frequency communication and radar tracking. A review of the 13 environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from HRC training Mt. Kaala.

3.4.2.17 WHEELER NETWORK SEGMENT CONTROL/PMRF COMMUNICATION SITES

Wheeler Network Communications Control is a major communications hub for PMRF located on Wheeler Army Auxiliary Airfield. Training at this site consists of support for the existing telemetry towers and communications. This facility—in conjunction with transceiver sites on Mount Kaala, Oahu, and Mount Kahili, Kauai, and computer/communication networks on Oahu and Maui—provides line-of-sight coverage of PMRF operational areas. In addition, PMRF utilizes data from a radar operated on Mount Kaala. A review of the 13 environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from HRC training at Wheeler Network Communications Control.

3.4.2.18 MAUNA KAPU COMMUNICATION SITE

The Mauna Kapu Communication Site, leased through the FAA by the Department of Energy, contains a repeater station. Training at this site consists of support for existing telemetry towers and communications. A review of the 13 environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from HRC training at the Mauna Kapu Communication Site.

3.4.2.19 MAKUA RADIO/REPEATER/CABLE HEAD

Makua Radio/Repeater/Cable Head is a Department of Energy communication site. Training at this site consists of existing telemetry towers and communications. A review of the 13 environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from HRC training at Makua Radio/Repeater/Cable Head.

3.5 MAUI

Maui is the second largest of the populated Hawaiian Islands. It covers approximately 700 square miles and was formed by two separate volcanoes: Mt. Haleakala, the world's largest dormant volcano, and Puu Kukui. Wailuku is the county seat. Maui County includes the islands of Maui, Lanai, Molokai (except Kalaupapa peninsula), and Kahoolawe. Current and proposed Hawaii Range Complex (HRC) training and research, development, test, and evaluation (RDT&E) activities on or offshore of Maui addressed in this Environmental Impact Statement /Overseas Environmental Impact Statement (EIS/OEIS) are located at the Maui Offshore area, Maui Space Surveillance Site, Maui High Performance Computing Center, Sandia Maui Haleakala Facility, and Molokai. For organizational purposes in this document, discussions about Molokai are included under the Maui heading, although it is a separate island and is not part of the island of Maui.

3.5.1 MAUI OFFSHORE

3.5.1.1 MAUI OFFSHORE

The Maui Offshore is an area situated around the islands of Maui, Kahoolawe, Lanai, and Molokai. The offshore area also includes the portion of Penguin Bank that is within 12 nautical miles (nm) of the islands' coastlines. The area is used as a submarine training area due to the unique characteristics of its acoustic environment and shallow depths of 50 and 100 fathoms. Multiple in-water runs of exercise MK-48 torpedoes (with no warheads) using one submarine as both target and launch platform occur in the Penguin Bank area as part of training and RDT&E activities.

Of the 13 environmental resources considered for analysis, air quality, airspace, cultural resources, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, visual and aesthetics, and water resources are not addressed.

3.5.1.1.1 Biological Resources—Maui Offshore

Appendix C includes a description of the primary laws and regulations regarding biological resources.

Region of Influence

The region of influence is the area within 12 nm around the islands of Maui, Kahoolawe, Lanai, and Molokai.

Affected Environment

Marine Habitats, Invertebrates

Detritus from nearby islands and calcareous sand and mud make up the bottom sediments in the region of influence. Sand, coral, and mud are all present in the area that formerly held hydrophones. Since black coral has been identified near the western end of Kahoolawe, additional coral patches are expected to be in the area. (Naval Undersea Warfare Center Detachment, 1994)

Fish

Bottomfish and pelagic fish occur at Penguin Bank. Bottomfish are fish species that live their lives on the ocean floor, whereas pelagic fish are species that live in the upper layers of the ocean. (Naval Undersea Warfare Center Division Newport, Rhode Island, 2007)

Lutjanid snapper (opakapaka) makes up the bulk of the bottomfish catch, although other fish, crabs, lobsters, and occasionally shrimp are present. The bottom fishery appears to be in decline or to have reached its maximum sustainable yield. A small commercial and recreational hand-line fishery for opakapaka is located in the region of influence. (Naval Undersea Warfare Center Detachment, 1994)

Pelagic fish that occur in Hawaiian waters include, but are not limited to, striped marlin (*Tetrapurus audax*), broadbill swordfish (*Xiphias gladius*), northern bluefin tuna (*Thunnus thynnus*), albacore (*Thunnus alalunga*), Bigeye tuna (*Thunnus obesus*), mackerel (*Scomber* spp.), sickle pomfret (*Tatactichthys steindachnen*), lustrous pomfret (*Eumegistus illustris*), yellowfin tuna (*Thunnus albacares*), kawakawa (*Euthynnus affinis*), and skipjack tuna (*Katsuwonus pelamis*). (Naval Undersea Warfare Center Division Newport, Rhode Island, 2007)

Marine Mammals

Spinner dolphins (*Stenella longirostris*) travel in pods of 10 to 300 dolphins throughout the Hawaiian Islands, but are found most frequently in deeper water. They prefer clear, calm water close to deep water where food is found, and rest in shallow bays during the day. Spotted dolphins (*Stenella attenuata*), which may be the most numerous Hawaiian cetacean, are found in large pods in offshore waters less than 100 fathoms. Bottlenose dolphins (*Tursiops truncatus*) inhabit offshore waters along the 50- to 100-fathom isobaths around the Hawaiian Islands. (Commander, Submarine Force U.S. Pacific Fleet, 1997)

At least 28 different marine mammal species have been observed in the Penguin Bank area. Of these, 26 species are whales and dolphins and 1 is a pinniped. At least seven species are generally found in the study area in moderate to high numbers either year-round or during annual migrations into or through the proposed test area. These include humpback whale (*Megaptera novaeangliae*), beaked whales (family *(Ziphiidae),* bottlenose dolphin, Pantropical spotted dolphin, spinner dolphin, false killer whale (*Pseudorca crassidens)*, and short-finned pilot whale (*Globicephala macrorhynchus*). Other cetacean species are present during part of the year based on occasional sightings, or stranding records. (Naval Undersea Warfare Center Division Newport, Rhode Island, 2007) Cetaceans are discussed in more detail in Section 3.1.2, Biological Resources—Open Ocean.

Rare, Threatened, and Endangered Species

Two species of sea turtles may occur at Penguin Bank: green turtle (*Chelonia mydas*) and hawksbill turtle (*Eretmochelys imbricata*) (Naval Undersea Warfare Center Division Newport, Rhode Island, 2007). Green turtles and hawksbill turtles are the most commonly seen marine turtles in the Main Hawaiian Islands. Most sightings of these species have been in shallow water. The green turtle prefers to forage and rest in waters less than about 27 fathoms deep, and migrate from the Four Island Area to French Frigate Shoals every 2 to 3 years. Numerous sightings have been reported for the water off Maui. Hawksbill turtles have been observed on Molokai and Maui. No critical habitat has been designated in the Pacific for any of these species of sea turtles. (Commander, Submarine Force U.S. Pacific Fleet, 1997) Sea turtles are discussed in more detail in Section 3.1.2, Biological Resources—Open Ocean.

The presence of the endangered humpback whale in the region of influence is seasonal, with peak concentrations in mid-February to mid-March. The whales seem to prefer areas within the 100-fathom contours such as the Molokai–Lanai–Maui–Kahoolawe channels and Penguin Bank. Humpback whale sightings in the region of influence are mainly concentrated north of Kahoolawe in protected channel areas. The Hawaiian monk seal (*Monachus schauinslandi*), is occasionally seen in the region of influence. The first monk seal birth on Maui was recorded in June 1997. (Commander, Submarine Force U.S. Pacific Fleet, 1997; Naval Undersea Warfare Center Division Newport, Rhode Island, 2007)

Hawaiian Islands Humpback Whale National Marine Sanctuary

Portions of the Maui Offshore area are included in the Hawaiian Islands Humpback Whale National Marine Sanctuary. According to the Hawaiian Islands Humpback Whale National Marine Sanctuary EIS (U.S. Department of Commerce, National Oceanic and Atmospheric Administration and State of Hawaii, Office of Planning, 1997), "… the waters adjacent to Maui, Molokai, and Lanai are important training areas for Navy ships homeported in Pearl Harbor. The channel between Maui, Lanai and Molokai is extensively used for biennial RIMPAC [Rim of the Pacific] exercises, EOD/MCM [Explosive Ordnance Disposal/Mine Countermeasures] exercises, and as well for shallow-water ASW [Anti-Submarine Warfare]… The areas inside the 100-fathom isobath surrounding Maui, Molokai and Lanai, and specifically the channel between these islands, are used for shallow-water ASW operations."

3.5.1.2 SHALLOW-WATER MINEFIELD SONAR TRAINING AREA-OFFSHORE

The Shallow-water Minefield Sonar Training Area provides Naval Station Pearl Harbor based submarines with the capability to conduct mine sonar training. A review of the 13 resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from HRC training and RDT&E activities at the Shallow-water Minefield Sonar Training Area. This training area, outside the Hawaiian Islands Humpback Whale National Marine Sanctuary, is utilized by submarines using high-frequency active sonar (not mid-frequency active sonar). Training in the Shallow-water Minefield Sonar Training Area can occur when humpback whales are present, as well as other marine species. During the years of use of this training area, there have been no reports of negative impacts. Section 4.1.2.4.12 includes a discussion of active acoustic devices, including submarines.

3.5.2 MAUI ONSHORE

3.5.2.1 MAUI SPACE SURVEILLANCE SYSTEM

The Maui Space Surveillance Site provides facilities that observe sub-orbital vehicles. Training and RDT&E activities at this site consist of an existing telemetry tower, communications, and tracking facilities. A review of the 13 resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from HRC training and RDT&E activities at the Maui Space Surveillance System site.

3.5.2.2 MAUI HIGH PERFORMANCE COMPUTING CENTER

The Maui High Performance Computing Center is an Air Force Research Laboratory managed by the University of Hawaii that provides state-of-the-art data processing. Training and RDT&E activities at this site consist of data processing. A review of the 13 resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from HRC training and RDT&E activities at the Maui High Performance Computing Center.

3.5.2.3 SANDIA MAUI HALEAKALA FACILITY

The Sandia Maui Haleakala Facility provides telemetry receiving and recording, flight following, command control and flight termination systems for high-altitude/exoatmospheric launches from the Pacific Missile Range Facility and for high-altitude training and RDT&E activities that traverse the Hawaiian Islands Chain. Training and RDT&E activities at this site consist of support for existing telemetry towers and communications. A review of the 13 resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from HRC training and RDT&E activities at the Sandia Maui Haleakala Facility.

3.5.2.4 MOLOKAI MOBILE TRANSMITTER SITE

A mobile command and control node is located at the Molokai Mobile Transmitter Site during Major Exercises. The transmitter site includes vehicles and portable equipment to generate low-power electronic signals that simulate various types of radar. A review of the 13 resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 determined there would be no impacts from HRC training and RDT&E activities at the Molokai Transmitter Site.

3.6 HAWAII

The island of Hawaii is the largest of the Hawaiian Islands. It covers approximately 4,028 square miles and is still growing because of continual eruptions of Kilauea. Resorts and most residential developments are located in coastal areas. Hilo, located on the east side of the island, is the county seat. Current and proposed Hawaii Range Complex (HRC) training and research, development, test, and evaluation (RDT&E) activities on the island of Hawaii addressed in this Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) are located at Pohakuloa Training Area (PTA), Bradshaw Army Airfield, and Kawaihae Pier.

3.6.1 HAWAII OFFSHORE

Hawaii Offshore addresses ocean areas within 12 nautical miles (nm) of the island of Hawaii, including ranges and training areas where activities are performed by the Navy. Discussions include the area offshore of the Kawaihae Pier. This offshore area is within the Hawaiian Islands Humpback Whale National Marine Sanctuary. The Kawaihae Pier itself is not part of the Hawaiian Islands Humpback Whale National Marine Sanctuary boundaries.

3.6.1.1 KAWAIHAE PIER—OFFSHORE

Kawaihae Pier is located within the Kawaihae Harbor on the northwestern corner of the island of Hawaii. Kawaihae Harbor is a deep-water port, one of two on the island of Hawaii. Expeditionary Assault events are conducted at Kawaihae Pier. Activities primary consist of offloading and loading vehicles and equipment from a landing ship at an existing boat ramp.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Kawaihae Pier Offshore. Of the 13 environmental resources considered for analysis, airspace, air quality, cultural resources, geology and soils, hazardous material and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.6.1.1.1 Biological Resources—Kawaihae Pier—Offshore

Region of Influence

The region of influence includes the area up to 12 nm offshore of the pier that may be affected by proposed training.

Affected Environment

Vegetation

A small beach area containing no vegetation is located immediately adjacent to the pier.

Threatened and Endangered Plant Species

No threatened or endangered plant species have been identified within the harbor area.

Wildlife

Habitat Areas of Particular Concern have not been identified within the harbor. A coral reef of management concern is located at Kawaihae Harbor. It is at risk from extensive development at the commercial harbor and from recent and continued development at the small boat harbor. Another coral reef, Puako Reef, is located approximately 3 to 4 miles (mi) from Kawaihae Harbor. (National Park Service, 2004)

A description of the coral reef area associated with the Hawaiian Islands and its management by both the State of Hawaii and the Federal government is provided in Section 3.1.2.1. The following coral information is summarized from the more extensive data provided in the *Marine Resources Assessment for the Hawaiian Islands Operating Area* (U.S. Department of the Navy, 2005b). Overall, coral communities of Hawaii are considered to be in good condition. The growth of coral reefs around the island of Hawaii is correlated to the intensity and frequency of wave disturbance. Coral reefs are primarily found on the western (leeward) side of the island, which includes the offshore area between Waikui and Mahukona (Figure 3.6.1.1.1-1). During summer, an occasional Kona storm generates storm swells of about 10 to 20 feet (ft) in height that can remove accreted reefs on the leeward side. (U.S. Department of the Navy, 2005b)

North of Waikui, there is a fairly large spur-and-groove reef system (1.3 nm long and 590 to 1,772 ft wide) off the Kawaihae Small Boat Harbor (Figure 3.6.1.1.1-1). This is the only spur-and-groove reef that the 2003 National Centers for Coastal Ocean Science/National Oceanic and Atmospheric Administration (U.S. Department of the Navy, 2007a) benthic habitat mapping program recorded for the island of Hawaii. From the Kawaihae Small Boat Harbor to Malae Point, the shoreline is flanked by a narrow intertidal area consisting of uncolonized volcanic rock (approximately 131 ft wide); just seaward there is a strip of colonized volcanic rock (131 to 459 ft wide) and aggregated coral heads (131 to 459 ft wide). Another 2.2 nm north of Malae Point, there is similar habitat zonation and sizes. From Malae Point to Makaohule Point the widths of colonized volcanic rock and aggregated coral head habitats range from 328 to 820 ft and 590 to 1,181 ft, respectively. (U.S. Department of the Navy, 2005b)

Threatened and Endangered Wildlife Species

No threatened or endangered species have been identified within the harbor. However, the water on this leeward side of the island provides good habitat for humpback whale (*Megaptera noveangliae*) mother and calf pods and for resting dolphin pods (National Park Service, 2004). No critical habitat is present (National Park Service, 2004).

Hawaiian Islands Humpback Whale National Marine Sanctuary

The Kawaihae Pier area is not part of the Hawaiian Islands Humpback Whale National Marine Sanctuary boundaries (National Oceanic and Atmospheric Administration, 2001).

EXPLANATION

- Road
- 3-Nautical Mile Line
- Uncolonized Volcanic Rock/Boulder
- Aggregated Coral
- Colonized Volcanic Rock/Boulder
- Spur and Groove Reef
- Colonized Pavement
- Scattered Coral/Rock in Unconsolidated Sediment
- Land

NORTH

0 3,000 6,000 12,000 Feet

Offshore Hardbottom Habitats Near Kawaihae Pier

Island of Hawaii

Figure 3.6.1.1.1-1

3.6.2 HAWAII ONSHORE

3.6.2.1 POHAKULOA TRAINING AREA (PTA)

PTA is a sub-installation of Schofield Barracks. It is located near the center of the island of Hawaii between three volcanoes: Mauna Kea, Mauna Loa, and Hualalai. The mission of Pohakuloa Training Area is to provide training of full-scale Live Fire Exercises (LFX) for the 25th Infantry Division (Light), U.S. Army Garrison, Hawaii. PTA also provides training facilities for other branches of the U.S. military and friendly foreign forces.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Pohakuloa Training Area. Of the 13 environmental resources considered for analysis, air quality, hazardous materials and hazardous waste, geology and soils, land use, socioeconomics, transportation, utilities, and water resources are not addressed.

There are no proposed activities in this EIS/OEIS that include Navy training at the Hilo Airport, and there are no plans to expand use of the airport by Navy aircraft. Air operations at the Hilo Airport are, therefore, not addressed in the following sections or analyzed within the EIS/OEIS.

3.6.2.1.1 Airspace—PTA

Appendix C includes a detailed description of airspace.

Region of Influence

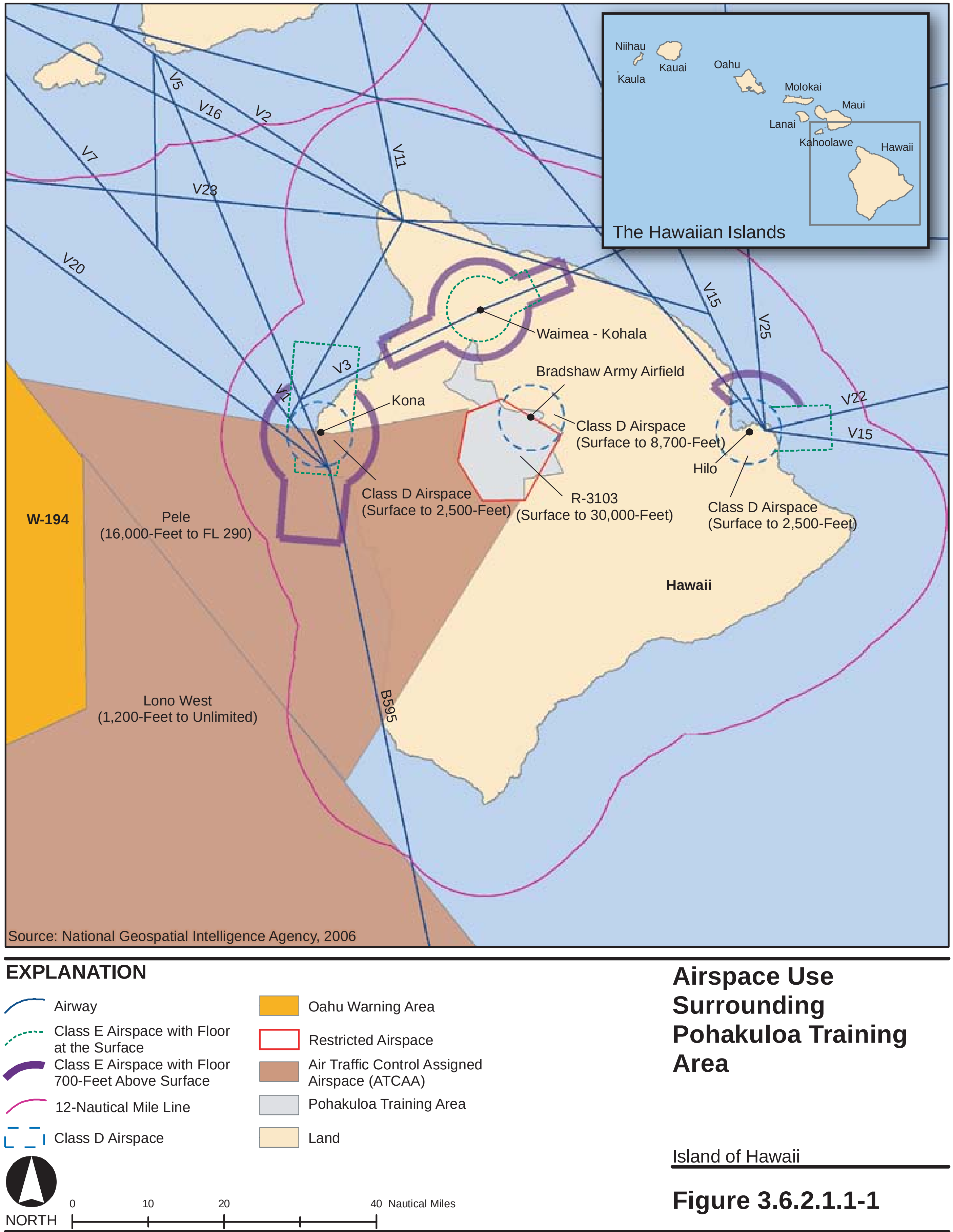
The PTA region of influence includes selected airspace within the territorial limits of the island of Hawaii as shown on Figure 3.6.2.1.1-1. The primary training and RDT&E activities occur above the PTA and within the Pele transition area between PTA and Warning Area W-194.

Affected Environment

The affected airspace in the PTA region of influence is described below in terms of its principal attributes: controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, airports and airfields, and air traffic control. There are no military training routes in the region of influence.

Controlled and Uncontrolled Airspace

The airspace in the PTA region of influence includes uncontrolled Class G airspace (see Appendix C), which extends from the surface to a ceiling of 1,200 ft, and controlled Class E airspace, which is airspace above 1,200 ft unless the special use airspace, discussed below, is activated. Bradshaw Army Airfield, located within PTA, is surrounded by Class D airspace extending from the surface to a ceiling of 8,700 ft. There is also class D airspace at the Kona and Hilo airports extending from the surface to 2,500 ft. (National Aeronautical Charting Office, 2007) However, because the PTA impact area and Bradshaw Army Airfield are located at an elevation approximately 6,000 ft above Hilo and Kona, those airports are typically not within the region of influence.



Airspace Use Surrounding Pohakuloa Training Area

Island of Hawaii

Figure 3.6.2.1.1-1

Special Use Airspace

The R-3103 restricted area (Figure 3.6.2.1.1-1) lies above PTA, extending from the surface to 30,000 ft (Table 3.6.2.1.1-1). The time of use is intermittent; notification is made by Notice to Airmen 12 hours in advance. The area is scheduled through the Navy Fleet Area Control and Surveillance Facility Pearl Harbor, which coordinates with the Honolulu Combined Facility. When R-3103 is active, Bradshaw Army Airfield Tower maintains control of a corridor of airspace for aircraft arriving or departing Bradshaw Army Airfield and PTA. Aircraft operating outside this corridor must coordinate with Range Control to enter or exit the airspace and to obtain specific routes for flights within Restricted Airspace R-3103 (U.S. Army Garrison, Hawaii, 1996). When the airspace is scheduled to be inactive, the agency releases it back to the Honolulu Combined Facility, and, in effect, the airspace is no longer restricted. (U.S. Department of the Army, 2004; National Aeronautical Charting Office, 2007)

Table 3.6.2.1.1-1. Special Use Airspace in the Island of Hawaii Region of Influence

Warning/ATCAA Number/Name	Location	Altitude (Ft)	Time of Use		Controlling Agency
			Days	Hours	
R-3103	Restricted Airspace	To 30,000	Intermittent	By Notice to Airmen	HCF
Pele	Between W-194 and R-3103	16,000 to FL290		By request	HCF

Source: National Aeronautical Charting Office, 2007
Notes:
W = Warning
ATCAA = Air Traffic Control Assigned Airspace
FL = Flight Level (FL 290 = 29,000 ft)
HCF = Honolulu Combined Facility

Although there are no formal, published military training routes on the island of Hawaii, the R-3103 restricted area is used for helicopter training, with an average of 900 aircraft movements per month, 99 percent of which involve helicopters. Typical training involves the use of 10 rotary-winged aircraft at any one time. During deployment training, one or two C-130s would be involved about twice a year. (U.S. Department of the Army, 2004)

Naval aircraft use of the R-3103 restricted area includes Navy and Marine Corps fighter and attack aircraft crews training during training. Strike Warfare Exercise training would typically involve a flight of 2 to 10 aircraft training in air-to-ground missile firing, conventional ordnance delivery, and precision-guided munitions firing. All Strike Warfare Exercise training at PTA uses inert munitions.

There is also one Air Traffic Control Assigned Airspace (ATCAA) area within the region of influence (Pele) that provides additional controlled airspace between R-3103 and Warning Area W-194 (Table 3.6.2.1.1-1).

En Route Airways and Jet Routes

As shown on Figure 3.6.2.1.1-1, there is one oceanic route (B595) located approximately 18 nm west of PTA, running along the eastern side of the island, terminating near Kona. Several low altitude Air Traffic Service (ATS) routes are located near Kona, and several others are located approximately 26 nm west of PTA at Hilo. One ATS route is located approximately 15 nm north of PTA.

Airports and Airfields

Bradshaw Army Airfield, located within PTA, is surrounded by Class D airspace extending from the surface to a ceiling of 8,700 ft. As described earlier, the Hilo and Kona airports and associated airspace are below the airspace typically utilized at PTA. Both Hilo and Kona are surrounded by Class D airspace. Both include surface Class E airspace extensions and additional Class E extensions, with a floor 700 ft above the surface. The Waimea airfield is located approximately 15 nm north of PTA at an altitude of 2,671 ft. It is surrounded by surface Class E airspace with additional Class E airspace extensions with a floor 700 ft above the surface. Air traffic in the region of influence is managed by the Honolulu Air Route Traffic Control Center.

3.6.2.1.2 Biological Resources—PTA

For the purpose of discussion, terrestrial biological resources have been divided into the areas of vegetation and wildlife (including threatened and endangered species) and environmentally sensitive habitat. Appendix C lists some of the regulations that govern biological resources.

Region of Influence

The region of influence is the area within or adjacent to PTA that could be affected by proposed training and RDT&E activities.

Affected Environment

Vegetation

Lava with little vegetative development covers approximately 25 percent of the installation. Treelands are dominated primarily by `ohia lehua (*Metrosideros polymorpha),* which is a member of the myrtle family and is the most abundant tree in Hawaii. Shrublands are the most diverse plant communities on the installation (14 different types). Dominant shrubs include *Myoporum sandwicense (*naio)*, Sophora chrysophylla* (mamane)*, Dodonaea viscosa (*a`ali`i), *Chenopodium oahuense* (`aweoweo)*,* and *Styphelia tameiameiae* (pukiawe)*.* Introduced plants are components of all habitats on PTA. (U.S. Department of Agriculture, 1990; U.S. Department of the Army, 2004; 2006)

<u>Threatened and Endangered Plant Species</u>

Fourteen Federally endangered plants and one threatened one, listed in Table 3.6.2.1.2-1, are known or expected to occur in the region of influence.

Table 3.6.2.1.2-1. Listed Species Known or Expected to Occur in the Vicinity of Pohakuloa Training Area

Scientific Name	Common Name	Federal Status
Plants		
*Asplenium fragile var. insulare**	Fragile fern	E
Haplostachys haplostachya	Honohono (Hawaiian mint)	E
*Hedyotis coriacea**	Kio`ele (leather-leaf sweet ear)	E
*Isodendrion hosakae**	Aupauka	E
Lipochaeta venosa	Nehe	E
*Neraudia ovata**	Big Island ma`oloa (spotted nettle brush)	E
*Portulaca sclerocarpa**	Po`e (purselane)	E
*Silene hawaiiensis**	Hawaii catchfly	T
*Silene lanceolata**	Lanceleaf catchfly	E
*Solanum incompletum**	Popolo ku mai (Hawaiian prickle leaf)	E
*Spermolepis hawaiiensis**	Hawaii scaleseed (Hawaiian parsley)	E
Stenogyne angustifolia	Ma`ohi`ohi (creeping mint)	E
Tetramolopium arenarium spp *arenarium**	Mauna Kea pamakani	E
*Vigna owahuensis**	Mohihihi	E
*Zanthoxylum hawaiiense**	A`e (Hawaiian yellow wood)	E
Birds		
Branta sandvicensis	Nene (Hawaiian goose)	E
Buteo solitarius	`Io (Hawaiian hawk)	E
Loxioides bailleui	Palila (finch-billed honeycreeper)	E
Pterodroma phaeopygia sandwichensis	`Ua`u (Hawaiian petrel)	E
Puffinus auricularis newelli	`A`o (Newell's Townsend's shearwater)	T
Mammals		
Lasiurus cinereus spp. *semotus*	Hawaiian hoary bat	E

Source: Shaw, 1997; U.S. Fish and Wildlife Service, 2006b; U.S. Department of the Army, 2004; 2006; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007

Notes:

* Critical habitat originally proposed for this plant, but later determined unnecessary by the U.S. Fish and Wildlife Service due to the management actions put forth in the Integrated Natural Resources Management Plan and Ecosystem Management Plan of the installation.

Key to Federal Status:

T Threatened
E Endangered

Wildlife

No reptiles have been documented on PTA. Wild pigs (*Sus scrofa*), goats (*Capra hircus*), sheep (*Ovis aries*), cats (*Felis catus*), and dogs (*Canis familiaris*) have been observed on PTA. U.S. Army Garrison Hawaii is proposing to construct and maintain fence units on PTA to protect threatened and endangered species and their habitats from the impact of introduced ungulates (hoofed mammals). The program would involve the removal of all ungulates from within the fence units. Without a physical barrier, sheep, pigs, and goats would continue to damage native natural communities and threatened and endangered species. (U.S. Department of the Army, 2006) Mouflon sheep, (*Ovis musimon*), cows, Norway rats (*Rattus norvegicus)*, and house mice (*Mus musculus*) are also present.

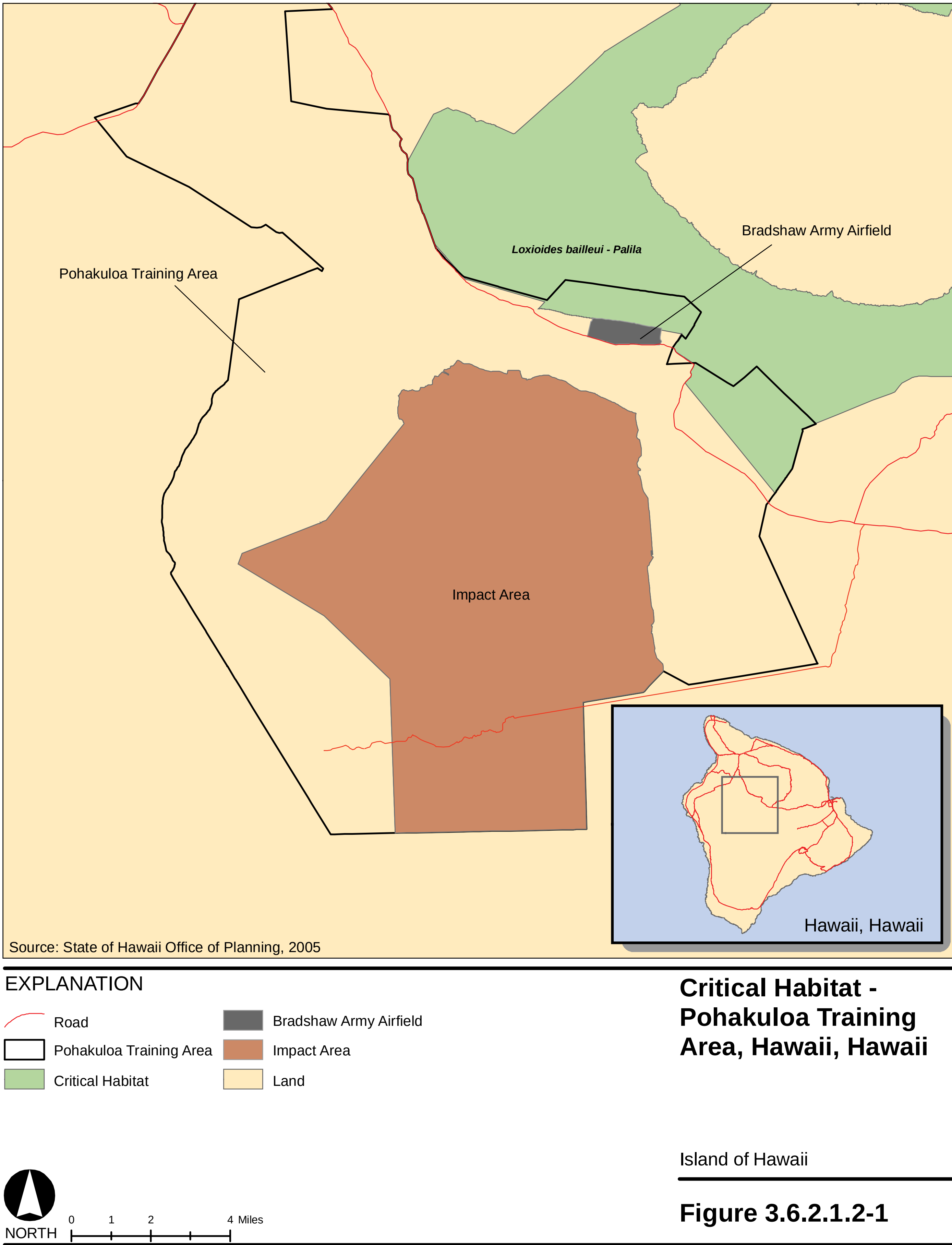
Endemic birds common to PTA are the `apapane (a honeycreeper) (*Himatione sanguinea*) and Hawaii `amakihi (a honeycreeper) (*Hemignathus virens*). The `i`iwi (a honeycreeper) (*Vestiaria coccinea*), Hawaii `elepaio (flycatcher) (*Chasiempis sandwichensis*), and ōma`o (Hawaiian thrush) (*Myadestes obscurus*) are present, but less common to PTA. The first `elepaio nest observed on PTA was discovered during a 2006 survey (U.S. Army Garrison, Hawaii, 2006). The pueo (Hawaiian owl) *(Asio flammeus sandwichensis)* is also present (U.S. Department of the Army, 2006). Nonnative bird species include Erckel's francolin (*Francolinus erckelii*), black francolin (*Francolinus francolinus*), California quail (*Callipepla californica*), and Japanese quail (*Coturnix japonica)*. (U.S. Department of the Army, 2004)

Threatened and Endangered Wildlife Species

Routine and transformation training actions at PTA were addressed in the 2003 biological opinion for PTA (U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007). The only native terrestrial mammal in the Hawaiian Islands, the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), is known to occur on PTA (Table 3.6.2.1.2-1). Of the four endangered forest birds listed in Table 3.6.2.1.2-1, only the `io (Hawaiian hawk) (*Buteo solitarius*) and nene (*Branta sandvicensis*) have been recorded in the past 5 years at PTA. The Federally endangered Hawaiian petrel (*Pterodroma phaeopygia sandwichensis*), a seabird, and the `a`o (Newell's Townsend's shearwater) (*Puffinus auricularis newelli)* have also been known to occur on PTA (Colorado State University, 2002). (U.S. Department of the Army, 2004; 2006; U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007)

Environmentally Sensitive Habitat

The U.S. Fish and Wildlife Service determined that critical habitat for 12 plants (see Table 3.6.2.1.2-1) was not necessary since the PTA Integrated Natural Resources Management Plan and Ecosystem Management Plan encompass management actions that will benefit the listed species for which critical habitat was originally proposed (U.S. Fish and Wildlife Service, 2003c). Critical habitat has been designated on the installation (Figure 3.6.2.1.2-1) for one of the larger Hawaiian honeycreepers, the palila (*Loxioides bailleui*), although this bird has not been observed in recent years. Up to 96 percent of the palila population and nearly all of the successful breeding occur on the southwestern slope of Mauna Kea (U.S. Fish and Wildlife Service, 2003d). The mamane-naio forest on the central plateau of Hawaii is the prime habitat of the palila, an endangered native bird (University of Hawaii Kapiolani Community College, undated).



Critical Habitat - Pohakuloa Training Area, Hawaii, Hawaii

Island of Hawaii

Figure 3.6.2.1.2-1

3.6.2.1.3 Cultural Resources—PTA

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The region of influence for cultural resources at PTA encompasses existing, heavily disturbed impact and training areas, trails, and roads and PTA facilities where LFX would take place and Large Area Tracking Range (ground relay stations) would be added.

Affected Environment

Archaeological Resources (Prehistoric and Historic)

PTA is part of a large cultural landscape that includes Mauna Kea, Mauna Loa, and the Saddle area between them. Researchers of Hawaiian culture (Maly, 1999; McEldowney, 1979; and Langlas et al., 1997) indicate that this landscape is spiritually and historically one of the most important places in Hawaiian tradition and history. Evidence of the area's significance is confirmed by physical and archaeological remains and through the many oral histories that describe historical events and uses of the area (U.S. Department of the Army, 2004,). Site types encompass traditional activities such as bird hunting for feathers and meat, quarrying volcanic glass, and lithic workshop locations for manufacturing the adzes made from Mauna Kea basalt. The Saddle region also displays numerous trails used for movement both cross-island and to the Mauna Kea and Mauna Loa summits. The Umi heiau on the slopes of Hualalai (south of PTA) is believed to have been built by the legendary chief "Umi a Liloa" around 1600 and derives some of its importance from its location at the juncture of several of these trails. Cave shelters are abundant due to an extensive natural lava tube system in the area; historically they have been a source of limited water and have provided refuge from the elements.

In the late 1800s, cattle and sheep ranching was the primary activity within the PTA area. There were two primary land leases during those years—the John Parker lease (ca. 1876-1891) situated in the western portion of what is now the PTA, and the Waimea Grazing and Agricultural Company lease (ca. 1860-1891) situated in the eastern portion. The latter completed a wagon road from one of its remote sheep stations near the Saddle Road (at Humuula) to Waimea to transport wool to the harbor at Kawaihae, and a portion of that road is still visible. A number of stone walls were also constructed during the 1890s (U.S. Department of the Army, 2004).

Approximately 30 percent of the PTA has been surveyed for archaeological resources, and 291 prehistoric and historic archaeological sites and traditional resources sites have been recorded (U.S. Department of the Navy, Commander, Third Fleet 2004, and 2006 and U.S. Department of the Navy, 2002a; U.S. Department of the Army, 2004,); additional sites have been recorded within adjacent areas. Typical site types include lava tubes, walls, trails, shelters (including C-shape), lithic scatters, quarries, shrines, cairns (ahu), platforms, and pits of unclear origin. Appendix H contains a list of PTA sites recommended as eligible for inclusion in the National Register of Historic Places (NRHP). One site, the Bobcat Trail Habitation Cave, is already listed in the NRHP. (U.S. Department of the Army, 2004)

Historic Buildings and Structures

PTA's first use as a military installation began in 1938 with the building of the Kaumana Road for military access between Hilo and Waimea (i.e., the Saddle Road). The new road allowed development of the Saddle Training Area, which consisted of the Bradshaw Army Airfield and the PTA. Permanent and consistent use of PTA began in the 1950s (Hays, 2002). In 2002, a historic evaluation of 129 buildings and structures was conducted of the cantonments within the PTA and Bradshaw Army Airfield (Hays, 2002). Of the 129 facilities evaluated, 107 were recommended as historic with 20 recommended for retention; however, the report has not been submitted to the Hawaii State Historic Preservation Office for concurrence (Godby, 2007). Eleven of the 20 were recommended for indefinite maintenance (Buildings T-001, T-39, T-90, T-109, T-184, T-230, T-246, T-285, T-286, T-290, and T-293.) (Hays, 2002) (see Section 3.6.2.2.3).

Traditional Resources

An oral history survey of PTA that included both interviews and a field visit with eight of the informants was conducted by Social Research Pacific, Inc. in 2002. The survey focused on place names, trail systems, and known Native Hawaiian structures. The report from this survey includes information gleaned from previous works, including McEldowney (1982), which contains oral accounts and written evidence about the Mauna Kea summit area; other early accounts from western visitors passing through the area (Maly, 1999); and myth and legend material found in Elbert (1959) and Kamakau (1992). Specific types of traditional sites identified in the region include agricultural terraces and enclosures, habitation shelters, and rock art sites. Some of the archaeological sites described above may have traditional components or be considered traditional sites as well.

3.6.2.1.4 Health and Safety—PTA

Appendix C includes a detailed discussion of health and safety resources laws and regulations.

Region of Influence

The region of influence is the area of the PTA where proposed training and RDT&E activities are planned.

Affected Environment

The affected environment is in an isolated area in the center of PTA with restricted access and located away from the civilian population. Safety and health precautions are covered in *Pohakuloa Training Area External Standing Operating Procedures* and are briefed by the PTA Operations Center.

For missile and weapons systems, the Range Safety Office at PTA establishes criteria for the safe execution of the test activity in the form of Range Safety Approval and Range Safety Operational Plan documents. These plans are required for all weapon and target systems using PTA. The plans include the allowable launch and flight conditions and flight control methods necessary to contain the missile flight and impacts within the predetermined impact hazard areas. All hazard areas are checked and determined to be clear of nonessential personnel and aircraft prior to an exercise.

Ammunition is brought from Wheeler Army Airfield or Lualualei to PTA via boat or helicopter. If boats are used, the ammunition is driven from Kawaihae Harbor to PTA. Once ammunition is brought to PTA, it is temporarily stored in ammunition holding areas on PTA. At completion of training, unused ammunition is returned to the ammunition supply point on Wheeler Army Airfield. Permanent ammunition storage is not authorized on PTA. Ranges at PTA have designated surface danger zones, whose construction is based on information in Army Regulation 385-63 and the draft update of this regulation. There have been no accidents involving the transportation of ammunition in the last 5 years. (U.S. Department of the Army, 2004; 2008)

Depleted Uranium

Uranium is a naturally occurring, slightly radioactive heavy metal found in many parts of the world. Natural uranium becomes depleted uranium (DU) when the more radioactive isotopes are removed to create nuclear fuel, which is used in commercial nuclear power plants for production of electricity and in nuclear weapons. DU is 40 percent less radioactive than natural uranium and is not nuclear waste. People are routinely exposed to natural uranium through food, water, and air. It has been estimated that the average person ingests 1.3 micrograms (µg) of uranium per day and inhales 0.6 µg every year. Most (more than 95 percent) of uranium that enters the body is not absorbed, but is eliminated through waste within a few days and never reaches the blood stream. Approximately 67 percent of the uranium that is absorbed into the blood will be filtered by the kidney and excreted within 24 hours. (International Atomic Energy Agency, 2003, U.S. Army Center for Health Promotion and Preventive Medicine, 2002, and World Health Organization, 2001)

All uranium mixtures (natural, depleted, and enriched) have the same chemical effect on the human body. Large amounts of uranium can react with human tissues and damage the kidneys. The radiation damage from exposure to high levels of natural or depleted uranium is not known to cause cancer. The Occupational Safety and Health and Administration occupational exposure limits for uranium in breathing air over an 8-hour workday, 40-hour work week are 0.05 milligrams per cubic meter (mg/m^3). (U.S. Army Center for Health Promotion and Preventive Medicine, 2002)

Current military use of DU includes making armor-piercing ammunitions. In addition, DU is a very dense metal, making it suitable for several commercial uses, such as a counter weight to balance aircraft and boats. (International Atomic Energy Agency, 2003) Current U.S. Army policy prohibits the use of DU ammunition for training events (U.S. Department of the Army, 2008).

In August 2007 the Army confirmed the presence of DU on remote sections of PTA. The Army has begun a three-part process to assess DU on Army ranges in Hawaii, including PTA. First, a historical assessment was performed of all Hawaii Army ranges where DU ammunition could have been fired. Next, a scoping survey was conducted to determine the presence of DU on the ranges. Finally, a full characterization survey will be performed to determine the extent of contamination and the possible health hazards. Once the surveys are completed, a plan will be developed to fully address the issue of DU. Part of the Army's plan is to work with the State of Hawaii and the Nuclear Regulatory Commission to determine an appropriate response. (U.S. Army, Pacific Public Affairs, 2007) All Navy activities at PTA will follow existing standard operating procedures and will comply with future plans and regulations for DU.

3.6.2.1.5 Noise—PTA

Appendix C includes a definition of noise and the main regulations and laws that govern it.

Region of Influence

The region of influence for noise analysis is the area within and surrounding PTA in which humans and wildlife may suffer annoyance or disturbance from proposed training and RDT&E activities noise sources at PTA.

Affected Environment

The Army's noise evaluation program is known as the Installation Compatible Use Zone (ICUZ). The following three broad noise exposure zones are used as the basis for characterizing various land use compatibility conditions at PTA:

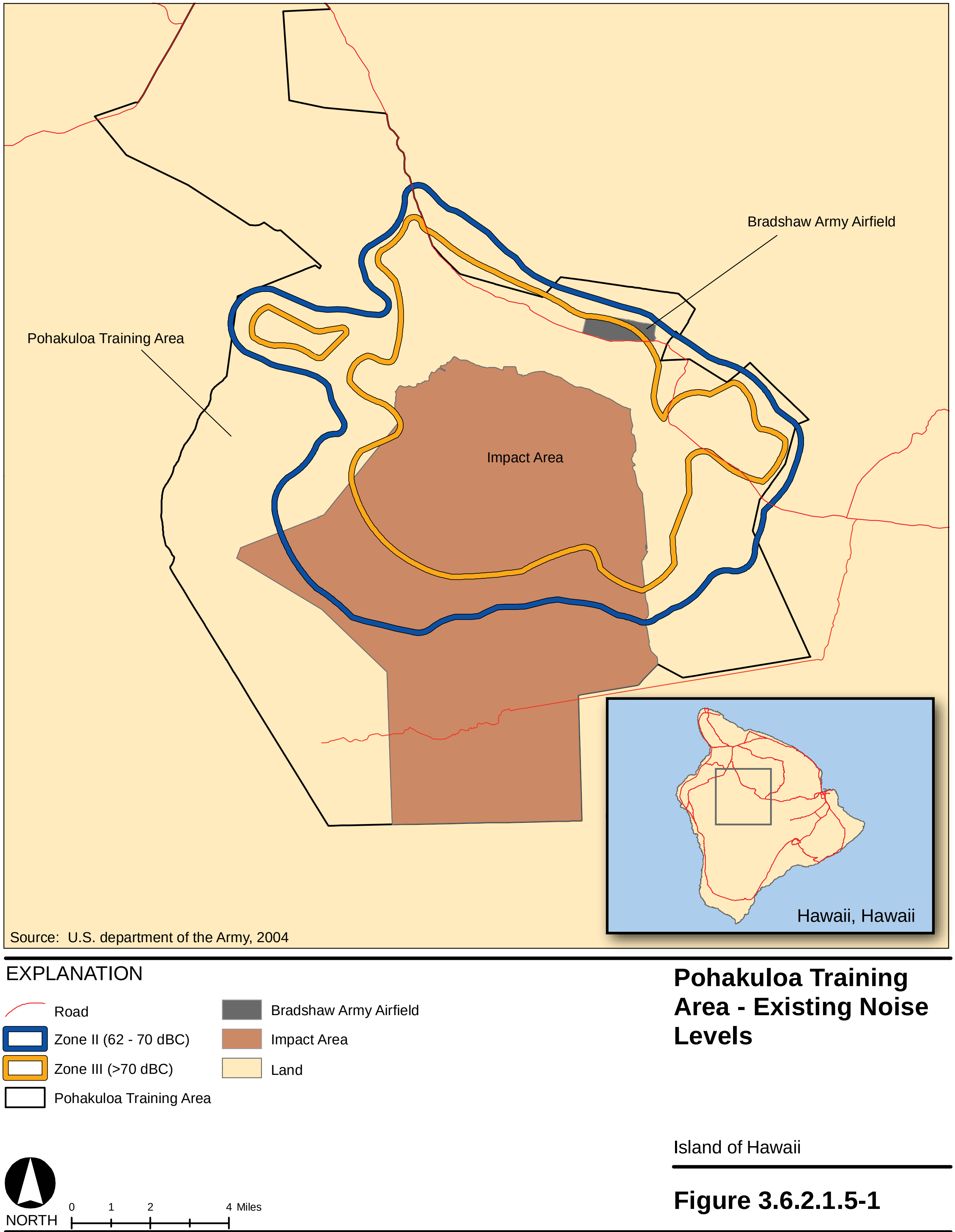
- Zone I – areas with day-night average sound level (L_{dn}) levels below 65 dBA;
- Zone II – areas with L_{dn} levels of 65 to 75 dBA; and
- Zone III – areas with L_{dn} levels above 75 dBA.

The ICUZ program states that all land uses are compatible with Zone I noise levels. Unless special acoustic designs or treatments are used to ensure acceptable interior noise levels, educational, medical, and residential land uses are not typically compatible with Zone II areas. Educational, medical, and residential areas are not compatible with Zone III noise levels; however, industrial, manufacturing, and office land uses may be acceptable in Zone II areas if special building designs or other measures are implemented. (U.S. Department of the Army, 2004; 2008)

Noise levels surrounding PTA are typically low due to the area having a low population and low volume of traffic on nearby roads. The noise levels within PTA can be high due to military training, such as military aircraft (primarily helicopters, but including jet fighters), military vehicle traffic, and ordnance used during LFX and other training events. Figure 3.6.2.1.5-1 depicts the existing Zone II and III noise levels at PTA. All Zone III noise levels occur within the boundaries of PTA. With the exception of the cantonment area, no noise-sensitive land uses are affected by existing Zone II noise levels. Because troops are not permanently based at PTA, all troop housing is used for troops who are visiting PTA to participate in training events. (U.S. Department of the Army, 2004; 2008)

The Army is developing an environmental noise management plan for PTA in accordance with the Army's Environmental Noise Management Program (described in Army Regulation 200-1). This plan is intended to improve land use compatibility and notification to surrounding communities about the scheduling and nature of military training events. (U.S. Department of the Army, 2004; 2008)

Wildlife receptors at PTA are described in Section 3.6.2.1.2, Biological Resources.



Pohakuloa Training Area - Existing Noise Levels

Island of Hawaii

Figure 3.6.2.1.5-1

3.6.2.2 BRADSHAW ARMY AIRFIELD

Bradshaw Army Airfield is located on the northern boundary of PTA and supports maneuver training. It has a 3,700-ft airstrip and a small cantonment area.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Bradshaw Army Airfield. Of the 13 environmental resources considered for analysis, air quality, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.6.2.2.1 Airspace—Bradshaw Army Airfield

Appendix C includes a detailed description of airspace.

Region of Influence

The region of influence for Bradshaw Army Airfield is similar to that described for airspace at PTA (Section 3.6.2.1.1).

Affected Environment

The affected airspace for Bradshaw Army Airfield is the same as that described in Section 3.6.2.1.1 for PTA.

3.6.2.2.2 Biological Resources—Bradshaw Army Airfield

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence is the area within or adjacent to Bradshaw Army Airfield that could be affected by proposed training.

Affected Environment

Since Bradshaw Army Airfield is located on the northern boundary of PTA, its affected environment is similar to that described in Section 3.6.2.1.2.

Vegetation

The majority of the open area is vegetated with native plants and is identified as Subalpine dryland.

Threatened and Endangered Plant Species

Plant species listed in Table 3.6.2.1.2-1 could also potentially be located on Bradshaw Army Airfield.

Wildlife

Since the area has been cleared for the runway, only small mammals and birds are likely to be in the region of influence. However, other wildlife species listed above at PTA could also potentially occur at Bradshaw Army Airfield.

Threatened and Endangered Wildlife Species

Routine and transformation training actions at Bradshaw Army Airfield were addressed in the 2003 biological opinion for PTA (U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007). The endangered Hawaiian hoary bat could pass through the area, as well as the `io and nene.

Environmentally Sensitive Habitat

Critical habitat for the endangered palila has been established both north and southeast of Bradshaw Army Airfield (see Figure 3.6.2.1.2-1), but none is located in the immediate vicinity of the airfield.

3.6.2.2.3 Cultural Resources—Bradshaw Army Airfield

Appendix C includes a description of cultural resources and the laws and regulations pertaining to them.

Region of Influence

The region of influence for cultural resources at Bradshaw Army Airfield encompasses the building where a new ground relay station will be added.

Affected Environment

Archaeological Resources (Prehistoric and Historic)

Bradshaw Army Airfield is located within PTA (see Figure 2.1-5); therefore, the prehistoric and historic context for the facility is the same as described for PTA. There are no known significant archaeological resources within Bradshaw Army Airfield; however, there are numerous archaeological sites identified within the adjacent PTA (see Section 3.6.2.1.3). (U.S. Department of the Navy, 2002a)

Historic Buildings and Structures

Identification of historic buildings and structures at Bradshaw Army Airfield is the same as described for PTA (see Section 3.6.2.1.3.)

Traditional Resources

Bradshaw Army Airfield is within the PTA; therefore, the traditional resources context for the facility is the same as described for PTA. There are no known traditional resources sites within Bradshaw Army Airfield (see Section 3.6.2.1.3). (U.S. Department of the Army, 2004)

3.6.2.3 KAWAIHAE PIER

Kawaihae Pier is located within the Kawaihae Harbor on the northwestern corner of the island of Hawaii. Kawaihae Harbor is a deep-water port, one of two on the island of Hawaii. Expeditionary Assault events are conducted at Kawaihae Pier. Activities primarily consist of offloading and loading vehicles and equipment from a landing ship at an existing boat ramp.

This section describes the environmental resources that would be affected by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Kawaihae Pier. Of the 13 environmental resources considered for analysis, airspace, air quality, cultural resources, geology and soils, hazardous material and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.

3.6.2.3.1 Biological Resources—Kawaihae Pier

Appendix C includes a detailed description of biological resources.

Region of Influence

The region of influence includes the beach and other areas adjacent to the pier that may be affected by proposed training.

Affected Environment

Vegetation

A small beach area containing no vegetation is located immediately adjacent to the pier.

Threatened and Endangered Plant Species

No threatened or endangered plant species have been identified within the harbor area.

Wildlife

Terrestrial wildlife at Kawaihae Pier is limited to transitory birds and small mammals.

Threatened and Endangered Wildlife Species

No threatened or endangered species have been identified within the harbor.

Environmentally Sensitive Habitat

No critical habitat is present (National Park Service, 2004).

3.7 HAWAIIAN ISLANDS HUMPBACK WHALE NATIONAL MARINE SANCTUARY (HIHWNMS)

The National Marine Sanctuaries Act (NMSA),16 United States Code § 1431 et seq., authorizes the Secretary of Commerce to designate areas of the marine environment that possess conservation, recreational, ecological, historical, research, and educational, or aesthetic resources and qualities of national significance as National Marine Sanctuaries, and to provide comprehensive management and protection of these areas. To protect the area designated, any Federal action that is likely to destroy, cause the loss of, or injure a sanctuary resource must consult with the Secretary of Commerce prior to commencement and adhere to reasonable and prudent alternatives set by the Secretary of Commerce. To the extent practicable, consultation may be consolidated with other consultation efforts under other Federal laws, such as the Endangered Species Act.

The Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) (Figure 3.3.1.1.1-2) is one of 14 established sanctuaries under the NMSA. It was established in 1992 by the Hawaiian Islands National Marine Sanctuary Act, Title II, subtitle C of the Oceans Act of 1992. At the inception of the HIHWNMS and by virtue of the *Hawaiian Islands Humpback Whale National Marine Sanctuary Final Environmental Impact Statement/Management Plan* (February 1997) and implementing regulations (15 CFR § 922.180), certain military activities were identified as exempt from the interagency consultation requirements and the prohibited activities designated under the NMSA.

Specifically, the HIHWNMS Final Environmental Impact Statement (EIS)/Management Plan identified 28 offshore training events and 20 open ocean training events as “classes of military activities” conducted in the Hawaiian waters. Offshore activities are conducted within the 100-fathom isobath demarcation of the HIHWNMS around the Hawaiian Islands. These classes of activities were noted to be conducted “by all the military services of the United States and, during combined exercises, by military units from cooperating foreign nations or the State of Hawaii Department of Defense/National Guard” (U.S. Department of Commerce, National Oceanic and Atmospheric Administration and State of Hawaii, Office of Planning, 1997). The HIHWNMS EIS described seven examples of “types” of Department of Defense (DoD) military activities that occur in or around the Sanctuary, then further described 31 “Other DoD Military Operations in the Hawaiian Islands”, noting whether each activity occurred within the 100 fathom isobath (the designated demarcation boundary of the HIHWNMS around the Hawaiian Islands). Included in the list of seven examples of types is “Anti-submarine Warfare (ASW) Exercises.” The example indicates that ASW exercises take place “usually two per year, lasting several days with surface ships and submarines and including the use of expendable equipment such as smoke floats and bathythermograph probes.” The bulleted types of activities and Appendix F of the HIHWNMS EIS/Management Plan (see Exhibit C-1 of Appendix C) more thoroughly list the ASW events as both within and outside the 100-fathom isobath, using sonar, sonobuoys, and mine countermeasures using sonar. Additionally, non-ASW activities such as air-to-surface gunnery exercises, air combat maneuvers, air-to-surface missile/bombing exercises, air-to-ground Strike Warfare Exercises, and Amphibious Exercises are listed as potential activities both outside and within the boundaries of the HIHWNMS. These types of activities can be combined into the Undersea Warfare Exercises (USWEX) or Rim of the Pacific (RIMPAC) exercise.

Under the HIHWNMS regulations, military activities are allowed within the HIHWNMS and are not subject to vessel/aircraft approach distances, discharge of materials prohibitions and consultation requirements if they are “classes of military activities, internal and external to the HIHWNMS, that are being or have been conducted before the effective date of these regulations, as identified in the Final Environmental Impact Statement/Management Plan.” If the military activity is proposed after the effective date of the regulations, then the activity is also allowable, but is subject to the prohibited activities provisions of 15 CFR § 922.184 unless the activity is not subject to consultation under NMSA (that is, not likely to destroy, cause the loss of, or injury to any sanctuary resource). Regulatory prohibition provisions include distance restrictions on vessel and aircraft approaches to humpback whales, prohibitions on depositing materials within or near the Sanctuary, and prohibitions on the taking or possessing of humpback whales. Finally, any military activity that is subsequently modified in a way that causes the activity to be “likely to destroy, cause the loss of, or injure a HIHWNMS resource in a manner significantly greater than was considered in previous consultation” is treated as a new military activity for which consultation may be necessary.

In April 1995, before the completion of the HIHWNMS Final EIS/Management Plan, the Department of the Navy provided the Department of Commerce with a “Report on Military Activities in Hawaiian Waters.” This document detailed to National Oceanic and Atmospheric Administration (NOAA) the varying military activities that occur around Hawaii, specifically explaining the nature of RIMPAC as well as other Major Exercises, unit-level training, and additional military activities. This document’s specificity aided NOAA in listing “classes” of activities for purposes of brevity in its EIS. (See Exhibit C-2 of Appendix C for the complete Report.)

In October 1995, the Department of Navy and the Department of Commerce entered into a Memorandum of Understanding regarding the military activities and the HIHWNMS. That Memorandum reflected the parties’ completion of consultation required by NMSA Section 304(d) regarding existing classes of military activities. The activities were found not likely to destroy, cause loss of, or injure a humpback whale. It was determined that the existing classes of military activities, therefore, were not subject to further consultation unless they became modified in a way that is likely to destroy, cause loss of, or injure a Sanctuary resource in a manner significantly greater than was considered in previous consultation. (See Exhibit C-3 of Appendix C for the complete Navy/NOAA Memorandum of Understanding Concerning Military Activities and the Hawaiian Islands Humpback Whale National Marine Sanctuary).

Humpback whales are seen in the winter months in the shallow waters surrounding the Hawaiian Islands where they congregate to mate and calve. The humpback whale population is growing by an average of 7 percent annually. The best available estimate of the central west pacific stock humpback whale abundance is 4,491 individuals. (Mobley et al., 2001) The whales travel more than 3,500 mi from Alaska to Hawaii's warm waters to mate, give birth, and care for their calves. The first whales of the season usually arrive around October, with the greatest number seen around Hawaii between 1 December and 15 May. (National Oceanic and Atmospheric Administration, 2007a; Mobley, 2002)

The following sections describe areas of the HIHWNMS, by island, that could be affected by proposed Hawaii Range Complex (HRC) training and research, development, test, and evaluation (RDT&E) activities.

3.7.1 BIOLOGICAL RESOURCES—HIHWNMS

3.7.1.1 KAUAI—BIOLOGICAL RESOURCES—HIHWNMS

The HIHWNMS (Figure 3.3.1.1.1-2) includes a portion of the ocean north of Kauai, but not within the Pacific Missile Range Facility vicinity or in the Barking Sands Tactical Underwater Range (BARSTUR) and the Barking Sands Underwater Ranges Expansion (BSURE) coverage areas (U.S. Department of the Navy, 2001a). (U.S. Department of Commerce, National Oceanic and Atmospheric Administration and State of Hawaii, Office of Planning, 1997)

No training or RDT&E activities are planned to occur in the area north of Kauai that is included in HIHWNMS. Warning Areas W-186 and W-188 airspace over the Open Ocean are outside the HIHWNMS boundary. The Warning Areas are used for missile, bomb, and gunnery exercises. Air, surface, and underwater exercises are conducted in the surface area of W-186 and W-188.

Instrumentation at BARSTUR provides the capability to conduct ASW and Anti-surface Underwater Warfare training. BSURE is also used for ASW and Anti-surface Underwater Warfare training and to track submarines and torpedo firing.

3.7.1.2 OAHU—BIOLOGICAL RESOURCES—HIHWNMS

HIHWNMS (Figure 3.3.1.1.1-2) areas are located off the northern and southeastern coastlines of Oahu. No current HRC activities are being performed within the HIHWNMS's boundaries, and none are being proposed.

3.7.1.3 MAUI—BIOLOGICAL RESOURCES—HIHWNMS

The Maui Offshore is an area situated around the islands of Maui, Kahoolawe, Lanai, and Molokai, portions of which are within the HIHWNMS (Figure 3.3.1.1.1-2). The waters adjacent to Maui, Molokai, and Lanai are important Navy training areas. The offshore area also includes the portion of Penguin Bank that is within 12 nautical miles (nm) of the islands' coastlines. The area is used as a submarine training area due to the unique characteristics of its acoustic environment and shallow depths of 50 and 100 fathoms. Multiple in-water runs of exercise MK-48 torpedoes (with no warheads) using one submarine as both target and launch platform also occur in the Penguin Bank area. According to the HIHWNMS EIS/Management Plan, submarines conduct post-overhaul shallow water dives and shallow water ASW events in the vicinity of Penguin Bank. Penguin Bank is the only shallow water area in Hawaiian waters suitable for initial submerged testing, which is necessary for crew rescue. Submarines also conduct mine warfare training at Penguin Bank.

According to the HIHWNMS EIS (U.S. Department of Commerce, National Oceanic and Atmospheric Administration and State of Hawaii, Office of Planning, 1997), "… the waters adjacent to Maui, Molokai, and Lanai are important training areas for Navy ships homeported in Pearl Harbor. The channel between Maui, Lanai and Molokai is extensively used for biennial RIMPAC [Rim of the Pacific] exercises, EOD/MCM [explosive ordnance disposal/mine countermeasures] exercises, and as well for shallow-water ASW [anti-submarine warfare]…

The areas inside the 100-fathom isobath surrounding Maui, Molokai and Lanai, and specifically the channel between these islands, are used for shallow-water ASW operations."

The presence of the endangered humpback whale in the region of influence is seasonal, with peak concentrations in mid-February to mid-March. The whales seem to prefer areas within the 100-fathom contours such as the Molokai–Lanai–Maui–Kahoolawe channels and Penguin Bank. Humpback whale sightings in the region of influence are mainly concentrated north of Kahoolawe in protected channel areas. (Commander, Submarine Force U.S. Pacific Fleet, 1997; Naval Undersea Warfare Center Division Newport, Rhode Island, 2007)

3.7.1.4 HAWAII—BIOLOGICAL RESOURCES—HIHWNMS

The Kawaihae Pier area is not included within the HIHWNMS (Figure 3.3.1.1.1-2), which is located off the northwestern shore of Hawaii. Other than transiting the HIHWNMS to reach Kawaihae Pier, no current HRC activities are being performed within the HIHWNMS's boundaries, and none are being proposed.

Hawaii Range Complex

Final Environmental Impact Statement/
Overseas Environmental Impact Statement (EIS/OEIS)

Volume 2 of 5: Chapters 4-11

May 2008

Coordinator
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HAWAII RANGE COMPLEX
FINAL ENVIRONMENTAL IMPACT STATEMENT/ OVERSEAS ENVIRONMENTAL IMPACT STATEMENT

Volume 2 of 5

MAY 2008

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COVER SHEET
FINAL ENVIRONMENTAL IMPACT STATEMENT/
OVERSEAS ENVIRONMENTAL IMPACT STATEMENT
HAWAII RANGE COMPLEX (HRC)

Lead Agency for the EIS:	U.S. Department of the Navy
Title of the Proposed Action:	Hawaii Range Complex
Affected Jurisdiction:	Kauai, Honolulu, Maui, and Hawaii Counties
Designation:	Final Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS)

Abstract

This Final EIS/OEIS has been prepared by the U.S. Department of the Navy (Navy) in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code § 4321 et seq.); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] §§ 1500-1508); Navy Procedures for Implementing NEPA (32 CFR § 775); and Executive Order 12114 (EO 12114), *Environmental Effects Abroad of Major Federal Actions*. The Navy has identified the need to support and conduct current, emerging, and future training and research, development, test, and evaluation (RDT&E) activities in the Hawaii Range Complex (HRC). The alternatives—the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3—are analyzed in this Final EIS/OEIS. All alternatives include an analysis of potential environmental impacts associated with the use of mid-frequency active (MFA) and high-frequency active (HFA) sonar. The No-action Alternative stands as no change from current levels of HRC usage and includes HRC training, support, and RDT&E activities, Major Exercises, and maintenance of the technical and logistical facilities that support these activities and exercises. Alternative 1 includes all ongoing training associated with the No-action Alternative, an increased tempo and frequency of such training (including increases in MFA and HFA sonar use), a new training event (Field Carrier Landing Practice), enhanced and future RDT&E activities, enhancements to optimize HRC capabilities, and an increased number of Major Exercises. Alternative 2 includes all of the training associated with Alternative 1 plus additional increases in the tempo and frequency of training (including additional increases in MFA and HFA sonar use), enhanced RDT&E activities, future RDT&E activities, and additional Major Exercises, such as supporting three Strike Groups training at the same time. Alternative 3 would include all of the training and RDT&E activities associated with Alternative 2. The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events, future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Alternative 3 is the Navy's preferred alternative.

This Final EIS/OEIS addresses potential environmental impacts that result from activities that occur under the No-action Alternative and proposed activities that would occur under Alternatives 1, 2, and 3. This EIS/OEIS also addresses changes and associated environmental analyses that were presented in the Supplement to the Draft EIS/OEIS. Environmental resource topics evaluated include air quality, airspace, biological resources (open ocean, offshore, and onshore), cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

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May 2008

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4.0 Environmental Consequences

4.0 ENVIRONMENTAL CONSEQUENCES

This chapter describes potential environmental consequences at each location that may be affected by the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3. The same resource areas addressed in Chapter 3.0 for each location are addressed in this chapter. The following sections address the potential for impacts on each environmental resource and its attributes by activity and sub-activities identified in Chapter 2.0.

Environmental consequences are discussed according to location; the Open Ocean Area is discussed first, followed by offshore and onshore discussion organized by island locations from west to east: Northwestern Hawaiian Islands, Kauai, Oahu, Maui, and Hawaii. For organizational purposes, discussions about Niihau and Kaula (although separate islands) are included under the Kauai heading because they are part of Kauai County. Similarly, discussions about Molokai are included under the Maui heading because it is part of Maui County. The last section discusses the Hawaiian Islands Humpback Whale National Marine Sanctuary. The page headers in this chapter identify which location is discussed. The rationale for not addressing certain resources for a given location is provided under each location. Table 4-1 lists each location and the section where each of the resources is addressed.

Potential environmental effects described in this section focus on the continuation of combinations of unit-level training and research, development, test, and evaluation (RDT&E) in the Hawaii Range Complex (HRC) (No-action Alternative) that have been occurring for decades and the effects of implementing Alternatives 1, 2, and 3 to the No-action Alternative. The environmental consequences assessment in the Environmental Impact Statement (EIS)/Overseas EIS (OEIS) includes estimates of the potential direct and indirect effects, long- and short-term effects, and irreversible and irretrievable resource commitments.

This EIS/OEIS describes measures required to mitigate adverse impacts. The EIS/OEIS also identifies those measures already committed to as part of current unit-level training and RDT&E, and additional mitigations (if any) which could reasonably be expected to reduce impacts if Alternative 1, 2, or 3 is implemented.

Table 4-1. Chapter 4.0 Locations and Resources

Location	Air Quality	Airspace	Biological Resources	Cultural Resources	Geology & Soils	Hazardous Materials & Waste	Health & Safety	Land Use	Noise	Socioeconomics	Transportation	Utilities	Water Resources
Open Ocean		4.1.1	4.1.2	4.1.3		4.1.4	4.1.5		4.1.6				4.1.7
Northwestern Hawaiian Islands Offshore			4.2.1.1										
Northwestern Hawaiian Islands Onshore			4.2.2.1	4.2.2.2									
Kauai Offshore													
PMRF-Offshore			4.3.1.1.1	4.3.1.1.2						4.3.1.1.3	4.3.1.1.4		
Niihau-Offshore			4.3.1.2.1										
Kaula-Offshore			4.3.1.3.1	4.3.1.3.2									
Kauai Onshore													
PMRF/Main Base	4.3.2.1.1	4.3.2.1.2	4.3.2.1.3	4.3.2.1.4	4.3.2.1.5	4.3.2.1.6	4.3.2.1.7	4.3.2.1.8	4.3.2.1.9	4.3.2.1.10	4.3.2.1.11	4.3.2.1.12	4.3.2.1.13
Makaha Ridge	4.3.2.2.1		4.3.2.2.2	4.3.2.2.3		4.3.2.2.4	4.3.2.2.5						
Kokee	4.3.2.3.1		4.3.2.3.2			4.3.2.3.3	4.3.2.3.4						
HIANG Kokee			4.3.2.4.1										
Kamokala Magazines						4.3.2.5.1	4.3.2.5.2						
Port Allen*													
Kikiaola Small Boat Harbor*													
Mt. Kahili*													
Niihau			4.3.2.9.1			4.3.2.9.2	4.3.2.9.3						
Kaula		4.3.2.10.1	4.3.2.10.2	4.3.2.10.3	4.3.2.10.4		4.3.2.10.5	4.3.2.10.6					
Oahu Offshore													
Puuloa Underwater Range-Offshore			4.4.1.1.1	4.4.1.1.2		4.4.1.1.3	4.4.1.1.4						
Naval Defensive Sea Area-Offshore			4.4.1.2.1	4.4.1.2.2			4.4.1.2.3						
Marine Corps Base Hawaii-Offshore			4.4.1.3.1	4.4.1.3.2									
Marine Corps Training Area/Bellows-Offshore			4.4.1.4.1	4.4.1.4.2									
Makua Military Reservation-Offshore			4.4.1.5.1	4.4.1.5.2									
Dillingham Military Reservation-Offshore			4.4.1.6.1	4.4.1.6.2									
Ewa Training Minefield-Offshore			4.4.1.7.1			4.4.1.7.2	4.4.1.7.3						
Barbers Point Underwater Range-Offshore			4.4.1.8.1			4.4.1.8.2	4.4.1.8.3						
NUWC SESEF-Offshore			4.4.1.9.1				4.4.1.9.2						
NUWC FORACS-Offshore			4.4.1.10.1				4.4.1.10.2						
Oahu Onshore													
Naval Station Pearl Harbor			4.4.2.1.1	4.4.2.1.2						4.4.2.1.3			
Ford Island			4.4.2.2.1	4.4.2.2.2									4.4.2.2.3
Naval Inactive Ship Maintenance Facility, Pearl Harbor			4.4.2.3.1			4.4.2.3.2							4.4.2.3.3
EOD Land Range NAVMAG Pearl Harbor West Loch			4.4.2.4.1	4.4.2.4.2	4.4.2.4.3		4.4.2.4.4						4.4.2.4.5
Lima Landing			4.4.2.5.1	4.4.2.5.2		4.4.2.5.3	4.4.2.5.4						
USCG Station Barbers Point/Kalaeola Airport		4.4.2.6.1	4.4.2.6.2										
Marine Corps Base Hawaii		4.4.2.7.1	4.4.2.7.2	4.4.2.7.3					4.4.2.7.4	4.4.2.7.5			
Marine Corps Training Area/Bellows			4.4.2.8.1	4.4.2.8.2									
Hickam Air Force Base		4.4.2.9.1	4.4.2.9.2										
Wheeler Army Airfield		4.4.2.10.1	4.4.2.10.2										
Makua Military Reservation			4.4.2.11.1	4.4.2.11.2			4.4.2.11.3		4.4.2.11.4				
Kahuku Training Area			4.4.2.12.1	4.4.2.12.2									
Dillingham Military Reservation			4.4.2.13.1	4.4.2.13.2									
Keehi Lagoon*													
Kaena Point*													
Mt. Kaala*													
Wheeler Network Segment Control/PMRF Communication Site*													
Mauna Kapu Communication Site*													
Makua Radio/Repeater/Cable Head*													
Maui Offshore													
Maui Offshore			4.5.1.1.1										
Shallow-water Minefield Sonar Training Area-Offshore*													
Maui Onshore													
Maui Space Surveillance Site*													
Maui High Performance Computing Center*													
Sandia Maui Haleakala Facility*													
Molokai Mobile Transmitter Site*													
Hawaii Offshore													
Kawaihae Pier			4.6.1.1.1										
Hawaii Onshore													
Pohakuloa Training Area		4.6.2.1.1	4.6.2.1.2	4.6.2.1.3			4.6.2.1.4		4.6.2.1.5				
Bradshaw Army Airfield		4.6.2.2.1	4.6.2.2.2	4.6.2.2.3									
Kawaihae Pier			4.6.2.3.1										
Hawaiian Islands Humpback Whale National Marine Sanctuary			4.7.1										

*A review of the 13 environmental resources against program activities determined there would be no impacts from site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3.

4.1 OPEN OCEAN AREA

Table 4.1-1 lists ongoing training and RDT&E for the No-action Alternative and proposed training and RDT&E for Alternatives 1, 2, and 3 in the Open Ocean Area. Alternative 3 is the preferred alternative.

Table 4.1-1. Training and RDT&E Activities in the Open Ocean Area

Training	Research, Development, Test, and Evaluation (RDT&E)
• Air Combat Maneuver (ACM) • Air-to-Air Missile Exercise (A-A MISSILEX) • Surface-to-Air Gunnery Exercise (S-A GUNEX) • Surface-to-Air Missile Exercise (S-A MISSILEX) • Chaff Exercise (CHAFFEX) • Naval Surface Fire Support Exercise (NSFS)[1] • Visit, Board, Search, and Seizure (VBSS) • Surface-to-Surface Gunnery Exercise (S-S GUNEX)[1] • Surface-to-Surface Missile Exercise (S-S MISSILEX)[1] • Air-to-Surface Gunnery Exercise (A-S GUNEX) • Air-to-Surface Missile Exercise (A-S MISSILEX)[1] • Bombing Exercise (BOMBEX) (Sea)[1] • Sinking Exercise (SINKEX)[1] • Anti-Surface Warfare (ASUW) Torpedo Exercise (TORPEX) (Submarine-Surface) • Anti-Submarine Warfare (ASW) Tracking Exercise (TRACKEX)[2] • ASW TORPEX[2] • Major Integrated ASW Training Exercise[2] • Electronic Combat Operations • Mine Countermeasures Exercise (MCM) • Mine Neutralization[1] • Swimmer Insertion/Extraction • Command and Control (C2) (Sea) • Demolition Exercises (Sea) • Extended Echo Ranging/Improved Extended Echo Ranging (EER/IEER)[1]	• Anti-Air Warfare RDT&E • Anti-Submarine Warfare • Combat System Ship Qualification Trial • Electronic Combat/Electronic Warfare (EC/EW) • High-Frequency Radio Signals • Missile Defense • Shipboard Electronic Systems Evaluation Facility (SESEF) Quick Look • SESEF System Performance Test • Additional Chemical Simulant (Alternative 1) • Intercept Targets Launched into Pacific Missile Range Facility (PMRF) Controlled Area (Alternative 1) • Launched SM-6 from Sea-Based Platform (AEGIS) (Alternative 1) • Test Unmanned Surface Vehicles (Alternative 1) • Test Unmanned Aerial Vehicles (Alternative 1) • Test Hypersonic Vehicles (Alternative 1) • Portable Undersea Tracking Range (Alternative 1) • Large Area Tracking Range Upgrade (Alternative 1) • Enhanced Electronic Warfare Training (Alternative 1) • Expanded Training Capability for Transient Air Wings (Alternative 1) • Directed Energy (Alternative 2/3) • Advanced Hypersonic Weapon (Alternative 2/3)

Notes: 1. Modeled for explosives
2. Modeled for sonar

4.1.1 AIRSPACE—OPEN OCEAN

The potential impacts on airspace in the Open Ocean Area are discussed in terms of conflicts with the use of controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields.

4.1.1.1 NO-ACTION ALTERNATIVE (AIRSPACE—OPEN OCEAN)

4.1.1.1.1 HRC Training—No-action Alternative

The ongoing, continuing HRC training that could affect airspace includes mine laying, Surface-to-Surface Gunnery Exercises (S-S GUNEX), Surface-to-Surface Missile Exercises (S-S MISSILEX), Air-to-Surface Gunnery Exercises (A-S GUNEX), Air-to-Surface Missile Exercises

(A-S MISSILEX), Bombing Exercises (BOMBEX), Sinking Exercises (SINKEX), Anti-Submarine Warfare (ASW), Air Combat Maneuvers (ACM), Air-to-Air Missile Exercises (A-A MISSILEX), Electronic Countermeasures (ECM), Surface-to-Air Gunnery Exercises (S-A GUNEX), Surface-to-Air Missile Exercises (S-A MISSILEX), Naval Surface Fire Support (NSFS), Flare Exercises, Chaff Exercises (CHAFFEX), and Extended Echo Ranging/Improved Extended Echo Ranging (EER/IEER) Exercises as listed in Table 2.2.2.1-1.

Controlled and Uncontrolled Airspace

The Navy can accomplish the No-action Alternative without modifications or need for additional airspace to accommodate continuing training.

Special Use Airspace

Ongoing, continuing training identified above will continue to use the existing Open Ocean Area special use airspace including Warning Areas and Air Traffic Control Assigned Airspace (ATCAA) shown on Figure 3.1.1-1. Although the nature and intensity of use varies over time and by individual special use airspace area, the continuing training represents precisely the kinds of events for which the special use airspace was created. The Warning Areas are designed and set aside by the Federal Aviation Administration (FAA) to accommodate training that presents a hazard to other aircraft. As such, the continuing training does not conflict with any airspace use plans, policies, and controls. The ATCAA has been developed by the FAA to facilitate the management of aircraft moving between and adjacent to other special use airspace areas.

En Route Airways and Jet Routes

Numerous instrument flight rules (IFR), en route low altitude air traffic service routes, and IFR en route high altitude oceanic routes are used by commercial aircraft that pass through the region of influence (see Figure 3.1.1-1). However, the region of influence is relatively remote from the majority of jet routes that traverse the northern Pacific Ocean. The Navy coordinates closely with the FAA to avoid conflicts with commercial aviation.

The low altitude airways that pass through a Warning Area include V7 (through W-190), V15 (through W-188), and V16 (through W-186). There are no oceanic routes that pass through a Warning Area. Several low altitude airways pass below the Pali ATCAA near Oahu. The floor of the Pali ATCAA is above the ceiling of the low altitude routes. Two low altitude airways pass above the ceiling of the Mela North ATCAA. Navy training involving aircraft in the Open Ocean Area is conducted away from en route airways and jet routes to minimize potential airspace conflicts.

Use of the low altitude airways and high-altitude jet routes comes under the control of the Honolulu and Oakland Air Route Traffic Control Centers (ARTCCs). In addition, the Navy surveys the airspace involved in each training event either by radar or patrol aircraft. Safety regulations dictate that hazardous activities will be suspended by the Navy when it is known that any non-participating aircraft has entered any part of a training activity danger zone. The suspension lasts until the non-participating entrant has left the area or a thorough check of the suspected area has been performed. Consequently, there are no impacts on non-military aircraft.

The continuing training will be conducted in compliance with Department of Defense (DoD) Directive 4540.1, as directed by Office of the Chief of Naval Operations Instruction (OPNAVINST) 3770.4A, which specifies procedures for conducting Aircraft Operations and for missile/projectile firing. Missile and projectile firing areas shall be selected so that trajectories are clear of established oceanic air routes or areas of known surface or air activity. In addition, before conducting training that is potentially hazardous to non-participating aircraft, Notices to Airmen (NOTAMs) published by the FAA will be sent in accordance with the conditions of the directive specified in OPNAVINST 3721.20A. The increasing adoption of “Free Flight” by commercial aircraft could make the airspace coordination task somewhat more difficult, but this will still be handled by the issuance of NOTAMs. As noted in Chapter 3.0, with the full implementation of this program, the amount of clear airspace in the region of influence may decrease as pilots, whenever practical, choose their own route and file a flight plan that follows the most efficient and economical route.

All airspace outside the territorial limits is located in international airspace. Because the Open Ocean Area airspace use region of influence is in international airspace, the procedures outlined in International Civil Aviation Authority (ICAO) Document 444, *Rules of the Air and Air Traffic Services* are followed. The FAA acts as the U.S. agent for aeronautical information to the ICAO, and air traffic in the over-water region of influence is managed by the Honolulu ARTCC, and to a lesser extent, the Oakland ARTCC.

As noted above, continuing training will use the existing Open Ocean Area special use airspace and will not require either: (1) a change to an existing or planned IFR minimum flight altitude, a published or special instrument procedure, or an IFR departure procedure; or (2) a visual flight rules (VFR) operation to change from a regular flight course or altitude. Consequently, there are no airspace conflicts.

Airports and Airfields

There are no airports and airfields in the Open Ocean Area region of influence.

4.1.1.1.2 HRC RDT&E Activities—No-action Alternative

The ongoing RDT&E activities that could affect airspace include missile defense ballistic missile target flights and interceptor activities, A-S MISSILEX, A-A MISSILEX, S-A MISSILEX, and S-S MISSILEX. RDT&E activities are conducted in Pacific Missile Range Facility (PMRF) Warning Areas and the Temporary Operating Area (TOA), as shown on Figure 3.1.1-1. Table 2.2.2.5-1 lists the RDT&E activities that are a part of the No-action Alternative. Missile launches from PMRF and Kauai Test Facility will move into Open Ocean Areas soon after launch.

Controlled and Uncontrolled Airspace

No new airspace proposal or any modification to the existing controlled airspace has been identified to accommodate continuing training. Typically target and interceptor missiles will be above flight level (FL) 600 within minutes of the rocket motor firing. As such, all other local flight activities will occur at sufficient distance and altitude that the target missile and interceptor missiles will be little noticed. However, activation of the proposed stationary altitude reservation (ALTRV) procedures, where the FAA provides separation between non-participating aircraft and the missile flight test activities in the TOA for use of the airspace identified in Figure 3.1.1-1, will impact the controlled airspace available for use by non-participating aircraft for the duration of the ALTRV—usually for a matter of a few hours, with a backup day reserved for the same hours. The airspace in the TOA is not heavily used by commercial aircraft, and is far removed from the en route airways and jet routes crossing the North Pacific Ocean. The relatively sparse use of the area by commercial aircraft and the advance coordination with the FAA regarding ALTRV requirements results in minimal impacts on controlled and uncontrolled airspace from RDT&E activities.

Special Use Airspace

Ongoing RDT&E activities identified above will continue to utilize the existing Open Ocean Area special use airspace including PMRF Warning Areas shown on Figure 3.1.1-1.

Missile intercepts will continue to be conducted within either the existing special use airspace in Warning Area W-188 and W-186 controlled by PMRF or within the TOA shown in the inset on Figure 3.1.1-1. Similarly, intercept impact debris will be contained within these same areas. Missiles coming into the TOA from various locations can overfly the Papahānaumokuākea Marine National Monument. At this point in their flight, the boosters follow a ballistic trajectory and will not impact the monument. For select intercept missions, the potential exists for limited debris to fall into the Open Ocean Area off Necker and Nihoa in the Papahānaumokuākea Marine National Monument. Although the nature and intensity of use varies over time and by individual special use airspace area, the proposed activities do not represent a direct special use airspace impact due to the nature of the special use airspace and the planning and coordination between the Navy and the FAA, as described below.

Warning Areas consist of airspace over international waters in which hazardous activity may be conducted. The Warning Areas are designed and set aside by the FAA to accommodate activities that present a hazard to other aircraft. Similarly, the use of ALTRV procedures—as authorized by the Central Altitude Reservation Function, an air traffic service facility, or appropriate ARTCC (the Oakland ARTCC for the TOA)—for airspace use under prescribed conditions in the TOA will not impact special use airspace. According to the FAA Handbook, 7610.44, ALTRVs may encompass certain rocket and missile activities, and other special activities, as may be authorized by FAA approval procedures.

PMRF will coordinate with the Honolulu or Oakland ARTCC military operations specialist assigned to handle such matters and the airspace coordinator at the Honolulu Center Radar Approach using ALTRV request procedures. After receiving the proper information on each test flight, a hazard pattern will be constructed and superimposed on a chart depicting the area of activities. Ensuring that the hazard pattern will not encroach any land mass, this area is then plotted using minimum points (latitude-longitude) to form a rectangular area. This plotted area is then faxed to the military operations specialist at Honolulu or Oakland ARTCC requesting airspace with the following information: area point (latitude-longitude); date and time for primary and backup (month, day, year, Zulu time); and altitude. A copy is sent to the Honolulu Center Radar Approach Control. A follow-up phone call is made after 48 hours to verify receipt of the fax. When approval of the request of the airspace is received from the military operations specialist at Honolulu or Oakland ARTCC, PMRF will submit an ALTRV request to Central Altitude Reservation Function, which publishes the ALTRV 72 hours prior to the flight test. With these coordination and planning procedures in place, the RDT&E activities do not conflict with any airspace use plans, policies, and controls.

En Route Airways and Jet Routes

Two IFR en route low altitude airways are used by commercial aircraft that pass through the PMRF Warning Areas. The two low altitude airways are V15 (through W-188), and V16 (through W-186). Use of these low altitude airways comes under the control of the Honolulu ARTCC. In addition, during a training event, provision is made for surveillance of the affected airspace either by radar or patrol aircraft. Safety regulations dictate that hazardous activities will be suspended when it is known that any non-participating aircraft has entered any part of the training danger zone until the non-participating entrant has left the area or a thorough check of the suspected area has been performed. Therefore, potential impacts on civilian aircraft are avoided.

The airways and jet routes that traverse the Open Ocean Area airspace region of influence have the potential to be affected by RDT&E activities. However, target and defensive missile launches and missile intercepts will be conducted in compliance with DoD Directive 4540.1, as enclosed by OPNAVINST 3770.4A. DoD Directive 4540.1 specifies procedures for conducting missile and projectile firing, namely “firing areas shall be selected so that trajectories are clear of established oceanic air routes or areas of known surface or air activity” (DoD Directive 4540.1, § E5).

Before conducting a missile launch and/or intercept test, NOTAMs will be sent in accordance with the conditions of the directive specified in OPNAVINST 3721.20. In addition, to satisfy airspace safety requirements, the responsible commander will obtain approval from the Administrator, FAA, through the appropriate Navy airspace representative. Provision is made for surveillance of the affected airspace either by radar or patrol aircraft. In addition, safety regulations dictate that hazardous activities will be suspended when it is known that any non-participating aircraft have entered any part of the danger zone until the non-participating entrant has left the area or a thorough check of the suspected area has been performed.

In addition to the reasons cited above, there is a scheduling agency identified for each piece of special use airspace that will be used. The procedures for scheduling each piece of airspace are performed in accordance with letters of agreement with the controlling FAA facility, and the Honolulu and Oakland ARTCCs. Schedules are provided to the FAA facility as agreed among the agencies involved. Aircraft transiting the Open Ocean Area region of influence on one of the low-altitude airways and/or high-altitude jet routes that will be affected by flight test activities will be notified of any necessary rerouting before departing their originating airport and will be able to take on additional fuel before takeoff. Real-time airspace management involves the release of airspace to the FAA when the airspace is not in use or when extraordinary events occur that require drastic action, such as weather requiring additional airspace.

The FAA ARTCCs are responsible for air traffic flow control or management to transition air traffic. The ARTCCs provide separation services to aircraft operating on IFR flight plans and principally during the en route phases of the flight. They also provide traffic and weather advisories to airborne aircraft. Hazardous military activities are contained within the over-water Warning Areas or by using ALTRV procedures in the TOA to ensure non-participating traffic is advised or separated accordingly.

Continuing RDT&E activities will use the existing Open Ocean Area special use airspace and will not require either: (1) a change to an existing or planned IFR minimum flight altitude, a published or special instrument procedure, or an IFR departure procedure; or (2) a VFR operation to change from a regular flight course or altitude. Consequently, there are no airspace conflicts.

Airports and Airfields

There are no airports and airfields in the Open Ocean Area region of influence.

4.1.1.1.3 Major Exercises—No-action Alternative

Major Exercises such as Rim of the Pacific (RIMPAC) and Undersea Warfare Exercise (USWEX), include combinations of unit-level training and, in some cases, RDT&E activities that have been occurring in the HRC for decades. Therefore, potential impacts from a Major Exercise on the open ocean airspace will be similar to those described above for training and the RDT&E activities. The No-action Alternative includes one RIMPAC exercise (with a single aircraft carrier) and up to five USWEXs. RIMPAC planning conferences, which include coordination with the FAA, are conducted beginning in March of the year prior to each RIMPAC. Each of the USWEXs, up to five per year, will include coordination with the FAA well in advance of each 3- or 4-day exercise.

The advance planning and coordination with the FAA regarding ALTRV requirements for missile tests, scheduling of special use airspace, and coordination of Navy training relative to en route airways and jet routes, results in minimal impacts on airspace from Major Exercises.

4.1.1.2 ALTERNATIVE 1 (AIRSPACE—OPEN OCEAN)

4.1.1.2.1 Increased Tempo and Frequency of Training—Alternative 1

Alternative 1 would include increases in the number of training events as shown in Table 2.2.2.3.1-1. Training would occur in the same locations as identified for the No-action Alternative.

The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to those described in Section 4.1.1.1 for the No-action Alternative. The total number of training events that affect airspace would increase by approximately 16 percent above the No-action Alternative. No new airspace proposal or any modification to the existing controlled airspace would be required. Training would continue to utilize the existing Open Ocean Area special use airspace including the PMRF and Oahu Warning Areas and ATCAA shown on Figure 3.1.1-1. By appropriately containing hazardous military activities within the over-water Warning Areas or coordinating the use of the ATCAA areas, non-participating traffic is advised or separated accordingly. Therefore, potential impacts on all airspace users are minimized.

As noted above, continuing training will use the existing Open Ocean Area special use airspace and will not require either: (1) a change to an existing or planned IFR minimum flight altitude, a published or special instrument procedure, or an IFR departure procedure; or (2) a VFR operation to change from a regular flight course or altitude. The increase in training under Alternative 1 would require an increase in coordination and scheduling by the Navy and the FAA. The increase in training would be readily accommodated within the existing airspace. Consequently, there are no airspace conflicts.

4.1.1.2.2 Enhanced and Future RDT&E Activities—Alternative 1

The proposed activities include interceptor targets launched from Wake Island, Kwajalein Atoll, or Vandenberg AFB into the TOA; Standard Missile-6 (SM-6) launches from a sea-based platform; and high speed and unmanned aerial vehicle testing. The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes would be similar to that described above for missile launches in Section 4.1.1.1.2. The intercept areas would be in the Open Ocean Area and TOA.

Alternative 1 would include increases in the number of RDT&E activities as shown in Table 2.2.2.5-1. RDT&E activities would occur in the same locations as for the No-action Alternative.

The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described in Section 4.1.1.1 for the No-action Alternative. The total number of RDT&E activities that may affect airspace would increase by approximately 6 percent above the No-action Alternative. No new airspace proposal or any modification to the existing controlled airspace would be required. The RDT&E activities would continue to utilize the existing Open Ocean Area special use airspace including the PMRF Warning Areas and ATCAA and TOA shown on Figure 3.1.1-1. By appropriately containing hazardous military activities within the over-water Warning Areas or coordinating the use of the ATCAA areas, or using ALTRV procedures in the TOA, non-participating traffic is advised or separated accordingly. The relatively sparse use of the area by commercial aircraft and the advance coordination with the FAA regarding ALTRV requirements results in minimal impacts on controlled and uncontrolled airspace from RDT&E activities. The small increase in RDT&E activities under Alternative 1 would require a minor increase in coordination and scheduling by the Navy and the FAA. The increased RDT&E activities would be readily accommodated within the existing airspace.

4.1.1.2.3 HRC Enhancements—Alternative 1

Range safety for high-energy lasers at PMRF could affect airspace. Depending on the intensity of the lasers, nomenclature would need to be added to aeronautical charts, and certain test events could require NOTAMs and Notices to Mariners (NOTMARs).

The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described above for missile launches. The establishment of laser range operational procedures, including horizontal and vertical buffers, would minimize potential impacts on aircraft. All activities would be in accordance with American National Standards Institute (ANSI) Z136.1, *Safe Use of Lasers*, which has been adopted by DoD as the governing standard for laser safety. Additional information on range safety for high-energy lasers is in Section 4.1.5, Health and Safety.

4.1.1.2.4 Major Exercises—Alternative 1

Major Exercises, such as RIMPAC and USWEX, include combinations of unit-level training and, in some cases, RDT&E activities that have been occurring in the HRC for decades. Therefore, potential impacts from a Major Exercise on the open ocean airspace would be similar to those described for training and the RDT&E activities under the No-action Alternative. RIMPAC planning conferences, which include coordination with the FAA, are conducted beginning in

March of the year prior to each RIMPAC. Each of the USWEXs, up to six per year, would include coordination with the FAA well in advance of each 3- or 4-day exercise.

The advance planning and coordination with the FAA regarding ALTRV requirements for missile tests, scheduling of special use airspace, and coordination of Navy training relative to en route airways and jet routes, results in minimal impacts on airspace from Major Exercises. The increase from one aircraft carrier to two during RIMPAC under Alternative 1 would require a minor increase in coordination and scheduling by the Navy and the FAA. The increased training would be readily accommodated within the existing airspace.

4.1.1.3 ALTERNATIVE 2 (AIRSPACE—OPEN OCEAN)

4.1.1.3.1 Increased Tempo and Frequency of Training—Alternative 2

Alternative 2 would include increases in the number of training events as shown on Table 2.2.2.3-1. Training would occur in the same locations as for the No-action Alternative.

The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described in Section 4.1.1.1 for the No-action Alternative. The total number of training events that affect airspace would increase by approximately 22 percent above the No-action Alternative. No new airspace proposal or any modification to the existing controlled airspace would be required. Training would continue to use the existing Open Ocean Area special use airspace including the PMRF and Oahu Warning Areas and ATCAA shown on Figure 3.1.1-1. By appropriately containing hazardous military activities within the over-water Warning Areas or coordinating the use of the ATCAA areas, non-participating traffic is advised or separated accordingly, thus avoiding adverse impacts on the low altitude airways and high-altitude jet routes in the region of influence.

Alternative 2 would also include increases in the number of RDT&E activities including missile defense ballistic missile target flights, Terminal High Altitude Area Defense (THAAD) interceptor activities, A-S MISSILEX, A-A MISSILEX, S-A MISSILEX, and S-S MISSILEX. RDT&E activities would occur in the same locations as for the No-action Alternative.

The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described in Section 4.1.1.1 for the No-action Alternative. The total number of RDT&E activities that may affect airspace would increase by approximately 16 percent above the No-action Alternative. No new airspace proposal or any modification to the existing controlled airspace would be required. The RDT&E activities would continue to use the existing Open Ocean Area special use airspace including the PMRF Warning Areas, ATCAA, and TOA shown on Figure 3.1.1-1. By appropriately containing hazardous military activities within the over-water Warning Areas or coordinating the use of the ATCAA areas, or using ALTRV procedures in the TOA, non-participating traffic would be advised or separated accordingly, thus avoiding adverse impacts on the low altitude airways and high-altitude jet routes in the region of influence. Due to the planning and coordination required for the use of special use airspace, the small increase in the tempo and frequency of training would be readily accommodated within the existing special use airspace.

As noted above, continuing training will use the existing Open Ocean Area special use airspace and will not require either: (1) a change to an existing or planned IFR minimum flight altitude, a published or special instrument procedure, or an IFR departure procedure; or (2) a VFR operation to change from a regular flight course or altitude. The increase in training under Alternative 1 would require an increase in coordination and scheduling by the Navy and the FAA. The increase in training would be readily accommodated within the existing airspace. Consequently, there are no airspace conflicts.

4.1.1.3.2 Enhanced and Future RDT&E Activities—Alternative 2

Future RDT&E activities include a Maritime Directed Energy Test Center at PMRF and the Advanced Hypersonic Weapon test program.

The Directed Energy Test Center, which may include a High-Energy Laser Program, would have minimal impacts on airspace due to the required electromagnetic radiation/electromagnetic interference (EMR/EMI) coordination process. As discussed in Section 4.1.1.2.3, high-energy lasers at PMRF could affect airspace. Depending on the intensity of the lasers, nomenclature would need to be added to aeronautical charts, and certain test events could require NOTAMs and NOTMARs. The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described earlier for missile launches. The establishment of laser range operational procedures, including horizontal and vertical buffers, would minimize potential impacts on aircraft. All activities would be in accordance with ANSI Z136.1, *Safe Use of Lasers*, which has been adopted by DoD as the governing standard for laser safety. Additional information on range safety for high-energy lasers is in Section 4.1.5, Health and Safety.

The Advanced Hypersonic Weapon tests would be similar to a ballistic missile test. Potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described earlier for missile launches.

4.1.1.3.3 Additional Major Exercises—Multiple Strike Group Training—Alternative 2

In addition to RIMPAC and USWEX, Alternative 2 includes a Multiple Strike Group Exercise consisting of training that involves Navy assets engaging in a schedule of events battle scenario, with U.S. forces pitted against a notional opposition force. Participants use and build upon previously gained training skill sets to maintain and improve the proficiency needed for a mission-capable, deployment-ready unit. The exercise would occur over a 5- to 10-day period. The Multiple Strike Group training would involve many of the training events identified and evaluated under Sections 4.1.1.1 and 4.1.1.2, No-action Alternative and Alternative 1, including mine laying, S-S GUNEX, A-S GUNEX, S-S MISSILEX, A-S MISSILEX, BOMBEX, SINKEX, EER/IEER, ACM, A-A MISSILEX, ECM, S-A GUNEX, S-A MISSILEX, NSFS, Flare Exercises, and CHAFFEX.

Additional training includes Maritime Interdiction and Air Interdiction of Maritime Targets. These events would include a U.S. surface action group consisting of Navy surface combatants, Military Sea-Lift Command ships, and a Coast Guard Cutter. Opposition forces would consist of Navy frigates, cruisers, and destroyers, carrier air wing aircraft from the three Navy aircraft carriers, and Air Force fighter aircraft. All coordinated training would take place within the

PMRF and Oahu Warning Areas and other areas as required. The exercise may include Air Force aircraft that would operate from Hickam Air Force Base (AFB), and carrier air wing aircraft that would operate from their respective aircraft carriers. The aircraft would coordinate efforts with opposition force surface ships to locate, target, and simulate strikes against the U.S. surface action group.

The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described in Section 4.1.1.1 for the No-action Alternative. The additional types of training described in the previous paragraphs are similar to and would occur in the same areas as some of the training analyzed under the No-action Alternative. No new airspace proposal or any modification to the existing controlled airspace would be required. The Multiple Strike Group Exercises and training identified above would continue to use the existing Open Ocean Area special use airspace including the PMRF and Oahu Warning Areas and ATCAA shown on Figure 3.1.1-1. By appropriately containing hazardous military activities within the over-water Warning Areas or coordinating the use of the ATCAA areas, non-participating traffic would be advised or separated accordingly, thus avoiding adverse impacts on the low altitude airways and high-altitude jet routes in the region of influence.

The advance planning and coordination with the FAA regarding scheduling of special use airspace and coordination of Navy training relative to en route airways and jet routes would result in minimal impacts on airspace from a Multiple Strike Group exercise. The use of three aircraft carriers during the 10-day exercise would require an increase in coordination and scheduling by the Navy and the FAA. The increased training would be readily accommodated within the existing airspace.

4.1.1.4 ALTERNATIVE 3 (AIRSPACE—OPEN OCEAN)

The difference between Alternative 2 and Alternative 3 is the amount of mid-frequency active/high frequency active (MFA/HFA) sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on airspace under Alternative 3 would be the same as those described for Alternative 2.

4.1.2 BIOLOGICAL RESOURCES—OPEN OCEAN

Generally, impacts on biological resources are evaluated as potential losses to populations of species of concern or to important habitat resources. Criteria for assessing potential impacts on marine biological resources are based on the following:

- Loss of habitat (destruction, degradation, denial, competition)
- Over-harvesting or excessive take (accidental or intentional death, injury)
- Harassment

- Increases in exposure or susceptibility to disease and predation
- Decrease in breeding success

Collision with ordnance, missile debris, or vessels; release of contaminants from munitions constituents or expended range materials; sound; or human contact could potentially cause impacts. Impacts are considered substantial if they have the potential to result in reduction of population size of Federally listed threatened or endangered species, degradation of biologically important unique habitat, or reduction in capacity of a habitat to support species.

This section includes the following biological resource topics:

- Coral (Biological Resources—Open Ocean)
- Fish (Biological Resources—Open Ocean)
- Sea Turtles (Biological Resources—Open Ocean)
- Marine Mammals (Biological Resources—Open Ocean)
- Methodology for Analyzing Impacts on Marine Mammals
- Marine Mammals No-action Alternative (Biological Resources—Open Ocean)
- Marine Mammals Alternative 1 (Biological Resources—Open Ocean)
- Marine Mammals Alternative 2 (Biological Resources—Open Ocean)
- Marine Mammals Alternative 3 (Biological Resources—Open Ocean)
- Marine Mammal Mortality Request

4.1.2.1 CORAL (BIOLOGICAL RESOURCES—OPEN OCEAN)

4.1.2.1.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Coral—Biological Resources—Open Ocean)

As shown on Figure 3.1.2.1-1, deep sea coral within the Open Ocean Area is located in deep water and is limited in areal extent. The potential for impacts on these deep water corals from Navy training and RDT&E activities would be very limited. The Navy activities would not result in any direct impacts on the coral or degradation of water/sediment quality in the vicinity of the corals. The probability of intercept debris from a MISSILEX or expended materials from GUNEX, BOMBEX, EER/IEER, or SINKEX affecting any coral is extremely small. In addition, the debris and expended materials are spread out over a wide area so that even in the unlikely event the debris or expended materials lands on the coral, the pieces would be diffused and negligible. There is no deep water coral located in the area where SINKEX is typically conducted. Because the potential for impacts on deep sea coral is so remote, further discussion is unnecessary.

New proposed activities will be located in areas with no known coral concentration when possible. In areas that have not been mapped for coral presence, the Navy will develop appropriate habitat data and any necessary Best Management Practices and mitigations in coordination with National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). The Navy will continue to work with regulatory agencies throughout the planning and development process to minimize the potential for impacts on coral.

4.1.2.2 FISH (BIOLOGICAL RESOURCES—OPEN OCEAN)

In this section, the approach to the assessment of effects on fish is presented, as well as a review of the literature on potential effects common to most activities. These include noise disturbance and underwater detonations. Effects on fish and the distances at which behavioral effects can occur depend on the nature of the sound, the hearing ability of the fish, and species-specific behavioral responses to sound. Changes in fish behavior can, at times, reduce their catchability and thus affect fisheries.

There are two types of sound sources that are of major concern to fish and fisheries: (1) strong underwater shock pulses that can cause physical damage to fish, and (2) underwater sounds that could cause disturbance to fish and affect their biology or catchability by fishers. The following methods were used to assess potential effects of noise on fish. Received noise levels that correspond to the various types of effects on fish were evaluated. Effects include physical damage to fish, short-term behavioral reactions, long-term behavioral reactions, and changes in distribution.

Effects of Human-Generated Sound on Fish

There have been very few studies on the effects that human-generated sound may have on fish. These have been reviewed in a number of places (e.g., National Research Council 1994, 2003, Popper 2003, Popper et al. 2004, Hastings and Popper 2005), and some more recent experimental studies have provided additional insight into the issues (e.g., Govoni et al. 2003, McCauley et al. 2003, Popper et al. 2005, 2007, Song et al., 2005). Most investigations, however, have been in the gray literature (non peer-reviewed reports – see Hastings and Popper, 2005 for an extensive critical review of this material). While some of these studies provide insight into effects of sound on fish, as mentioned earlier, the majority of the gray literature studies often lack appropriate controls, statistical rigor, and/or expert analysis of the results.

There are a wide range of potential effects on fish that range from no effect at all (e.g., the fish does not detect the sound or it "ignores" the sound) to immediate mortality. In between these extremes are a range of potential effects that parallel the potential effects on fish that were illustrated by Richardson et al. (1995a). These include, but may not be limited to:

- No effect behaviorally or physiologically: The animal may not detect the signal, or the signal is not one that would elicit any response from the fish.
- Small and inconsequential behavioral effects: Fish may show a temporary "awareness" of the presence of the sound but soon return to normal activities.
- Behavioral changes that result in the fish moving from its current site: This may involve leaving a feeding or breeding ground. This effect may be temporary, in that the fish return to the site after some period of time (perhaps after a period of acclimation or when the sound terminates), or permanent.
- Temporary loss of hearing (often called Temporary Threshold Shift – TTS): This recovers over minutes, hours, or days.
- Physical damage to auditory or non-auditory tissues (e.g., swim bladder, blood vessels, brain): The damage may be only temporary, and the tissue "heals" with little impact on

fish survival, or it may be more long-term, permanent, or may result in death. Death from physical damage could be a direct effect of the tissue damage or the result of the fish being more subject to predation than a healthy individual.

Studies on effects on hearing have generally been of two types. In one set of studies, the investigators exposed fish to long-term increases in background noise to determine if there are changes in hearing, growth, or survival of the fish. Such studies were directed at developing some understanding of how fish might be affected if they lived in an area with constant and increasing shipping or in the presence of a wind farm, or in areas where there are long-term acoustic tests. Other similar environments might be aquaculture facilities or large marine aquaria. In most of these studies examining long-term exposure, the sound intensity was well below any that might be expected to have immediate damage to fish (e.g., damage tissues such as the swim bladder or blood vessels).

In the second type of studies, fish were exposed to short-duration but high-intensity signals such as might be found near a high-intensity sonar, pile driving, or seismic airgun survey. The investigators in such studies were examining whether there was not only hearing loss and other long-term effects, but also short-term effects that could result in death to the exposed fish.

Effects of Long-Duration Increases in Background Sounds on Fish

Effects of long-duration relatively low intensity sounds (e.g., below 170–180 decibels (dB) re 1 micropascal (μPa) received level ([RL]) indicate that there is little or no effect of long-term exposure on hearing generalists (e.g., Scholik and Yan, 2001, Amoser and Ladich, 2003, Smith et al., 2004a,b, Wysocki et al., 2007). The longest of these studies exposed young rainbow trout (*Oncorhynchus mykiss*) to a level of noise equivalent to one that fish would experience in an aquaculture facility (e.g., on the order of 150 dB re 1 μPa RL) for about 9 months. The investigators found no effect on hearing or on any other measures including growth and effects on the immune system as compared to fish raised at 110 dB re 1 μPa RL. The sound level used in the study would be equivalent to ambient sound in the same environment without the presence of pumps and other noise sources of an aquaculture facility (Wysocki et al., 2007).

Studies on hearing specialists have shown that there is some hearing loss after several days or weeks of exposure to increased background sounds, although the hearing loss seems to recover (e.g., Scholik and Yan, 2002; Smith et al., 2004b, 2006). Smith et al. (2004a, 2006) investigated the goldfish (*Carassius auratus*). They exposed fish to noise at 170 dB re 1 μPa and there was a clear relationship between the level of the exposure sound and the amount of hearing loss. There was also a direct correlation of level of hearing loss and the duration of exposure, up to 24-hours, after which time the maximum hearing loss was found.

Similarly, Wysocki and Ladich (2005) investigated the influence of noise exposure on the auditory sensitivity of two freshwater hearing specialists, the goldfish and the lined Raphael catfish (*Platydoras costatus*), and on a freshwater hearing generalist, a sunfish (*Lepomis gibbosus*). Baseline thresholds showed greatest hearing sensitivity around 0.5 kilohertz (kHz) in the goldfish and catfish and at 0.1 kHz in the sunfish. For the hearing specialists (goldfish and catfish), continuous white noise of 130 dB re 1 μPa RL resulted in a significant threshold shift of 23 to 44 dB. In contrast, the auditory thresholds in the hearing generalist (sunfish) declined by 7 to 11 dB.

In summary, and while data are limited to a few freshwater species, it appears that some increase in ambient noise level, even to above 170 dB re 1 μPa does not permanently alter the hearing ability of the hearing generalist species studied, even if the increase in sound level is for an extended period of time. However, this may not be the case for all hearing generalists, though it is likely that any temporary hearing loss in such species would be considerably less than for specialists receiving the same noise exposure. But, it is critical to note that more extensive data are needed on additional species, and if there are places where the ambient levels exceed 170–180 dB, it would be important to do a quantitative study of effects of long-term sound exposure at these levels.

It is also clear that there is a larger temporary hearing loss in hearing specialists. Again, however, extrapolation from the few freshwater species to other species (freshwater or marine) must be done with caution until there are data for a wider range of species, and especially species with other types of hearing specializations than those found in the species studied to date (all of which are otophysan fishes and have the same specializations to enhance hearing).

Effects of High Intensity Sounds on Fish

There is a small group of studies that discusses effects of high intensity sound on fish. However, as discussed in Hastings and Popper (2005), much of this literature has not been peer reviewed, and there are substantial issues with regard to the actual effects of these sounds on fish. More recently, however, there have been two studies of the effects of high intensity sound on fish that, using experimental approaches, provided insight into overall effects of these sounds on hearing and on auditory and non-auditory tissues. One study tested effects of seismic airguns, a highly impulsive and intense sound source, while the other study examined the effects of Surveillance Towed Array Sensor System Low-Frequency Active (SURTASS LFA) sonar. Since these studies are the first that examined effects on hearing and physiology, they will be discussed in some detail. These studies not only provide important data, but also suggest ways in which future experiments need to be conducted. This discussion will be followed by a brief overview of other studies that have been done, some of which may provide a small degree of insight into potential effects of human-generated sound on fish.

Effects of Seismic Airguns on Fish

Popper et al. (2005; Song et al., 2006) examined the effects of exposure to a seismic airgun array on three species of fish found in the Mackenzie River Delta near Inuvik, Northwest Territories, Canada. The species included a hearing specialist, the lake chub (*Couesius plumbeus*), and two hearing generalists, the northern pike (*Esox lucius*), and the broad whitefish (*Coregonus nasus*) (a salmonid). In this study, fish in cages were exposed to 5 or 20 shots from a 730 in^3 (12,000 cc) calibrated airgun array. And, unlike earlier studies, the received exposure levels were not only determined for root-mean-square (rms) sound pressure level (SPL), but also for peak sound levels and for sound equivalent levels (SELs) (e.g., average mean peak SPL 207 dB re 1 μPa RL; mean rms sound level 197 dB re 1 μPa RL; mean SEL 177 dB re 1 $\mu Pa^2 s$).

The results showed a temporary hearing loss for both lake chub and northern pike, but not for the broad whitefish, to both 5 and 20 airgun shots. Hearing loss was on the order of 20 to 25 dB at some frequencies for both the northern pike and lake chub, and full recovery of hearing took place within 18 hours after sound exposure. While a full pathological study was not conducted, fish of all three species survived the sound exposure and were alive more than 24 hours after exposure. Those fish of all three species had intact swim bladders and there was no apparent external or internal damage to other body tissues (e.g., no bleeding or grossly damaged tissues), although it is important to note that the observer in this case (unlike in the following LFA study) was not a trained pathologist. Recent examination of the ear tissues by an expert pathologist showed no damage to sensory hair cells in any of the fish exposed to sound (Song et al., 2006).

A critical result of this study was that it demonstrated differences in the effects of airguns on the hearing thresholds of different species. In effect, these results substantiate the argument made by Hastings et al. (1996) and McCauley et al. (2003) that it is difficult to extrapolate between species with regard to the effects of intense sounds.

Experiments conducted by Skalski et al. (1992), Dalen and Raknes (1985), Dalen and Knutsen (1986), and Engas et al. (1996) demonstrated that some fish were forced to the bottom and others driven from the area in response to low-frequency airgun noise. The authors speculated that catch per unit effort would return to normal quickly in their experimental area because behavior of the fish returned to normal minutes after the sounds ceased.

Effects of SURTASS LFA Sonar on Fish

Popper et al. (2007) studied the effect of SURTASS LFA on hearing, the structure of the ear, and select non-auditory systems in the rainbow trout (*Oncorhynchus mykiss*) and channel catfish (*Ictalurus punctatus*) (also Halvorsen et al., 2006).

The SURTASS LFA sonar study was conducted in an acoustic free-field environment that enabled the investigators to have a calibrated sound source and to monitor the sound field throughout the experiments. In brief, experimental fish were placed in a test tank, lowered to depth, and exposed to LFA sonar for 324 or 648 seconds, an exposure duration that is far greater than any fish in the wild would get since, in the wild, the sound source is on a vessel moving past the far slower swimming fish. For a single tone, the maximum RL was approximately 193 dB re 1 μPa at 196 Hz and the level was uniform within the test tank to within approximately ±3 dB. The signals were produced by a single SURTASS LFA sonar transmitter giving an approximate source level of 215 dB. Following exposure, hearing was measured in the test animals. Animals were also sacrificed for examination of auditory and non-auditory tissues to determine any non-hearing effects. All results from experimental animals were compared to results obtained from baseline control and control animals.

A number of results came from this study. Most importantly, no fish died as a result of exposure to the experimental source signals. Fish all appeared healthy and active until they were sacrificed or returned to the fish farm from which they were purchased. In addition, the study employed the expertise of an expert fish pathologist who used double-blind methods to analyze the tissues of the fish exposed to the sonar source, and compared these to control animals. The results clearly showed that there were no pathological effects from sound exposure including no effects on all major body tissues (brain, swim bladder, heart, liver, gonads, blood, etc.). There was no damage to the swim bladder and no bleeding as a result of LFA sonar exposure. Furthermore, there were no short- or long-term effects on ear tissue (Popper et al., 2007, also Kane et al., in preparation).

Moreover, behavior of caged fish after sound exposure was no different than that prior to tests. It is critical to note, however, that behavior of fish in a cage in no way suggests anything about how fish would respond to a comparable signal in the wild. Just as the behavior of humans exposed to a noxious stimulus might show different behavior if in a closed room as compared to being out-of-doors, it is likely that the behaviors shown by fish to stimuli will also differ, depending upon their environment.

The study also incorporated effects of sound exposure on hearing both immediately post exposure and for several days thereafter to determine if there were any long-term effects, or if hearing loss showed up at some point post exposure. Catfish and some specimens of rainbow trout showed 10-20 dB of hearing loss immediately after exposure to the LFA sonar when compared to baseline and control animals; however, another group of rainbow trout showed no hearing loss. Recovery in trout took at least 48 hours, but studies could not be completed. The different results between rainbow trout groups is difficult to understand, but may be due to developmental or genetic differences in the various groups of fish. Catfish hearing returned to, or close to, normal within about 24 hours.

Additional Sonar Data

While there are no other data on the effects of sonar on fish, there are two recent unpublished reports of some relevance since it examined the effects on fish of a mid-frequency sonar (1.5 to 6.5 kHz) on larval and juvenile fish of several species (Jørgensen et al., 2005, Kvadsheim and Sevaldsen, 2005). In this study, larval and juvenile fish were exposed to simulated sonar signals in order to investigate potential effects on survival, development, and behavior. The study used herring (*Clupea harengus*) (standard lengths 2 to 5 centimeters [cm]), Atlantic cod (*Gadus morhua*) (standard length 2 and 6 cm), saithe (*Pollachius virens*) (4 cm), and spotted wolffish (*Anarhichas minor*) (4 cm) at different developmental stages.

Fish were placed in plastic bags 3 m from the sonar source and exposed to between four and 100 pulses of 1-second duration of pure tones at 1.5, 4 and 6.5 kHz. Sound levels at the location of the fish ranged from 150 to 189 dB. There were no effects on fish behavior during or after exposure to sound (other than some startle or panic movements by herring for sounds at 1.5 kHz) and there were no effects on behavior, growth (length and weight), or survival of fish kept as long as 34 days post exposure. All exposed animals were compared to controls that received similar treatment except for actual exposure to the sound. Excellent pathology of internal organs showed no damage as a result of sound exposure. The only exception to almost full survival was exposure of two groups of herring tested with SPLs of 189 dB, where there was a post-exposure mortality of 20 to 30 percent. While these were statistically significant losses, it is important to note that this sound level was only tested once and so it is not known if this increased mortality was due to the level of the test signal or to other unknown factors.

In a follow-up unpublished analysis of these data, Kvadsheim and Sevaldsen (2005) sought to understand whether the mid-frequency continuous wave (CW) signals used by Jørgensen et al. (2005) would have a significant impact on larvae and juveniles in the wild exposed to this sonar. The investigators concluded that the extent of damage/death induced by the sonar would be below the level of loss of larval and juvenile fish from natural causes, and so no concerns should be raised. The only issue they did suggest needs to be considered is when the CW signal is at the resonance frequency of the swim bladders of small clupeids. If this is the case, the investigators predict (based on minimal data that is in need of replication) that such sounds might increase the mortality of small clupeids that have swim bladders that would resonate.

Other High Intensity Sources

A number of other sources have been examined for potential effects on fish. These have been critically and thoroughly reviewed recently by Hastings and Popper (2005) and so only brief mention will be made of a number of such studies.

One of the sources of most concern is pile driving, as occurs during the building of bridges, piers, off-shore wind farms, and the like. There have been a number of studies that suggest that the sounds from pile driving, and particularly from driving of larger piles, kill fish that are very close to the source. The source levels in such cases often exceed 230 dB re 1 μPa (peak) and there is some evidence of tissue damage accompanying exposure (e.g., Caltrans 2001, 2004, reviewed in Hastings and Popper 2005). However, there is reason for concern in analysis of such data since, in many cases, the only dead fish that were observed were those that came to the surface. It is not clear whether fish that did not come to the surface survived the exposure to the sounds, or died and were carried away by currents.

There are also a number of gray literature experimental studies that placed fish in cages at different distances from the pile driving operations and attempted to measure mortality and tissue damage as a result of sound exposure. However, in most cases the studies' (e.g., Caltrans 2001, 2004, Abbott et al. 2002, 2005, Nedwell et al. 2003) work was done with few or no controls, and the behavioral and histopathological observations done very crudely (the exception being Abbott et al. 2005). As a consequence of these limited and unpublished data, it is not possible to know the real effects of pile driving on fish.

In a widely cited unpublished report, Turnpenny et al. (1994) examined the behavior of three species of fish in a pool in response to different sounds. While this report has been cited repeatedly as being the basis for concern about the effects of human-generated sound on fish, there are substantial issues with the work that make the results unusable for helping understand the potential effects of any sound on fish, including mid- and high-frequency sounds. The problem with this study is that there was a complete lack of calibration of the sound field at different frequencies and depths in the test tank, as discussed in detail in Hastings and Popper (2005). The issue is that in enclosed chambers that have an interface with air, such as tanks and pools used by Turnpenny et al., the sound field is known to be very complex and will change significantly with frequency and depth. Thus, it is impossible to know the stimulus that was actually received by the fish. Moreover, the work done by Turnpenny et al. was not replicated by the investigators even within the study, and so it is not known if the results were artifact, or were a consequence of some uncalibrated aspects of the sound field that cannot be related, in any way, to human-generated high intensity sounds in the field, at any frequency range.

Several additional studies have examined effects of high intensity sounds on the ear. While there was no effect on ear tissue in either the SURTASS LFA study (Popper et al., 2007) or the study of effects of seismic airguns on hearing (Popper et al., 2005, Song et al., 2006), three earlier studies suggested that there may be some loss of sensory hair cells due to high intensity sources. However, none of these studies concurrently investigated effects on hearing or non-auditory tissues. Enger (1981) showed some loss of sensory cells after exposure to pure tones in the Atlantic cod. A similar result was shown for the lagena of the oscar (*Astronotus oscellatus*), a cichlid fish, after an hour of continuous exposure (Hastings et al., 1996). In neither study was the hair cell loss more than a relatively small percent of the total sensory hair cells in the hearing organs.

Most recently, McCauley et al. (2003) showed loss of a small percent of sensory hair cells in the saccule (the only end organ studied) of the pink snapper (*Pagrus auratus*), and this loss continued to increase (but never to become a major proportion of sensory cells) for up to at least 53 days post exposure. It is not known if this hair cell loss, or the ones in the Atlantic cod or oscar, would result in hearing loss since fish have tens or even hundreds of thousands of sensory hair cells in each otolithic organ (Popper and Hoxter, 1984, Lombarte and Popper, 1994) and only a small portion were affected by the sound. The question remains as to why McCauley et al. (2003) found damage to sensory hair cells while Popper et al. (2005) did not. The problem is that there are so many differences in the studies, including species, precise sound source, spectrum of the sound (the Popper et al. 2005 study was in relatively shallow water with poor low-frequency propagation), that it is hard to even speculate.

Beyond these studies, there have also been questions raised as to the effects of other sound sources such as shipping, wind farm operations, and the like. However, there are limited or no data on actual effects of the sounds produced by these sources on any aspect of fish biology.

Intraspecific Variation in Effects

One unexpected finding in several of the recent studies is that there appears to be variation in the effects of sound, and on hearing, that may be a correlated with environment, developmental history, or even genetics.

During the aforementioned LFA sonar study on rainbow trout, Popper et al. (2007) found that some fish showed a hearing loss, but other animals, obtained a year later but from the same supplier and handled precisely as the fish used in the earlier part of the study, showed no hearing loss. The conclusion reached by Popper et al. (2007) was that the differences in responses may have been related to differences in genetic stock or some aspect of early development in the two groups of fish studied.

The idea of a developmental effect was strengthened by findings of Wysocki et al. (2007) who found differences in hearing sensitivity of rainbow trout that were from the same genetic stock, but that were treated slightly differently in the egg stage. This is further supported by studies on hatchery-reared Chinook salmon (*Oncorhynchus tshawytscha*) which showed that some animals from the same stock and age class had statistical differences in their hearing capabilities that were statistically correlated with differences in otolith structure (Oxman et al., 2007). While a clear correlation could not be made between these differences in otolith structure and specific factors, there is strong reason to believe that the differences resulted from environmental effects during development.

The conclusion one must reach from these findings is that there is not only variation in effects of intense sound sources on different species, but that there may also be differences based on genetics or development. Indeed, one can go even further and suggest that there may ultimately be differences in effects of sound on fish (or lack of effects) that are related to fish age as well as development and genetics since it was shown by Popper et al. (2005) that identical seismic airgun exposures had very different effects on hearing in young-of-the-year northern pike and sexually mature animals.

Effects of Anthropogenic Sound on Behavior

There have been very few studies of the effects of anthropogenic sounds on the behavior of wild (unrestrained) fishes. This includes not only immediate effects on fish that are close to the source but also effects on fish that are further from the source.

Several studies have demonstrated that human-generated sounds may affect the behavior of at least a few species of fish. Engås et al. (1996) and Engås and Løkkeborg (2002) examined movement of fish during and after a seismic airgun study although they were not able to actually observe the behavior of fish per se. Instead, they measured catch rate of haddock and Atlantic cod as an indicator of fish behavior. These investigators found that there was a significant decline in catch rate of haddock (*Melanogrammus aeglefinus*) and Atlantic cod (*Gadus morhua*) that lasted for several days after termination of airgun use. Catch rate subsequently returned to normal. The conclusion reached by the investigators was that the decline in catch rate resulted from the fish moving away from the fishing site as a result of the airgun sounds. However, the investigators did not actually observe behavior, and it is possible that the fish just changed depth. Another alternative explanation is that the airguns actually killed the fish in the area, and the return to normal catch rate occurred because of other fish entering the fishing areas.

More recent work from the same group (Slotte et al., 2004) showed parallel results for several additional pelagic species including blue whiting and Norwegian spring spawning herring. However, unlike earlier studies from this group, Slotte et al. used fishing sonar to observe behavior of the local fish schools. They reported that fishes in the area of the airguns appeared to go to greater depths after the airgun exposure compared to their vertical position prior to the airgun usage. Moreover, the abundance of animals 30-50 km away from the ensonification increased, suggesting that migrating fish would not enter the zone of seismic activity. It should be pointed out that the results of these studies have been refuted by Gausland (2003) who, in a non peer-reviewed study, suggested that catch decline was from factors other than exposure to airguns and that the data were not statistically different than the normal variation in catch rates over several seasons.

Similarly Skalski et al. (1992) showed a 52 percent decrease in rockfish (*Sebastes* sp.) catch when the area of catch was exposed to a single airgun emission at 186-191 dB re 1 µPa (mean peak level) (see also Pearson et al., 1987, 1992). They also demonstrated that fishes would show a startle response to sounds as low as 160 dB, but this level of sound did not appear to elicit decline in catch.

Wardle et al. (2001) used a video system to examine the behaviors of fish and invertebrates on a coral reef in response to emissions from seismic airguns that were carefully calibrated and measured to have a peak level of 210 dB re 1 µPa at 16 m from the source and 195 dB re 1 µPa at 109 m from the source. They found no substantial or permanent changes in the behavior of the fish or invertebrates on the reef throughout the course of the study, and no animals appeared to leave the reef. There was no indication of any observed damage to the animals.

Culik et al. (2001) and Gearin et al. (2000) studied how noise may affect fish behavior by looking at the effects of mid-frequency sound produced by acoustic devices designed to deter marine mammals from gillnet fisheries. Gearin et al. (2000) studied responses of adult sockeye salmon (*Oncorhynchus nerka*) and sturgeon (*Acipenser* sp.) to pinger sounds. They found that fish did not exhibit any reaction or behavior change to the onset of the sounds of pingers that produced broadband energy with peaks at 2 kHz or 20 kHz. This demonstrated that the alarm was either inaudible to the salmon and sturgeon, or that neither species was disturbed by the mid-frequency sound (Gearin et al., 2000). Based on hearing threshold data (Table 3.1.2.2.3.2-1), it is highly likely that the salmonids did not hear the sounds.

Culik et al. (2001) did a very limited number of experiments to determine catch rate of herring (*Clupea harengus*) in the presence of pingers producing sounds that overlapped the frequency range of hearing of herring (2.7 kHz to over 160 kHz). They found no change in catch rate in gill nets with or without the higher frequency (> 20 kHz) sounds present, although there was an increase in catch rate with the signals from 2.7 kHz to 19 kHz (a different source than the higher frequency source). The results could mean that the fish did not “pay attention” to the higher frequency sound or that they did not hear it, but that lower frequency sounds may be attractive to fish. At the same time, it should be noted that there were no behavioral observations on the fish, and so how the fish actually responded when they detected the sound is not known.

The low-frequency (<2 kHz) sounds of large vessels or accelerating small vessels usually caused an initial avoidance response among the herring. The startle response was observed occasionally. Avoidance ended within 10 seconds of the “departure” of the vessel. After the initial response, 25 percent of the fish groups habituated to the sound of the large vessel and 75 percent of the responsive fish groups habituated to the sound of the small boat. Chapman and Hawkins (1969) also noted that fish adjust rapidly to high underwater sound levels, and Schwartz and Greer (1984) found no reactions to an echosounder and playbacks of sonar signals which were much higher than that of the MFA in the Proposed Action.

Masking

Any sound detectable by a fish can have an impact on behavior by preventing the fish from hearing biologically important sounds including those produced by prey or predators (Myrberg 1980, Popper et al. 2003). This inability to perceive biologically relevant sounds as a result of the presence of other sounds is called masking. Masking may take place whenever the received level of a signal heard by an animal exceeds ambient noise levels or the hearing threshold of the animal. Masking is found among all vertebrate groups, and the auditory system in all vertebrates, including fishes, is capable of limiting the effects of masking signals, especially when they are in a different frequency range than the signal of biological relevance (Fay, 1988, Fay and Megela-Simmons 1999).

One of the problems with existing fish masking data is that the bulk of the studies have been done with goldfish, a freshwater hearing specialist. The data on other species are much less extensive. As a result, less is known about masking in non-specialist and marine species. Tavolga (1974a, b) studied the effects of noise on pure-tone detection in two non-specialists and found that the masking effect was generally a linear function of masking level, independent of frequency. In addition, Buerkle (1968, 1969) studied five frequency bandwidths for Atlantic cod in the 20 to 340 Hz region and showed masking in all hearing ranges. Chapman and Hawkins (1973) found that ambient noise at higher sea states in the ocean have masking effects in cod, haddock, and Pollock, and similar results were suggested for several sciaenid species by Ramcharitar and Popper (2004). Thus, based on limited data, it appears that for fish, as for mammals, masking may be most problematic in the frequency region of the signal of the masker. Thus, for mid-frequency sonars, which are well outside the range of hearing of most all fish species, there is little likelihood of masking taking place for biologically relevant signals to fish since the fish will not hear the masker.

There have been a few field studies which may suggest that masking could have an impact on wild fish. Gannon et al. (2005) showed that bottlenose dolphins (*Tursiops truncatus*) move toward acoustic playbacks of the vocalization of Gulf toadfish (*Opsanus beta*). Bottlenose dolphins employ a variety of vocalizations during social communication including low-frequency pops. Toadfish may be able to best detect the low-frequency pops since their hearing is best below 1 kHz, and there is some indication that toadfish have reduced levels of calling when bottlenose dolphins approach (Remage-Healey et al. 2006). Silver perch have also been shown to decrease calls when exposed to playbacks of dolphin whistles mixed with other biological sounds (Luczkovich et al. 2000). Results of the Luczkovich et al. (2000) study, however, must be viewed with caution because it is not clear what sound may have elicited the silver perch response (Ramcharitar et al. 2006a).

Of considerable concern is that human-generated sounds could mask the ability of fish to use communication sounds, especially when the fish are communicating over some distance. In effect, the masking sound may limit the distance over which fish can communicate, thereby having an impact on important components of the behavior of fish. For example, the sciaenids, which are primarily inshore species, are probably the most active sound producers among fish, and the sounds produced by males are used to “call” females to breeding sights (Ramcharitar et al. 2001; reviewed in Ramcharitar et al. 2006a). If the females are not able to hear the reproductive sounds of the males, this could have a significant impact on the reproductive success of a population of sciaenids.

Also potentially vulnerable to masking is navigation by larval fish, although the data to support such an idea are still exceedingly limited. There is indication that larvae of some species may have the potential to navigate to juvenile and adult habitat by listening for sounds emitted from a reef (either due to animal sounds or non-biological sources such as surf action) (e.g., Higgs 2005). In a study of an Australian reef system, the sound signature emitted from fish choruses was between 0.8 and 1.6 kHz (Cato 1978) and could be detected by hydrophones 5 to 8 km (3 to 4 NM) from the reef (McCauley and Cato 2000). This bandwidth is within the detectable bandwidth of adults and larvae of the few species of reef fish that have been studied (Kenyon 1996, Myrberg 1980). At the same time, it has not been demonstrated conclusively that sound, or sound alone, is an attractant of larval fish to a reef, and the number of species tested has been very limited. Moreover, there is also evidence that larval fish may be using other kinds of sensory cues, such as chemical signals, instead of, or alongside of, sound (e.g., Atema et al. 2002, Higgs et al. 2005).

Finally, it should be noted that even if a masker prevents a larval (or any) fish from hearing biologically relevant sounds for a short period of time (e.g., while a sonar-emitting ship is passing), this may have no biological effect on the fish since they would be able to detect the relevant sounds before and after the masking, and thus would likely be able to find the source of the sounds.

Stress

Although an increase in background sound may cause stress in humans, there have been few studies on fish (e.g., Smith et al. 2004a, Remage-Healey et al. 2006, Wysocki et al. 2006, 2007). There is some indication of physiological effects on fish such as a change in hormone levels and altered behavior in some (Pickering 1981, Smith et al. 2004a, b), but not all, species tested to date (e.g., Wysocki et al. 2007). Sverdrup et al. (1994) found that Atlantic salmon subjected to up to 10 explosions to simulate seismic blasts released primary stress hormones, adrenaline and cortisol, as a biochemical response. There was no mortality. All experimental subjects returned to their normal physiological levels within 72 hours of exposure. Since stress affects human health, it seems reasonable that stress from loud sound may impact fish health, but available information is too limited to adequately address the issue.

Eggs and Larvae

One additional area of concern is whether high intensity sounds may have an impact on eggs and larvae of fish. Eggs and larvae do not move very much and so must be considered as a stationary object with regard to a moving navy sound source. Thus, the time for impact of sound is relatively small since there is no movement relative to the Navy vessel.

There have been few studies on effects of sound on eggs and larvae (reviewed extensively in Hastings and Popper 2005) and there are no definitive conclusions to be reached. At the same time, many of the studies have used non-acoustic mechanical signals such as dropping the eggs and larvae or subjecting them to explosions (e.g., Jensen and Alderice 1983, 1989, Dwyer et al. 1993). Other studies have placed the eggs and/or larvae in very small chambers (e.g., Banner and Hyatt 1973) where the acoustics are not suitable for comparison with what might happen in a free sound field (and even in the small chambers, results are highly equivocal).

Several studies did examine effects of sounds on fish eggs and larvae. One non peer-reviewed study using sounds from 115-140 dB (re 1 µPa, peak) on eggs and embryos in Lake Pend Oreille (Idaho) reported normal survival or hatching, but few data were provided to evaluate the results (Bennett et al., 1994). In another study, Kostyuchenko (1973) reported damage to eggs of several marine species at up to 20 m from a source designed to mimic seismic airguns, but few data were given as to effects. Similarly, Booman et al. (1996) investigated the effects of seismic airguns on eggs, larvae, and fry and found significant mortality in several different marine species (Atlantic cod, saithe, herring) at a variety of ages, but only when the specimens were within about 5 m of the source. The most substantial effects were to fish that were within 1.4 m of the source. While the authors suggested damage to some cells such as those of the lateral line, few data were reported and the study is in need of replication. Moreover, it should be noted that the eggs and larvae were very close to the airgun array, and at such close distances the particle velocity of the signal would be exceedingly large. However, the received sound pressure and particle velocity were not measured in this study.

Conclusions - Effects

The data obtained to date on effects of sound on fish are very limited both in terms of number of well-controlled studies and in number of species tested. Moreover, there are significant limits in the range of data available for any particular type of sound source. And finally, most of the data currently available has little to do with actual behavior of fish in response to sound in their normal environment. There is also almost nothing known about stress effects of any kind(s) of sound on fish.

Mortality and Damage to Non-auditory Tissues

The results to date show only the most limited mortality, and then only when fish are very close to an intense sound source. Thus, whereas there is evidence that fish within a few meters of a pile driving operation will potentially be killed, very limited data (and data from poorly designed experiments) suggest that fish further from the source are not killed, and may not be harmed. It should be noted, however, that these and other studies showing mortality (to any sound source) need to be extended and replicated in order to understand the effects of the most intense sound on fish.

It is also becoming a bit clearer (again, albeit from very few studies) that those species of fish tested at a distance from the source where the sound level is below source level, show no mortality and possibly no long-term effects. Of course, it is recognized that it is very difficult to extrapolate from the data available (e.g., Popper et al. 2005, 2007) since only a few sound types have been tested, and even within a single sound type there have to be questions about effects of multiple exposures and duration of exposure. Still, the results to date are of considerable interest and importance, and clearly show that exposure to many types of loud sounds may have little or no affect on fish. And, if one considers that the vast majority of fish exposed to a loud sound are probably some distance from a source, where the sound level has attenuated considerably, one can start to predict that only a very small number of animals in a large population will ever be killed or damaged by sounds.

Effects on Fish Behavior

The more critical issue, however, is the effect of human-generated sound on the behavior of wild animals, and whether exposure to the sounds will alter the behavior of fish in a manner that will affect its way of living – such as where it tries to find food or how well it can find a mate. With the exception of just a few field studies, there are no data on behavioral effects, and most of these studies are very limited in scope and all are related to seismic airguns. Because of the limited ways in which behavior of fish in these studies were “observed” (often by doing catch rates, which tell nothing about how fish really react to a sound), there really are no data on the most critical questions regarding behavior.

Indeed, the fundamental questions are how fish behave during and after exposure to a sound as compared to their “normal” pre-exposure behavior. This requires observations of a large number of animals over a large area for a considerable period of time before and after exposure to sound sources, as well as during exposure. Only with such data is it possible to tell how sounds affect overall behavior (including movement) of animals.

Increased Background Sound

In addition to questions about how fish movements change in response to sounds, there are also questions as to whether any increase in background sound has an effect on more subtle aspects of behavior, such as the ability of a fish to hear a potential mate or predator, or to glean information about its general environment. There is a body of literature that shows that the sound detection ability of fish can be “masked” by the presence of other sounds within the range of hearing of the fish. Just as a human has trouble hearing another person as the room they are in gets noisier, it is likely that the same effect occurs for fish (as well as all other animals). In effect, acoustic communication and orientation of fish may potentially be restricted by noise regimes in their environment that are within the hearing range of the fish.

While it is possible to suggest behavioral effects on fish, there have been few laboratory, and no field, studies to show the nature of any effects of increased background noise on fish behavior. At the same time, it is clear from the literature on masking in fish, as for other vertebrates, that the major effect on hearing is when the added sound is within the hearing range of the animal. Moreover, the bulk of the masking effect is at frequencies around that of the masker. Thus, a 2 kHz masker will only mask detection of sounds around 2 kHz, and a 500 Hz masker will primarily impact hearing in a band around 500 Hz.

As a consequence, if there is a background sound of 2 kHz, as might be expected from some mid-frequency sonars, and the fish in question does not hear at that frequency, there will be no masking, and no affect on any kind of behavior. Moreover, since the bulk of fish communication sounds are well below 1 kHz (e.g., Zelick et al. 1999), even if a fish is exposed to a 2 kHz masker which affects hearing at around 2 kHz, detection of biologically relevant sounds (e.g., of mates) will not be masked.

Indeed, many of the human-generated sounds in the marine environment are outside the detection range of most species of marine fish studied to date (see Figure 3.1.2.2.3.1-1 and Table 3.1.2.2.3.2-1). In particular, it appears that the majority of marine species have hearing ranges that are well below the frequencies of the mid- and high-frequency range of the operational sonars used in Navy exercises, and therefore, the sound sources do not have the potential to mask key environmental sounds. The few fish species that have been shown to be able to detect mid- and high-frequencies, such as the clupeids (herrings, shads, and relatives), do not have their best sensitivities in the range of the operational sonars. Additionally, vocal marine fish largely communicate below the range of mid- and high-frequency levels used in Navy exercises.

Implications of Temporary Hearing Loss (TTS)

Another related issue is the impact of temporary hearing loss, referred to as temporary threshold shift (TTS), on fish. This effect has been demonstrated in several fish species where investigators used exposure to either long-term increased background levels (e.g., Smith et al. 2004a) or intense, but short-term, sounds (e.g., Popper et al. 2005), as discussed above. At the same time, there is no evidence of permanent hearing loss (e.g., deafness), often referred to in the mammalian literature as permanent threshold shift (PTS), in fish. Indeed, unlike in mammals where deafness often occurs as a result of the death and thus permanent loss of sensory hair cells, sensory hair cells of the ear in fish are replaced after they are damaged or killed (Lombarte et al., 1993, Smith et al., 2006). As a consequence, any hearing loss in fish may be as temporary as the time course needed to repair or replace the sensory cells that were damaged or destroyed (e.g., Smith et al., 2006).

TTS in fish, as in mammals, is defined as a recoverable hearing loss. Generally there is recovery to normal hearing levels, but the time-course for recovery depends on the intensity and duration of the TTS-evoking signal. There are no data that allows one to “model” expected TTS in fish for different signals, and developing such a model will require far more data than currently available. Moreover, the data would have to be from a large number of fish species since there is so much variability in hearing capabilities and in auditory structure.

A fundamentally critical question regarding TTS is how much the temporary loss of hearing would impact survival of fish. During a period of hearing loss, fish will potentially be less sensitive to sounds produced by predators or prey, or to other acoustic information about their environment. The question then becomes how much TTS is behaviorally significant for survival. However, there have yet to be any studies that examine this issue.

At the same time, the majority of marine fish species are hearing generalists and so cannot hear mid- and high-frequency sonar. Thus, there is little or no likelihood of there being TTS as a result of exposure to these sonars, or any other source above 1.5 kHz. It is possible that mid-frequency sonars are detectable by some hearing specialists such as a number of sciaenid species and clupeids. However, the likelihood of TTS in these species is small since the duration of exposure of animals to a moving source is probably very low since exposure to a maximum sound level (generally well below the source level) would only be for a few seconds as the navy vessel moves by.

Stress

While the major questions on effects of sound relate to behavior of fish in the wild, a more subtle issue is whether the sounds potentially affect the animal through increased stress. In effect, even when there are no apparent direct effects on fish as manifest by hearing loss, tissue damage, or changes in behavior, it is possible that there are more subtle effects on the endocrine or immune systems that could, over a long period of time, decrease the survival or reproductive success of animals. While there have been a few studies that have looked at things such as cortisol levels in response to sound, these studies have been very limited in scope and in species studied.

Eggs and Larvae

Finally, while eggs and larvae must be of concern, the few studies of the effects of sounds on eggs and larvae do not lead to any conclusions with how sound would impact survival. And of the few potentially useful studies, most were done with sources that are very different than sonar. Instead, they employed seismic airguns or mechanical shock. While a few results suggest some potential effects on eggs and larvae, such studies need to be replicated and designed to ask direct questions about whether sounds, and particularly mid- and high-frequency sounds, would have any potential impact on eggs and larvae.

Effects of Impulsive Sounds

There are few studies on the effects of impulsive sounds on fish, and no studies that incorporated mid- or high-frequency signals. The most comprehensive studies using impulsive sounds are from seismic airguns (e.g., Popper et al. 2005, Song et al. 2006). Additional studies have included those on pile driving (reviewed in Hastings and Popper 2005) and explosives (e.g., Yelverton et al. 1975, Keevin et al. 1997, Govoni et al. 2003; reviewed in Hastings and Popper 2005).

As discussed earlier, the airgun studies on very few species resulted in a small hearing loss in several species, with complete recovery within 18 hours (Popper et al. 2005). Other species showed no hearing loss with the same exposure. There appeared to be no effects on the structure of the ear (Song et al., 2006), and a limited examination of non-auditory tissues, including the swim bladder, showed no apparent damage (Popper et al., 2005). One other study of effects of an airgun exposure showed some damage to the sensory cells of the ear (McCauley et al., 2003), but it is hard to understand the differences between the two studies. However, the two studies had different methods of exposing fish, and used different species.

There are other studies that have demonstrated some behavioral effects on fish during airgun exposure used in seismic exploration (e.g., Pearson et al., 1987, 1992, Engås et al., 1996, Engås and Løkkeborg, 2002, Slotte et al., 2004), but the data are limited and it would be very difficult to extrapolate to other species, as well as to other sound sources.

Explosive Sources

A number of studies have examined the effects of explosives on fish. These are reviewed in detail in Hastings and Popper (2005). One of the real problems with these studies is that they are highly variable and so extrapolation from one study to another, or to other sources, such as those used by the Navy, is not really possible. While many of these studies show that fish are killed if they are near the source, and there are some suggestions that there is a correlation between size of the fish and death (Yelverton et al., 1975), little is known about the very important issues of non-mortality damage in the short- and long-term, and nothing is known about effects on behavior of fish.

The major issue in explosives is that the gas oscillations induced in the swim bladder or other air bubble in fishes caused by high sound pressure levels can potentially result in tearing or rupturing of the chamber. This has been suggested to occur in some (but not all) species in several gray literature unpublished reports on effects of explosives (e.g., Alpin 1947; Coker and Hollis, 1950; Gaspin 1975; Yelverton et al., 1975), whereas other published studies do not show such rupture (e.g., the very well done peer reviewed study by Govoni et al., 2003). Key variables that appear to control the physical interaction of sound with fishes include the size of the fish relative to the wavelength of sound, mass of the fish, anatomical variation, and location of the fish in the water column relative to the sound source (e.g., Yelverton et al., 1975, Govoni et al., 2003).

Explosive blast pressure waves consist of an extremely high peak pressure with very rapid rise times (< 1 millisecond [ms]). Yelverton et al. (1975) exposed eight different species of freshwater fish to blasts of 1-lb spheres of Pentolite in an artificial pond. The test specimens ranged from 0.02 g (guppy) to 744 g (large carp) body mass and included small and large animals from each species. The fish were exposed to blasts having extremely high peak overpressures with varying impulse lengths. The investigators found what appears to be a direct correlation between body mass and the magnitude of the "impulse," characterized by the product of peak overpressure and the time it took the overpressure to rise and fall back to zero (units in psi-ms), which caused 50 percent mortality (see Hastings and Popper 2005 for detailed analysis).

One issue raised by Yelverton et al. (1975) was whether there was a difference in lethality between fish which have their swim bladders connected by a duct to the gut and fish which do not have such an opening. The issue is that it is potentially possible that a fish with such a connection could rapidly release gas from the swim bladder on compression, thereby not increasing its internal pressure. However, Yelverton et al. (1975) found no correlation between lethal effects on fish and the presence or lack of connection to the gut.

While these data suggest that fishes with both types of swim bladders are affected in the same way by explosive blasts, this may not be the case for other types of sounds, and especially those with longer rise or fall times that would allow time for a biomechanical response of the swim bladder (Hastings and Popper, 2005). Moreover, there is some evidence that the effects of explosives on fishes without a swim bladder are less than those on fishes with a swim bladder (e.g., Gaspin, 1975; Goertner et al., 1994; Keevin et al., 1997). Thus, if internal damage is, even in part, an indirect result of swim bladder (or other air bubble) damage, fishes without this organ may show very different secondary effects after exposure to high sound pressure levels. Still, it must be understood that the data on effects of impulsive sources and explosives on fish are limited in number and quality of the studies, and in the diversity of fish species studied. Thus, extrapolation from the few studies available to other species or other devices must be done with the utmost caution.

In a more recent published report, Govoni et al. (2003) found damage to a number of organs in juvenile pinfish (*Lagodon rhomboids*) and spot (*Leiostomus xanthurus*) when they were exposed to submarine detonations at a distance of 3.6 m, and most of the effects, according to the authors, were sublethal. Effects on other organ systems that would be considered irreversible (and presumably lethal) only occurred in a small percentage of fish exposed to the explosives. Moreover, there was virtually no effect on the same sized animals when they were at a distance of 7.5 m, and more pinfish than spot were affected.

Based upon currently available data it is not possible to predict specific effects of Navy impulsive sources on fish. At the same time, there are several results that are at least suggestive of potential effects that result in death or damage. First, there are data from impulsive sources such as pile driving and seismic airguns that indicate that any mortality declines with distance, presumably because of lower signal levels. Second, there is also evidence from studies of explosives (Yelverton et al., 1975) that smaller animals are more affected than larger animals. Finally, there is also some evidence that fish without an air bubble, such as flatfish and sharks and rays, are less likely to be affected by explosives and other sources than are fish with a swim bladder or other air bubble.

Yet, as indicated for other sources, the evidence of short- and long-term behavioral effects, as defined by changes in fish movement, etc., is non-existent. Thus, we still do not know if the presence of an explosion or an impulsive source at some distance, while not physically harming a fish, will alter its behavior in any significant way.

General Conclusions of Sounds on Fish

As discussed, the extent of data, and particularly scientifically peer-reviewed data, on the effects of high intensity sounds on fish is exceedingly limited. Some of these limitations include:

- Types of sources tested;
- Effects of individual sources as they vary by such things as intensity, repetition rate, spectrum, distance to the animal, etc.;
- Number of species tested with any particular source;
- The ability to extrapolate between species that are anatomically, physiologically, and/or taxonomically, different;
- Potential differences, even within a species as related to fish size (and mass) and/or developmental history;
- Differences in the sound field at the fish, even when studies have used the same type of sound source (e.g., seismic airgun);

- Poor quality experimental design and controls in many of the studies to date;
- Lack of behavioral studies that examine the effects on, and responses of, fish in their natural habitat to high intensity signals;
- Lack of studies on how sound may impact stress, and the short- and long-term effects of acoustic stress on fish; and
- Lack of studies on eggs and larvae that specifically use sounds of interest to the Navy.

At the same time, in considering potential sources that are in the mid- and high-frequency range, a number of potential effects are clearly eliminated. Most significantly, since the vast majority of fish species studied to date are hearing generalists and cannot hear sounds above 500 to 1,500 Hz (depending upon the species), there are not likely to be behavioral effects on these species from higher frequency sounds.

Moreover, even those fish species that may hear above 1.5 kHz, such as a few sciaenids and the clupeids (and relatives), have relatively poor hearing above 1.5 kHz as compared to their hearing sensitivity at lower frequencies. Thus, it is reasonable to suggest that even among the species that have hearing ranges that overlap with some mid- and high-frequency sounds, it is likely that the fish will only actually hear the sounds if the fish and source are very close to one another. And, finally, since the vast majority of sounds that are of biological relevance to fish are below 1 kHz (e.g., Zelick et al., 1999; Ladich and Popper, 2004), even if a fish detects a mid- or high-frequency sound, these sounds will not mask detection of lower frequency biologically relevant sounds.

Thus, a reasonable conclusion, even without more data, is that there will be few, and more likely no, impacts on the behavior of fish.

At the same time, it is possible that very intense mid- and high-frequency signals, and particularly explosives, could have a physical impact on fish, resulting in damage to the swim bladder and other organ systems. However, even these kinds of effects have only been shown in a few cases in response to explosives, and only when the fish has been very close to the source. Such effects have never been shown to any Navy sonar. Moreover, at greater distances (the distance clearly would depend on the intensity of the signal from the source) there appears to be little or no impact on fish, and particularly no impact on fish that do not have a swim bladder or other air bubble that would be affected by rapid pressure changes.

Underwater Detonations

Underwater detonations are possible during SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS. The weapons used in most missile and Live Fire Exercises pose little risk to fish unless the fish were near the surface at the point of impact. Machine guns (50 caliber) and close-in weapons systems (anti-missile systems) fire exclusively non-explosive ammunition. The same applies to larger weapons firing inert ordnance for training (e.g., 5-inch guns and 76-mm guns). The rounds pose an extremely low risk of a direct hit and potential to directly affect a marine species. Target area clearance procedures will again reduce this risk. A SINKEX uses a variety of live fire weapons. These rounds pose a risk only at the point of impact.

Several factors determine a fish's susceptibility to harm from underwater detonations. Most injuries in fish involve damage to air- or gas-containing organs (i.e., the swim bladder). Fish with swim bladders are vulnerable to effects of explosives, while fish without swim bladders are much more resistant (Yelverton, 1981; Young, 1991). Research has focused on the effects on the swim bladder from underwater detonations but not the ears of fish (Edds-Walton and Finneran, 2006).

For underwater demolition training, the effects on fish from a given amount of explosive depend on location, season, and many other factors. O'Keeffe (1984) provides charts that allow estimation of the potential effect on swim-bladder fish using a damage prediction method developed by Goertner (1982). O'Keeffe's parameters include the size of the fish and its location relative to the explosive source, but are independent of environmental conditions (e.g., depth of fish, explosive shot, frequency content). Table 4.1.2.2-1 lists the estimated maximum effects ranges using O'Keeffe's (1984) method for an 8-pound (lb) explosion at source depths of 1.7 fathoms (10 ft).

Table 4.1.2.2-1. Maximum Fish-Effects Ranges

Fish Weight	10 Percent Mortality Range (in feet)
1 ounce	518.3
1 pound	208.9
30 pounds	155.2

Source: O'Keefe, 1984

Potential impacts on fish from underwater demolition detonations would be negligible. A small number of fish are expected to be injured by detonation of explosive, and some fish located in proximity to the initial detonations can be expected to die. However, the overall impacts on water column habitat would be localized and transient. As training begins, the natural reaction of fish in the vicinity would be to leave the area. When training events are completed, the fish stock would be expected to return to the area.

Essential Fish Habitat

This section briefly discusses the potential impacts by the proposed actions to EFH and managed species. Despite nearshore and offshore designations of the HRC, species within all Fisheries Management Plans (FMPs) may utilize both nearshore and offshore areas during their lives, as eggs and larvae for most species are planktonic and can occur in nearshore and offshore waters, while adults may be present in nearshore and/or offshore waters. Therefore, all project activities can potentially affect a lifestage of a managed species.

Adverse effects are defined as any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810(a)).

Permanent, adverse impacts on EFH components are not anticipated since operations are conducted to avoid potential impacts; however, there are temporary unavoidable impacts associated with several operations that may result in temporary and localized impacts. In addition, a single operation may potentially have multiple effects on EFH. The current and proposed operations in the HRC have the potential to result in the following impacts:

- Physical disruption of open ocean habitat
- Physical destruction or adverse modification of benthic habitats
- Alteration of water or sediment quality from debris or discharge
- Cumulative impacts

Each impact and operation associated with those impacts are discussed in a separate document, *Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007b) and a summary for each proposed activity is provided. Potential impacts on FMP species include direct and indirect effects from sonar and shock waves (see discussion above and EFH document, U.S. Department of the Navy, 2007a). Numerous operations may affect benthic habitats from debris, and there may also be temporary impacts on water quality from increased turbidity or release of materials. However, due to the mitigation measures implemented to protect sensitive habitats, and the localized and temporary impacts of the Proposed Action and alternatives, it is concluded that the potential impact of the Proposed Action and alternatives on EFH for the five major FMPs and their associated management units would be minimal.

4.1.2.2.1 No-action Alternative (Fish—Biological Resources—Open Ocean)

The No-action Alternative includes a total of 1,167 hours of MFA surface ship sonar and the associated Directional Command Activated Sonobuoy System (DICASS) sonobuoy, MK-48 torpedo (an HFA source), dipping sonar, and submarine sonar (see Appendix J for a detailed description). Underwater detonations are possible during SINKEX, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS. The abundance and diversity of fish within the HRC will not measurably decrease as a result of implementation of the No-action Alternative.

HRC Training—No-action Alternative

Sonar

ASW training in HRC other than during Major Exercises includes ASW Tracking Exercise (TRACKEX) and ASW Torpedo Exercise (TORPEX) as described in Table 2.2.2.3-1 and Appendix D. The annual sonar for TRACKEX and TORPEX includes 360 hours of AN/SQS 53 and 75 hours of AN/SQS 56 MFA surface ship sonar, associated sonobuoys, MK-48 torpedo HFA sonar, dipping sonar, and submarine sonar.

HRC RDT&E Activities—No-action Alternative

Other sources such as unmanned aerial vehicles (UAVs), underwater communications, and electronic warfare systems that may be deployed in the ocean are beyond the frequency range or intensity level to affect fish. Other RDT&E activities identified as ASW do not include sonar or include very limited use of sonar and short durations (<1.5 hours). These activities will have minimal effects on fish.

Major Exercises—No-action Alternative

RIMPAC and USWEX

The training events and impacts from RIMPAC Exercises have been summarized in the RIMPAC 2006 Supplement to the 2002 RIMPAC Environmental Assessment (EA) (U.S. Department of the Navy, Commander Third Fleet, 2006). The No-action Alternative modeling included 399 hours of AN/SQS 53 and 133 hours of AN/SQS 56 surface ship sonar and associated dipping sonar, sonobuoys, and MK-48 torpedoes per RIMPAC (conducted every other year).

The training events and impacts on fish from USWEX Exercises have been summarized in the USWEX Programmatic EA/Overseas EA (OEA) (U.S. Department of the Navy, 2007b). The No-action Alternative USWEX modeling included 525 hours of AN/SQS 53 and 175 hours of AN/SQS 56 MFA sonar and associated dipping sonar and sonobuoys per year.

The potential impacts on fish from RIMPAC and USWEX sonar and underwater detonations (i.e., SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS will be similar to those described above for the HRC training.

4.1.2.2.2 Alternative 1 (Fish—Biological Resources—Open Ocean)

The increased training and RDT&E activities under Alternative 1 results in a total of 2,339 hours of MFA surface ship sonar plus the associated DICASS sonobuoy, MK-48 torpedo (an HFA source), dipping sonar, and submarine sonar (see Appendix J for a detailed description). Underwater detonations are possible during SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS.

Tempo and Frequency of Training—Alternative 1

Under Alternative 1, ASW training in HRC other than during Major Exercises includes ASW TRACKEX and ASW TORPEX as described in Table 2.2.2.3-1 and Appendix D. The annual sonar for TRACKEX and TORPEX includes 360 hours of AN/SQS 53 and 75 hours of AN/SQS 56 MFA surface ship sonar plus associated sonobuoys, MK-48 torpedo HFA sonar, dipping sonar, and submarine sonar. Potential impacts on fish from sonar and underwater detonations under Alternative 1 would be similar to those described under the No-action Alternative. Although the number of hours of underwater detonations would increase, the impacts would still be minimal.

Enhanced RDT&E Activities—Alternative 1

There are no new RDT&E activities proposed that would affect fish. Sources such as UAVs, underwater communications, and electronic warfare systems that may be deployed in the ocean are at frequency ranges or intensity levels that have no affect on fish. Other RDT&E activities identified as ASW do not include sonar or include very limited use of sonar and short durations (<1.5 hours). These activities would have minimal effects on fish.

Future RDT&E Activities—Alternative 1

There are no new or future RDT&E activities proposed that would affect marine animals. Sources such as UAVs, underwater communications, and electronic warfare systems that may be deployed in the ocean are generally transmitting above the frequency range or below the intensity level to affect marine animals. Other RDT&E activities identified as ASW do not include sonar or include very limited use of sonar and are generally of short durations (<1.5 hours). These activities would have minimal effects on fish.

HRC Enhancements—Alternative 1

There are no new HRC enhancements proposed that would affect fish. Other sources such as the Portable Undersea Tracking Range, underwater communications, and electronic warfare systems that may be deployed in the ocean are at frequency ranges or intensity levels that have no affect on fish. The Navy will continue to work with the regulatory agencies throughout the planning and development process to minimize the potential for impacts on fish.

Major Exercises—Alternative 1

RIMPAC and USWEX

The training events and impacts on fish from RIMPAC Exercises have been summarized in the RIMPAC 2006 Supplement to the 2002 RIMPAC EA (U.S. Department of the Navy, Commander Third Fleet, 2006). Alternative 1 assumes two Strike Groups and 798 hours of AN/SQS 53 and 266 hours of AN/SQS 56 MFA sonar plus associated dipping sonar, sonobuoys, and MK-48 torpedoes HFA sonar per two carrier RIMPAC (conducted every other year).

The training events and impacts on fish from USWEX Exercises have been summarized in the USWEX Programmatic EA/OEA (U.S. Department of the Navy, 2007b). Alternative 1 assumes 630 hours of AN/SQS 53 and 210 hours of AN/SQS 56 MFA sonar plus associated dipping sonar and sonobuoys for six USWEXs per year. Although the number of hours of sonar and the number of underwater detonations would increase over the No-action Alternative, the impacts would still be minimal considering the few fish species that would be able to detect sound in the frequencies of the Proposed Action and the limited exposure of juvenile fish with swim bladder resonance in the frequencies of the sound sources.

Essential Fish Habitat

Impacts on EFH are expected to be similar to those described previously for the No-action Alternative (see Section 4.1.2.2.1), and the small change in the number of exercises would not change those predictions (see *Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* [U.S. Department of the Navy, 2007b]).

4.1.2.2.3 Alternative 2 (Fish—Biological Resources—Open Ocean)

The increased training and RDT&E activities under Alternative 2 result in an increase in the number of hours of ASW training. Alternative 2 includes a total of 3,283 hours of MFA surface ship sonar plus the associated DICASS sonobuoy, MK-48 torpedo (an HFA source), dipping sonar, and submarine sonar (see Appendix J for a detailed description). Underwater detonations are possible during SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS.

Tempo and Frequency of Training—Alternative 2

ASW training for Alternative 2 other than during Major Exercises includes ASW TRACKEX and ASW TORPEX as described in Table 2.2.2.3-1 and Appendix D. The annual sonar for TRACKEX and TORPEX includes 360 hours of AN/SQS 53 and 75 hours of AN/SQS 56 MFA surface ship sonar plus associated sonobuoys, MK-48 torpedo HFA sonar, dipping sonar, and submarine sonar. Potential impacts on fish from sonar and underwater detonations under Alternative 2 would be similar to those described under the No-action Alternative. Although the number of hours of sonar and the number of underwater detonations would increase over the No-action Alternative, the impacts would still be minimal.

Enhanced RDT&E Activities—Alternative 2

There are no new RDT&E activities proposed that would affect fish. Sources such as UAVs, underwater communications, and electronic warfare systems that may be deployed in the ocean at the frequency ranges or intensity levels that have no affect on fish. Other RDT&E activities identified as ASW do not include sonar or include very limited use of sonar and short durations (<1.5 hours). These activities would have minimal effects on fish.

Future RDT&E Activities—Alternative 2

There are no new or future RDT&E activities proposed that would affect marine animals. Noise sources such as UAVs, underwater communications, and electronic warfare systems that may be deployed in the ocean are generally transmitting above the frequency range or below the intensity level to affect marine animals. Other RDT&E activities identified as ASW do not include sonar or include very limited use of sonar and are generally of short durations (<1.5 hours). These activities would have minimal effects on fish.

HRC Enhancements—Alternative 2

There are no new HRC enhancements proposed that would affect fish. Other sources such as underwater communications and electronic warfare systems that may be deployed in the ocean are at frequency ranges or intensity levels that have no affect on fish.

Major Exercises—Alternative 2

RIMPAC

The training events and impacts on fish from RIMPAC Exercises have been summarized in the RIMPAC 2006 Supplement to the 2002 RIMPAC EA (U.S. Department of the Navy, Commander Third Fleet, 2006). Alternative 2 assumes two Strike Groups and 798 hours of AN/SQS 53 and 266 hours of AN/SQS 56 MFA sonar plus dipping sonar, sonobuoys, and MK-48 torpedoes HFA sonar per two carrier RIMPAC (conducted every other year).

USWEX

The training events and impacts on fish from USWEX Exercises have been summarized in the USWEX Programmatic EA/OEA (U.S. Department of the Navy, 2007b). Alternative 2 assumes 630 hours of AN/SQS 53 and 210 hours of AN/SQS 56 MFA sonar plus dipping sonar and sonobuoys for six USWEXs per year. Although the number of hours of sonar and the number of underwater detonations would increase over the No-action Alternative, the impacts would still be minimal considering the few fish species that would be able to detect sound in the frequencies of the Proposed Action and the limited exposure of juvenile fish with swim bladder resonance in the frequencies of the sound sources.

Additional Major Exercise—Multiple Strike Group Training

With the addition of this Major Exercise, up to three Strike Groups would conduct training simultaneously in the HRC. The Strike Groups would not be homeported in Hawaii, but would stop in Hawaii en route to a final destination. The Strike Groups would be in Hawaii for up to 10 days per Multiple Strike Group exercise. Training would be provided to submarine, ship, and aircraft crews in tactics, techniques, and procedures for ASW, Defensive Counter Air, Maritime Interdiction, and operational level Command and Control (C2) of maritime forces. The Multiple Strike Group Exercise would include 708 hours of AN/SQS 53 and 236 hours of AN/SQS 56 MFA sonar, associated sonobuoys, dipping sonar, *and* MK-48 torpedo HFA sonar. Although the number of hours of sonar and the number of underwater detonations would increase over Alternative 1, the impacts would still be minimal.

Essential Fish Habitat

Impacts on EFH are expected to be similar to those described previously for the No- action Alternative (see Section 4.1.2.2.1), and the small change in the number of exercises would not change those predictions (see *Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* [U.S. Department of the Navy, 2007b]).

4.1.2.2.4 Alternative 3 (Fish—Biological Resources—Open Ocean)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on fish from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2, Section 4.1.2.2.3.

4.1.2.3 SEA TURTLES (BIOLOGICAL RESOURCES—OPEN OCEAN)

Sonar

Extrapolation from human and marine mammal data to turtles is inappropriate given the morphological differences between the auditory systems of mammals and turtles. However, the measured hearing threshold for green turtles (and by extrapolation from this species to other hardshelled sea turtles; at least the olive ridley, loggerhead, and hawksbill) is only slightly lower than the maximum levels to which these species could be exposed. Given the lack of audiometric information, the potential for temporary threshold shifts among leatherback turtles must be classified as unknown, but would likely follow those of other sea turtles. It is not likely that a temporary threshold shift would occur at such a small margin over threshold in any species. Therefore, no threshold shifts in green, olive ridley, loggerhead, hawksbill, or leatherback turtles are expected.

As described in Chapter 3.0, sea turtle hearing is generally most sensitive between 100 Hz to 800 Hz for hard shell turtles, frequencies that are at the lower end of the sound spectrum. Although low-frequency hearing has not been studied in many sea turtle species, most of those that have been tested exhibit low audiometric and behavioral sensitivity to low-frequency sound. It appears, therefore, that if there were the potential for the MFA/HFA sonar to increase masking effects of any sea turtle species, it would be expected to be minimal as most sea turtle species are apparently low-frequency specialists. The use of low-frequency sources is not part of the Proposed Action in the HRC EIS/OEIS. Any potential role of long-range acoustical perception in sea turtles has not been studied. Anecdotal information, however, suggests that the acoustic signature of a turtle's natal beach might serve as a cue for nesting returns. Again, however, the sources used in the HRC are above sea turtle's most sensitive hearing range.

As demonstrated by Jessop et al. (2002) for breeding adult male green turtles, there is a complex relationship between stress/physiological state and plasma hormone responses. Even if sea turtles were able to sense the sonar output, it is unlikely that any physiological stress leading to endocrine and corticosteroid imbalances would result over the long term (allostatic loading) (McEwen and Lashley, 2002). Although there may be many hours of active ASW sonar events, the active "pings" of the sonar generally only occur only twice a minute, as it is necessary for the ASW operators to listen for the return echo of the sonar ping before another ping is transmitted. Given the time between pings and relative high ship speed in comparison to turtles and the relatively low hearing sensitivity even within the frequency ranges that sea turtles hear best, which is for the most part below the frequency range of MFA/HFA sonar, it is unlikely that sea turtles would be affected by this type of sonar. Based on the current available data, MFA/HFA sonar use would not affect sea turtles.

Potential Non-Acoustic Impacts

Ship Strikes

The Navy has adopted standard operating procedures (SOPs) that reduce the potential for collisions between surface vessels and sea turtles (See Chapter 6.0). On the bridge of surface ships, there will always be at least three people on watch whose duties include observing the water surface around the vessel during at-sea movements. If a sea turtle is sighted, appropriate action will be taken to avoid the animal. Given the SOPs and the relative few number of turtles and Navy vessels in the open ocean, the Navy believes collisions with sea turtles are unlikely. A study of green sea turtle strandings in the Hawaiian Archipelago from 1982-2003 showed that boat strikes and shark attacks each accounted for 2.7 percent of the 3,732 green sea turtle strandings (boat strikes are in general from small craft). Green turtle strandings attributable to boat strike were more likely from Kauai and Oahu. The most common cause of the strandings was the tumor-forming disease, fibropapillomatosis (28 percent); 49 percent of the strandings could not be attributed to any known cause (Chaloupka et al, 2004).

Torpedo Guidance Wire

The potential entanglement impact of MK-48 torpedo control wires on sea turtles is very low because the control wire is very thin (approximately 0.02 in) and has a relatively low breaking strength. In addition, when the wire is released or broken, it is relatively straight and the physical characteristics of the wire prevent it from tangling.

Torpedo Strike Impact

Given the relatively small size of sea turtles, there is negligible risk that a turtle could be struck by a torpedo during ASW training events. The potential for any harm or harassment to sea turtles is extremely low.

Because some torpedo air launch accessories remain in the marine environment, the potential for impacting sea turtles through ingestion or entanglement has been previously analyzed. Ingestion of pieces of the launch accessories is unlikely because most of those are large and metallic and will sink rapidly (U.S. Department of the Navy, 1996a).

MK-48 Torpedo Flex Hoses

The Navy analyzed the potential for the flex hoses to impact sea turtles and marine mammals. The analysis concluded that the potential entanglement impact on marine animals would be insignificant for reasons similar to those stated for the potential entanglement impact of control wires (U.S. Department of the Navy, 1996b).

Sonobuoy and Other Parachutes

Sonobuoys, lightweight torpedoes, and other devices deployed from aircraft use nylon parachutes of varying sizes. At water impact, the parachute assembly is jettisoned and sinks away from the exercise weapon or target. The parachute assembly would potentially be at the surface for a short time before sinking to the sea floor. Many large sea turtles subsist mainly on jellyfish, and the incidence of plastic bags being found in dead turtles indicates that the turtles may mistake floating plastic bags for jellyfish (Cottingham, 1989). Sea turtles also ingest pieces of polystyrene foam, monofilament fishing line, and several other kinds of synthetic drift items. However, the parachutes used on the proposed HRC are large in comparison with these animals' normal food items, and would be very difficult to ingest. Overall, the possibility of sea turtles ingesting nylon parachute fabric or being entangled in parachute assemblies is very remote.

Potential Underwater Detonation Impacts

Events involving underwater detonation involve EER/IEER, MINEX, MISSILEX, BOMBEX, SINKEX, GUNEX, and NSFS. Criteria and thresholds for estimating the impacts on marine mammals and sea turtles from a single underwater detonation event were defined and publicly vetted through the National Environmental Policy Act (NEPA) process during the environmental assessments for the two Navy ship-shock trials: the SEAWOLF Final EIS (FEIS) (U.S. Department of the Navy 1998a) and the Churchill FEIS (U.S. Department of the Navy, 2001b). During the analysis of the effects of explosions on marine mammals and sea turtles conducted by the Navy for the Churchill EIS, analysts compared the injury levels reported by the best of these experiments to the injury levels that would be predicted using the modified Goertner method and found them to be similar (U.S. Department of the Navy, 2001b, Goertner 1982). The criteria and thresholds for injury and harassment, which are the same for both sea turtles and marine mammals, are summarized in Table 4.1.2.3-1.

Table 4.1.2.3-1. Summary of Criteria and Acoustic Thresholds for Underwater Detonation Impacts on Sea Turtles and Marine Mammals

Harassment Level	Criterion	Threshold
Level A Harassment Mortality	Onset of severe lung injury	"Goertner" modified positive impulse indexed to 31 psi-ms
Injury	Tympanic membrane rupture	50 percent rate of rupture 205 dB re 1 µPa^2-s (Energy Flux Density)
Injury	Onset of slight lung injury	Goertner Modified Positive Impulse Indexed to 13 psi-ms
Level B Harassment Non-Injury	Onset Temporary Threshold Shift (TTS) (Dual Criteria)	182 dB re 1 µPa^2-s (Energy Flux Density) in any 1/3-octave band at frequencies above 100 Hz for all toothed whales (e.g., sperm whales, beaked whales); above 10 Hz for all baleen whales
Non-Injury	Onset of TTS (Dual Criteria)	23 psi peak pressure level (for small explosives; less than 2,000 lb NEW)
Non-Injury	Sub-TTS behavioral disturbance	177 dB re 1 µPa^2-s (Energy Flux Density) for multiple successive explosions

Notes: psi = pounds per square inch
µPa^2-s = squared micropascal-second
Hz = hertz
psi-ms = pounds per square inch-milliseconds
dB = decibel
NEW = net explosive weight

Injury Thresholds

When analyzing underwater detonations, two criteria are used for injury: onset of slight lung injury and 50 percent eardrum rupture (tympanic membrane [TM] rupture). These criteria are considered indicative of the onset of injury. The threshold for onset of slight lung injury is calculated for a small animal (a dolphin calf weighing 26.9 lb), and is given in terms of the "Goertner modified positive impulse," indexed to 13 psi-millisecond (ms) in the (U.S. Department of the Navy, 2001b). This threshold is conservative since the positive impulse needed to cause injury is proportional to animal mass, and therefore, larger animals require a higher impulse to cause the onset of injury. The threshold for TM rupture corresponds to a 50 percent rate of rupture (i.e., 50 percent of animals exposed to the level are expected to suffer TM rupture); this is stated in terms of an energy level value of 205 dB re 1 µPa^2-s. The criterion reflects the fact that TM rupture is not necessarily a serious or life-threatening injury, but is a useful index of possible injury that is well correlated with measures of permanent hearing impairment (e.g., Ketten 1998) indicates a 30 percent incidence of permanent threshold shift [PTS] at the same threshold).

The criterion for marine mammal mortality when analyzing underwater detonations used in the Churchill FEIS is "onset of severe lung injury." This is conservative in that it corresponds to a 1 percent chance of mortal injury, and yet any animal experiencing onset of severe lung injury is counted as a lethal exposure. The threshold is stated in terms of the Goertner (1982) modified positive impulse with value "indexed to 31 psi-ms." Since the Goertner approach depends on propagation, source/animal depths, and animal mass in a complex way, the actual impulse value corresponding to the 31-psi-ms index is a complicated calculation. Again, to be conservative, the CHURCHILL FEIS used the mass of a calf dolphin (at 26.9 lb), so that the threshold index is 30.5 psi-ms.

Harassment Thresholds

There are two thresholds for non-injurious harassment from underwater explosives. The first is temporary threshold shift (TTS), which is a temporary, recoverable, loss of hearing sensitivity (National Marine Fisheries Service, 2001a; U.S. Department of the Navy, 2001b). The second threshold, termed “sub-TTS,” applies to multiple explosions in succession (separated by less than 2 seconds). The sub-TTS threshold is used to account for behavioral disturbance significant enough to be judged as harassment, but occurring at lower sound energy levels than those that may cause TTS.

There are dual criteria for TTS when analyzing underwater detonations. The first is 182 dB re 1 squared micropascal-second (μPa^2-s) maximum Energy Flux Density Level (EL) level in any 1/3-octave band at frequencies >100 Hz for marine mammals and sea turtles. The second criterion for impact analysis when considering underwater detonations and a TTS threshold is 12 pounds per square inch (psi) peak pressure that was developed for 10,000-lb charges as part of the Churchill FEIS (U.S. Department of the Navy, 2001b; National Oceanic and Atmospheric Administration, 2005 and 2006h). It was introduced to provide a safety zone for TTS when the explosive or the animal approaches the sea surface (for which case the explosive energy is reduced but the peak pressure is not). Navy policy is to use a 23 psi criterion for explosive charges less than 2,000 lb and the 12 psi criterion for explosive charges larger than 2,000 lb. All explosives modeled for the HRC EIS/OEIS are less than 1,500 lb.

Harassment Threshold for Multiple Successive Explosions (MSE)

There may be rare occasions when MSE are part of a static location event such as during MINEX, MISSILEX, BOMBEX, SINKEX, GUNEX, and NSFS (when using other than inert weapons). For these events, the Churchill FEIS approach was extended to cover MSE events occurring at the same static location. For MSE exposures, accumulated energy over the entire training time is the natural extension for energy thresholds since energy accumulates with each subsequent shot; this is consistent with the treatment of multiple arrivals in Churchill. For positive impulse, it is consistent with Churchill FEIS to use the maximum value over all impulses received.

For MSE, the acoustic criterion for sub-TTS behavioral disturbance is used to account for behavioral effects significant enough to be judged as harassment, but occurring at lower sound energy levels than those that may cause TTS. The sub-TTS threshold is derived following the approach of the Churchill FEIS for the energy-based TTS threshold.

The research on pure-tone exposures reported in Schlundt et al. (2000) and Finneran and Schlundt (2004) provided a threshold of 192 dB re 1 μPa^2-s as the lowest TTS value. This value for pure-tone exposures is modified for explosives by (a) interpreting it as an energy metric, (b) reducing it by 10 dB to account for the time constant of the mammal ear, and (c) measuring the energy in 1/3 octave bands, the natural filter band of the ear. The resulting TTS threshold for explosives is 182 dB re 1 μPa^2-s in any 1/3 octave band. As reported by Schlundt et al. (2000) and Finneran and Schlundt (2004), instances of altered behavior in the pure-tone research generally began five dB lower than those causing TTS. The sub-TTS threshold is therefore derived by subtracting five dB from the 182 dB re 1 μPa2-s in any 1/3 octave band threshold, resulting in a 177 dB re 1 μPa^2-s (EL) sub-TTS behavioral disturbance threshold for MSE.

Preliminary modeling undertaken for other Navy compliance documents using the sub-TTS threshold of 177 dB has demonstrated that for events involving MSE using small (NEW) explosives (MINEX, GUNEX, NSFS, and underwater detonation), the footprint of the threshold for explosives onset TTS criteria based on the 23 psi pressure component dominates and supersedes any exposures at a received level involving the 177 dB EL threshold. Restated in another manner, modeling for the sub-TTS threshold should not result in any estimated impacts that are not already quantified under the larger footprint of the 23 psi criteria for small MSE. Given that modeling for sub-TTS should not, therefore, result in any additional harassment takes for MINEX, GUNEX, NSFS, and underwater detonation, analysis of potential for behavioral disturbance using the sub-TTS criteria was not undertaken for these events (MINEX, GUNEX, NSFS, and underwater detonation).

For the remainder of the MSE events (BOMBEX, SINKEX, and MISSILEX) where the sub-TTS exposures may need to be considered, these potential behavioral disturbances were estimated by extrapolation from the acoustic modeling results for the explosives TTS threshold (182 dB re 1 μPa^2-s in any 1/3 octave band). To account for the 5 dB lower sub-TTS threshold, a factor of 3.17 was applied to the TTS modeled numbers in order to extrapolate the number of sub-TTS exposures estimated for MSE events. This multiplication factor is used calculate the increased area represented by the difference between the 177 dB sub-TTS threshold and the modeled 182 dB threshold. The factor is based on the increased range 5 dB would propagate (assuming spherical spreading), where the range increases by approximately 1.78 times, resulting in a circular area increase of approximately 3.17 times that of the modeled results at 182 dB.

Potential overlap of exposures from multiple explosive events within a 24-hour period was not taken into consideration in the modeling resulting in the potential for some double counting of exposures. However, because an animal would generally move away from the area following the first explosion, the overlap is likely to be minimal.

It should be emphasized that there is a lead time for set up and clearance of any area before an event using explosives takes place (this may be 30 minutes for an underwater detonation to several hours for a SINKEX). There will, therefore, be a long period of rather intense activity before the event occurs when the area is under observation and before any detonation or live fire occurs. Ordnance cannot be released until the target area is determined clear. In addition, the event is immediately halted if sea turtles are observed within the target area and the training is delayed until the animal clears the area. These mitigation factors to determine if the area is clear, serve to minimize the risk of harming sea turtles and marine mammals.

4.1.2.3.1 No-action Alternative (Sea Turtles—Biological Resources—Open Ocean)

HRC Training—No-action Alternative

As discussed in detail above, MFA/HFA sonar use would not affect sea turtles.

Underwater detonations are possible during SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS. The weapons used in most exercises utilizing inert ordnance pose little risk to sea turtles unless they were to be near the surface at the point of impact. A turtle would have to be near the point of projectile impact to be in the affected area. Given the density of water, and the variable direction and energy loss of projectiles hitting the water, there is no accurate average answer in regard to a specific “area” or “depth.” Machine guns (0.50 caliber) and the close-in weapons systems (anti-missile systems) fire exclusively non-explosive ammunition. The same applies to larger weapons firing inert ordnance for training. Target area clearance procedures will reduce the potential for impacting a sea turtle such that impacts on sea turtles from exercises utilizing inert ordnance will be highly unlikely.

Exercises that utilize explosive ordnance pose a greater risk to sea turtles; however, the area affected by the explosive is relatively small, and target area clearance procedures will further reduce the potential for such an extremely unlikely event to occur.

Individual pieces of debris from ballistic missile intercept tests are dispersed over a large area. While a direct hit from a piece of debris would impact sea a turtle at the surface, it is extremely unlikely that this would ever occur.

The explosive payload of an EER/IEER buoy is suspended below the surface at a depth where sea turtles are unlikely to be present in the open ocean. Given the size of the ocean, It is unlikely that a sea turtle will be present in the vicinity of an EER/IEER buoy when detonated. In addition, in the rare event that a turtle is present when an EER/IEER is detonated, the depth of the approximately 4-lb charge will likely preclude there being any adverse effects.

HRC RDT&E Activities—No-action Alternative

RDT&E activities will not affect sea turtles.

Major Exercises—No-action Alternative

Underwater detonations during RIMPAC and USWEX will be similar to those described under HRC Training. Impacts on sea turtles are not anticipated given range clearance procedures, the low density of sea turtles, and the temporary nature and episodic number of the events involved.

Compliance under ESA for Sea Turtles

In accordance with ESA requirements, the Navy has undertaken Section 7 consultation with NMFS for the ongoing activities in the HRC. The Navy finds that these activities are not likely to affect green, olive ridley, loggerhead, hawksbill, or leatherback sea turtles.

4.1.2.3.2 Alternative 1 (Sea Turtles—Biological Resources—Open Ocean)

The increased training and RDT&E activities under Alternative 1 result in an increase in the number of underwater detonations during SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NFSF.

Increased Tempo and Frequency of Training—Alternative 1

Although the number of underwater detonations would increase, due to the clearance requirements for underwater detonations and exercises involving explosives, sea turtles would not be within the area, and therefore impacts are not anticipated.

Enhanced RDT&E Activities—Alternative 1

Enhanced RDT&E activities would not affect sea turtles.

Future RDT&E Activities—Alternative 1

There are no future RDT&E activities that would affect sea turtles.

HRC Enhancements—Alternative 1

There are no new HRC enhancements that would affect sea turtles. The Navy will develop appropriate habitat data and any necessary Best Management Practices and mitigations in coordination with NMFS and USFWS for new activities. The Navy will continue to work with regulatory agencies throughout the planning and development process to minimize the potential for impacts on sea turtles.

Major Exercises—Alternative 1

Underwater detonations during RIMPAC and USWEX would be similar to those described under the No-action Alternative. Due to the clearance requirements for underwater detonations and exercises involving explosives, sea turtles would not be within the area and therefore impacts are not anticipated.

Compliance under ESA for Sea Turtles

In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS for the proposed and ongoing activities in the HRC under Alternative 1. The Navy finds that these activities are not likely to affect green, olive ridley, loggerhead, hawksbill, or leatherback sea turtles.

4.1.2.3.3 Alternative 2 (Sea Turtles—Biological Resources—Open Ocean)

The increased training and RDT&E activities under Alternative 2 result in an increase in the number of underwater detonations during SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS.

Increased Tempo and Frequency of Training—Alternative 2

Although the number of underwater detonations would increase, due to the clearance requirements for underwater detonations and exercises involving explosives, sea turtles would not be within the area, and therefore impacts are not anticipated.

Enhanced and Future RDT&E Activities—Alternative 2

There are no enhanced or future RDT&E activities that would affect sea turtles.

HRC Enhancements—Alternative 2

There are no new HRC enhancements that would affect sea turtles.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would conduct training simultaneously in the HRC. Underwater detonations during the Multiple Strike Group training would be similar to those described under the No-action Alternative for RIMPAC and USWEX. Due to the clearance requirements for underwater detonations and exercises involving explosives, sea turtles would not be within the area, and therefore impacts are not anticipated.

Compliance under ESA for Sea Turtles

In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS for the proposed and ongoing activities in the HRC under Alternative 2. The Navy finds that these activities are not likely to affect green, olive ridley, loggerhead, hawksbill, or leatherback sea turtles.

4.1.2.3.4 Alternative 3 (Sea Turtles—Biological Resources—Open Ocean)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhance RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on sea turtles from MFA/HFA sonar usage determined for Alternative 3 are discussed in the No-action Alternative, Section 4.1.2.3.1. Potential effects on sea turtles from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2, Section 4.1.2.3.3.

In accordance with ESA requirements, the Navy has undertaken Section 7 consultation with NMFS for the proposed and ongoing activities in the HRC under Alternative 3 as the preferred alternative. The Navy finds that these activities are not likely to affect green, olive ridley, loggerhead, hawksbill, or leatherback sea turtles.

4.1.2.4 MARINE MAMMALS (BIOLOGICAL RESOURCES—OPEN OCEAN)

Potential impacts on marine mammals from Navy actions can occur from sources that are non-acoustic (i.e., ship strikes) and acoustic with sonar and underwater detonations being the primary acoustic concern. The Navy has and is continuing to conduct research on the effect of sound on marine mammals, the modeling of sound effects on marine mammals in areas of Navy training, and methods of reducing impacts through monitoring of marine mammals, sound reduction, and the use of mitigation measures (Chapter 6.0).

This section includes a discussion of the following topics for assessing potential impacts on marine mammals from Navy actions identified in Chapter 2.0:

- Potential Non-Acoustic Impacts
- Potential Sonar and Explosive Impacts

- Analytical Framework for Assessing Marine Mammal Response to Active Sonar
- Regulatory Framework
- Integration of Regulatory and Biological Frameworks
- Criteria and Thresholds for Physiological Effects
- Other Physiological Effects Considered
- Previous Criteria and Thresholds for Behavioral Effects
- Summary of Existing Credible Scientific Evidence Relevant to Assessing Behavioral Effects
- Cetacean Stranding Events
- Marine Mammal Mitigation Measures Related to Acoustic and Explosive Exposures
- Sonar Marine Mammal Modeling
- Explosive Source Marine Mammal Modeling

Marine Mammal Habitat

The primary source of potential marine mammal habitat impact during training and RDT&E activities within the HRC is underwater sound resulting from ASW, MISSILEX and testing, LFX (e.g., 5-inch guns) events, aerial bombardment, and underwater detonations. However, the sound does not constitute a long-term physical alteration of the water column or bottom topography, as the occurrences are of limited duration and are intermittent in time given that surface vessels associated with training move continuously and relatively rapidly through any given area. Other sources that may impact marine mammal habitat were considered and potentially include the introduction of fuel, debris, expended materials, ordnance, and chemical residues into the water column. The effects of each of these components were considered in this EIS/OEIS. Critical Habitat within the HRC for the Hawaiian monk seal was designated for beaches, sand spits, and bays out to the 20-fathom line (120 ft) for the Northwestern Hawaiian Islands (National Marine Fisheries Service, 1988). With the exception of a portion of Penguin Banks, the Hawaiian Islands Humpback Whale National Marine Sanctuary is located within 12 nautical miles (nm) of the islands, and potential impacts are discussed in the sections of this document that deal with each island.

4.1.2.4.1 Potential Non-Acoustic Impacts

Non-acoustic activities and equipment that were analyzed for potential impact on marine mammals during Navy training are discussed in this section and include ship strikes, torpedo guidance wire, torpedo strike impact, torpedo air launch accessories, MK-48 torpedo flex hoses, sonobuoys, and other expendable devices.

Ship Strikes

Ship strikes to marine mammals can cause major wounds and may occasionally cause fatalities. Whale-watching tours are becoming increasingly popular, and ship strikes have risen in recent years. In the Hawaiian Islands, ship strikes of the humpback whale are of particular concern. According to the NMFS Pacific Islands Region Marine Mammal Response Network Activity Update (dated January 2007 [National Marine Fisheries Service, 2007d]), there were nine reported collisions with humpback whales in 2006 (none involved the Navy .These collisions can also occur with commercial or Navy ships. All types of ships can hit whales, and much of the time the marine mammal is either seen too late to avoid a collision, not observed until the collision occurs, or not detected.

The most vulnerable marine mammals are those that spend extended periods of time at the surface in order to restore oxygen levels within their tissues after deep dives (e.g., sperm whale). In addition, some baleen whales, such as the northern right whale and fin whale, swim slowly and seem generally unresponsive to ship sound, making them more susceptible to ship strikes (Nowacek et al., 2004). North Pacific right whales are primarily found in the Arctic, and there are only a few recorded sightings near the Hawaiian Islands (U.S. Department of the Navy, 2005a). Fin whales are rarely seen in Hawaiian Island waters (Barlow, 2006). Most baleen whales are rare in the Hawaiian Islands with the exception of the humpback whale that occurs seasonally and generally close to shore, within 25 nm of shore (Mobley, 2004; U.S. Department of the Navy, 2005a). Hawaii is the breeding ground for humpback whales, and there are also many calves present. While calves spend a lot of time at the surface, potentially increasing their vulnerability to ship strikes, they are also very active and often breech or create disturbances at the surface raising their probability of detection.

Ship strikes with whales are a recognized source of whale mortality worldwide. Of the 11 species known to be hit by ships, the most frequently reported is the fin whale, although there have been no recent incidents of ship strikes on fin whales in the Hawaiian Islands. Whale-watching tours are becoming increasingly popular, and ship strikes have risen in recent years. In the Hawaiian Islands, ship strikes of the humpback whale are of particular concern. According to the NMFS Pacific Islands Region Marine Mammal Response Network Activity Update (dated January 2007[National Marine Fisheries Service, 2007d]), there were nine reported ship strikes with humpback whales in 2006. Whale watching could also have an effect on whales by distracting them from important biological activities such as nursing and breeding (see Katona and Kraus, 1999 for discussion of potential impacts from whale watching).

A review of recent reports on ship strikes provides some insight regarding the types of whales, locations and vessels involved, but also reveals significant gaps in the data. The Large Whale Ship Strike Database provides a summary of the 292 worldwide confirmed or possible whale/ship strikes from 1975 through 2002 (Jensen and Silber, 2003). The report notes that the database represents a minimum number of collisions, because the vast majority probably go undetected or unreported. In contrast, Navy vessels are likely to detect any strike that does occur, and they are required to report all ship strikes involving marine mammals. Overall, the percentages of Navy traffic relative to overall large shipping traffic are very small (on the order of 2 percent).

The ability of a ship to avoid a collision and to detect a collision depends on a variety of factors, including environmental conditions, ship design, size, and manning. The majority of ships participating in HRC training activities, such as Navy destroyers, have a number of advantages for avoiding ship strikes as compared to most commercial merchant vessels including the following:

- Navy ships have their bridges positioned forward, offering good visibility ahead of the bow.

- Crew size is much larger than that of merchant ships allowing for more potential observers on the bridge.
- Dedicated lookouts are posted during a training activity scanning the ocean for anything detectible in the water; anything detected is reported to the Officer of the Deck.
- Navy lookouts receive extensive training including Marine Species Awareness Training designed to provide marine species detection cues and information necessary to detect marine mammals.
- Navy ships are generally much more maneuverable than commercial merchant vessels.

The National Oceanic and Atmospheric Administration (NOAA) continues to review all shipping activities and their relationship to cumulative effects, in particular on large whale species. According to the NMFS Pacific Islands Region Marine Mammal Response Network Activity Update (dated January 2007[[National Marine Fisheries Service, 2007d]), the factors that contribute to ship strikes of whales are not clear, nor is it understood why some species appear more vulnerable than others. Nonetheless, the number of known ship strikes indicate that deaths and injuries from ships and shipping activities remain a threat to endangered large whale species.

The Navy has adopted standard SOPs that reduce the potential for ship strikes with surfaced marine mammals (See Chapter 6.0). At all times when ships are underway, there are trained observers on watch scanning the area around the ship. If a marine mammal is sighted, appropriate action will be taken to avoid the animal. Collisions with cetaceans and pinnipeds are not expected.

Torpedo Guidance Wire

The potential entanglement impact of MK-48 torpedo control wires on marine mammals is very low for the following reasons. The control wire is very thin (approximately 0.02 inch) and has a relatively low breaking strength. Even with the exception of a chance encounter with the control wire while it was sinking to the sea floor (at an estimated rate of 0.5 ft per second), a marine animal would not be vulnerable to entanglement given the low breaking strength.

- The torpedo control wire is held stationary in the water column by drag forces as it is pulled from the torpedo in a relatively straight line until its length becomes sufficient for it to form a catenary droop (U.S. Department of the Navy, 1996a). When the wire is released or broken, it is relatively straight and the physical characteristics of the wire prevent it from tangling, unlike the monofilament fishing lines and polypropylene ropes identified in the entanglement literature (U.S. Department of the Navy, 1996a). Although Heezen (1957, as cited in U.S. Department of the Navy, 1996a) theorized that the entanglement of marine mammals with undersea telecommunication cables was a direct result of the mammal coming into contact with loops in the cable (e.g., swimming through loops that then tightened around the mammal), this should not be the case for the thin torpedo guidance wires. The potential for any harm or harassment to these species is extremely low.

Torpedo Strike Impact

There is negligible risk that a marine mammal could be struck by a torpedo during ASW training events. This conclusion is based on a review of ASW torpedo design features. The torpedoes are specifically designed to ignore false targets. As a result, their homing logic does not detect or recognize the relatively small air volume associated with the lungs of marine mammals. They do not detect or home to marine mammals. In addition, there has never been a reconditioned torpedo (numbered in the thousands) that inadvertently struck a marine mammal, which would have been apparent given the fragile nature of the components at the head of the torpedo.

Torpedo Air Launch Accessories

Because some torpedo air launch accessories remain in the marine environment, the potential for impacting marine mammals through ingestion or entanglement has been previously analyzed. Ingestion of pieces of the launch accessories is unlikely because most of those are large and metallic and will sink rapidly (U.S. Department of the Navy, 1996a). With the exception of a chance encounter as the air launch accessories sink to the bottom, marine animals would only be vulnerable to entanglement or ingestion impacts if their diving and feeding behaviors place them in contact with the sea floor.

In previous studies, the Naval Ocean Systems Center identified two potential impacts of the MK-50 torpedo air launch accessories (Naval Ocean Systems Center, 1990). As the air launch accessories for the MK-46 torpedo are similar in function, materials, and size to those of the MK-50 torpedo, the following potential impacts identified by the Naval Ocean Systems Center are applicable to both torpedoes (U.S. Department of the Navy, 1996a):

- Upon water entry and engine startup, the air stabilizer would be released from the torpedo and sink to the bottom. Bottom currents may cause the air stabilizer canopy to billow, potentially posing an entanglement threat to marine animals that feed on the bottom. However, the canopy is large and highly visible compared to materials such as gill nets and nylon fishing line in which marine animals may become entangled. Thus, entanglement of marine animals in the canopy or suspension lines would be unlikely.
- Non-floating air launch accessories ranges in length from 11 to 44 inches. Because of the relatively large size of this accessory, the potential risk for ingestion of this accessory by marine animals other than bottom-feeding whales would be small. The probability of a whale coming in contact with and ingesting the air launch accessories likewise would be small.

MK-48 Torpedo Flex Hoses

The Navy analyzed the potential for the flex hoses to impact marine mammals. The analysis concluded that the potential entanglement impact on marine animals would be insignificant for reasons similar to those stated for the potential entanglement impact of control wires, specifically (U.S. Department of the Navy, 1996b):

- Due to its weight, the flex hose would rapidly sink to the bottom upon release. With the exception of a chance encounter with the flex hose while it was sinking to the sea floor, a marine animal would be vulnerable to entanglement only if its diving and feeding patterns placed it in contact with the bottom.

- Due to its stiffness, the 250-ft-long flex hose would not form loops that could entangle marine animals.

Sonobuoy and Other Parachutes

Sonobuoys, lightweight torpedoes, and other devices deployed from aircraft use nylon parachutes of varying sizes. At water impact, the parachute assembly is jettisoned and sinks away from the exercise weapon or target. The parachute assembly would potentially be at the surface for a short time before sinking to the sea floor.

Marine mammals are also subject to entanglement in marine trash, particularly anything incorporating loops or rings, hooks and lines, or sharp objects. Entanglement and the eventual drowning of a marine mammal in a parachute assembly would be unlikely, since the parachute would have to land directly on an animal, or an animal would have to swim into it before it sinks. The potential for a marine mammal to encounter an expended parachute assembly is extremely low, given the generally low probability of a marine mammal being in the immediate location of deployment. If bottom currents are present, the canopy may billow and pose an entanglement threat to marine animals with bottom-feeding habits; however, given the extreme depth in the majority of the HRC, the probability of a marine mammal encountering a parachute assembly on the sea floor and the potential for accidental entanglement in the canopy or suspension lines is considered to be unlikely.

Overall, the possibility of marine mammals ingesting nylon parachute fabric or being entangled in parachute assemblies is very remote.

4.1.2.4.2 Potential Sonar and Explosive Impacts

ASW is a primary warfare area for Navy patrol ships (surface and submarines), aircraft, and ASW helicopters. ASW aircrews must practice using sensors, including electro-optical devices, radar, magnetic anomaly detectors, sonar (including helicopter dipping sonar and both active and passive sonobuoys) in both the deep and shallow water environment. The training events being analyzed for Alternative 1 are not new and have taken place in the HRC over the past 60 years with no significant changes in the sonar equipment output in the last 30 years. Although there may be many hours of active ASW sonar events, the approximate 1-second “ping” of the sonar generally occurs no more often than twice a minute. The intermediate time when the sonar is passive is necessary so the sonar operators can detect/listen for sonar ping reflections.

The approach for estimating potential acoustic effects from ASW training within the HRC on cetacean species makes use of the methodology that was developed in cooperation with NOAA for the Navy’s Undersea Warfare Training Range (USWTR) Draft OEIS/EIS (2005), USWEX Programmatic EA/OEA (U.S. Department of the Navy, 2007b), RIMPAC EA/OEA (U.S. Department of the Navy, Commander Third Fleet, 2006), and Composite Training Unit Exercise (COMPTUEX) / Joint Task Force Exercise (JTFEX) EA/OEA (U.S. Department of the Navy, 2007c). In addition, the approach for estimating potential acoustic effects from HRC training activities on marine mammals incorporates comments received on these previous documents. The NMFS and other commenters recommended the use of an alternate methodology to evaluate when sound exposures might result in behavioral effects without corresponding physiological effects.

Training that results in potential impacts from explosives include NSFS Exercise and GUNEX (5-inch and 76-mm guns when using non-inert rounds); MISSILEX (Penguin, Maverick, and Harpoon missiles); BOMBEX (MK-82, MK-83, MK-84 when using non-inert bombs); EER/IEER (explosive charge); SINKEX (multiple ordnance); and Mine Neutralization (up to a 20-lb explosive charge).

The Difference Between MFA/HFA Sonar and Low-Frequency Active Sonar

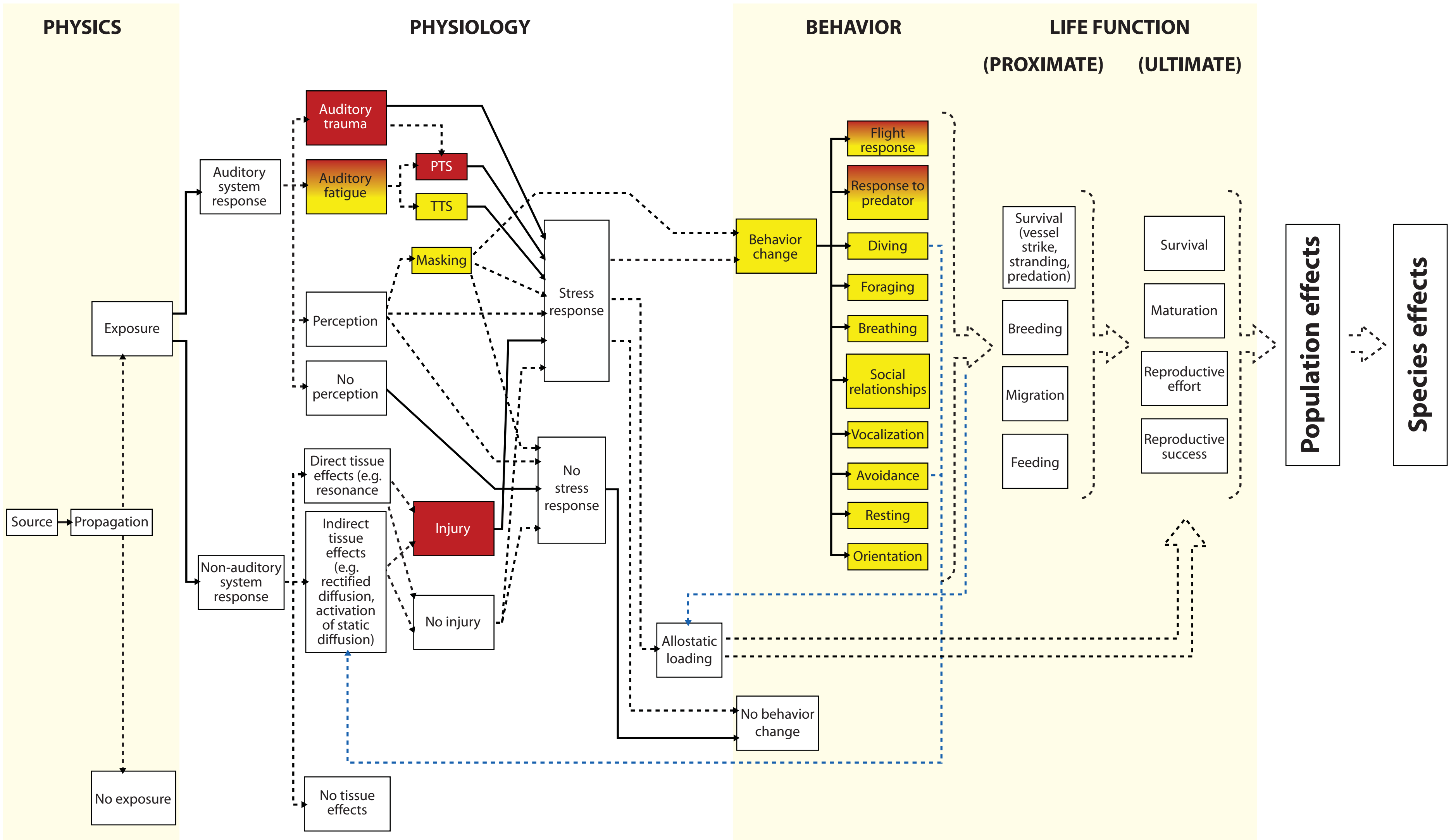
There is some confusion stemming from materials presented in reference to use of low-frequency active (LFA) sonar, which is not an action being proposed by this EIS/OEIS. MFA sonar operates in a range between 1 kHz to 10 kHz and HFA operates in a frequency range above 10 kHz. A LFA sonar system typically conducts sonar activities between 0.1 kHz to 0.5 kHz. An existing Navy LFA sonar system is the SURTASS LFA. The typical SURTASS LFA sonar signal is not a constant tone, but rather a transmission of various waveforms that vary in frequency and duration. A complete sequence of sound transmissions from LFA can last for as short as 6 seconds to as long as 100 seconds. A typical MFA/HFA sonar ping lasts approximately less than 1 second. The use of LFA is not part HRC EIS/OEIS Proposed Action.

4.1.2.4.3 Analytical Framework for Assessing Marine Mammal Response to Active Sonar

As summarized by the National Research Council, the possibility that human-generated sound could harm marine mammals or significantly interfere with their “normal” activities is an issue of increasing concern (National Research Council, 2005). This section evaluates the potential for the specific Navy acoustic sources used in the HRC to result in harassment of marine mammals.

Assessing whether a sound may disturb or injure a marine mammal involves understanding the characteristics of the acoustic sources, the marine mammals that may be present in the vicinity of the sound, and the effects that sound may have on the physiology and behavior of those marine mammals. Although it is known that sound is important for marine mammal communication, navigation, and foraging, there are many unknowns in assessing the effects and significance of the response of marine mammals to sound exposures (National Research Council, 2005). For this reason, the Navy enlisted the expertise of NMFS as the cooperating agency. Their input assisted the Navy in developing a conceptual analytical framework for evaluating what sound levels marine mammals might receive as a result of Navy training actions at HRC, whether marine mammals might respond to these exposures, and whether that response might have a mode of action on the biology or ecology of marine mammals such that the response should be considered a potential harassment. From this framework of evaluating the potential for harassment incidents to occur, an assessment of whether acoustic sources might impact populations, stocks, or species of marine mammals can be conducted.

The conceptual analytical framework (Figure 4.1.2.4.3-1) presents an overview of how the MFA/HFA sonar sources used during training are assessed to evaluate the potential for marine mammals to be exposed to an acoustic source, the potential for that exposure to result in a physiological effect or behavioral response by an animal, and the assessment of whether that



EXPLANATION

Conceptual Marine Mammal Protection Action Analytical Framework

Figure 4.1.2.4.3-1

response may result in a consequence that constitutes harassment in accordance with Marine Mammal Protection Act (MMPA) definitions. As shown on the figure, the Navy has developed acoustic models to predict when Navy training and RDT&E activities could result in injury or behavioral disturbance. Total energy models are used to predict exposures that could result in either behavioral effects or physiological effects resulting in injury or temporary physiological changes. Risk function models using sound pressure levels are used to predict exposures that could result in behavioral effects.

Each exposure could result in a wide range of potential direct physiological effects, which could then lead to a behavioral response. For the purposes of this analysis all PTS exposures are assumed to result in injury (MMPA Level A harassment), and all TTS exposures are assumed to result in significant behavioral effects (MMPA Level B harassment). The other physiological effects are also considered in the analysis, although it is unlikely that they rise to the level of injury. The potential direct effects of physiological responses which may lead to behavioral exposures are considered in light of the biology and ecology of each species in order to arrive at the mode of action or result of the potential direct effect. The intensity of the resulting mode of action can then be used to determine if the natural behavioral patterns are abandoned or significantly altered.

Finally, the physiological and behavioral responses are reviewed in light of the population effects in order to determine the potential for effects on stocks or species.

The general analytical framework for analyzing potential effects of acoustic exposures on Endangered Species Act (ESA) listed species was developed by NMFS as presented in the Biological Opinion for RIMPAC 2006 and for the USWEX Programmatic EA/OEA (National Marine Fisheries Service, 2006a, 2007b). The framework is similar to the framework presented in Figure 4.1.2.4.3-1 in that the exposures calculated by the energy level and risk function models are used to evaluate a number of proximate responses and the resulting modes of action. The fitness consequences could then be determined for individuals and populations.

The first step in the conceptual model is to estimate the potential for marine mammals to be exposed to a Navy acoustic source. Three questions are answered in this “acoustic modeling” step:

1. **What action will occur?** This requires identification of all acoustic sources that would be used in the exercises and the specific outputs of those sources. This information is provided in Appendix J.

2. **Where and when will the action occur?** The place and season of the action are important to:
   - Determine which marine mammal species are likely to be present. Species occurrence and density data (Chapter 3.0) are used to determine the subset of marine mammals that may be present when an acoustic source is operational. The species occurrence information is provided in Chapter 3.0 and the density data is provided in Appendix J.

   - Predict the underwater acoustic environment that would be encountered. The acoustic environment here refers to environmental factors that influence the propagation of underwater sound. Acoustic parameters influenced by the place, season, and time are described in Appendix J.

3. **How many marine mammals are predicted to be exposed to sound from the acoustic sources?** Sound propagation models are used to predict the received exposure level from an acoustic source, and these are coupled with species distribution and density data to estimate the accumulated received energy and sound pressure level that could be considered as potential harassment. Appendix J describes the acoustic modeling and Sections 4.1.2.5, 4.1.2.6, and 4.1.2.7 present the number of exposures predicted by the modeling.

The next steps in the analytical framework evaluate whether the sound exposures predicted by the acoustic model might cause a physiological response in a marine mammal, and if that response might cause a change in behavior. Harassment includes the concepts of potential injury (Level A Harassment) and behavioral disturbance (Level B harassment). The response assessment portion of the analytical framework examines the following question:

4. **Which potential acoustic exposures might result in harassment of marine mammals?** The predicted acoustic exposures are first considered within the context of the species biology (e.g., can a marine mammal detect the sound, and is that mammal likely to respond to that sound?). Next, if a response is predicted, what type of physiological change will occur (e.g., auditory trauma or fatigue, tissue effects from bubble formation or resonance). If a physiological change has occurred will there be a stress response (i.e., increases in heart rate, hormonal activity, respiration rate and awareness) followed by change in behavior (e.g., flight response or avoidance, changes in diving, foraging, or vocalization patterns or social behavior). Next, how will changes in behavior affect proximate life functions (e.g., survival, breeding, migration, and feeding) and ultimate life functions (e.g., survival, maturation, reproductive effort, and reproductive success). Ultimately determine, if possible with available information, what population or species/stock effects may occur. If a response is predicted, will it potentially be considered "harassment" in accordance with MMPA harassment definitions? For example, if a response to the acoustic exposure has a mode of action that results in a consequence for an individual, such as interruption of feeding, that response or repeated occurrence of that response could be considered "abandonment or significant alteration of natural behavioral patterns," and therefore the exposure(s) would cause Level B harassment.

Section 4.1.2.4.3 reviews the regulatory framework and premise for the Navy/NMFS marine mammal response analytical framework. Sections 4.1.2.5, 4.1.2.6, 4.1.2.7, and 4.1.2.8 include the analysis by species/stock for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, presenting relevant information about the species biology and ecology to provide a context for assessing whether modeled exposures might result in incidental harassment. Each alternative includes a discussion of estimated effects on ESA listed species and a section on non-ESA listed species. The potential for harassment is considered within the context of the affected marine mammal population to assess the fitness consequence under the ESA. Particular focus on recruitment and survival are provided to analyze whether the effects of the action can be considered to have negligible impact on species or stocks under MMPA.

Literature Searches for Relevant Analytical Information

Literature searches were conducted to collect relevant reference material using published and unpublished sources. These include peer published journal articles, book chapters, monitoring or mitigation reports, Federal Register notices, environmental documents and workshop or conference reports. Recently, due to the increased concern over acoustic effects on marine animals, more information on the effects of a variety of underwater sound sources on marine animals has become available.

Literature searches using the Library of Congress' First Search and Dissertation Abstracts databases, SCOPUS, Web of Science, BioOne, Oceanic Abstracts, Cambridge Abstract's Aquatic Sciences, University of California MYLVYL, Biosis, Zoological Record Plus and Fisheries Abstracts (ASFA) database services. Specific journals that often publish marine mammal related publications (Aquatic Mammals, Journal of Mammalogy, Canadian Journal of Zoology, Marine Mammal Science), ecology (Ambio, Bioscience, Journal of Animal Ecology, Journal of Applied Ecology, Journal of the Marine Biological Association of the UK, Marine Pollution Bulletin), and bioacoustics (Journal of the Acoustical Society of America) were regularly searched for new publications. References were also obtained by contacting in the appropriate researchers in the field (commercial and academic researchers) and resource agencies (e.g. NMFS, USFWS). This allowed us to collect gray literature reports and submitted or in-press journal articles.

4.1.2.4.4 Regulatory Framework

The MMPA and ESA prohibit the unauthorized harassment of marine mammals and endangered species, and provide the regulatory processes for authorization for any such harassment that might occur incidental to an otherwise lawful activity.

The regulatory framework for estimating potential acoustic effects from HRC ASW training activities on cetacean species makes use of the methodology that was developed in cooperation with NOAA for the Navy's *Undersea Warfare Training Range (USWTR) Draft Overseas Environmental Impact Statement/Environmental Impact Statement (OEIS/EIS),* (U.S. Department of the Navy, Commander, U.S. Atlantic Fleet, 2005). Via response comment letter to USWTR received from NMFS January 30, 2006, NMFS concurred with the use of EL for the determination of physiological effects on marine mammals. Therefore, this methodology is used to estimate the annual exposure of marine mammals that may be considered Level A harassment or Level B harassment as a result of temporary, recoverable physiological effects.

In addition, the approach for estimating potential acoustic effects from HRC training activities on marine mammals makes use of the comments received on the Navy's USWTR Draft OEIS/EIS (U.S. Department of the Navy, Commander, U.S. Atlantic Fleet, 2005) and the *2006 Rim of the Pacific Supplemental Overseas Environmental Assessment* (U.S. Department of the Navy, 2006a). NMFS and other commenters recommended the use of an alternate methodology to evaluate when sound exposures might result in behavioral effects without corresponding physiological effects. As a result of these comments, this document uses a risk function approach to evaluate the potential for behavioral effects. A number of Navy actions and NOAA rulings have helped to qualify possible events deemed as "harassment" under the MMPA. As stated previously, "harassment" under the MMPA includes both potential injury (Level A), and disruptions of natural behavioral patterns to a point where they are abandoned or significantly altered (Level B). NMFS also includes mortality as a possible outcome to consider in addition to

Level A and Level B harassment. The acoustic effects analysis and exposure calculations are based on the following premises:

- Harassment that may result from Navy training described in the HRC EIS/OEIS is unintentional and incidental to those training events.
- This HRC EIS/OEIS uses an unambiguous definition of injury as defined in the USWTR Draft OEIS/EIS (U.S. Department of the Navy, Commander, U.S. Atlantic Fleet, 2005), *2006 Rim of the Pacific Supplemental Overseas Environmental Assessment* (U.S. Department of the Navy, 2006a), and in previous rulings (National Oceanic and Atmospheric Administration, 2001; 2002a): injury occurs when any biological tissue is destroyed or lost as a result of the action.
- Behavioral disruption might result in subsequent injury and injury may cause a subsequent behavioral disruption, so Level A and Level B harassment categories (defined below) can overlap and are not necessarily mutually exclusive. However, by prior ruling (National Oceanic and Atmospheric Administration, 2001; 2006b), this HRC EIS/OEIS analysis assumes that Level A and B do not overlap.
- An individual animal predicted to experience simultaneous multiple injuries, multiple disruptions, or both, is counted as a single take (see National Oceanic and Atmospheric Administration, 2001; 2006b). An animal whose behavior is disrupted by an injury has already been counted as a Level A harassment and will not also be counted as a Level B harassment. Based on the consideration of two different acoustic modeling methodologies to assess the potential for sound exposures that might result in behavioral disturbance, it is possible that the model would count a Level B TTS exposure and a Level B behavioral exposure for the same animal. Although this approach calculates the maximum potential for behavioral disturbance incidents, it is considered conservative because the actual incidents of disturbance are expected to be lower.
- The acoustic effects analysis is based on primary exposures of the action. Secondary, or indirect, effects, such as susceptibility to predation following injury and injury resulting from disrupted behavior, while possible, can only be reliably predicted in circumstances where the responses have been well documented. Consideration of secondary effects would result in Level A exposures being considered Level B exposures, and vice versa, since Level A exposure (assumed to be Level A harassment and injury) has the potential to disrupt behavior resulting in Level B harassment. In like manner, temporary physiological or behavioral disruption (Level B exposures) could be conjectured to have the potential for injury (Level A). Consideration of secondary effects would lead to circular definitions of exposures. For beaked whales, where a connection between behavioral disruption by MFA/HFA sonar and injury to beaked whales is considered a possibility (under specific operational and environmental parameters), secondary effects are considered in the discussion for each species.

4.1.2.4.5 Integration of Regulatory and Biological Frameworks

This section presents a biological framework within which potential effects can be categorized and then related to the existing regulatory framework for MMPA and ESA. The information presented in Sections 4.1.2.4.6 and 4.1.2.4.7 is used to develop specific numerical exposure thresholds and risk function curves. Exposure thresholds and risk function curves are combined with sound propagation models and species distribution data to estimate the potential exposures as presented for the No-action Alternative in Section 4.1.2.5; Alternative 1 in Section 4.1.2.6; Alternative 2 in Section 4.1.2.7; and Alternative 3 in Section 4.1.2.8.

Physiological and Behavioral Effects

Sound exposure may affect multiple biological traits of a marine animal. The biological framework proposed here is structured according to potential physiological and behavioral effects resulting from sound exposure. The range of effects may then be assessed according to MMPA and ESA regulations.

Physiology and behavior are chosen over other biological traits because:

- They are consistent with regulatory statements defining harassment by injury and harassment by disturbance.
- They are components of other biological traits that may be relevant.
- They are a more sensitive and immediate indicator of effect.

For example, ecology is not used as the basis of the framework because the ecology of an animal is dependent on the interaction of an animal with the environment. The animal’s interaction with the environment is driven both by its physiological function and its behavior, and an ecological impact may not be observable over short periods of observation. However, ecological information is considered in the analysis of the effects of individual species.

A “physiological effect” is defined here as one in which the “normal” physiological function of the animal is altered in response to sound exposure. Physiological function is any of a collection of processes ranging from biochemical reactions to mechanical interaction and operation of organs and tissues within an animal. A physiological effect may range from the most significant of impacts (i.e., mortality and serious injury) to lesser effects that would define the lower end of the physiological impact range, such as the non-injurious distortion of auditory tissues.

A “behavioral effect” is one in which the “normal” behavior or patterns of behavior of an animal are overtly disrupted in response to an acoustic exposure. Examples of behaviors of concern can be derived from the harassment definitions in the MMPA and ESA implementing regulations and Public Law (PL) 108—136 (2004).

In this EIS/OEIS the term “normal” is used to qualify distinctions between physiological and behavioral effects. Its use follows the convention of normal daily variation in physiological and behavioral function without the influence of anthropogenic acoustic sources. As a result, this EIS/OEIS uses the following definitions:

- A physiological effect is a variation in an animal’s respiratory, endocrine, hormonal, circulatory, neurological, or reproductive activity and processes, beyond the animal’s normal range of variability, in response to human activity or to an exposure to a stimulus such as active sonar.

- A behavioral effect is a variation in the pattern of an animal's breathing, feeding, resting, migratory, intraspecific behavior (such as reproduction, mating, territorial, rearing, and agonistic behavior), and interspecific behavior, beyond the animal's normal pattern of variability in response to human activity or to an exposure to a stimulus such as active sonar.

The definitions of physiological effect and behavioral effect used here are specific to this EIS/OEIS and should not be confused with more global definitions applied to the field of biology or to existing Federal law. It is reasonable to expect some physiological effects on result in subsequent behavioral effects. For example, a marine mammal that suffers a severe injury may be expected to alter diving or foraging to the degree that its variation in these behaviors is outside that which is considered normal for the species. If a physiological effect is accompanied by a behavioral effect, the overall effect is characterized as a physiological effect; physiological effects take precedence over behavioral effects with regard to their ordering. This approach provides the most conservative ordering of effects with respect to severity, provides a rational approach to dealing with the overlap of the definitions, and avoids circular arguments.

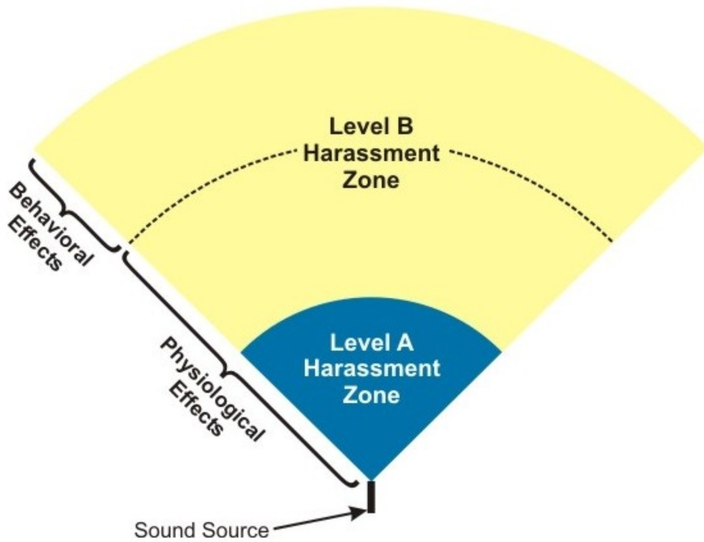
The severity of physiological effects generally decreases with decreasing sound exposure and/or increasing distance from the exposure source. The same generalization does not consistently hold for behavioral effects because they do not depend solely on the received sound level. Behavioral responses also depend on an animal's learned responses, innate response tendencies, motivational state, the pattern of the sound exposure, and the context in which the sound is presented. (Southall et al., 2007) However, to provide a tractable approach to predicting acoustic effects that is relevant to the regulatory terms of behavioral disruption, it is assumed here that the severities of behavioral effects also decrease with decreasing sound exposure and/or increasing distance from the sound source.

MMPA Level A and Level B Harassment

Categorizing potential effects as either physiological or behavioral effects allows them to be related to the harassment definitions. For military readiness events, Level A harassment includes any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild. Injury defined in previous rule (National Oceanic and Atmospheric Administration, 2001; 2002a), is the destruction or loss of biological tissue. The destruction or loss of biological tissue will result in an alteration of physiological function that exceeds the normal daily physiological variation of the intact tissue. For example, increased localized histamine production, edema, production of scar tissue, activation of clotting factors, white blood cell response, etc., may be expected following injury. Therefore, this EIS/OEIS assumes that all injury is qualified as a physiological effect and, to be consistent with prior actions and rulings (National Oceanic and Atmospheric Administration, 2001), all injuries (slight to severe) are considered Level A harassment.

PL 108-136 (2004) amended the MMPA definition of Level B harassment for military readiness events, which applies to this action. For military readiness events, Level B harassment is now defined as "any act that disturbs or is likely to disturb a marine mammal or marine mammal stock by causing disruption of natural behavioral patterns including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering to a point where such behaviors are abandoned or significantly altered." Unlike Level A harassment, which is solely associated with physiological effects, both physiological and behavioral effects may cause Level B harassment.

The volumes of ocean in which Level A and Level B harassment is predicted to occur are described as harassment zones. All marine mammals predicted to be in a zone are considered exposed to effects that could result in the corresponding level of harassment. Figure 4.1.2.4.5-1 illustrates harassment zones extending from a hypothetical, directional sound source.



Note: This figure is for illustrative purposes only and does not represent the sizes or shapes of the actual harassment zones

Figure 4.1.2.4.5-1. Harassment Zones Extending from a Hypothetical, Directional Sound Source

The Level A harassment zone extends from the source out to the distance and exposure at which the slightest amount of injury is predicted to occur. The acoustic exposure that produces the slightest degree of injury is therefore the threshold value defining the outermost limit of the Level A harassment zone. Use of the threshold associated with the onset of slight injury as the most distant point and least injurious exposure takes account of all more serious injuries by inclusion within the Level A harassment zone. The threshold used to define the outer limit of the Level A harassment zone is given in Section 4.1.2.4.6.

The Level B harassment zone begins just beyond the point of slightest injury and extends outward from that point to include all animals that may possibly experience Level B harassment. Physiological effects extend beyond the range of slightest injury to a point where slight temporary distortion of the most sensitive tissue occurs, but without destruction or loss of that tissue. The animals predicted to be in this zone are assumed to experience Level B harassment by virtue of temporary impairment of sensory function (altered physiological function) that can disrupt behavior. The criterion and threshold used to define the outer limit of physiological effects leading to Level B harassment are given in Section 4.1.2.4.6. As described earlier, some behavioral effects occur without an accompanying physiological effect. The risk function that is used to define the non-physiological behavioral effects that constitute potential Level B harassment is described in Section 4.1.2.4.9 and Appendix J.

The Navy's most powerful MFA surface ship sonar, the AN/SQS 53, has a nominal source level of 235 dB re 1 µPa at 1 m. The estimated distance to a received level at the TTS threshold (195 dB SEL) – from a 235 dB source level (a nominal 53C ping) having 1-second duration – is approximately 180 yards. The estimated distance to a received level at the PTS threshold (a 215 dB SEL) is approximately 11 yards from the 235 dB sound source. To reiterate this important point, with the sonar producing a 1-second ping at a source level 235 dB, a marine mammal would have to be within 180 yards of the sonar dome (the bow of the ship) to be exposed to a 195 dB SEL, which is the threshold for a temporary threshold shift in hearing. The Navy's standard operating procedures or mitigation measures incorporate a shutdown of sonar if marine mammals come within 200 yards of an MFA and this is after two power-down steps at 1,000 yards and 500 yards.

ESA Harm and Harassment

ESA regulations define harm as "an act which actually kills or injures" fish or wildlife (50 Code of Federal Regulations [CFR] § 222.102). ESA regulations define harassment as an "intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering" (50 CFR § 17.3). Under ESA there are also behavioral effects that exceed the normal daily variation in behavior, but which arise without an accompanying physiological effect.

Auditory Tissues as Indicators of Physiological Effects

The mammalian auditory system, including those of marine mammals, consists of the outer ear (vestigial in cetaceans), middle ear, inner ear, and central nervous system (Ketten 1998). Sound waves are transmitted through the middle ear to fluids within the inner ear, except in cetaceans. The inner ear contains delicate electromechanical hair cells that convert the fluid motions into neural impulses that are sent to the brain. The hair cells within the inner ear are the most vulnerable to over-stimulation by sound exposure (Yost and Nielson, 1994).

Very high sound levels may rupture the eardrum or damage the small bones in the middle ear (Yost and Nielson, 1994). Lower level exposures of sufficient duration may cause permanent or temporary hearing loss; such an effect is called a sound-induced threshold shift, or simply a threshold shift (TS) (Miller, 1974). A threshold shift may be either permanent, in which case it is termed a PTS, or it may be temporary, in which case it is termed a TTS. Still lower levels of sound may result in auditory masking, which may interfere with an animal's ability to hear other concurrent sounds.

Because the tissues of the ear appear to be the most susceptible to the physiological effects of sound and TSs tend to occur at lower exposures than other more serious auditory effects, PTS and TTS are used here as the biological indicators of physiological effects. TTS is the first indication of physiological non-injurious change and is not physical injury. The remainder of this section is, therefore, focused on TSs, including PTSs and TTSs. Because masking (without a resulting TS) is not associated with abnormal physiological function, it is not considered a physiological effect in this analysis, but rather a potential behavioral effect.

Noise-Induced Threshold Shifts

The amount of TS depends on the amplitude, duration, frequency, and temporal pattern of the sound exposure. Threshold shifts will generally increase with the amplitude and duration of sound exposure. For continuous sounds, exposures of equal energy will lead to approximately equal effects (Ward, 1997). For intermittent sounds, less TS will occur than from a continuous exposure with the same energy (some recovery will occur between exposures) (Kryter et al., 1966; Ward, 1997).

The magnitude of a TS normally decreases with the amount of time post-exposure (Miller, 1974). The amount of TS just after exposure is called the initial TS. If the TS eventually returns to zero (the threshold returns to the pre-exposure value), the TS is a TTS. Since the amount of TTS depends on the time post-exposure, it is common to use a subscript to indicate the time in minutes after exposure (Quaranta et al., 1998). For example, TTS_2 means a TTS measured 2 minutes after exposure. If the TS does not return to zero but leaves some finite amount of TS, then that remaining TS is a PTS. The distinction between PTS and TTS is based on whether there is a complete recovery of a TS following a sound exposure. Figure 4.1.2.4.5-2 shows two hypothetical TSs, one that completely recovers, a TTS, and one that does not completely recover, leaving some PTS.

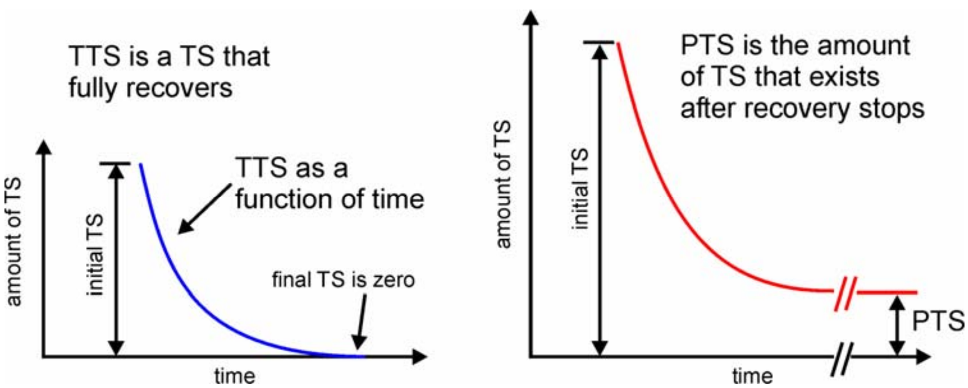


Figure 4.1.2.4.5-2. Hypothetical Temporary and Permanent Threshold Shifts

PTS, TTS, and Harassment Zones

PTS is non-recoverable and, by definition, must result from the destruction of tissues within the auditory system. PTS therefore qualifies as an injury and is classified as Level A harassment under the wording of the MMPA. In the Draft EIS/OEIS, the smallest amount of PTS (onset-PTS) is taken to be the indicator for the smallest degree of injury that can be measured. The acoustic exposure associated with onset-PTS is used to define the outer limit of the Level A harassment zone.

TTS is recoverable and, as in recent rulings (National Oceanic and Atmospheric Administration, 2001, 2002a), is considered to result from the temporary, non-injurious distortion of hearing-related tissues. Because it is considered non-injurious (there is no tissue damage), the acoustic exposure associated with onset-TTS is used to define the outer limit of the portion of the Level B harassment zone attributable to physiological effects. This follows from the concept that hearing loss potentially affects an animal's ability to react normally to the sounds around it.

Therefore, in the HRC, TTS is considered as a Level B harassment resulting from physiological effects on the auditory system.

4.1.2.4.6 Criteria and Thresholds for Physiological Effects

This section presents the effect criteria and thresholds for physiological effects of sound leading to injury and behavioral disturbance as a result of sensory impairment. Section 4.1.2.4.5 identified the tissues of the ear as being the most susceptible to physiological effects of underwater sound. PTS and TTS were determined to be the most appropriate biological indicators of physiological effects that equate to the onset of injury (Level A harassment) and behavioral disturbance (Level B harassment), respectively. This section is, therefore, focused on criteria and thresholds to predict PTS and TTS in marine mammals.

Marine mammal ears are functionally and structurally similar to terrestrial mammal ears; however, there are important differences (Ketten, 1998). The most appropriate information from which to develop PTS/TTS criteria for marine mammals would be experimental measurements of PTS and TTS from marine mammal species of interest. TTS data exist for several marine mammal species and may be used to develop meaningful TTS criteria and thresholds. Because of the ethical issues presented, PTS data do not exist for marine mammals and are unlikely to be obtained. Therefore, PTS criteria must be extrapolated using TTS criteria and estimates of the relationship between TTS and PTS.

This section begins with a review of the existing marine mammal TTS data. The review is followed by a discussion of the relationship between TTS and PTS. The specific criteria and thresholds for TTS and PTS used in this authorization request are then presented. This is followed by discussions of EL, the relationship between EL and SPL, and the use of SPL and EL in previous environmental compliance documents.

Energy Flux Density Level and Sound Pressure Level

Energy Flux Density Level (EL) is measure of the sound energy flow per unit area expressed in dB. EL is stated in dB re 1 µPa^2-s for underwater sound and dB re (20 µPa)^2-s for airborne sound.

Sound Pressure Level (SPL) is a measure of the root-mean square, or "effective," sound pressure in decibels. SPL is expressed in dB re 1 µPa for underwater sound and dB re 20 µPa for airborne sound.

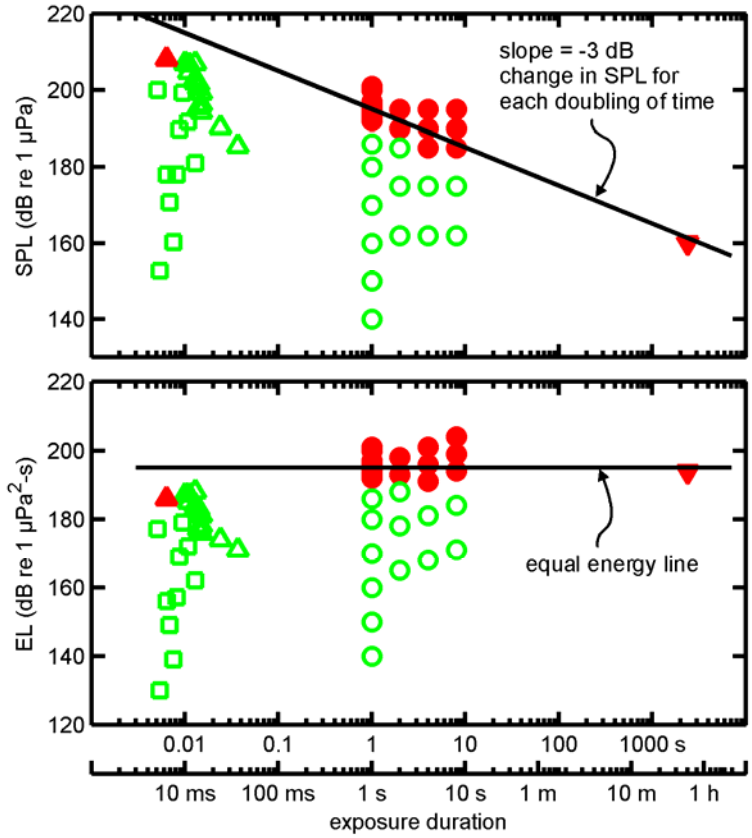
<u>TTS in Marine Mammals</u>

A number of investigators have measured TTS in marine mammals. These studies measured hearing thresholds in trained marine mammals before and after exposure to intense sounds. Some of the more important data obtained from these studies are onset-TTS levels—exposure levels sufficient to cause a just-measurable amount of TTS—often defined as 6 dB of TTS (for example, Schlundt et al., 2000). The existing cetacean TTS data are summarized in the following bullets.

- **Schlundt et al. (2000)** reported the results of TTS experiments conducted with bottlenose dolphins and beluga exposed to 1-second tones. This paper also includes a reanalysis of preliminary TTS data released in a technical report by Ridgway et al. (1997). At frequencies of 3, 10, and 20 kHz, SPLs necessary to induce measurable amounts (6 dB or more) of TTS were between 192 and 201 dB re 1 µPa (EL = 192 to 201 dB re 1 µPa^2-s). The mean exposure SPL and EL for onset-TTS were 195 dB re 1 µPa and 195 dB re 1 µPa^2-s, respectively. The sound exposure stimuli (tones) and relatively large number of test subjects (five dolphins and two belugas) make the Schlundt et al. (2000) data the most directly relevant TTS information for the scenarios described in the HRC EIS/OEIS.
- **Finneran et al. (2001, 2003, 2005)** described TTS experiments conducted with bottlenose dolphins exposed to 3-kHz tones with durations of 1, 2, 4, and 8 seconds. Small amounts of TTS (3 to 6 dB) were observed in one dolphin after exposure to ELs between 190 and 204 dB re 1 µPa^2-s. These results were consistent with the data of Schlundt et al. (2000) and showed that the Schlundt et al. (2000) data were not significantly affected by the masking sound used. These results also confirmed that, for tones with different durations, the amount of TTS is best correlated with the exposure EL rather than the exposure SPL.
- **Nachtigall et al. (2003)** measured TTS in a bottlenose dolphin exposed to octave-band sound centered at 7.5 kHz. Nachtigall et al. (2003a) reported TTSs of about 11 dB measured 10 to 15 minutes after exposure to 30 to 50 minutes of sound with SPL 179 dB re 1 µPa (EL about 213 dB re µPa^2-s). No TTS was observed after exposure to the same sound at 165 and 171 dB re 1 µPa. Nachtigall et al. (2004) reported TTSs of around 4 to 8 dB 5 minutes after exposure to 30 to 50 minutes of sound with SPL 160 dB re 1 µPa (EL about 193 to 195 dB re 1 µPa^2-s). The difference in results was attributed to faster post-exposure threshold measurement—TTS may have recovered before being detected by Nachtigall et al. (2003). These studies showed that, for long-duration exposures, lower sound pressures are required to induce TTS than are required for short-duration tones. These data also confirmed that, for the cetaceans studied, EL is the most appropriate predictor for onset-TTS.
- **Finneran et al. (2000, 2002)** conducted TTS experiments with dolphins and belugas exposed to impulsive sounds similar to those produced by distant underwater explosions and seismic waterguns. These studies showed that, for very short-duration impulsive sounds, higher sound pressures were required to induce TTS than for longer-duration tones.
- **Kastak et al. (1999a, 2005)** conducted TTS experiments with three species of pinnipeds, California sea lion, northern elephant seal and a Pacific harbor seal, exposed to continuous underwater sounds at levels of 80 and 95 dB SPL at 2.5 and 3.5 kHz for up to 50 minutes. Mean TTS shifts of up to 12.2 dB occurred with the harbor seals showing the largest shift of 28.1 dB. Increasing the sound duration had a greater effect on TTS than increasing the sound level from 80 to 95 dB.

Figure 4.1.2.4.6-1 shows the existing TTS data for cetaceans (dolphins and belugas). Individual exposures are shown in terms of SPL versus exposure duration (upper panel) and EL versus exposure duration (lower panel). Exposures that produced TTS are shown as filled symbols. Exposures that did not produce TTS are represented by open symbols. The squares and triangles represent impulsive test results from Finneran et al., 2000 and 2002, respectively. The circles show the 3-, 10-, and 20-kHz data from Schlundt et al. (2000) and the results of Finneran et al. (2003). The inverted triangle represents data from Nachtigall et al. (2004).

Figure 4.1.2.4.6-1 illustrates that the effects of the different sound exposures depend on the SPL and duration. As the duration decreases, higher SPLs are required to cause TTS. In contrast, the ELs required for TTS do not show the same type of variation with exposure duration.



Legend: Filled symbol: Exposure that produced TTS, Open symbol: Exposure that did not produce TTS
Squares: Impulsive test results from Finneran et al., 2000, Triangles: Impulsive test results from Finneran et al., 2002a, Circles: 3, 10, and 20-kHz data from Schlundt et al. (2000) and results of Finneran et al. (2003), and Inverted triangle: Data from Nachtigall et al., 2004.

Figure 4.1.2.4.6-1. Existing TTS Data for Cetaceans

The solid line in the upper panel of Figure 4.1.2.4.6-1 has a slope of -3 dB per doubling of time. This line passes through the point where the SPL is 195 dB re 1 µPa and the exposure duration is 1 second. Since EL = SPL + 10log10 (duration), doubling the duration *increases* the EL by 3 dB. Subtracting 3 dB from the SPL *decreases* the EL by 3 dB. The line with a slope of -3 dB per doubling of time, therefore, represents an *equal energy line*—all points on the line have the same EL, which is, in this case, 195 dB re 1 µPa^2-s. This line appears in the lower panel as a horizontal line at 195 dB re 1 µPa^2-s. The equal energy line at 195 dB re 1 µPa^2-s fits the tonal and sound data (the non-impulsive data) very well, despite differences in exposure duration, SPL, experimental methods, and subjects.

In summary, the existing cetacean TTS data show that, for the species studied and sounds (non-impulsive) of interest, the following is true:

- The growth and recovery of TTS are analogous to those in land mammals. This means that, as in land mammals, cetacean TSs depend on the amplitude, duration, frequency content, and temporal pattern of the sound exposure. Threshold shifts will generally increase with the amplitude and duration of sound exposure. For continuous sounds, exposures of equal energy will lead to approximately equal effects (Ward, 1997). For intermittent sounds, less TS will occur than from a continuous exposure with the same energy (some recovery will occur between exposures) (Kryter et al., 1966; Ward, 1997).
- SPL by itself is not a good predictor of onset-TTS, since the amount of TTS depends on both SPL and duration.
- Exposure EL is correlated with the amount of TTS and is a good predictor for onset-TTS for single, continuous exposures with different durations. This agrees with human TTS data presented by Ward et al. (1958, 1959).
- An energy flux density level of 195 dB re 1 µPa^2-s is the most appropriate predictor for onset-TTS from a single, continuous exposure.

<u>Relationship between TTS and PTS</u>

Since marine mammal PTS data do not exist, onset-PTS levels for these animals must be estimated using TTS data and relationships between TTS and PTS. Much of the early human TTS work was directed towards relating TTS_2 after 8 hours of sound exposure to the amount of PTS that would exist after years of similar daily exposures (e.g., Kryter et al., 1966). Although it is now acknowledged that susceptibility to PTS cannot be reliably predicted from TTS measurements, TTS data do provide insight into the amount of TS that may be induced without a PTS. Experimental studies of the growth of TTS may also be used to relate changes in exposure level to changes in the amount of TTS induced. Onset-PTS exposure levels may therefore be predicted by:

- Estimating the largest amount of TTS that may be induced without PTS. Exposures causing a TS greater than this value are assumed to cause PTS.
- Estimating the additional exposure, above the onset-TTS exposure, necessary to reach the maximum allowable amount of TTS that, again, may be induced without PTS. This is equivalent to estimating the growth rate of TTS—how much additional TTS is produced by an increase in exposure level.

Experimentally induced TTSs in marine mammals have generally been limited to around 2 to 10 dB, well below TSs that result in some PTS. Experiments with terrestrial mammals have used much larger TSs and provide more guidance on how high a TS may rise before some PTS results. Early human TTS studies reported complete recovery of TTSs as high as 50 dB after exposure to broadband sound (Ward, 1960; Ward et al., 1958, 1959). Ward et al. *(*1959) also reported slower recovery times when TTS_2 approached and exceeded 50 dB, suggesting that

50 dB of TTS_2 may represent a "critical" TTS. Miller et al. (1963) found PTS in cats after exposures that were only slightly longer in duration than those causing 40 dB of TTS. Kryter et al. (1966) stated: "A TTS_2 that approaches or exceeds 40 dB can be taken as a signal that danger to hearing is imminent." These data indicate that TSs up to 40 to 50 dB may be induced without PTS, and that 40 dB is a reasonable upper limit for TS to prevent PTS.

The small amounts of TTS produced in marine mammal studies also limit the applicability of these data to estimates of the growth rate of TTS. Fortunately, data do exist for the growth of TTS in terrestrial mammals. For moderate exposure durations (a few minutes to hours), TTS_2 varies with the logarithm of exposure time (Ward et al., 1958, 1959; Quaranta et al., 1998). For shorter exposure durations the growth of TTS with exposure time appears to be less rapid (Miller, 1974; Keeler, 1976). For very long-duration exposures, increasing the exposure time may fail to produce any additional TTS, a condition known as asymptotic threshold shift (Saunders et al., 1977; Mills et al., 1979).

Ward et al. (1958, 1959) provided detailed information on the growth of TTS in humans. Ward et al. presented the amount of TTS measured after exposure to specific SPLs and durations of broadband sound. Since the relationship between EL, SPL, and duration is known, these same data could be presented in terms of the amount of TTS produced by exposures with different ELs.

Figure 4.1.2.4.6-2 shows results from Ward et al. (1958, 1959) plotted as the amount of TTS_2 versus the exposure EL. The data in Figure 4.1.2.4.6-2(a) are from broadband (75 Hz to 10 kHz) sound exposures with durations of 12 to 102 minutes (Ward et al., 1958). The symbols represent mean TTS_2 for 13 individuals exposed to continuous sound. The solid line is a linear regression fit to all but the two data points at the lowest exposure EL. The experimental data are fit well by the regression line (R2 = 0.95). These data are important for two reasons: (1) they confirm that the amount of TTS is correlated with the exposure EL; and (2) the slope of the line allows one to estimate the additional amount of TTS produced by an increase in exposure. For example, the slope of the line in Figure 4.1.2.4.6-2(a) is approximately 1.5 dB TTS_2 per dB of EL. This means that each additional dB of EL produces 1.5 dB of additional TTS_2.

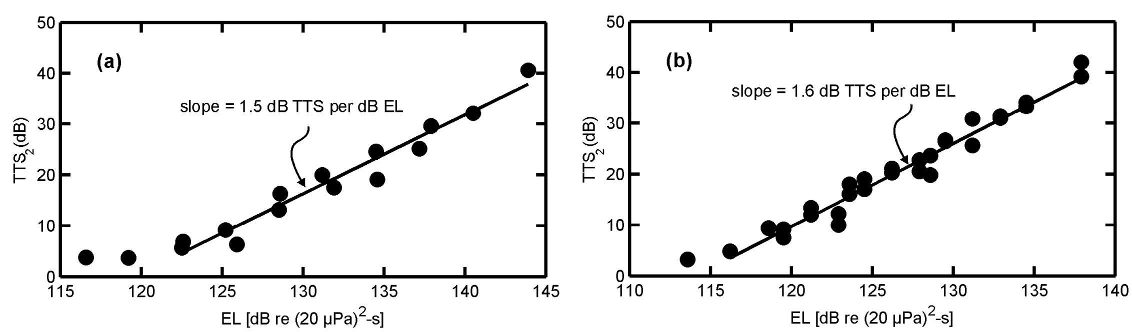


Figure 4.1.2.4.6-2. Growth of TTS versus the Exposure EL (from Ward et al., 1958, 1959)

The data in Figure 4.1.2.4.6-2(b) are from octave-band sound exposures (2.4 to 4.8 kHz) with durations of 12 to 102 minutes (Ward et al., 1959). The symbols represent mean TTS for 13 individuals exposed to continuous sound. The linear regression was fit to all but the two data points at the lowest exposure EL. The results are similar to those shown in Figure

4.1.2.4.6-2(a). The slope of the regression line fit to the mean TTS data was 1.6 dB TTS_2/dB EL. A similar procedure was carried out for the remaining data from Ward et al. *(*1959), with comparable results. Regression lines fit to the TTS versus EL data had slopes ranging from 0.76 to 1.6 dB TTS_2/dB EL, depending on the frequencies of the sound exposure and hearing test.

An estimate of 1.6 dB TTS_2 per dB increase in exposure EL is the upper range of values from Ward et al. (1958, 1959) and gives the most conservative estimate—it predicts a larger amount of TTS from the same exposure compared to the lines with smaller slopes. The difference between onset-TTS (6 dB) and the upper limit of TTS before PTS (40 dB) is 34 dB. To move from onset-TTS to onset-PTS, therefore, requires an increase in EL of 34 dB divided by 1.6 dB/dB, or approximately 21 dB. An estimate of 20 dB between exposures sufficient to cause onset-TTS and those capable of causing onset-PTS is a reasonable approximation. To summarize:

- In the absence of marine mammal PTS data, onset-PTS exposure levels may be estimated from marine mammal TTS data and PTS/TTS relationships observed in terrestrial mammals. This involves:
  - Estimating the largest amount of TTS that may be induced without PTS. Exposures causing a TS greater than this value are assumed to cause PTS.
  - Estimating the growth rate of TTS—how much additional TTS is produced by an increase in exposure level.
- A variety of terrestrial mammal data sources point toward 40 dB as a reasonable estimate of the largest amount of TS that may be induced without PTS. A conservative estimate is that continuous-type exposures producing TSs of 40 dB or more always result in some amount of PTS.
- Data from Ward et al. *(*1958, 1959) reveal a linear relationship between TTS_2 and exposure EL. A value of 1.6 dB TTS_2 per dB increase in EL is a conservative estimate of how much additional TTS is produced by an increase in exposure level for continuous-type sounds.
- There is a 34 dB TS difference between onset-TTS (6 dB) and onset-PTS (40 dB). The additional exposure above onset-TTS that is required to reach PTS is therefore 34 dB divided by 1.6 dB/dB, or approximately 21 dB.
- Exposures with ELs 20 dB above those producing TTS may be assumed to produce a PTS. This number is used as a conservative simplification of the 21 dB number derived above.

<u>Threshold Levels for Harassment to Cetaceans from Physiological Effects</u>

For this specified action, sound exposure thresholds for TTS and PTS are as presented in the following text box:

195 dB re 1 μPa^2-s received EL for TTS

215 dB re 1 μPa^2-s received EL for PTS

Cetaceans predicted to receive a sound exposure with EL of 215 dB re 1 µPa^2-s or greater are assumed to experience PTS and are counted as Level A harassment. Cetaceans predicted to receive a sound exposure with EL greater than or equal to 195 dB re 1 µPa^2-s but less than 215 dB re 1 µPa^2-s are assumed to experience TTS and are counted as Level B harassment.

Derivation of an Effect Threshold for Cetaceans

The TTS threshold is primarily based on the cetacean TTS data from Schlundt et al. (2000). Since these tests used short-duration tones similar to sonar pings, they are the most directly relevant data. The mean exposure EL required to produce onset-TTS in these tests was 195 dB re 1 µPa^2-s. This result is corroborated by the short-duration tone data of Finneran et al. (2000, 2003) and the long-duration sound data from Nachtigall et al. (2003, 2004). Together, these data demonstrate that TTS in cetaceans is correlated with the received EL and that onset-TTS exposures are fit well by an equal-energy line passing through 195 dB re 1 µPa^2-s.

The PTS threshold is based on a 20 dB increase in exposure EL over that required for onset-TTS. The 20 dB value is based on estimates from terrestrial mammal data of PTS occurring at 40 dB or more of TS, and on TS growth occurring at a rate of 1.6 dB/dB increase in exposure EL. This is conservative because: (1) 40 dB of TS is actually an upper limit for TTS used to approximate onset-PTS, and (2) the 1.6 dB/dB growth rate is the highest observed in the data from Ward et al. (1958, 1959).

Use of EL for Physiological Effect Thresholds

Effect thresholds are expressed in terms of total received EL. Energy flux density is a measure of the flow of sound energy through an area. Marine and terrestrial mammal data show that, for continuous-type sounds of interest, TTS and PTS are more closely related to the energy in the sound exposure than to the exposure SPL.

The EL for each individual ping is calculated from the following equation:

EL = SPL + 10log10(duration)

The EL includes both the ping SPL and duration. Longer-duration pings and/or higher-SPL pings will have a higher EL.

If an animal is exposed to multiple pings, the energy flux density in each individual ping is summed to calculate the total EL. Since mammalian TS data show less effect from intermittent exposures compared to continuous exposures with the same energy (Ward, 1997), basing the effect thresholds on the total received EL is a conservative approach for treating multiple pings; in reality, some recovery will occur between pings and lessen the effect of a particular exposure.

Therefore, estimates are conservative because recovery is not taken into account—intermittent exposures are considered comparable to continuous exposures.

The total EL depends on the SPL, duration, and number of pings received. The TTS and PTS thresholds do not imply any specific SPL, duration, or number of pings. The SPL and duration of each received ping are used to calculate the total EL and determine whether the received EL meets or exceeds the effect thresholds. For example, the TTS threshold would be reached through any of the following exposures:

- A single ping with SPL = 195 dB re 1 µPa and duration = 1 second.
- A single ping with SPL = 192 dB re 1 µPa and duration = 2 seconds.
- Two pings with SPL = 192 dB re 1 µPa and duration = 1 second.
- Two pings with SPL = 189 dB re 1 µPa and duration = 2 seconds.

Previous Use of EL for Physiological Effects

Energy measures have been used as a part of dual criteria for cetacean auditory effects in shock trials, which only involve impulsive-type sounds (U.S. Department of the Navy, 1998a, 2001b). These actions used 192 dB re 1 µPa^2-s as a reference point to derive a TTS threshold in terms of EL. A second TTS threshold, based on peak pressure, was also used. If either threshold was exceeded, effect was assumed.

The 192 dB re 1 µPa^2-s reference point differs from the threshold of 195 dB re 1 µPa^2-s used in this HRC EIS/OEIS. The 192 dB re 1 µPa^2-s value was based on the minimum observed by Ridgway et al. (1997) and Schlundt et al. (2000) during TTS measurements with bottlenose dolphins exposed to 1-second tones. At the time, no impulsive test data for marine mammals were available and the 1-second tonal data were considered to be the best available. The minimum value of the observed range of 192 to 201 dB re 1 µPa^2-s was used to protect against misinterpretation of the sparse data set available. The 192 dB re 1 µPa^2-s value was reduced to 182 dB re 1 µPa^2-s to accommodate the potential effects of pressure peaks in impulsive waveforms.

The additional data now available for onset-TTS in small cetaceans confirm the original range of values and increase confidence in it (Finneran et al., 2001, 2003; Nachtigall et al., 2003, 2004). The HRC EIS/OEIS, therefore, uses the more complete data available and the mean value of the entire Schlundt et al. (2000) data set (195 dB re 1 µPa^2-s), instead of the minimum of 192 dB re 1 µPa^2-s. From the standpoint of statistical sampling and prediction theory, the mean is the most appropriate predictor—the “best unbiased estimator”—of the EL at which onset-TTS should occur; predicting the number of exposures in future actions relies (in part) on using the EL at which onset-TTS will most likely occur. When that EL is applied over many pings in each of many sonar exercises, that value will provide the most accurate prediction of the actual number of exposures by onset-TTS over all of those exercises. Use of the minimum value would calculate the maximum potential of exposures because many animals counted would not have experienced onset-TTS. Further, there is no logical limiting minimum value of the distribution that would be obtained from continued successive testing. Continued testing and use of the minimum would produce more and more erroneous estimates.

<u>Summary of Physiological Effects Criteria for Cetacea</u>

PTS and TTS are used as the criteria for physiological effects resulting in injury (Level A harassment) and disturbance (Level B harassment), respectively. Sound exposure thresholds for TTS and PTS in Cetacea are 195 dB re 1 µPa^2-s received EL for TTS and 215 dB re 1 µPa^2-s received EL for PTS. The TTS threshold is primarily based on cetacean TTS data from Schlundt et al. (2000). Since these tests used short-duration tones similar to sonar pings, they are the most directly relevant data. The PTS threshold is based on a 20 dB increase in exposure EL over that required for onset-TTS. The 20 dB value is based on extrapolations from terrestrial mammal data indicating that PTS occurs at 40 dB or more of TS, and that TS growth occurring at a rate of approximately 1.6 dB/dB increase in exposure EL. The application of the model results to estimate marine mammal exposures for each species is discussed in Sections 4.1.2.5, 4.1.2.6, and 4.1.2.7.

Summary of Physiological Effects Criteria for Monk Seals

PTS and TTS are used as the criteria for physiological effects resulting in injury (Level A harassment) and disturbance (Level B harassment), respectively for the Hawaiian monk seal. As noted previously, research by Kastak et al. (1999a; 2005) provided estimates of the average SEL (EFD level) for onset-TTS for a harbor seal, sea lion, and Northern Elephant seal. Although the duration for exposure sessions duration is well beyond those typically used with tactical sonars, the frequency ranges are similar (2.5 kHz to 3.5 kHz). This data provides good estimates for the onset of TTS in pinnipeds since the researchers tested different combinations of SPL and exposure duration, and plotted the growth of TTS with an increasing energy exposure level.

Of the three pinniped groups studied by Kastak et al., elephant seals are the most closely related to the Hawaiian monk seal (the family *Monachinae*). The onset-TTS number, provided by Kastak et al. for elephant seals and used to analyze impacts on monk seals in this document, is 204 dB re 1µPa^2-s. Using the same rationale described previously for the establishment of the PTS threshold based on odontocete onset-TTS (20 dB up from onset-TTS), the PTS threshold for monk seals used in the HRC analysis is 224 dB re 1µPa^2-s.

Application of Physiological Effect Criteria for Mysticetes

Information on auditory function in mysticetes is extremely lacking. Sensitivity to low-frequency sound by baleen whales has been inferred from observed vocalization frequencies, observed reactions to playback of sounds, and anatomical analyses of the auditory system. Baleen whales are estimated to hear from 15 Hz to 20 kHz, with good sensitivity from 20 Hz to 2 kHz (Ketten, 1998). Filter-bank models of the humpback whale's ear have been developed from anatomical features of the humpback's ear and optimization techniques (Houser et al., 2001). The results suggest that humpbacks are sensitive to frequencies between 700 Hz and 10 kHz, and maximum sensitivity is between 2 kHz and 6 kHz. Research involving the recording of humpback vocalizations has found harmonics in the range up to 24~~0~~ kHz (Au et al. 2001; 2006). These results do not, however, indicate that humpbacks can actually hear those high-frequency harmonics and given that sound of that frequency attenuates rapidly over distance, those sounds would not serve as a means of communication over distance. There are no cases where the absolute sensitivity for any baleen whale species has been modeled or determined. Furthermore, there is no indication of what sorts of sound exposure may produce threshold shifts in these animals. As a result, the thresholds and criteria established for odontocetes is used to analyze potential affects from sonar use in mysticetes.

4.1.2.4.7 Other Physiological Effects Considered

The criteria and thresholds for PTS and TTS developed for odontocetes for this activity are also used for mysticetes. This generalization is based on the assumption that the empirical data at hand are representative of both groups until data collection on mysticete species shows otherwise. For the frequencies of interest for this action, there is no evidence that the total amount of energy required to induce onset-TTS and onset-PTS in mysticetes is different than that required for odontocetes.

Stress

A possible stressor for marine mammals exposed to sound, including MFA/HFA sonar, is the effect on health and physiological stress (Fair and Becker, 2000). A stimulus may cause a number of behavioral and physiological responses such as an elevated heart rate, increases in endocrine and neurological function, and decreased immune function, particularly if the animal perceives the stimulus as life threatening (Seyle, 1950; Moberg, 2000; Sapolsky, 2005). The primary response to the stressor is to move away to avoid continued exposure. Next the animal's physiological response to a stressor is to engage the autonomic nervous system with the classic "fight or flight" response. This includes changes in the cardiovascular system (increased heart rate), the gastrointestinal system (decreased digestion), the exocrine glands (increased hormone output), and the adrenal glands (increased norepinephrine). These physiological and hormonal responses are short lived and may not have significant long-term effects on an animal's health or fitness. Generally these short-term responses are not detrimental to the animal except when the health of the animal is already compromised by disease, starvation, or parasites; or the animal is chronically exposed to a stressor.

Exposure to chronic or high intensity sound sources can cause physiological stress. Acoustic exposures and physiological responses have been shown to cause stress responses (elevated respiration and increased heart rates) in humans (Jansen, 1998). Jones (1998) reported on reductions in human performance when faced with acute, repetitive exposures to acoustic disturbance. Trimper et al. (1998) reported on the physiological stress responses of osprey to low-level aircraft noise. Krausman et al. (2004) reported on the auditory (TTS) and physiology stress responses of endangered Sonoran pronghorn to military overflights. Smith et al. (2004a, 2004b) recorded sound-induced physiological stress responses in a hearing-specialist fish that was associated with TTS. Welch and Welch (1970), reported physiological and behavioral stress responses that accompanied damage to the inner ears of fish and several mammals.

Most of these responses to sound sources or other stimuli have been studied extensively in terrestrial animals but are much more difficult to determine in marine mammals. Increases in heart rate are a common reaction to acoustic disturbance in marine mammals (Miksis et al., 2001) as are small increases in the hormones norepinephrine, epinephrine, and dopamine (Romano et al., 2002; 2004). Increases in cortical steroids are more difficult to determine because blood collection procedures will also cause stress (Romano et al., 2002; 2004). A recent study, Chase Encirclement Stress Studies (CHESS), was conducted by NMFS on chronic stress effects in small odontocetes affected by the Eastern Tropical Pacific tuna fishery (Forney et al., 2002). Analysis was conducted on blood constituents, immune function, reproductive parameters, heart rate, and body temperature of small odontocetes that had been pursued and encircled by tuna fishing boats. Some effects were noted, including lower pregnancy rates, increases in norepinephrine, dopamine, ACTH and cortisol levels, heart lesions and an increase in fin and surface temperature when chased for over 75 minutes but with no change in core body temperature (Forney et al., 2002). These stress effects in small cetaceans that were actively pursued (sometimes for over 75 minutes) were relatively small and difficult to discern. It is unlikely that marine mammals exposed to MFA/HFA sonar would be exposed as long as the cetaceans in the CHESS study and would not be pursued by the Navy ships; therefore, stress effects would be minimal from the short-term exposure to sonar.

Acoustically Mediated Bubble Growth and Decompression Sickness

One suggested cause of stranding in marine mammals is by rectified diffusion (Crum and Mao, 1996), which is the process of increasing the size of a bubble by exposing it to a sound field. This process is facilitated if the environment in which the ensonified bubbles exist is supersaturated with a gas, such as nitrogen, which makes up approximately 78 percent of air. It is unlikely that the short duration of sonar pings would be able to drive bubble growth to any substantial size, if such a phenomenon occurs. Laboratory studies exposed blood and tissues for 2-3 hours to pressure and then to HFA sonar to develop bubbles *in vitro* (Crum and Mao, 2004). However, an alternative but related hypothesis has also been suggested: stable bubbles could be destabilized by high-level sound exposures such that bubble growth then occurs through static diffusion of gas out of the tissues. In such a scenario the marine mammal would need to be in a gas-supersaturated state for a long enough period of time and exposed to a continuous sound source for bubbles to become of a problematic size.

Repetitive diving in a trained marine mammal caused the blood and some tissues to accumulate gas to a greater degree than is supported by the surrounding environmental pressure but no decompression sickness symptoms were reported (Ridgway and Howard, 1979). Deeper and longer dives of some marine mammals (for example, beaked whales) are hypothetically predicted to induce greater nitrogen supersaturation (Houser et al., 2001). Studies have shown that marine mammal lung structure (both pinnipeds and cetaceans) facilitates collapse of the lungs at depths deeper than approximately 162 ft (Kooyman et al., 1970). Collapse of the lungs would force air into the non-air exchanging areas of the lungs (into the bronchioles away from the alveoli), thus significantly decreasing nitrogen diffusion into the body. Deep diving pinnipeds such as the northern elephant seal (*Mirounga angustirostris*) and Weddell seal (*Leptonychotes weddellii*) typically exhale before long deep dives, further reducing air volume in the lungs (Kooyman, et al., 1970) but cetaceans may not exhale on diving but use that air in the nasal passages for vocalizations (including echolocation in odontocetes).

Another hypothesis suggests that rapid ascent to the surface following exposure to a startling sound might produce tissue gas saturation sufficient for the evolution of nitrogen bubbles (Jepson et al., 2003). In this scenario, the rate of ascent would need to be sufficiently rapid to compromise behavioral or physiological protections against nitrogen bubble formation. Cox et al. (2006), with experts in the field of marine mammal behavior, diving, physiology, respiration physiology, pathology, anatomy, and bio-acoustics considered this to be a plausible hypothesis but required further investigation. Conversely, Fahlman et al. (2006) suggested that diving bradycardia (reduction in heart rate and circulation to the tissues), lung collapse, and slow ascent rates would reduce nitrogen uptake and thus reduce the risk of decompression sickness by 50 percent in models of marine mammals. Recent information on the diving profiles of Cuvier's (*Ziphius cavirostris*) and Blainville's (*Mesoplodon densirostris*) beaked whales in Hawaii (Baird et al., 2006) showed slower ascent rates than descent rates, but Tyack et al. (2006) showed that while these species do dive deeply (regularly exceed depths of 2,620 ft) and for long periods (48 to 68 minutes), they have significantly slower ascent rates than descent rates. Tyack et al. (2006) reported rapid ascents from deep dives in Cuvier's and Blainville's beaked whales but concluded that the natural diving behavior of beaked whales precluded them from having problems with nitrogen gas surpersaturation and embolisms. Zimmer and Tyack (2007) presented a model that suggested that repetitive shallow diving by beaked whales that may occur in response to a predator, would be above the depth for lung collapse and therefore could cause decompression sickness. There is no evidence that beaked whales dive in this manner in response to predators or sound sources and other marine mammals such as Antarctic and Galapagos fur seals, and pantropical spotted dolphins make repetitive shallow dives with no apparent decompression sickness (Kooyman and Trillmich, 1984; Kooyman et al., 1984; Baird et al., 2001).

Although theoretical predictions suggest the possibility for acoustically mediated bubble growth, there is considerable disagreement among scientists as to its likelihood (Piantadosi and Thalmann, 2004; Evans and Miller, 2003). To date, ELs predicted to cause in vivo bubble formation within diving cetaceans have not been evaluated (National Oceanic and Atmospheric Administration, 2002b). Further, although it has been argued that traumas from recent beaked whale strandings are consistent with gas emboli and bubble-induced tissue separations (Jepson et al., 2003), there is no conclusive evidence of this and complicating factors associated with introduction of gas into the venous system during necropsy or lesions occur as a result of physical trauma during stranding on the shoreline. Rommel et al (2006) reviewed several hypothetical causes of strandings in beaked whales and concluded that “It is important to note that no current hypothesis of pathogenic mechanisms resulting in acoustically-related strandings is proven.” According to Rommel et al. (2006) “The lesions observed in beaked whales that mass stranded in the Canary Islands in 2002 are consistent with, but not diagnostic of, decompression sickness.” Because evidence supporting decompression sickness in marine mammals exposed to mid- and high-frequency active sonar is debatable, no marine mammals addressed in this EIS/OEIS are given special treatment due to the possibility for acoustically mediated bubble growth.

Resonance

Another suggested cause of injury in marine mammals is air cavity resonance due to sonar exposure. Resonance is a phenomenon that exists when an object is vibrated at a frequency near its natural frequency of vibration—the particular frequency at which the object vibrates most readily. The size and geometry of an air cavity determine the frequency at which the cavity will resonate. Displacement of the cavity boundaries during resonance has been suggested as a cause of injury. Large displacements have the potential to tear tissues that surround the air space (for example, lung tissue).

Understanding resonant frequencies and the susceptibility of marine mammal air cavities to resonance is important in determining whether certain sonars have the potential to affect different cavities in different species. In 2002, NMFS convened a panel of government and private scientists to address this issue (National Oceanic and Atmospheric Administration, 2002b). They modeled and evaluated the likelihood that Navy MFA sonar caused resonance effects in beaked whales that eventually led to their stranding (U.S. Department of Commerce and U.S. Department of the Navy, 2001). The frequencies at which resonance was predicted to occur were below the frequencies utilized by the sonar systems employed. Furthermore, air cavity vibrations due to the resonance effect were not considered to be of sufficient amplitude to cause tissue damage. This EIS/OEIS assumes that similar phenomenon would not be problematic in other cetacean species.

Masking

Natural and artificial sounds can disrupt behavior by masking, or interfering with an animal's ability to hear other sounds. Masking occurs when the receipt of a sound is interfered with by a second sound at similar frequencies and at similar or higher levels. If the second sound were artificial, it could be potentially harassing if it disrupted hearing-related behavior such as communications or echolocation. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs during the sound exposure.

Historically, principal masking concerns have been with prevailing background sound levels from natural and manmade sources (for example, Richardson et al., 1995a). Dominant examples of the latter are the accumulated sound from merchant ships and sound of seismic surveys. Both cover a wide frequency band and are long in duration.

HRC ASW training occurs in areas that are away from harbors but may include heavily traveled shipping lanes, although that is a small portion of the overall range complex. The loudest underwater sounds in the training area are those produced by sonars that are in the mid-frequency and high-frequency range.

The most dominant underwater sounds in the Hawaiian Islands during the 6-month November to April period, when humpback whales are present, are the vocalizations of the humpback whales. As detailed in Au et al. (2000), the ambient sound pressure level of 120 dB (SPL) occurs during this period as a result of thousands of whale "songs" having source levels as high as 174 dB SPL and other whale vocalizations and noises (e.g., flipper slaps) having source levels as high as 192 dB SPL (Richardson et al., 1995b).

The sonar signals are likely within the audible range of most cetaceans, but are very limited in the temporal, frequency, and spatial domains. In particular, the pulse lengths are short, the duty cycle low (number of pings per minute are low), the total number of hours of operation per year small, and the tactical sonars transmit within a narrow band of frequencies (typically less than one-third octave). Finally, high levels of sound are confined to a volume around the source and are constrained by propagation attenuation rates at mid- and high frequencies, and consist of relative short (generally less than a second) pulse lengths. For the reasons outlined above, the chance of sonar operations causing masking effects is considered negligible.

4.1.2.4.8 Previous Criteria and Thresholds for Behavioral Effects

The necessary information to conduct an assessment of behavioral effects for each species resulting from exposure to MFAS is incomplete and unavailable at this time due to the paucity of empirical data. The Navy has funded, and will continue to fund, research efforts to develop this data, but such an undertaking will require years to complete. The unavailability of such information is relevant to the ability to develop species-specific behavioral effects criterion. The science of understanding the effects of sound on marine mammals is dynamic, and the Navy is committed to the use of the best available science for evaluating potential effects from training and testing activities.

This section presents the previous effect criteria and thresholds for behavioral effects of sound leading to behavioral disturbance, and summarizes existing credible scientific evidence which is relevant to evaluating behavioral disturbance. Since TTS was and continues to be used as the biological indicator for onset of a physiological effect leading to behavioral disturbance, behavioral effects criteria are applied to exposure levels at or below those causing TTS that will result in a behavioral disturbance.

A large body of research on terrestrial animal and human response to airborne sound exists, but results from those studies are not readily extendible to the development of effect criteria and thresholds for marine mammals. For example, "annoyance" is one of several criteria used to define impact on humans from exposure to industrial sound sources. Comparable criteria cannot be developed for marine mammals because there is no acceptable method for determining whether a non-verbal animal is annoyed. Further, differences in hearing thresholds, dynamic range of the ear, and the typical exposure patterns of interest (e.g., human data tend to focus on 8-hour-long exposures) make extrapolation of human sound exposure standards inappropriate.

Behavioral observations of marine mammals exposed to anthropogenic sound sources exist (review by Richardson et al., 1995a; Southall et al., 2007); however, there are few observations and no controlled measurements of behavioral disruption of cetaceans caused by sound sources with frequencies, waveforms, durations, and repetition rates comparable to those employed by the MFA/HFA sonars to be used in the HRC. At the present time there is no consensus on how to account for behavioral effects on marine mammals exposed to continuous-type sounds (National Research Council, 2003).

History of Assessing Potential Harassment from Behavioral Effects

The prior Navy Letter of Authorization (LOA) and Incidental Harassment Authorization (IHA) requests for the Undersea Warfare Training Range (USWTR) and the Rim of the Pacific (RIMPAC) MFA sonar training respectively relied on behavioral observations of trained cetaceans exposed to intense underwater sound under controlled circumstances to develop a criterion and threshold for behavioral effects of sound based on energy flux density. These data are described in detail in Schlundt et al. (2000), Finneran et al., 2001; 2003 and Finneran and Schlundt 2004. Finneran and Schlundt (2004) analyzed behavioral observations from related TTS studies (Schlundt *et al*., 2000; Finneran *et* al. 2001, 2003) to calculate behavioral reactions as a function of known noise exposure. During the TTS experiments, four dolphins and two white whales were exposed during a total of 224 sessions to 1-s pulses between 160 and 204 dB re 1 μPa (root-mean-square SPL), at 0.4, 3, 10, 20 and 75 kHz. Finneran and Schlundt (2004) evaluated the behavioral observations in each session and determined whether a "behavioral alteration" (ranging from modifications of response behavior during hearing sessions to attacking the experimental equipment) occurred. For each frequency, the percentage of sessions in which behavioral alterations occurred was calculated as a function of received noise SPL. By pooling data across individuals and test frequencies, respective SPL levels coincident with responses by 25, 50, and 75 percent behavioral alteration were documented. 190 dB re 1 μPa^2-s (SEL) is the point at which 50 percent of the animals exposed to 3, 10, and 20 kHz tones were deemed to respond with some behavioral alteration, and the threshold that the Navy originally proposed for sub-TTS behavioral disturbance. These data represented the best available data at the time those activities were proposed because they are based on controlled, tonal sound exposures within the tactical sonar frequency range and because the species studied are closely related to the majority of animals expected to be located within the Proposed Action areas. The October 2005 USWTR Draft OEIS/EIS provided analysis to the 190 dB re 1 μPa^2-s criterion and threshold for behavioral effects, which the Navy had determined most accurately reflected scientifically-derived behavioral reactions from sound sources that are most similar to MFA sonars. A full discussion of the scientific data and use of those data to derive the 190 dB re 1 µPa^2-s threshold is presented in the original USWTR Draft OEIS/EIS (U.S. Environmental Protection Agency, 2005b).

The Navy's rationale for using energy flux density level (EL) for evaluation of behavioral effects included:

- **EL effect takes both the exposures SPL and duration into account.** Both SPL and duration of exposure affect behavioral responses to sound, so a behavioral effect threshold based on EL accounts for exposure duration.

- **EL takes into account the effects of multiple pings.** Effect thresholds based on SPL predict the same effect regardless of the number of received sounds. Previous actions using SPL-based criteria included implicit methods to account for multiple pings, such as the single-ping equivalent used in the SURTASS LFA (U.S. Department of the Navy, 2001c).

- **EL allows a rational ordering of behavior effects with physiological effects.** The effect thresholds for physiological effects are stated in terms of EL because experimental data described above showed the observed effects (TTS and PTS) are correlated best with the sound energy, not SPL. Using EL for behavioral effects allows the behavioral and physiological effects to be placed on a single exposure scale, with behavioral effects occurring at lower exposures than physiological effects.

As described above, behavioral observations of trained cetaceans exposed to intense underwater sound under controlled circumstances are an important data set in evaluating and developing a criterion and threshold for behavioral effects of sound. These behavioral response data are an important foundation for the scientific basis of the Navy's prior threshold of onset behavioral effects because of the (1) finer control over acoustic conditions; (2) greater quality and confidence in recorded sound exposures; and (3) the exposure stimuli closely match those of interest for the MFA sonar used as proposed in the HRC. Since no comparable controlled exposure data for wild animals exist, or are likely to be obtained in the near-term, the relationship between the behavioral results reported by Finneran and Schlundt (2004) and wild animals is not known. Although experienced, trained subjects may tolerate higher sound levels than inexperienced animals; it is also possible that prior experiences and resultant expectations may have made some trained subjects less tolerant of sound exposures.

In response to USWTR comments, potential differences between trained subjects and wild animals were considered by the Navy in conjunction with NMFS in the Navy's IHA application for RIMPAC 2006. At that time, NMFS recommended that the Navy include analysis of this threshold based on NMFS' evaluation of behavioral observations of marine mammals under controlled conditions, plus NMFS' interpretation of two additional studies on reactions to an alert stimuli (Nowacek et al., 2004) and analysis of the May 2003 USS SHOUP MFA sonar event (National Marine Fisheries Service, 2005a). Nowacek *et al.* (2004) conducted controlled exposure experiments on North Atlantic right whales using ship noise, social sounds of con-specifics, and an alerting stimulus (frequency modulated tonal signals between 500 Hz and 4.5 kHz). Animals were tagged with acoustic sensors (D-tags) simultaneously measured movement in three dimensions. Whales reacted strongly to alert signals at received levels of 133 – 148 dB SPL, mildly to conspecifics signals, and not at all to ship sounds or actual vessels. The alert stimulus caused whales to immediately cease foraging behavior and swim rapidly to the surface. Although SEL values were not directly reported, based on received exposure durations, approximate received values were on the order of 160 dB re 1μPa^2-s (SEL). National Marine Fisheries Service (2005) evaluated the acoustic exposures and coincident behavioral reactions of killer whales in the presence of SHOUP's use of MFA sonar in Haro Strait on May 5, 2003. In this case, none of the animals were directly fitted with acoustic dosimeters. However, based on a Naval Research Laboratory (NRL) analysis that took advantage of the fact that calibrated measurements of the sonar signals were made in situ and using advanced modeling to bound likely received exposures, estimates of received sonar signals by the killer whales were possible. Received SPL values ranged from 121 to 175 dB re 1 μPa. The most probable SEL values were 169.1 to 187.4 dB re 1μPa^2-s (SEL); worst-case estimates ranged from 177.7 to 195.8 dB re 1μPa^2-s (SEL). While researchers observing the animals during the course of sonar exposure subsequently reported unusual alterations in swimming, breathing, and diving behavior, Navy marine mammal scientists who reviewed the videotape of the event as part of the U.S. Pacific Fleet's investigation into the matter determined the behaviors of the killer whales as recorded on the video were within the species' normal range of behaviors and there were no immediate or general overt negative behavior reactions depicted (U.S. Department of the Navy, 2004b). Based on the duration and received levels of exposure and known behavioral reactions in other cetaceans, NMFS concluded that the killer whales "experienced exposure levels likely to induce behavioral reaction as a result of the 5 May 2003 sonar transmissions" (National Marine Fisheries Service, 2005). Accordingly, a conservative threshold for effect was derived compared to the regulatory definition of harassment, and Navy and NMFS agreed to the use of the 173 dB re 1 μPa^2-s threshold for the RIMPAC IHA request.

Subsequent to issuance of the RIMPAC IHA, additional public comments were received and considered. Based on this input, Navy continued to coordinate with NMFS to determine whether an alternate approach to energy flux density could be used to evaluate when a marine mammal may behaviorally be affected by MFA sound exposure. Coordination between the Navy and NMFS produced the adoption of risk function for evaluation of behavioral effects. The acoustic risk function approach for evaluating behavioral effects is described in the following section and fully considers the controlled, tonal sound exposure data in addition to comments received from the regulatory, scientific and public regarding concerns with the use of EL for evaluating the effects of sound on wild animals.

4.1.2.4.9 Summary of Existing Credible Scientific Evidence Relevant to Assessing Behavioral Effects

4.1.2.4.9.1 Background

Based on available evidence, marine animals are likely to exhibit any of a suite of potential behavioral responses or combinations of behavioral responses upon exposure to sonar transmissions. Potential behavioral responses include, but are not limited to: avoiding exposure or continued exposure; behavioral disturbance (including distress or disruption of social or foraging activity); habituation to the sound; becoming sensitized to the sound; or not responding to the sound.

Existing studies of behavioral effects of human-made sounds in marine environments remain inconclusive, partly because many of those studies have lacked adequate controls, applied only to certain kinds of exposures (which are often different from the exposures being analyzed in the study), and had limited ability to detect behavioral changes that may be significant to the biology of the animals that were being observed. These studies are further complicated by the wide variety of behavioral responses marine mammals exhibit and the fact that those responses can vary significantly by species, individuals, and the context of an exposure. In some circumstances, some individuals will continue normal behavioral activities in the presence of high levels of human-made noise. In other circumstances, the same individual or other individuals may avoid an acoustic source at much lower received levels (Richardson et al., 1995a; Wartzok et al., 2003; Southall et al., 2007). These differences within and between individuals appear to result from a complex interaction of experience, motivation, and learning that are difficult to quantify and predict.

It is possible that some marine mammal behavioral reactions to anthropogenic sound may result in strandings. Several "mass stranding" events—strandings that involve two or more individuals of the same species (excluding a single cow–calf pair)—that have occurred over the past two decades have been associated with naval operations, seismic surveys, and other anthropogenic activities that introduced sound into the marine environment. Sonar exposure has been identified as a contributing cause or factor in five specific mass stranding events: Greece in 1996; the Bahamas in March 2000; Madeira, Portugal in 2000; the Canary Islands in 2002, and Spain in 2006 (Advisory Committee Report on Acoustic Impacts on Marine Mammals, 2006).

In these circumstances, exposure to acoustic energy has been considered an indirect cause of the death of marine mammals (Cox et al., 2006). Based on studies of lesions in beaked whales that have stranded in the Canary Islands and Bahamas associated with exposure to naval exercises that involved sonar, several investigators have hypothesized that there are two potential physiological mechanisms that might explain why marine mammals stranded: tissue damage resulting from resonance effects (Ketten, 2005) and tissue damage resulting from "gas and fat embolic syndrome" (Fernandez et al., 2005; Jepson et al., 2003; 2005). It is also likely that stranding is a behavioral response to a sound under certain contextual conditions and that the subsequently observed physiological effects of the strandings (e.g., overheating, decomposition, or internal hemorrhaging from being on shore) were the result of the stranding versus exposure to sonar (Cox et al., 2006).

4.1.2.4.9.2 Development of the Risk Function

In Section 4.1.2.4.9 of the Draft EIS/OEIS, the Navy presented a dose methodology to assess the probability of Level B behavioral harassment from the effects of MFA and HFA sonar on marine mammals. Following publication of the Draft EIS/OEIS the Navy continued working with NMFS to refine the mathematically representative curve previously used, along with applicable input parameters with the purpose of increasing the accuracy of the Navy's assessment. As the regulating and cooperating agency, NMFS presented two methodologies to six scientists (marine mammalogists and acousticians from within and outside the federal government) for an independent review (National Marine Fisheries Service, 2008). Two NMFS scientists, one from the NMFS Office of Science and Technology and one from the Office of Protected Resources, then summarized the reviews from the six scientists and developed a recommendation.

One of the methodologies was a normal curve fit to a "mean of means" calculated from the mean of: (1) the estimated mean received level produced by the reconstruction of the USS SHOUP event of May 2003 in which killer whales were exposed to MFA sonar (U.S. Department of the Navy, 2004b); (2) the mean of the five maximum received levels at which Nowacek et al. (2004) observed significantly different responses of right whales to an alert stimuli; and (3) the mean of the lowest received levels from the 3 kHz data that the SPAWAR Systems Center (SSC) classified as altered behavior from Finneran and Schlundt (2004).

The second methodology was a derivation of a mathematical function used for assessing the percentage of a marine mammal population experiencing the risk of harassment under the MMPA associated with the Navy's use of the SURTASS LFA sonar (U.S. Department of the Navy, 2001c). This function is appropriate for application to instances with limited data (Feller, 1968). This methodology is subsequently identified as "the risk function" in this document.

The NMFS Office of Protected Resources made the decision to use the risk function and applicable input parameters to estimate the risk of behavioral harassment associated with exposure to MFA sonar. This determination was based on the recommendation of the two NMFS scientists; consideration of the independent reviews from six scientists; and NMFS MMPA regulations affecting the Navy's use of SURTASS LFA sonar (U.S. Department of the Navy, 2002b; National Oceanic and Atmospheric Administration, 2007b).

4.1.2.4.9.3 Methodology for Applying Risk Function

To assess the potential effects on marine mammals associated with active sonar used during training activities, the Navy together with NMFS, as a first step, investigated a series of mathematical models and methodologies that estimate the number of times individuals of the different species of marine mammals might be exposed to MFA sonar at different received levels. The Navy effects analyses assumed that the potential consequences of exposure to MFA sonar on individual animals would be a function of the received sound pressure level (dB re 1 µPa). These analyses assume that MFA sonar poses no risk, that is, does not constitute harassment to marine mammals if they are exposed to sound pressure levels from the MFA sonar below a certain basement value.

The second step of the assessment procedure requires the Navy and NMFS to identify how marine mammals are likely to respond when they are exposed to active sonar. Marine mammals can experience a variety of responses to sound including sensory impairment (permanent and temporary threshold shifts and acoustic masking), physiological responses (particular stress responses), behavioral responses, social responses that might result in reducing the fitness of individual marine mammals, and social responses that would not result in reducing the fitness of individual marine mammals.

As noted in the prior section, the Navy and NMFS have previously used acoustic thresholds to identify the number of marine mammals that might experience hearing losses (temporary or permanent) or behavioral harassment upon being exposed to MFA sonar (see Figure 4.1.2.4.9.3-1 left panel). These acoustic thresholds have been represented by either sound exposure level (related to sound energy, abbreviated as SEL), sound pressure level (abbreviated as SPL), or other metrics such as peak pressure level and acoustic impulse. The general approach has been to apply these threshold functions so that a marine mammal is counted as behaviorally harassed or experiencing hearing loss when exposed to received sound levels above a certain threshold and not counted as behaviorally harassed or experiencing hearing loss when exposed to received levels below that threshold. For example, previous Navy EISs, environmental assessments, MMPA take authorization requests, and the MMPA incidental harassment authorization (IHA) for the Navy's 2006 RIMPAC Major Exercise (National Oceanic and Atmospheric Administration, 2006i) used 173 decibel re 1 micropascal squared-second (dB re 1 μPa^2-s) as the energy threshold level (i.e., SEL) for Level B behavioral harassment for cetaceans. If the transmitted sonar accumulated energy received by a whale was above 173 dB re 1 μPa^2-s, then the animal was considered to have been behaviorally harassed. If the received accumulated energy level was below 173 dB re 1 μPa^2-s, then the animal was not treated as having been behaviorally harassed.

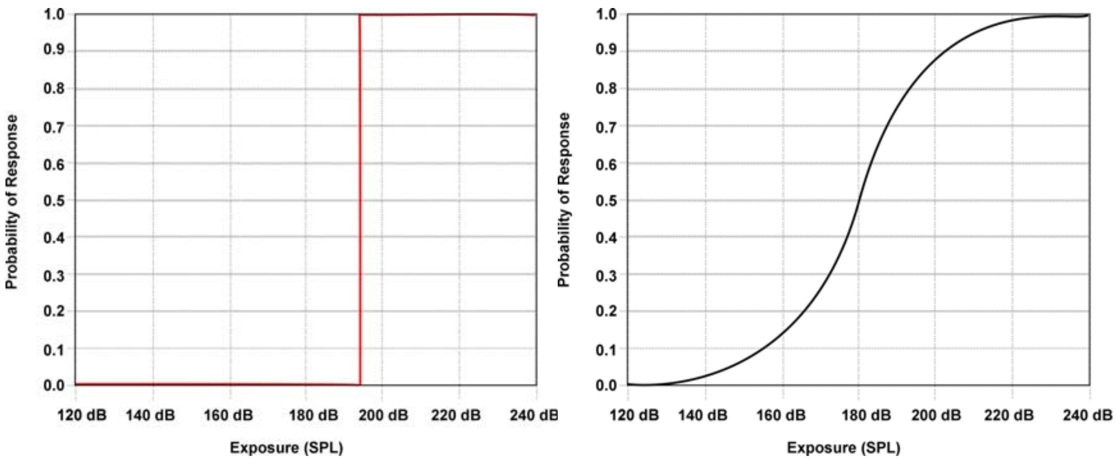


Figure 4.1.2.4.9.3-1. Step Function Versus Risk Continuum Function

Note: The left panel illustrates a typical step function with the probability of a response on the y-axis and received exposure on the x-axis. The right panel illustrates a typical risk continuum-function using the same axes. SPL is "Sound Pressure Level" in decibels referenced to 1 micropascal root mean square (1 μPa rms).

The left panel in Figure 4.1.2.4.9.3-1 illustrates a typical step-function or threshold that might also relate a sonar exposure to the probability of a response. As this figure illustrates, past Navy/NMFS acoustic thresholds assumed that every marine mammal above a particular received level (for example, to the right of the red vertical line in the figure) would exhibit identical responses to a sonar exposure. This assumed that the responses of marine mammals would not be affected by differences in acoustic conditions; differences between species and populations; differences in gender, age, reproductive status, or social behavior; or the prior experience of the individuals.

Both the Navy and NMFS agree that the studies of marine mammals in the wild and in experimental settings do not support these assumptions—different species of marine mammals and different individuals of the same species respond differently to sonar exposure. Additionally, there are specific geographic/bathymetric conditions that dictate the response of marine mammals to sonar that suggest that different populations may respond differently to sonar exposure. Further, studies of animal physiology suggest that gender, age, reproductive status, and social behavior, among other variables, probably affect how marine mammals respond to sonar exposures. (Wartzok et al., 2003; Southall et al., 2007)

Over the past several years, the Navy and NMFS have worked on developing an MFA sonar acoustic risk function to replace the acoustic thresholds used in the past to estimate the probability of marine mammals being behaviorally harassed by received levels of MFA sonar. The Navy and NMFS will continue to use acoustic thresholds to estimate temporary or permanent threshold shifts using SEL as the appropriate metric. Unlike acoustic thresholds, acoustic risk continuum functions (which are also called “exposure-response functions,” “dose-response functions,” or “stress-response functions” in other risk assessment contexts) assume that the probability of a response depends first on the “dose” (in this case, the received level of sound) and that the probability of a response increases as the “dose” increases. It is important to note that the probabilities associated with acoustic risk functions do not represent an individual’s probability of responding. Rather, the probabilities identify the proportion of an exposed population that is likely to respond to an exposure.

The right panel in Figure 4.1.2.4.9.3-1 illustrates a typical acoustic risk function that might relate an exposure, as received sound pressure level in decibels referenced to 1 μPa, to the probability of a response. As the exposure receive level increases in this figure, the probability of a response increases as well but the relationship between an exposure and a response is “linear” only in the center of the curve (that is, unit increases in exposure would produce unit increases in the probability of a response only in the center of a risk function curve). In the “tails” of an acoustic risk function curve, unit increases in exposure produce smaller increases in the probability of a response. Based on observations of various animals, including humans, the relationship represented by an acoustic risk function is a more robust predictor of the probable behavioral responses of marine mammals to sonar and other acoustic sources.

The Navy and NMFS have previously used the acoustic risk function to estimate the probable responses of marine mammals to acoustic exposures for other training and research programs. Examples of previous application include the Navy FEISs on the SURTASS LFA sonar (U.S. Department of the Navy, 2001c); the North Pacific Acoustic Laboratory experiments conducted off the Island of Kauai (Office of Naval Research, 2001), and the Supplemental EIS for SURTASS LFA sonar (U.S. Department of the Navy, 2007d).

The Navy and NMFS used two metrics to estimate the number of marine mammals that could be subject to Level B harassment (behavioral harassment and temporary threshold shift [TTS]) as defined by the MMPA, during training exercises. The agencies used acoustic risk functions with the metric of received sound pressure level (dB re 1 µPa) to estimate the number of marine mammals that might be at risk for MMPA Level B behavioral harassment as a result of being exposed to MFA sonar. The agencies will continue to use acoustic thresholds (“step-functions”) with the metric of sound exposure level (dB re 1 μPa^2-s) to estimate the number of marine mammals that might be “taken” through sensory impairment (i.e., Level A – permanent threshold shift [PTS] and Level B – TTS) as a result of being exposed to MFA sonar.

Although the Navy has not used acoustic risk functions in previous MFA sonar assessments of the potential effects of MFA sonar on marine mammals, risk functions are not new concepts for risk assessments. Common elements are contained in the process used for developing criteria for air, water, radiation, and ambient noise and for assessing the effects of sources of air, water, and noise pollution. The Environmental Protection Agency uses dose-functions to develop water quality criteria and to regulate pesticide applications (U.S. Environmental Protection Agency, 1998); the Nuclear Regulatory Commission uses dose-functions to estimate the consequences of radiation exposures (see Nuclear Regulatory Commission, 1997 and 10 Code of Federal Regulations 20.1201); the Centers for Disease Control and Prevention and the Food and Drug Administration use dose-functions as part of their assessment methods (for example, see Centers for Disease Control and Prevention, 2003, U.S. Food and Drug Administration and others, 2001); and the Occupational Safety and Health Administration uses dose-functions to assess the potential effects of noise and chemicals in occupational environments on the health of people working in those environments (for examples, see Occupational Safety and Health Administration, 1996b; Occupational Safety and Health Administration, 2006).

Risk Function Adapted from Feller (1968)

The particular acoustic risk function developed by the Navy and NMFS estimates the probability of behavioral responses that NMFS would classify as harassment for the purposes of the MMPA given exposure to specific received levels of MFA sonar. The mathematical function is derived from a solution in Feller (1968) for the probability as defined in the SURTASS LFA Sonar Final OEIS/EIS (U.S. Department of the Navy, 2001c), and relied on in the Supplemental SURTASS LFA Sonar EIS (U.S. Department of the Navy, 2007d) for the probability of MFA sonar risk for MMPA Level B behavioral harassment with input parameters modified by NMFS for MFA sonar for mysticetes, odontocetes, and pinnipeds.

In order to represent a probability of risk, the function should have a value near zero at very low exposures, and a value near one for very high exposures. One class of functions that satisfies this criterion is cumulative probability distributions, a type of cumulative distribution function. In selecting a particular functional expression for risk, several criteria were identified:

- The function must use parameters to focus discussion on areas of uncertainty;
- The function should contain a limited number of parameters;
- The function should be capable of accurately fitting experimental data; and
- The function should be reasonably convenient for algebraic manipulations.

As described in U.S. Department of the Navy (2001c), the mathematical function below is adapted from a solution in Feller (1968).

$$R = \frac{1 - \left(\frac{L-B}{K}\right)^{-A}}{1 - \left(\frac{L-B}{K}\right)^{-2A}}$$

Where: R = risk (0 – 1.0);
L = Received Level (RL) in dB;
B = basement RL in dB; (120 dB);
K = the RL increment above basement in dB at which there is 50 percent risk;
A = risk transition sharpness parameter (10) .

In order to use this function, the values of the three parameters (B, K, and A) need to be established. The values used in the development of the parameters are based on three sources of data: TTS experiments conducted at SSC and documented in Finneran, et al. (2001, 2003, and 2005; Finneran and Schlundt, 2004); reconstruction of sound fields produced by the USS SHOUP associated with the behavioral responses of killer whales observed in Haro Strait and documented in Department of Commerce (National Marine Fisheries Service, 2005a); U.S. Department of the Navy (2004b); and Fromm (2004a, 2004b); and observations of the behavioral response of North Atlantic right whales exposed to alert stimuli containing mid-frequency components documented in Nowacek et al. (2004). The input parameters, as defined by NMFS, are based on very limited data that represent the best available science at this time.

4.1.2.4.9.4 Data Sources Used for Risk Function

There is widespread consensus that cetacean response to MFA sound signals needs to be better defined using controlled experiments (Cox et al., 2006; Southall et al., 2007). The Navy is contributing to an ongoing behavioral response study in the Bahamas that is anticipated to provide some initial information on beaked whales, the species identified as the most sensitive to MFA sonar. NMFS is leading this international effort with scientists from various academic institutions and research organizations to conduct studies on how marine mammals respond to underwater sound exposures.

Until additional data is available, NMFS and the Navy have determined that the following three data sets are most applicable for the direct use in developing risk function parameters for MFA/HFA sonar. These data sets represent the only known data that specifically relate altered behavioral responses to exposure to MFA sound sources. Until applicable data sets are evaluated to better qualify harassment from HFA sources, the risk function derived for MFA sources will apply to HFA.

Data from SSC's Controlled Experiments

Most of the observations of the behavioral responses of toothed whales resulted from a series of controlled experiments on bottlenose dolphins and beluga whales conducted by researchers at SSC's facility in San Diego, California (Finneran et al., 2001, 2003, 2005; Finneran and Schlundt 2004; Schlundt et al., 2000). In experimental trials with marine mammals trained to perform tasks when prompted, scientists evaluated whether the marine mammals performed these tasks when exposed to mid-frequency tones. Altered behavior during experimental trials usually involved refusal of animals to return to the site of the sound stimulus. This refusal included what appeared to be deliberate attempts to avoid a sound exposure or to avoid the location of the exposure site during subsequent tests. (Schlundt et al., 2000, Finneran et al., 2002a) Bottlenose dolphins exposed to 1-second (sec) intense tones exhibited short-term changes in behavior above received sound levels of 178 to 193 dB re 1 μPa root mean square (rms), and beluga whales did so at received levels of 180 to 196 dB and above. Test animals sometimes vocalized after an exposure to impulsive sound from a seismic watergun (Finneran et al., 2002a). In some instances, animals exhibited aggressive behavior toward the test apparatus (Ridgway et al., 1997; Schlundt et al., 2000).

1. Finneran and Schlundt (2004) examined behavioral observations recorded by the trainers or test coordinators during the Schlundt et al. (2000) and Finneran et al. (2001, 2003, 2005) experiments featuring 1-sec tones. These included observations from 193 exposure sessions (fatiguing stimulus level > 141 dB re 1μPa) conducted by Schlundt et al. (2000) and 21 exposure sessions conducted by Finneran et al. (2001, 2003, 2005). The observations were made during exposures to sound sources at 0.4 kHz, 3 kHz, 10 kHz, 20 kHz, and 75 kHz. The TTS experiments that supported Finneran and Schlundt (2004) are further explained below:

    a. Schlundt et al. (2000) provided a detailed summary of the behavioral responses of trained marine mammals during TTS tests conducted at SSC San Diego with 1-sec tones. Schlundt et al. (2000) reported eight individual TTS experiments.

Fatiguing stimuli durations were 1-sec; exposure frequencies were 0.4 kHz, 3 kHz, 10 kHz, 20 kHz and 75 kHz. The experiments were conducted in San Diego Bay. Because of the variable ambient noise in the bay, low-level broadband masking noise was used to keep hearing thresholds consistent despite fluctuations in the ambient noise. Schlundt et al. (2000) reported that “behavioral alterations,” or deviations from the behaviors the animals being tested had been trained to exhibit, occurred as the animals were exposed to increasing fatiguing stimulus levels.

b. Finneran et al. (2001, 2003, 2005) conducted TTS experiments using tones at 3 kHz. The test method was similar to that of Schlundt et al. (2000) except the tests were conducted in a pool with very low ambient noise level (below 50 dB re 1 μPa^2/hertz [Hz]), and no masking noise was used. Two separate experiments were conducted using 1-sec tones. In the first, fatiguing sound levels were increased from 160 to 201 dB SPL. In the second experiment, fatiguing sound levels between 180 and 200 dB SPL were randomly presented.

Data from Studies of Baleen (Mysticetes) Whale Responses

The only mysticete data available resulted from a field experiments in which baleen whales (mysticetes) were exposed to a range of frequency sound sources from 120 Hz to 4500 Hz.(Nowacek et al., 2004). An alert stimulus, with a mid-frequency component, was the only portion of the study used to support the risk function input parameters.

2. Nowacek et al. (2004; 2007) documented observations of the behavioral response of North Atlantic right whales exposed to alert stimuli containing mid-frequency components. To assess risk factors involved in ship strikes, a multi-sensor acoustic tag was used to measure the responses of whales to passing ships and experimentally tested their responses to controlled sound exposures, which included recordings of ship noise, the social sounds of conspecifics and a signal designed to alert the whales. The alert signal was 18 minutes of exposure consisting of three 2-minute signals played sequentially three times over. The three signals had a 60 percent duty cycle and consisted of: (1) alternating 1-sec pure tones at 500 Hz and 850 Hz; (2) a 2-sec logarithmic down-sweep from 4,500 Hz to 500 Hz; and (3) a pair of low (1,500 Hz)-high (2,000 Hz) sine wave tones amplitude modulated at 120 Hz and each 1-sec long. The purposes of the alert signal were (a) to provoke an action from the whales via the auditory system with disharmonic signals that cover the whales’ estimated hearing range; (b) to maximize the signal to noise ratio (obtain the largest difference between background noise) and c) to provide localization cues for the whale. Five out of six whales reacted to the signal designed to elicit such behavior. Maximum received levels ranged from 133 to 148 dB re 1μPa/√Hz.

Observations of Killer Whales in Haro Strait in the Wild

In May 2003, killer whales (*Orcinus orca*) were observed exhibiting behavioral responses while USS SHOUP was engaged in MFA sonar operations in the Haro Strait in the vicinity of Puget Sound, Washington. Although these observations were made in an uncontrolled environment, the sound field associated with the sonar operations had to be estimated, and the behavioral observations were reported for groups of whales, not individual whales, the observations associated with the USS SHOUP provide the only data set available of the behavioral responses of wild, non-captive animal upon exposure to the AN/SQS-53 MFA sonar.

3. U.S. Department of Commerce (National Marine Fisheries, 2005a); U.S. Department of the Navy (2004b); Fromm (2004a, 2004b) documented reconstruction of sound fields produced by USS SHOUP associated with the behavioral response of killer whales observed in Haro Strait. Observations from this reconstruction included an approximate closest approach time which was correlated to a reconstructed estimate of received level at an approximate whale location (which ranged from 150 to 180 dB), with a mean value of 169.3 dB SPL.

4.1.2.4.9.5 Limitations of the Risk Function Data Sources

There are significant limitations and challenges to any risk function derived to estimate the probability of marine mammal behavioral responses; these are largely attributable to sparse data. Ultimately there should be multiple functions for different marine mammal taxonomic groups, but the current data are insufficient to support them. The goal is unquestionably that risk functions be based on empirical measurement.

The risk function presented here is based on three data sets that NMFS and Navy have determined are the best available science at this time. The Navy and NMFS acknowledge each of these data sets has limitations.

While NMFS considers all data sets as being weighted equally in the development of the risk function, the Navy believes the SSC San Diego data is the most rigorous and applicable for the following reasons:

- The data represents the only source of information where the researchers had complete control over and ability to quantify the noise exposure conditions.
- The altered behaviors were identifiable due to long-term observations of the animals.
- The fatiguing noise consisted of tonal exposures with limited frequencies contained in the MFA sonar bandwidth.

However, the Navy and NMFS do agree that the following are limitations associated with the three data sets used as the basis of the risk function:

- The three data sets represent the responses of only four species: trained bottlenose dolphins and beluga whales, North Atlantic right whales in the wild, and killer whales in the wild.
- None of the three data sets represent experiments designed for behavioral observations of animals exposed to MFA sonar.
- The behavioral responses of marine mammals that were observed in the wild are based solely on an estimated received level of sound exposure; they do not take into consideration (due to minimal or no supporting data):
  - Potential relationships between acoustic exposures and specific behavioral activities (e.g., feeding, reproduction, changes in diving behavior, etc.), variables such as bathymetry, or acoustic waveguides; or

– Differences in individuals, populations, or species, or the prior experiences, reproductive state, hearing sensitivity, or age of the marine mammal.

<u>SSC San Diego Trained Bottlenose Dolphins and Beluga Data Set:</u>

- The animals were trained animals in captivity; therefore, they may be more or less sensitive than cetaceans found in the wild (Domjan, 1998).
- The tests were designed to measure TTS, not behavior.
- Because the tests were designed to measure TTS, the animals were exposed to much higher levels of sound than the baseline risk function (only two of the total 193 observations were at levels below 160 dB re 1 μPa^2-s).
- The animals were not exposed in the open ocean but in a shallow bay or pool.
- The tones used in the tests were 1-second pure tones similar to MFA sonar.

<u>North Atlantic Right Whales in the Wild Data Set:</u>

- The observations of behavioral response were from exposure to alert stimuli that contained mid-frequency components but was not similar to an MFA sonar ping. The alert signal was 18 minutes of exposure consisting of three 2-minute signals played sequentially three times over. The three signals had a 60 percent duty cycle and consisted of: (1) alternating 1-sec pure tones at 500 Hz and 850 Hz; (2) a 2-sec logarithmic down-sweep from 4,500 Hz to 500 Hz; and (3) a pair of low (1,500 Hz)-high (2,000 Hz) sine wave tones amplitude modulated at 120 Hz and each 1-sec long. This 18-minute alert stimuli is in contrast to the average 1-sec ping every 30 sec in a comparatively very narrow frequency band used by military sonar.
- The purpose of the alert signal was, in part, to provoke an action from the whales through an auditory stimulus.

<u>Killer Whales in the Wild Data Set:</u>

- The observations of behavioral harassment were complicated by the fact that there were other sources of harassment in the vicinity (other vessels and their interaction with the animals during the observation).
- The observations were anecdotal and inconsistent. There were no controls during the observation period, with no way to assess the relative magnitude of the observed response as opposed to baseline conditions.

4.1.2.4.9.6 Input Parameters for the Feller-Adapted Risk Function

The values of <u>B</u>, <u>K</u>, and <u>A</u> need to be specified in order to utilize the risk function defined in Section 4.2.1.9.3 previously. The risk continuum function approximates the dose-response function in a manner analogous to pharmacological risk assessment (U.S. Department of the Navy, 2001c, Appendix A). In this case, the risk function is combined with the distribution of sound exposure levels to estimate aggregate impact on an exposed population.

4.1.2.4.9.6.1 Basement Value for Risk—The <u>B</u> Parameter

The <u>B</u> parameter defines the basement value for risk, below which the risk is so low that calculations are impractical. This 120 dB level is taken as the estimate received level (RL) below which the risk of significant change in a biologically important behavior approaches zero for the

MFA sonar risk assessment. This level is based on a broad overview of the levels at which multiple species have been reported responding to a variety of sound sources, both mid-frequency and other, was recommended by the scientists, and has been used in other publications. The Navy recognizes that for actual risk of changes in behavior to be zero, the signal-to-noise ratio of the animal must also be zero.

4.1.2.4.9.6.2 The K Parameter

NMFS and the Navy used the mean of the following values to define the midpoint of the function: (1) the mean of the lowest received levels (185.3 dB) at which individuals responded with altered behavior to 3 kHz tones in the SSC data set; (2) the estimated mean received level value of 169.3 dB produced by the reconstruction of the USS SHOUP incident in which killer whales exposed to MFA sonar (range modeled possible received levels: 150 to 180 dB); and (3) the mean of the 5 maximum received levels at which Nowacek et al. (2004) observed significantly altered responses of right whales to the alert stimuli than to the control (no input signal) is 139.2 dB SPL. The arithmetic mean of these three mean values is 165 dB SPL. The value of K is the difference between the value of B (120 dB SPL) and the 50 percent value of 165 dB SPL; therefore, K=45.

4.1.2.4.9.6.3 Risk Transition—The A Parameter

The A parameter controls how rapidly risk transitions from low to high values with increasing receive level. As A increases, the slope of the risk function increases. For very large values of A, the risk function can approximate a threshold response or step function. NMFS has recommended that Navy use A=10 as the value for odontocetes, and pinnipeds, and A=8 for mysticetes, (Figures 4.1.2.4.9.6.3-1 and 4.1.2.4.9.6.3-2) (National Marine Fisheries Service, 2008).

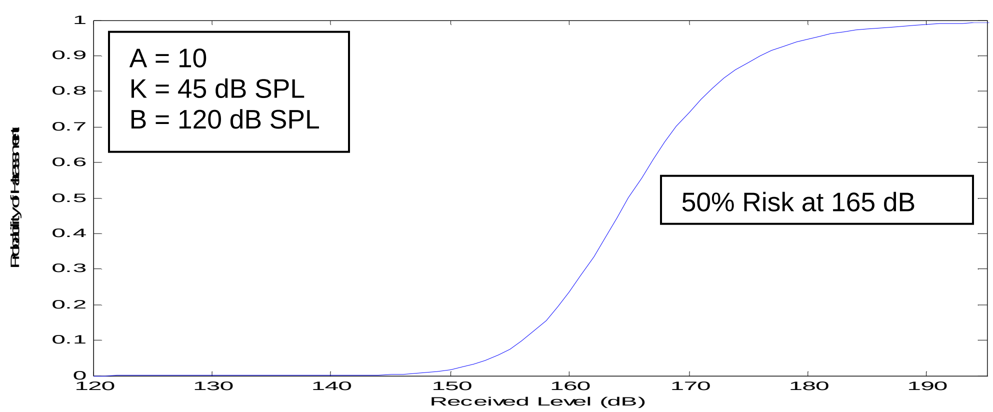


Figure 4.1.2.4.9.6.3-1. Risk Function Curve for Odontocetes (Toothed Whales) and Pinnipeds

The NMFS independent review process, described previously, provided the impetus for the selection of the parameters for the risk function curves. One scientist recommended staying close to the risk continuum concept as used in the SURTASS LFA sonar EIS. This scientist opined that both the basement and slope values; B=120 dB and A=10 respectively, from the SURTASS LFA sonar risk continuum concept are logical solutions in the absence of compelling data to select alternate values supporting the Feller-adapted risk function for MFA sonar. Another scientist indicated a steepness parameter needed to be selected, but did not recommend a value. Four scientists did not specifically address selection of a slope value. After reviewing the six scientists' recommendations, the two NMFS scientists recommended selection of A=10. Direction was provided by NMFS to use the A=10 curve for odontocetes based on the scientific review of potential risk functions explained in Section 4.1.2.4.9.2.

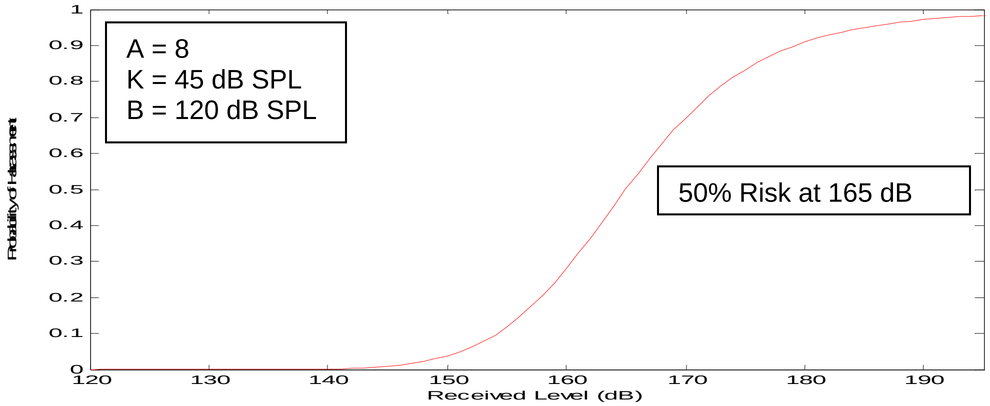


Figure 4.1.2.4.9.6.3-2. Risk Function Curve for Mysticetes (Baleen Whales)

<u>Justification for the Steepness Parameter of A=10 for the Odontocete Curve</u>

As background, a sensitivity analysis of the A=10 parameter was undertaken and presented in Appendix D of the SURTASS/LFA FEIS (U.S. Department of the Navy, 2001c). The analysis was performed to support the A=10 parameter for mysticete whales responding to a low-frequency sound source, a frequency range to which the mysticete whales are believed to be most sensitive to. The sensitivity analysis results confirmed the increased risk estimate for animals exposed to sound levels below 165 dB. Results from the Low Frequency Sound Scientific Research Program (LFS SRP) phase II research showed that whales (specifically gray whales in their case) did scale their responses with received level as supported by the A=10 parameter (Buck and Tyack, 2000). In the second phase of the LFS SRP research, migrating gray whales showed responses similar to those observed in earlier research (Malme et al., 1983, 1984) when the LF source was moored in the migration corridor (2 km [1.1 nm] from shore). The study extended those results with confirmation that a louder SL elicited a larger scale avoidance response. However, when the source was placed offshore (4 km [2.2 nm] from shore) of the migration corridor, the avoidance response was not evident. This implies that the inshore avoidance model – in which 50 percent of the whales avoid exposure to levels of 141 ± 3 dB – may not be valid for whales in proximity to an offshore source (U.S. Department of Navy, 2001c). As concluded in the SURTASS LFA Sonar Final OEIS/EIS (U.S. Department of the Navy, 2001c), the value of A=10 produces a curve that has a more gradual transition than the curves developed by the analyses of migratory gray whale studies (Malme et al., 1984; Buck and Tyack, 2000; and SURTASS LFA Sonar EIS, Subchapters 1.43, 4.2.4.3 and Appendix D, and National Marine Fisheries Service, 2008).

<u>Justification for the steepness parameter of A=8 for the Mysticete Curve</u>

The Nowacek et al. (2004) study provides the only available data source for a mysticete species behaviorally responding to a sound source (*i.e.*, alert stimuli) with frequencies in the range of tactical mid-frequency sonar (1-10 kHz), including empirical measurements of received levels

(RLs). While there are fundamental differences in the stimulus used by Nowacek et al. (2004) and tactical mid-frequency sonar (*e.g.*, source level, waveform, duration, directionality, likely range from source to receiver), they are generally similar in frequency band and the presence of modulation patterns. Thus, while they must be considered with caution in interpreting behavioral responses of mysticetes to mid-frequency sonar, they seemingly cannot be excluded from this consideration given the overwhelming lack of other information. The Nowacek et al. (2004) data indicate that five out the six North Atlantic right whales exposed to an alert stimuli "significantly altered their regular behavior and did so in identical fashion" (*i.e*., ceasing feeding and swimming to just under the surface). For these five whales, maximum RLs associated with this response ranged from root- mean-square sound (rms) pressure levels of 133-148 dB (re: 1 µPa).

When six scientists (one of them being Nowacek) were asked to independently evaluate available data for constructing a dose response curve based on a solution adapted from Feller (1968), the majority of them (4 out of 6; one being Nowacek) indicated that the Nowacek et al. (2004) data were not only appropriate but also necessary to consider in the analysis. While other parameters associated with the solution adapted from Feller (1968) were provided by many of the scientists (*i.e.*, basement parameter [B], increment above basement where there is 50 percent risk [K]), only one scientist provided a suggestion for the risk transition parameter, A.

A single curve may provide the simplest quantitative solution to estimating behavioral harassment. However, the policy decision, by NMFS-OPR, to adjust the risk transition parameter from A=10 to A=8 for mysticetes and create a separate curve was based on the fact the use of this shallower slope better reflected the increased risk of behavioral response at relatively low RLs suggested by the Nowacek et al. (2004) data. In other words, by reducing the risk transition parameter from 10 to 8, the slope of the curve for mysticetes is reduced. This results in an increase the proportion of the population being classified as behaviorally harassed at lower RLs. It also slightly reduces the estimate of behavioral response probability at quite high RLs, though this is expected to have quite little practical result owing to the very limited probability of exposures well above the mid-point of the function. This adjustment allows for a slightly more conservative approach in estimating behavioral harassment at relatively low RLs for mysticetes compared to the odontocete curve and is supported by the only dataset currently available. It should be noted that the current approach (with A=8) still yields an extremely low probability for behavioral responses at RLs between 133-148 dB, where the Nowacek data indicated significant responses in a majority of whales studied. (Note: Creating an entire curve based strictly on the Nowacek et al. [2004] data alone for mysticetes was advocated by several of the reviewers and considered inappropriate, by NMFS-OPR, since the sound source used in this study was not identical to tactical mid-frequency sonar, and there were only 5 data points available). The policy adjustment made by NMFS-OPR was also intended to capture some of the additional recommendations and considerations provided by the scientific panel (*i.e.*, the curve should be more data driven and that a greater probability of risk at lower RLs be associated with direct application of the Nowacek et al. 2004 data).

4.1.2.4.9.7 Basic Application of the Risk Function and Relation to the Current Regulatory Scheme

The risk function is used to estimate the percentage of an exposed population that is likely to exhibit behaviors that would qualify as harassment (as that term is defined by the MMPA applicable to military readiness activities, such as the Navy's testing and training with MFA sonar) at a given received level of sound. For example, at 165 dB SPL (dB re: 1µPa rms), the risk (or probability) of harassment is defined according to this function as 50 percent, and Navy/NMFS applies that by estimating that 50 percent of the individuals exposed at that received level are likely to respond by exhibiting behavior that NMFS would classify as behavioral harassment. The risk function is not applied to individual animals, only to exposed populations.

The data used to produce the risk function were compiled from four species that had been exposed to sound sources in a variety of different circumstances. As a result, the risk function represents a general relationship between acoustic exposures and behavioral responses that is then applied to specific circumstances. That is, the risk function represents a relationship that is deemed to be generally true, based on the limited, best-available science, but may not be true in specific circumstances. In particular, the risk function, as currently derived, treats the received level as the only variable that is relevant to a marine mammal's behavioral response. However, we know that many other variables—the marine mammal's gender, age, and prior experience; the activity it is engaged in during an exposure event, its distance from a sound source, the number of sound sources, and whether the sound sources are approaching or moving away from the animal—can be critically important in determining whether and how a marine mammal will respond to a sound source (Southall et al., 2007). The data that are currently available do not allow for incorporation of these other variables in the current risk functions; however, the risk function represents the best use of the data that are available.

NMFS and Navy made the decision to apply the MFA risk function curve to HFA sources due to lack of available and complete information regarding HFA sources. As more specific and applicable data become available for MFA/HFA sources, NMFS can use these data to modify the outputs generated by the risk function to make them more realistic. Ultimately, data may exist to justify the use of additional, alternate, or multi-variate functions. As mentioned above, it is known that the distance from the sound source and whether it is perceived as approaching or moving away can affect the way an animal responds to a sound (Wartzok et al., 2003). In the HRC example, animals exposed to received levels between 120 and 130 dB may be more than 65 nautical miles (131,651 yards) from a sound source (Table 4.1.2.4.9.7-1); those distances would influence whether those animals might perceive the sound source as a potential threat, and their behavioral responses to that threat. Though there are data showing marine mammal responses to sound sources at that received level, NMFS does not currently have any data that describe the response of marine mammals to sounds at that distance (or to other contextual aspects of the exposure, such as the presence of higher frequency harmonics), much less data that compare responses to similar sound levels at varying distances. However, if data were to become available that suggested animals were less likely to respond (in a manner NMFS would classify as harassment) to certain levels beyond certain distances, or that they were more likely to respond at certain closer distances, the Navy will re-evaluate the risk function to try to incorporate any additional variables into the "take" estimates.

Last, pursuant to the MMPA, an applicant is required to estimate the number of animals that will be "taken" by their activities. This estimate informs the analysis that NMFS must perform to determine whether the activity will have a "negligible impact" on the species or stock. Level B (behavioral) harassment occurs at the level of the individual(s) and does not assume any resulting population-level consequences, though there are known avenues through which behavioral disturbance of individuals can result in population-level effects. Alternately, a negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (i.e., population-level effects). An estimate of the number of Level B harassment takes, alone, is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS must consider other factors, such as the nature of any responses (their intensity, duration, etc.), the context of any responses (critical reproductive time or location, migration, etc.), or any of the other variables mentioned in the first paragraph (if known), as well as the number and nature of estimated Level A takes, the number of estimated mortalities, and effects on habitat. Generally speaking, the Navy and NMFS anticipate more severe effects from takes resulting from exposure to higher received levels (though this is in no way a strictly linear relationship throughout species, individuals, or circumstances) and less severe effects from takes resulting from exposure to lower received levels (Figure 4.1.2.4.9.7-1).

Table 4.1.2.4.9.7-1. Harassments at Each Received Level Band

Received Level	Distance at which Levels Occur in HRC	Percent of Harassments Occurring at Given Levels
Below 140 dB SPL	36 km–125 km	<1%
140>Level>150 dB SPL	15 km–36 km	2%
150>Level>160 dB SPL	5 km–15 km	20%
160>Level>170 dB SPL	2 km–5 km	40%
170>Level>180 dB SPL	0.6–2 km	24%
180>Level>190 dB SPL	180–560 meters	9%
Above 190 dB SPL	0–180 meters	2%
TTS (195 dB EFDL)	0–110 meters	2%
PTS (215 dB EFDL)	0–10 meters	<1%

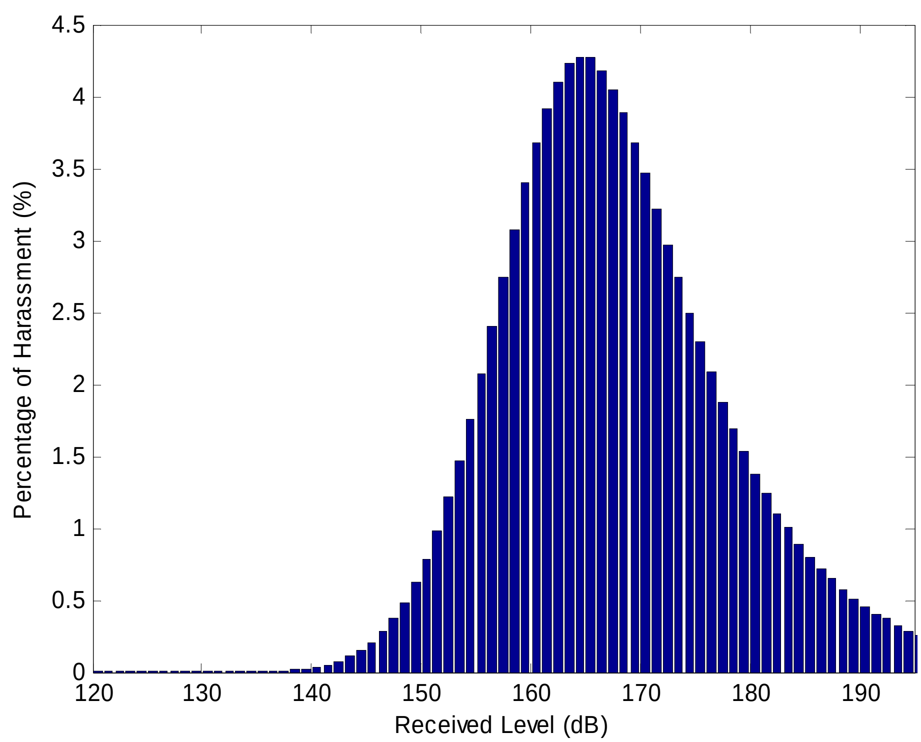


Figure 4.1.2.4.9.7-1. The Percentage of Behavioral Harassments Resulting from the Risk Function for Every 5 dB of Received Level

4.1.2.4.9.8 Navy Post Acoustic Modeling Analysis

The quantification of the acoustic modeling results includes additional analysis to increase the accuracy of the number of marine mammals affected. Table 4.1.2.4.9.8-1 provides a summary of the modeling protocols used in this analysis. Post modeling analysis includes reducing acoustic footprints where they encounter land masses, accounting for acoustic footprints for sonar sources that overlap to accurately sum the total area when multiple ships are operating together, and to better account for the maximum number of individuals of a species that could potentially be exposed to sonar within the course of one day or a discreet continuous sonar event.

Table 4.1.2.4.9.8-1. Navy Protocols Providing for Accurate Modeling Quantification of Marine Mammal Exposures

Historical Data	Sonar Positional Reporting System (SPORTS)	Annual active sonar usage data is obtained from the SPORTS database to determine the number of active sonar hours and the geographic location of those hours for modeling purposes.
Acoustic Parameters	AN/SQS-53 and AN/SQS-56	The AN/SQS-53 and the AN/SQS-56 active sonar sources separately to account for the differences in source level, frequency, and exposure effects.
	Submarine Sonar	Submarine active sonar use is included in effects analysis calculations using the SPORTS database.
Post Modeling Analysis	Land Shadow	For sound sources within the acoustic footprint of land, (approximately 65 nautical miles [nm] for the Hawaii Range Complex [HRC]) subtract the land area from the marine mammal exposure calculation.
	Multiple Ships	Correction factors are used to address the maximum potential of exposures to marine mammals resulting from multiple counting based on the acoustic footprint when there are occasions for more than one ship operating within approximately 130 nm of one another.
	Multiple Exposures	Accurate accounting for HRC training events within the course of one day or a discreet continuous sonar event: • Other HRC ASW training – 13.5 hours • RIMPAC – 12 hours • USWEX – 16 hours • Multi-strike group – 12 hours.

Pinniped

Information on the hearing abilities of the Hawaiian monk seal is limited. The range of underwater hearing in monk seals is 12 to 70 kHz, with best hearing from 12 to 28 kHz and 60 to 70 kHz (Thomas et al., 1990). This audiogram was from only one animal, and the high upper frequency range, which is high for a phocid (this taxonomic group), may not be indicative of the species. There is no information on underwater sounds, and in-air sounds are low-frequency sounds (below 1,000 Hz) such as “soft liquid bubble,” short duration guttural expiration, a roar and belching/coughing sound (Miller and Job, 1992). A pup produces a higher frequency call (1.4 kHz) that presumably is used to call its mother. The audiogram of the Hawaiian monk seal suggests they hear above MFA sonar, although the in-air sounds they produce are below MFA sonar.

For there to be an exposure to MFA/HFA sonar during ASW events in the HRC, a monk seal would have to be underwater and in the vicinity of the event to exceed the exposure thresholds discussed previously. The NMFS Recovery Plan for the Hawaiian Monk Seal notes; “Monk seals spend approximately two-thirds of their time in the water” (National Marine Fisheries Service, 2007e). The acoustic modeling’s resulting in-water exposures to monk seals has, therefore, been reduced in this analysis by one-third to account for the time monk seals are not expected to be in the water.

Modeling undertaken for monk seals does not take into consideration the effect of mitigation measures or foraging habitat preferences. Monk seals generally forage at depths of less than 100 m, but occasionally dive to depths of over 500 m. The majority of ASW training in the HRC, however, takes place in waters 4 to 8 times deeper than even this reported (500 m) maximum. It is also very rare for ASW training using MFA sonar to take place in waters as shallow as 100 m in depth. The Navy’s mitigation measures require continuous visual observation during training with active sonar. It would, therefore, be rare for a Hawaiian monk seal to be present in the vicinity of an ASW event and the potential for detection by aircraft and lookouts aboard ship should further preclude the possibility that monk seals would be in the vicinity of ASW training events. Additionally, unlike the concern over beaked whales given a limited number of strandings coincident with the use of MFA sonar use, there have been no indications that any pinniped has ever been affected by exposure to MFA sonar.

4.1.2.4.10 Cetacean Stranding Events

The Navy is very concerned about and thoroughly investigates each stranding potentially associated with sonar use to better understand these interactions. Strandings can be a single animal, but several to hundreds may be involved. An event where animals are found out of their normal habitat is considered a stranding even though animals do not necessarily end up beaching (such as the July 2004 Hanalei Mass Stranding Event; see Southall et al., 2006). Several hypotheses have been given for the mass strandings, which include the impact of shallow beach slopes on odontocete echolocation, disease or parasites, geomagnetic anomalies that affect navigation, following a food source in close to shore, avoiding predators, social interactions that cause other cetaceans to come to the aid of stranded animals, and from human actions. Generally inshore species do not strand in large numbers but usually as a single animal. This may be due to their familiarity with the coastal area, whereas some pelagic species that are unfamiliar with obstructions or sea bottom tend to strand more often in larger numbers (Woodings, 1995). The Navy has studied several stranding events in detail that may have occurred in association with Navy sonar activities. To better understand the causal factors in stranding events that may be associated with Navy sonar activities, the main factors, including bathymetry (i.e., steep drop offs), narrow channels (less than 35 nm), environmental conditions (e.g., surface ducting), and multiple sonar ships (see section on Stranding Events Associated with Navy Sonar) were compared between the different stranding events.

In a review of 70 reports of world-wide mass stranding events between 1960 and 2006, 48 (68 percent) involved beaked whales, 3 (4 percent) involved dolphins, and 14 (20 percent) involved whale species (International Whaling Commission, 2005). Cuvier’s beaked whales were involved in the greatest number of these events (48 or 68 percent), followed by sperm whales (7 or 10 percent), and Blainville’s and Gervais’ beaked whales (4 each or 6 percent). Naval training that might have involved tactical sonars are reported to have coincided with 9 (13 percent) or 10 (14 percent) of those stranding events. Between the mid-1980s and 2003 (the period reported by the International Whaling Commission, 2007), the Navy identified reports of

44 mass cetacean stranding events, of which at least 5 have been correlated with naval training that were using MFA sonar.

RIMPAC Exercises have occurred every second year since 1968, and ASW training has occurred in each of the 19 exercises that have occurred thus far. If the MFA sonar employed during those exercises killed or injured whales whenever the whales encountered the sonar, it seems likely that some mass strandings would have occurred at least once or twice over the 38-year period since 1968. With one exception, there is little evidence of a pattern in the record of strandings reported for the main Hawaiian Islands.

What is a Stranded Marine Mammal?

When a live or dead marine mammal swims or floats onto shore and becomes "beached" or incapable of returning to sea, the event is termed a "stranding" (Geraci et al., 1999; Perrin and Geraci, 2002; Geraci and Lounsbury, 2005; National Marine Fisheries Service, 2007p). The legal definition for a stranding within the United States is that "a marine mammal is dead and is (i) on a beach or shore of the United States; or (ii) in waters under the jurisdiction of the United States (including any navigable waters); or (B) a marine mammal is alive and is (i) on a beach or shore of the United States and is unable to return to the water; (ii) on a beach or shore of the United States and, although able to return to the water, is in need of apparent medical attention; or (iii) in the waters under the jurisdiction of the United States (including any navigable waters), but is unable to return to its natural habitat under its own power or without assistance." (16 U.S.C. 1421h).

The majority of animals that strand are dead or moribund (National Marine Fisheries Service, 2007p). For animals that strand alive, human intervention through medical aid and/or guidance seaward may be required for the animal to return to the sea. If unable to return to sea, rehabilitation at an appropriate facility may be determined as the best opportunity for animal survival. An event where animals are found out of their normal habitat is may be considered a stranding depending on circumstances even though animals do not necessarily end up beaching (Southhall, 2006).

Three general categories can be used to describe strandings: single, mass, and unusual mortality events. The most frequent type of stranding is a single stranding, which involves only one animal (or a mother/calf pair) (National Marine Fisheries Service, 2007p).

Mass stranding involves two or more marine mammals of the same species other than a mother/calf pair (Wilkinson, 1991), and may span one or more days and range over several miles (Simmonds and Lopez-Jurado, 1991; Frantzis, 1998; Walsh et al., 2001; Freitas, 2004). In North America, only a few species typically strand in large groups of 15 or more and include sperm whales, pilot whales, false killer whales, Atlantic white-sided dolphins, white-beaked dolphins, and rough-toothed dolphins (Odell, 1987, Walsh et al., 2001). Some species, such as pilot whales, false-killer whales, and melon-headed whales occasionally strand in groups of 50 to 150 or more (Geraci et al., 1999). All of these normally pelagic off-shore species are highly sociable and usually infrequently encountered in coastal waters. Species that commonly strand in smaller numbers include pygmy killer whales, common dolphins, bottlenose dolphins, Pacific white-sided dolphin Frasier's dolphins, gray whale and humpback whale (West Coast only), harbor porpoise, Cuvier's beaked whales, California sea lions, and harbor seals (Mazzuca et al., 1999, Norman et al., 2004, Geraci and Lounsbury, 2005).

Unusual Mortality Events (UMEs) can be a series of single strandings or mass strandings, or unexpected mortalities (i.e., die-offs) that occur under unusual circumstances (Dierauf and Gulland, 2001; Harwood, 2002; Gulland, 2006; National Marine Fisheries Service, 2007p). These events may be interrelated: for instance, at-sea die-offs lead to increased stranding frequency over a short period of time, generally within one to two months. As published by the NMFS, revised criteria for defining a UME include (National Marine Fisheries Service, 2006c):

- A marked increase in the magnitude or a marked change in the nature of morbidity, mortality, or strandings when compared with prior records.
- A temporal change in morbidity, mortality, or strandings is occurring.
- A spatial change in morbidity, mortality, or strandings is occurring.
- The species, age, or sex composition of the affected animals is different than that of animals that are normally affected.
- Affected animals exhibit similar or unusual pathologic findings, behavior patterns, clinical signs, or general physical condition (e.g., blubber thickness).
- Potentially significant morbidity, mortality, or stranding is observed in species, stocks or populations that are particularly vulnerable (e.g., listed as depleted, threatened or endangered or declining). For example, stranding of three or four right whales may be cause for great concern whereas stranding of a similar number of fin whales may not.
- Morbidity is observed concurrent with or as part of an unexplained continual decline of a marine mammal population, stock, or species.

UMEs are usually unexpected, infrequent, and may involve a significant number of marine mammal mortalities. As discussed below, unusual environmental conditions are probably responsible for most UMEs and marine mammal die-offs (Vidal and Gallo-Reynoso, 1996; Geraci et al., 1999; Walsh et al., 2001; Gulland and Hall, 2005).

United States Stranding Response Organization

Stranding events provide scientists and resource managers information not available from limited at-sea surveys, and may be the only way to learn key biological information about certain species such as distribution, seasonal occurrence, and health (Rankin, 1953; Moore et al., 2004; Geraci and Lounsbury, 2005). Necropsies are useful in attempting to determine a reason for the stranding, and are performed on stranded animals when the situation and resources allow.

In 1992, Congress amended the MMPA to establish the Marine Mammal Health and Stranding Response Program (MMHSRP) under authority of the Department of Commerce, NMFS. The MMHSRP was created out of concern started in the 1980s for marine mammal mortalities, to formalize the response process, and to focus efforts being initiated by numerous local stranding organizations and as a result of public concern.

Major elements of the MMHSRP include:

- National Marine Mammal Stranding Network
- Marine Mammal UME Program

- National Marine Mammal Tissue Bank (NMMTB) and Quality Assurance Program
- Marine Mammal Health Biomonitoring, Research, and Development
- Marine Mammal Disentanglement Network
- John H. Prescott Marine Mammal Rescue Assistance Grant Program (a.k.a. the Prescott Grant Program)
- Information Management and Dissemination. (National Marine Fisheries Service, 2007p)

The United States has a well-organized network in coastal states to respond to marine mammal strandings. Overseen by the NMFS, the National Marine Mammal Stranding Network is comprised of smaller organizations manned by professionals and volunteers from nonprofit organizations, aquaria, universities, and state and local governments trained in stranding response, animal health, and diseased investigation. Currently, 141 organizations are authorized by NMFS to respond to marine mammal strandings (National Marine Fisheries Service, 2007p). Through a National Coordinator and six regional coordinators, NMFS authorizes and oversees stranding response activities and provides specialized training for the network.

Stranding reporting and response efforts over time have been inconsistent, although effort and data quality within the United States have been improving within the last 20 years (National Marine Fisheries Service, 2007p). Given the historical inconsistency in response and reporting, however, interpretation of long-term trends in marine mammal stranding is difficult (National Marine Fisheries Service, 2007p). During the past decade (1995 – 2004), approximately 40,000 stranded marine mammals (about 12,400 are cetaceans) have been reported by the regional stranding networks, averaging 3,600 strandings reported per year (National Marine Fisheries Service, 2007p). The highest number of strandings were reported between the years 1998 and 2003 (National Marine Fisheries Service, 2007p). Detailed regional stranding information including most commonly stranded species can be found in Zimmerman (1991), Geraci and Lounsbury (2005), and National Marine Fisheries Service (2007p).

Stranding Data

Stranding events, though unfortunate, can be useful to scientists and resource managers because they can provide information that is not accessible at sea or through any other means. Necropsies are useful in attempting to assess a reason for the stranding, and are performed on stranded animals when the situation allows. Stranded animals have provided us with the opportunity to gain insight into the lives of marine mammals such as their natural history, seasonal distribution, population health, reproductive biology, environmental contaminant levels, types of interactions with humans, and the prevalence of disease and parasites. The only existing information on some cetacean species has been discovered from stranding events (National Marine Fisheries Service, 2007c).

Currently the government agency that is responsible for responding to strandings is the Marine Mammal Health and Stranding Response Program (MMHSRP) within NMFS. The National Marine Mammal Stranding Network, which is one part of the more comprehensive MMHSRP, is made up of smaller organizations partnered with NMFS to investigate marine mammal strandings. These stranding networks are established in all coastal states and consist of professionals and volunteers from nonprofit organizations, aquaria, universities, and state and local governments who are trained in stranding response. NMFS authorizes, coordinates, and participates in response activities and personnel training (National Marine Fisheries Service, 2007c). NMFS oversees stranding response via a National Coordinator and a regional coordinator in each of the NMFS regions. Stranding reporting and response efforts over time have been inconsistent and have been increasing over the past three decades, making any trends hard to interpret (National Marine Fisheries Service, 2007d). Over the past decade (1990–2000), approximately 40,000 stranded marine mammals have been reported by the regional stranding networks, averaging 3,600 strandings reported per year (National Marine Fisheries Service, 2007f). The highest number of strandings was reported between the years 1992–1993 and 1997–1998, with a peak in the number of reported strandings in 1998 totaling 5,708 (National Marine Fisheries Service, 2007f; National Marine Fisheries Service, 2007d). These have since been determined to have been El Niño years, which for a variety of reasons can have a drastic effect on marine mammals (see below). Reporting effort has been more consistent since 1994. Between 1994 and 1998 a total of 19,130 strandings were reported, with an average of 3,826 per year (National Marine Fisheries Service, 2007d). The composition of animals involved in strandings varied by region.

Peak years for cetacean strandings were in 1994 and 1999, and can be attributed to two UMEs. In 1994, 220 bottlenose dolphins stranded off Texas, which represented almost double the annual average (National Marine Fisheries Service, 2007f). It has been determined that the probable cause for these strandings was a morbillivirus outbreak. Then in 1999, 223 harbor porpoises stranded from Maine to North Carolina, representing a four-fold increase over the annual average (National Marine Fisheries Service, 2007f). The most likely cause for these strandings is interspecific aggression due to sea surface temperatures and a shift in prey species in the Mid-Atlantic (National Marine Fisheries Service, 2007f).

Table 4.1.2.4.10-1 describes numbers and composition of reported strandings during the more recent 5-year period between 2001-2005 (National Marine Fisheries Service, 2007d).

Table 4.1.2.4.10-1. Summary of the Number of Cetacean and Pinniped Strandings by Region from 2001-2005

Region	Number of Cetaceans	Number of Pinnipeds
Pacific	152	119
Southeast	3,549	55
Northeast	2,144	4,744
Southwest	49	230
Northwest	321	1,984
Alaska	152	119
Five-Year Totals	**6,636**	**7,489**

Source: National Marine Fisheries Service, 2007d; 2008

4.1.2.4.10.1 Causes of Strandings

Reports of marine mammal strandings can be traced back to ancient Greece (Walsh et al., 2001). Like any wildlife population, there are normal background mortality rates that influence marine mammal population dynamics, including starvation, predation, aging, reproductive success, and disease (Geraci et al., 1999; Carretta et al., 2007). Strandings in and of themselves may be reflective of this natural cycle or, more recently, may be the result of anthropogenic sources (i.e., human impacts). Current science suggests that multiple factors, both natural and man-made, may be acting alone or in combination to cause a marine mammal to strand (Geraci et al., 1999; Culik, 2002; Perrin and Geraci, 2002; Hoelzel, 2003; Geraci and Lounsbury, 2005; National Research Council, 2006). While post-stranding data collection and necropsies of dead animals are attempted in an effort to find a possible cause for the stranding, it is often difficult to pinpoint exactly one factor that can be blamed for any given stranding. An animal suffering from one ailment becomes susceptible to various other influences because of its weakened condition, making it difficult to determine a primary cause. In many stranding cases, scientists never learn the exact reason for the stranding.

Specific potential stranding causes can include both natural and human influenced (anthropogenic) causes listed below and described in the following sections:

Natural Stranding Causes:
- Disease
- Naturally occurring marine neurotoxins
- Weather and climatic influences
- Navigation errors
- Social cohesion
- Predation

Human Influenced (Anthropogenic) Stranding Causes:
- Fisheries interaction
- Vessel strike
- Pollution and ingestion
- Noise
- Gunshots

Natural Stranding Causes

Significant natural causes of mortality, die-offs, and stranding presented in Table 4.1.2.4.10.1-1 include disease and parasitism; marine neurotoxins from algae; navigation errors that lead to inadvertent stranding; and climatic influences that impact the distribution and abundance of potential food resources (i.e., starvation). Other natural mortality not discussed in detail includes predation by other species such as sharks (Cockcroft et al., 1989; Heithaus, 2001), killer whales (Constantine et al., 1998; Guinet et al., 2000; Pitman et al., 2001), and some species of pinniped (Hiruki et al., 1999; Robinson et al., 1999). Table 4.1.2.4.10.1.1 lists unusual mortality events for marine mammals that have been attributed to or suspected from natural causes from 1978 to 2005.

Table 4.1.2.4.10.1-1. Marine Mammal Unusual Mortality Events Attributed to or Suspected from Natural Causes 1978-2005

Year	Species and number	Location	Cause
1978	Hawaiian monk seals (50)	NW Hawaiian Islands	Ciguatoxin and maitotoxin
1979-80	Harbor seals (400)	Massachusetts	Influenza A
1982	Harbor seals	Massachusetts	Influenza A
1983	Multiple pinniped species	West coast of U.S., Galapagos	El Nino
1984	California sea lions (226)	California	Leptospirosis
1987	Sea otters (34)	Alaska	Saxitoxin
1987	Humpback whales (14)	Massachusetts	Saxitoxin
1987-88	Bottlenose dolphins (645)	Eastern seaboard (New Jersey to Florida)	Morbillivirus; Brevetoxin
1987-88	Baikal seals (80-100,000)	Lake Baikal, Russia	Canine distemper virus
1988	Harbor seals (approx 18,000)	Northern Europe	Phocine distemper virus
1990	Stripped dolphins (550)	Mediterranean Sea	Dolphin morbillivirus
1990	Bottlenose dolphins (146)	Gulf Coast, U.S.	Unknown; unusual skin lesions observed
1994	Bottlenose dolphins (72)	Texas	Morbillivirus
1995	California sea lions (222)	California	Leptospirosis
1996	Florida manatees (149)	West Coast Florida	Brevetoxin
1996	Bottlenose dolphins (30)	Mississippi	Unknown; Coincident with algal bloom
1997	Mediterranean monk seals (150)	Western Sahara, Africa	Harmful algal bloom; Morbillivirus
1997-98	California sea lions (100s)	California	El Nino
1998	California sea lions (70)	California	Domoic acid
1998	Hooker’s sea lions (60% of pups)	New Zealand	Unknown, bacteria likely
1999	Harbor porpoises	Maine to North Carolina	Oceanographic factors suggested
2000	Caspian seals (10,000)	Caspian Sea	Canine distemper virus
1999-2000	Bottlenose dolphins (115)	Panhandle of Florida	Brevetoxin
1999-2001	Gray whales (651)	Canada, U.S. West Coast, Mexico	Unknown; starvation involved
2000	California sea lions (178)	California	Leptospirosis
2000	California sea lions (184)	California	Domoic acid
2000	Harbor seals (26)	California	Unknown; Viral pneumonia suspected
2001	Bottlenose dolphins (35)	Florida	Unknown
2001	Harp seals (453)	Maine to Massachusetts	Unknown
2001	Hawaiian monk seals (11)	NW Hawaiian Islands	Malnutrition
2002	Harbor seals (approx. 25,000)	Northern Europe	Phocine distemper virus

Table 4.1.2.4.10.1-1. Marine Mammal Unusual Mortality Events Attributed to or Suspected from Natural Causes 1978-2005 (Continued)

Year	Species and number	Location	Cause
2002	Multispecies (common dolphins, California sea lions, sea otters) (approx. 500)	California	Domoic acid
2002	Hooker's sea lions	New Zealand	Pneumonia
2002	Florida manatee	West Coast of Florida	Brevetoxin
2003	Multispecies (common dolphins, California sea lions, sea otters) (approx. 500)	California	Domoic acid
2003	Beluga whales (20)	Alaska	Ecological factors
2003	Sea otters	California	Ecological factors
2003	Large whales (16 humpback, 1 fine, 1 minke, 1 pilot, 2 unknown)	Maine	Unknown; Saxitoxin and domoic acid detected in 2 of 3 humpbacks
2003-2004	Harbor seals, minke whales	Gulf of Maine	Unknown
2003	Florida manatees (96)	West Coast of Florida	Brevetoxin
2004	Bottlenose dolphins (107)	Florida Panhandle	Brevetoxin
2004	Small cetaceans (67)	Virginia	Unknown
2004	Small cetaceans	North Carolina	Unknown
2004	California sea lions (405)	Canada, U.S. West Coast	Leptospirosis
2005	Florida manatees, bottlenose dolphins (ongoing Dec 2005)	West Coast of Florida	Brevetoxin
2005	Harbor porpoises	North Carolina	Unknown
2005	California sea lions; Northern fur seals	California	Domoic acid
2005	Large whales	Eastern North Atlantic	Domoic acid suspected
2005-2006	Bottlenose dolphins	Florida	Brevetoxin suspected

Source: Data from Gulland and Hall (2007); citations for each event contained in Gulland and Hall (2007)

Disease

Marine mammals frequently suffer from a variety of diseases resulting from viral, bacterial, or parasites (National Oceanic and Atmospheric Administration, 2006e). Gulland and Hall (2005, 2007) provide a more-detailed summary of individual and population effects of marine mammal diseases.

Microparasites such as bacteria, viruses, and other microorganisms are commonly found in marine mammal habitats and usually pose little threat to a healthy animal (Geraci et al., 1999). For example, long-finned pilot whales that inhabit the waters off of the northeastern coast of the U.S. are carriers of the morbillivirus, yet have grown resistant to its usually lethal effects (Geraci et al., 1999). Since the 1980s, however, virus infections have been strongly associated with marine mammal die-offs (Domingo et al., 1992; Geraci and Lounsbury, 2005). Morbillivirus is the most significant marine mammal virus and suppresses a host's immune system, increasing risk of secondary infection (Harwood, 2002). A bottlenose dolphin UME in 1993 and 1994 was caused by infectious disease. Die-offs ranged from northwestern Florida to Texas, with an increased number of deaths as it spread (National Marine Fisheries Service, 2007d). A 2004 UME in Florida was also associated with dolphin morbillivirus (National Marine Fisheries Service, 2004a). Influenza A was responsible for the first reported mass mortality in the United States, occurring along the coast of New England in 1979-1980 (Geraci et al., 1999; Harwood, 2002). Canine distemper virus (a type of morbillivirus) has been responsible for large scale pinniped mortalities and die-offs (Grachev et al., 1989; Kennedy et al., 2000; Gulland and Hall, 2005), while a bacteria, *Leptospira pomona*, is responsible for periodic die-offs in California sea lions about every 4 years (Gulland et al., 1996; Gulland and Hall, 2005). It is difficult to determine whether microparasites commonly act as a primary pathogen, or whether they show up as a secondary infection in an already weakened animal (Geraci et al., 1999). Most marine mammal die-offs from infectious disease in the last 25 years, however, have had viruses associated with them (Simmonds and Mayer, 1997; Geraci et al., 1999; Harwood, 2002).

Macroparasites are usually large parasitic organisms and include lungworms, trematodes (parasitic flatworms), and protozoans (Geraci and St. Aubin, 1987; Geraci et al., 1999). Marine mammals can carry many different types, and have shown a robust tolerance for sizeable infestation unless compromised by illness, injury, or starvation (Morimitsu et al., 1987; Dailey et al., 1991; Geraci et al., 1999). Nasitrema, a usually benign trematode found in the head sinuses of cetaceans (Geraci et al., 1999), can cause brain damage if it migrates (Ridgway and Dailey, 1972). As a result, this worm is one of the few directly linked to stranding in the cetaceans (Dailey and Walker, 1978; Geraci et al., 1999).

Non-infectious disease, such as congenital bone pathology of the vertebral column (osteomyelitis, spondylosis deformans, and ankylosing spondylitis), has been described in several species of cetacean (Paterson, 1984; Alexander et al., 1989; Kompanje, 1995; Sweeny et al., 2005). In humans, bone pathology such as ankylosing spondylitis can impair mobility and increase vulnerability to further spinal trauma (Resnick and Niwayama, 2002). Bone pathology has been found in cases of single strandings (Paterson, 1984; Kompanje, 1995), and also in cetaceans prone to mass stranding (Sweeny et al., 2005), possibly acting as a contributing or causal influence in both types of events.

Naturally Occurring Marine Neurotoxins

Some single cell marine algae common in coastal waters, such as dinoflagellates and diatoms, produce toxic compounds that can accumulate (termed bioaccumulation) in the flesh and organs of fish and invertebrate (Geraci et al., 1999; Harwood, 2002). Marine mammals become exposed to these compounds when they eat prey contaminated by these naturally produced toxins although exposure can also occur through inhalation and skin contact (Van Dolah, 2005).

In the Gulf of Mexico and mid- to southern Atlantic states, “red tides,” a form of harmful algal bloom, are created by a dinoflagellate (*Karenia brevis*). *K. brevis* is found throughout the Gulf of Mexico and sometimes along the Atlantic coast (Van Dolah, 2005; National Marine Fisheries Service, 2007p). It produces a neurotoxin known as brevetoxin. Brevetoxin has been associated with several marine mammal UMEs within this area (Geraci, 1989; Van Dolah et al., 2003; National Marine Fisheries Service, 2004a; Flewelling et al., 2005; Van Dolah, 2005).

On the U.S. west coast and in the northeast Atlantic, several species of diatoms (microscopic marine plants) produce a toxin called domoic acid which has also been linked to marine mammal strandings (Geraci et al., 1999; Van Dolah et al., 2003; Greig et al., 2005; Van Dolah, 2005; Brodie et al., 2006; National Marine Fisheries Service, 2007p). These diatoms are widespread and can be found on the east and west coasts of the United States as well as in the Gulf of Mexico (National Marine Fisheries Service, 2007n). Domoic acid has also been known to have serious effects on public health and a variety of marine species (National Marine Fisheries Service, 2007n). Since 1998, domoic acid has been identified as the cause of mass mortalities of seabirds and marine mammals off the coast of California, and whale deaths off Georges Bank and it was suspected in mass mortalities as early as 1992 otherwise listed as “unknown neurologic disorder” (National Marine Fisheries Service, 2007n). Other algal toxins associated with marine mammal strandings include saxitoxins and ciguatoxins and are summarized by Van Dolah (2005); Ciguatoxins are common in Hawaiian reef fish.

In 2004, between March 10 and April 13, 107 bottlenose dolphins were found dead and stranded on the Florida Panhandle, along with hundreds of dead fish and marine invertebrates (National Marine Fisheries Service, 2007o). This event was declared a UME. Analyses of the dolphins found brevetoxins at high levels within the dolphin stomach contents, and at variable levels within their tissues (National Marine Fisheries Service, 2007o). Low levels of domoic acid were also detected in some of the dolphins, and a diatom that produces domoic acid (*Pseudo-nitzschia delicatissima*) was present in low to moderate levels in water samples (National Marine Fisheries Service, 2007o). In the Gulf of Mexico, two other UMEs associated with red tide involving bottlenose dolphins occurred previously in 1996, and between 1999 and 2000 (National Marine Fisheries Service, 2005h).

Insufficient information is available to determine how, or at what levels and in what combinations, environmental contaminants may affect cetaceans (Marine Mammal Commission, 2003). There is growing evidence that high contaminant burdens are associated with several physiological abnormalities, including skeletal deformations, developmental effects, reproductive and immunological disorders, and hormonal alterations (Reijnders and Aguilar, 2002). It is possible that anthropogenic chemical contaminants initially cause immunosuppression, rendering whales susceptible to opportunistic bacterial, viral, and parasitic infection (De Swart et al., 1995). Specific information regarding the potential effects of environmental contamination on marine species in the Hawaiian Islands is not available, and therefore cumulative effects cannot be determined.

Weather and Climatic Influences

Severe storms, hurricanes, typhoons, and prolonged temperature extremes may lead to localized marine mammal strandings (Geraci et al., 1999; Walsh et al., 2001). Hurricanes may have been responsible for mass strandings of pygmy killer whales in the British Virgin Islands and Gervais’ beaked whales in North Carolina (Mignucci-Giannoni et al., 2000; Norman and Mead, 2001). Storms in 1982-1983 along the California coast led to deaths of 2,000 northern elephant seal pups (Le Boeuf and Reiter, 1991). Ice movement along southern Newfoundland has forced groups of blue whales and white-beaked dolphins ashore (Sergeant, 1982). Seasonal oceanographic conditions in terms of weather, frontal systems, and local currents may also play a role in stranding (Walker et al., 2005).

The effect of large scale climatic changes to the world’s oceans and how these changes impact marine mammals and influence strandings is difficult to quantify given the broad spatial and temporal scales involved, and the cryptic movement patterns of marine mammals (Moore, 2005; Learmonth et al., 2006). The most immediate, although indirect, effect is decreased prey availability during unusual conditions. This, in turn, results in increased search effort required by marine mammals (Crocker et al., 2006), potential starvation if not successful, and corresponding stranding due directly to starvation or succumbing to disease or predation while in a more weakened, stressed state (Selzer and Payne, 1988; Geraci et al., 1999; Moore, 2005; Learmonth et al., 2006; Weise et al., 2006).

Two recent papers examined potential influences of climate fluctuation on stranding events in southern Australia, including Tasmania, an area with a history of more than 20 mass stranding since the 1920s (Evans et al., 2005; Bradshaw et al., 2005). These authors note that patterns in animal migration, survival, fecundity, population size, and strandings will revolve around the availability and distribution of food resources. In southern Australia, movement of nutrient-rich waters pushed closer to shore by periodic meridinal winds (occurring about every 12 to 14 years) may be responsible for bringing marine mammals closer to land, thus increasing the probability of stranding (Bradshaw et al., 2006). The papers conclude, however, that while an overarching model can be helpful for providing insight into the prediction of strandings, the particular reasons for each one are likely to be quite varied.

Navigational Errors

Geomagnetism

It has been hypothesized that, like some land animals, marine mammals may be able to orient to the Earth's magnetic field as a navigational cue, and that areas of local magnetic anomalies may influence strandings (Bauer et al., 1985; Klinowska, 1985; Kirschvink et al., 1986; Klinowska, 1986; Walker et al., 1992; Wartzok and Ketten, 1999). In a plot of live stranding positions in Great Britain with magnetic field maps, Klinowska (1985, 1986) observed an association between live stranding positions and magnetic field levels. In all cases, live strandings occurred at locations where magnetic minima, or lows in the magnetic fields, intersect the coastline. Kirschvink et al. (1986) plotted stranding locations on a map of magnetic data for the east coast of the United States, and were able to develop associations between stranding sites and locations where magnetic minima intersected the coast. The authors concluded that there were highly significant tendencies for cetaceans to beach themselves near these magnetic minima and coastal intersections. The results supported the hypothesis that cetaceans may have a magnetic sensory system similar to other migratory animals, and that marine magnetic topography and patterns may influence long-distance movements (Kirschvink et al., 1986). Walker et al. (1992) examined fin whale swim patterns off the northeastern U.S. continental shelf, and reported that migrating animals aligned with lows in the geometric gradient or intensity. While a similar pattern between magnetic features and marine mammal strandings at New Zealand stranding sites was not seen (Brabyn and Frew, 1994), mass strandings in Hawaii typically were found to occur within a narrow range of magnetic anomalies (Mazzuca et al., 1999).

Echolocation Disruption in Shallow Water

Some researchers believe stranding may result from reductions in the effectiveness of echolocation within shallow water, especially with the pelagic species of odontocetes who may be less familiar with coastline (Dudok van Heel, 1966; Chambers and James, 2005). For an odontocete, echoes from echolocation signals contain important information on the location and identity of underwater objects and the shoreline. The authors postulate that the gradual slope of a beach may present difficulties to the navigational systems of some cetaceans, since it is common for live strandings to occur along beaches with shallow, sandy gradients (Brabyn and

McLean, 1992; Mazzuca et al., 1999; Maldini et al., 2005; Walker et al., 2005). A contributing factor to echolocation interference in turbulent, shallow water is the presence of microbubbles from the interaction of wind, breaking waves, and currents. Additionally, ocean water near the shoreline can have an increased turbidity (e.g., floating sand or silt, particulate plant matter, etc.) due to the run-off of fresh water into the ocean, either from rainfall or from freshwater outflows (e.g., rivers and creeks). Collectively, these factors can reduce and scatter the sound energy within echolocation signals and reduce the perceptibility of returning echoes of interest.

Social Cohesion

Many pelagic species such as sperm whales, pilot whales, melon-head whales, and false killer whales, and some dolphins occur in large groups with strong social bonds between individuals. When one or more animals strand due to any number of causative events, then the entire pod may follow suit out of social cohesion (Geraci et al., 1999; Conner, 2000; Perrin and Geraci, 2002; National Marine Fisheries Service, 2007p).

Predation

Many species of marine mammal serve as prey to other animals and forms of marine life, including sharks and even other marine mammals. Predation from sharks is considered to be a contributing factor in the decline of the Hawaiian monk seal (Geraci et al., 1999). A stranded marine mammal will sometimes show signs of interactions with predators such as bites, teeth marks, and other injuries, which occasionally are severe enough to have been the primary cause of injury, death, and stranding.

Human Influenced (Anthropogenic) Causes

Over the past few decades there has been an increase in marine mammal mortalities believed to be caused by a variety of human activities (Geraci et al., 1999; National Marine Fisheries Service, 2007p), such as gunshots, ship strikes (National Oceanic and Atmospheric Administration, 2006e; Nelson et al., 2007), and other trauma and mutilations.

- Gunshot injuries are the most common man-made cause of strandings in sea lions and seals on the U.S. West Coast (National Marine Fisheries Service, 2007d).
- Every year a few northern right whales are killed within shipping lanes along the U.S. Atlantic coast, which may be enough to jeopardize stock recovery (Geraci et al., 1999).
- In 1998, two bottlenose dolphins and a calf were killed by vessel strikes in the Gulf of Mexico (National Marine Fisheries Service, 2005h).
- In 1999 there was one report of a stranded false killer whale on the Alabama coast that was classified as likely caused by fishery interactions or other human interaction due to limb mutilation (the fins and flukes of the animal had been amputated) (National Marine Fisheries Service, 2005e).
- 1,377 bottlenose dolphins were found stranded in the Gulf of Mexico from 1999 through 2003; 73 animals (11 percent) showed evidence of human interactions as the cause of death (e.g., gear entanglement, mutilations, gunshot wounds) (National Marine Fisheries Service, 2005h).

Data from strandings in which there was evidence of human interaction is available for the years 1999–2000. Table 4.1.2.4.10.1-2 provides the number of stranded marine mammals (cetaceans and pinnipeds) during this period that displayed evidence of human interactions (taken from National Marine Fisheries Service, 2007f). (Stranding data for the California region for the year 1999 is unavailable; therefore numbers are for stranded animals in 2000 only. Similarly, data is unavailable for the year 2000 in the Alaska region; numbers provided represent strandings for 1999 only.)

Table 4.1.2.4.10.1-2. Summary of Marine Mammal Strandings by Cause for Each Region from 1999-2000

Interaction	Southeast	Northeast	Northwest	California	Alaska
Fisheries	89	75	10	30	16
Vessel Strike	9	6	1	8	2
Gun Shot	6	6	12	41	4
Blunt Trauma	-	1	-	-	-
Mutilation	4	17	-	-	-
Plastic Ingestion	1	3	-	-	-
Power Plant Entrapment	1	11	-	23	-
Harassment	-	9	-	-	-
Arrow Wound	-	-	1	-	-
Harpoon Wound	-	-	2	-	-
Hit by Car	-	-	1	1	-
Hit by Train	-	-	1	-	-
Marine Debris Entanglement	-	-	1	3	-
Total	**110**	**128**	**27**	**106**	**22**

Source: National Marine Fisheries Service, 2007f

Fisheries Interaction: By-Catch, Directed Catch, and Entanglement

The incidental catch of marine mammals in commercial fisheries is a significant threat to many populations of marine mammals (Geraci et al., 1999; Baird, 2002; Culik, 2002; Carretta et al., 2004; Geraci and Lounsbury, 2005; National Marine Fisheries Service, 2007p). Interactions with fisheries and entanglement in discarded or lost gear continue to be a major factor in marine mammal deaths worldwide (Geraci et al., 1999; Nieri et al., 1999; Geraci and Lounsbury, 2005; Read et al., 2006; Zeeberg et al., 2006). For instance, baleen whales and pinnipeds have been found entangled in nets, ropes, monofilament line, and other fishing gear that has been discarded out at sea (Geraci et al., 1999; Campagna et al., 2007).

Bycatch

Bycatch is the catching of non-target species within a given fishing operation and can include non-commercially used invertebrates, fish, sea turtles, birds, and marine mammals (National Research Council, 2006). Read et al. (2006) attempted to estimate the magnitude of marine mammal bycatch in U.S. and global fisheries. Data on marine mammal bycatch within the United States was obtained from fisheries observer programs, reports of entangled stranded animals, and fishery logbooks, and was then extrapolated to estimate global bycatch by using the ratio of U.S. fishing vessels to the total number of vessels within the world's fleet (Read et al., 2006). Within U.S. fisheries, between 1990 and 1999 the mean annual bycatch of marine mammals was 6,215 animals, with a standard error of +/- 448 (Read et al., 2006). Eighty-four percent of cetacean bycatch occurred in gill-net fisheries, with dolphins and porpoises constituting most of the cetacean bycatch (Read et al., 2006). Over the decade there was a 40 percent decline in marine mammal bycatch, which was significantly lower from 1995-1999 than it was from 1990-1994 (Read et al., 2006). Read et al. (2006) suggests that this is primarily due to effective conservation measures that were implemented during this time period.

Read et al. (2006) then extrapolated this data for the same time period and calculated an annual estimate of 653,365 of marine mammals globally, with most of the world's bycatch occurring in gill-net fisheries. With global marine mammal bycatch likely to be in the hundreds of thousands every year, bycatch in fisheries will be the single greatest threat to many marine mammal populations around the world (Read et al., 2006).

Entanglement

Entanglement in fishing gear is a major cause of death or severe injury among the endangered whales. In the 2006-2007 whale season in Hawaii, the stranding network received reports of 26 entanglements (National Oceanic and Atmospheric Administration, 2006e). Entangled marine mammals may die as a result of drowning, escape with pieces of gear still attached to their bodies, or manage to be set free either of their own accord or by fishermen. Many large whales carry off gear after becoming entangled (Read et al., 2006). Many times when a marine mammal swims off with gear attached, the end result can be fatal. The gear may be become too cumbersome for the animal, or it can be wrapped around a crucial body part and tighten over time. Stranded marine mammals frequently exhibit signs of previous fishery interaction, such as scarring or gear attached to their bodies, and the cause of death for many stranded marine mammals is often attributed to such interactions (Baird and Gorgone, 2005). Marine mammals that die or are injured in fisheries activities may not wash ashore, therefore stranding data may underestimate fishery-related mortalities and serious injuries (National Marine Fisheries Service, 2005b).

From 1993 through 2003, 927 harbor porpoises were reported stranded from Maine to North Carolina, many of which had cuts and body damage suggestive of net entanglement. In 1999 it was possible to determine that the cause of death for 38 of the stranded porpoises was from fishery interactions, with one additional animal having been mutilated (right flipper and fluke cut off). In 2000, one stranded porpoise was found with monofilament line wrapped around its body and in 2003, nine stranded harbor porpoises were attributed to fishery interactions, with an additional three mutilated animals (National Marine Fisheries Service, 2005g). An estimated 78 baleen whales were killed annually in the offshore southern California/Oregon drift gillnet fishery during the 1980s (Heyning and Lewis, 1990). From 1998-2005, based on observer records, five fin whales (CA/OR/WA stock), 19 humpback whales (ENP stock), and six sperm whales (CA/OR/WA stock) were either seriously injured or killed in fisheries off the mainland west coast of the United States (California Marine Mammal Stranding Network Database, 2006).

Ship Strike

Ship strikes to marine mammals are another cause of mortality and stranding (Laist et al., 2001; Geraci and Lounsbury, 2005; De Stephanis and Urquiola, 2006). An animal at the surface could be struck directly by a ship, a surfacing animal could hit the bottom of a ship, or an animal just below the surface could be cut by a ship's propeller. The severity of injuries typically depends on the size and speed of the ship (Knowlton and Kraus, 2001; Laist et al., 2001; Vanderlaan and Taggart 2007).

In the 2006-2007 whale season in Hawaii, the stranding network saw an increase in the number of vessel collisions with whales (none involving military vessels) having recorded eight ship strikes (National Oceanic and Atmospheric Administration, 2006e). Three of these collisions with marine mammals were known to have caused injury to the animal.

An examination of all known ship strikes from all shipping sources (civilian and military) indicates ship speed is a principal factor in whether a ship strike results in death (Knowlton and Kraus 2001; Laist et al. 2001, Jensen and Silber 2003; Vanderlaan and Taggart 2007). In assessing records in which ship speed was known, Laist et al. (2001) found a direct relationship between the occurrence of a whale strike and the speed of the ship involved in the collision. While the authors concluded that most deaths occurred when a ship was traveling in excess of 13 knots, the study did not, however, take into account the historical increase in ship speed and the increase in the number of ships since records have been collected. In essence, very few modern ships transit at less than 13 knots.

Jensen and Silber (2003) detailed 292 records of known or probable ship strikes of all large whale species from 1975 to 2002. Of these, ship speed at the time of collision was reported for 58 cases. Of these cases, 39 (or 67 percent) resulted in serious injury or death (19 or 33 percent resulted in serious injury as determined by blood in the water, propeller gashes or severed tailstock, and fractured skull, jaw, vertebrae, hemorrhaging, massive bruising or other injuries noted during necropsy, and 20 or 35 percent resulted in death). Operating speeds of ships that struck various species of large whales ranged from 2 to 51 knots. The majority (79 percent) of these strikes occurred at speeds of 13 knots or greater. The average speed that resulted in serious injury or death was 18.6 knots. Pace and Silber (2005) found that the probability of death or serious injury increased rapidly with increasing ship speed. Specifically, the predicted probability of serious injury or death increased from 45 percent to 75 percent as ship speed increased from 10 to 14 knots, and exceeded 90 percent at 17 knots. Higher speeds during collisions result in greater force of impact, but higher speeds also appear to increase the chance of severe injuries or death by pulling whales toward the ship. Computer simulation modeling showed that hydrodynamic forces pulling whales toward the ship hull increase with increasing speed (Clyne, 1999; Knowlton et al., 1995).

The growth in civilian commercial ports and associated commercial ship traffic is a result in the globalization of trade. The Final Report of the NOAA International Symposium on “Shipping Noise and Marine Mammals: A Forum for Science, Management, and Technology” stated that the worldwide commercial fleet has grown from approximately 30,000 ships in 1950 to over 85,000 ships in 1998 (National Research Council, 2003; Southall, 2005). Between 1950 and 1998, the U.S. flagged fleet declined from approximately 25,000 to less than 15,000 and currently represents only a small portion of the world fleet. From 1985 to 1999, world seaborne trade doubled to 5 billion tons and currently includes 90 percent of the total world trade, with container shipping movements representing the largest volume of seaborne trade. It is unknown how international shipping volumes and densities will continue to grow. However, current statistics support the prediction that the international shipping fleet will continue to grow at the current rate or at greater rates in the future. Shipping densities in specific areas and trends in routing and ship design are as, or more, significant than the total number of ships. Densities along existing coastal routes are expected to increase both domestically and internationally. New routes are also expected to develop as new ports are opened and existing ports are expanded. Ship propulsion systems are also advancing toward faster ships operating in higher sea states for lower operating costs; and container ships are expected to become larger along certain routes (Southall, 2005).

While there are reports and statistics of whales struck by ships in U.S. waters, the magnitude of the risks of commercial ship traffic poses to marine mammal populations is difficult to quantify or estimate. In addition, there is limited information on ship strike interactions between ships and marine mammals outside of U.S. waters (De Stephanis and Urquiola, 2006). Laist et al. (2001) concluded that ship collisions may have a negligible effect on most marine mammal populations in general, except for regional based small populations where the significance of low numbers of collisions would be greater given smaller populations or populations segments.

Navy ship traffic is a small fraction of the overall U.S. commercial and fishing ship traffic. While Navy ship movements may contribute to the ship strike threat, given the lookout and mitigation measures adopted by the Navy, probability of ship strikes is greatly reduced. Furthermore, actions to avoid close interaction of Navy ships and marine mammals and sea turtles, such as maneuvering to keep away from any observed marine mammal and sea turtle are part of existing at-sea protocols and standard operating procedures. Navy ships have up to three or more dedicated and trained lookouts as well as two to three bridge watchstanders during at-sea movements who would be searching for any whales, sea turtles, or other obstacles on the water surface. Such lookouts are expected to further reduce the chances of a collision.

Ingestion of Plastic Objects and Other Marine Debris and Toxic Pollution Exposure

For many marine mammals, debris in the marine environment is a great hazard and can be harmful to wildlife. Not only is debris a hazard because of possible entanglement, animals may mistake plastics and other debris for food (National Marine Fisheries Service, 2007h). There are certain species of cetaceans, along with Florida manatees, that are more likely to eat trash, especially plastics, which is usually fatal for the animal (Geraci et al., 1999).

Between 1990 through October 1998, 215 pygmy sperm whales stranded along the U.S. Atlantic coast from New York through the Florida Keys (National Marine Fisheries Service, 2005b). Remains of plastic bags and other debris were found in the stomachs of 13 of these animals (National Marine Fisheries Service, 2005b). During the same time period, 46 dwarf sperm whale strandings occurred along the U.S. Atlantic coastline between Massachusetts and the Florida Keys (National Marine Fisheries Service, 2005e). In 1987 a pair of latex examination gloves was retrieved from the stomach of a stranded dwarf sperm whale (National Marine Fisheries Service, 2005f). From 1999–2003, 125 pygmy sperm whales were reported stranded between Maine and Puerto Rico; in one pygmy sperm whale found stranded in 2002, red plastic debris was found in the stomach along with squid beaks (National Marine Fisheries Service, 2005c).

Sperm whales and beaked whales have been known to ingest plastic debris, such as plastic bags (e.g., Evans et al., 2003; Whitehead, 2003). While this has led to mortality, the scale to which this is affecting sperm whale and beaked whale populations is unknown, Whitehead (2003) argued that it was not substantial at that time.

High concentrations of potentially toxic substances within marine mammals along with an increase in new diseases have been documented in recent years. Scientists have begun to consider the possibility of a link between pollutants and marine mammal mortality events. NMFS takes part in a marine mammal biomonitoring program not only to help assess the health and contaminant loads of marine mammals, but also to assist in determining anthropogenic impacts on marine mammals, marine food chains and marine ecosystem health. Using strandings and bycatch animals the program provides tissue/serum archiving, samples for analyses, disease monitoring and reporting and additional response during disease investigations (National Marine Fisheries Service 2007e).

The impacts of these activities are difficult to measure. However, some researchers have correlated contaminant exposure to possible adverse health effects in marine mammals. Contaminants such as organochlorines do not tend to accumulate in significant amounts in invertebrates, but do accumulate in fish and fish-eating animals. Thus, contaminant levels in planktivorous mysticetes have been reported to be one to two orders of magnitude lower compared to piscivorous odontocetes (Borell, 1993; O'Shea and Brownell, 1994; O'Hara and Rice, 1996; O'Hara et al., 1999).

The man-made chemical PCB (polychlorinated biphenyl), and the pesticide DDT (dichlorodiphenyltrichloroethane), are both considered persistent organic pollutants that are currently banned in the United States for their harmful effects in wildlife and humans (National Marine Fisheries Service, 2007d). Despite having been banned for decades in the United States, the levels of these compounds are still high in marine mammal tissue samples taken along U.S. coasts (National Marine Fisheries Service, 2007d). Both compounds are long lasting, reside in marine mammal fat tissues (especially in blubber), and can be toxic, causing effects such as reproductive impairment and immunosuppression (National Marine Fisheries Service, 2007d).

Both long-finned and short-finned pilot whales have a tendency to mass strand throughout their range. Short-finned pilot whales have been reported as stranded as far north as Rhode Island, and long-finned pilot whales as far south as South Carolina (National Marine Fisheries Service, 2005c). (For U.S. east coast stranding records, both species are lumped together and there is rarely a distinction between the two because of uncertainty in species identification [National Marine Fisheries Service, 2005c]). Since 1980 within the Northeast region alone, between 2 and 120 pilot whales have stranded annually either individually or in groups (National Marine Fisheries Service, 2005c). Between 1999 and 2003 from Maine to Florida, 126 pilot whales were reported to be stranded, including a mass stranding of 11 animals in 2000 and another mass stranding of 57 animals in 2002, both along the Massachusetts coast (National Marine Fisheries Service, 2005c).

It is unclear how much of a role human activities play in these pilot whale strandings, and toxic poisoning may be a potential human-caused source of mortality for pilot whales (National Marine Fisheries Service, 2005d). Moderate levels of PCBs and chlorinated pesticides (such as DDT, DDE, and dieldrin) have been found in pilot whale blubber (National Marine Fisheries Service, 2005d). Bioaccumulation levels have been found to be more similar in whales from the same stranding event than from animals of the same age or sex (National Marine Fisheries Service, 2005d). Numerous studies have measured high levels of toxic metals (mercury, lead, cadmium), selenium, and PCBs in pilot whales in the Faroe Islands (National Marine Fisheries

Service, 2005d). Population effects resulting from such high contamination levels are currently unknown (National Marine Fisheries Service, 2005d).

Habitat contamination and degradation may also play a role in marine mammal mortality and strandings. Some events caused by man have direct and obvious effects on marine mammals, such as oil spills (Geraci et al., 1999). But in most cases, effects of contamination will more than likely be indirect in nature, such as effects on prey species availability, or by increasing disease susceptibility (Geraci et al., 1999).

Navy ship operation between ports and exercise locations has the potential for release of small amounts of pollutant discharges into the water column. Navy ships are not a typical source, however, of either pathogens or other contaminants with bioaccumulation potential such as pesticides and PCBs. Furthermore, any ship discharges such as bilgewater and deck runoff associated with the ships would be in accordance with international and U.S. requirements for eliminating or minimizing discharges of oil, garbage, and other substances, and not likely to contribute significant changes to ocean water quality.

Ambient Sound in the Ocean

Ambient noise is environmental background noise. Marine mammals are regularly exposed to several sources of natural and anthropogenic sounds. As one of the potential stressors to marine mammal populations, noise and acoustic influences may disrupt marine mammal communication, navigational ability, and social patterns, and may or may not influence stranding. Many marine mammals use sound to communicate, navigate, locate prey, and sense their environment. Both anthropogenic and natural sounds may cause interference with these functions, although comprehension of the type and magnitude of any behavioral or physiological responses resulting from man-made sound, and how these responses may contribute to strandings, is rudimentary at best (National Marine Fisheries Service, 2007p). Marine mammals may respond both behaviorally and physiologically to sound exposure (e.g., Richardson et al., 1995a; Finneran et al., 2000; Finneran et al., 2003; Finneran et al., 2005, National Research Council, 2005; Southall et al., 2007); however, the range and magnitude of the behavioral response of marine mammals to various sound sources is highly variable and appears to depend on the species involved, the experience of the animal with the sound source, the motivation of the animal (e.g., feeding, mating), and the context of the exposure (Richardson et al., 1995a; National Research Council, 2005; Southall et al., 2007).

Natural Sound in the Ocean

There is a large and variable natural component to the ambient noise level in the ocean as a result of events such as earthquakes, rainfall, waves breaking, and lightning hitting the ocean as well as biological noises such as those from snapping shrimp and the vocalizations of marine mammals. For example, lightning hits the ocean with a resulting 260 dB SPL source level and research indicates humpback whale songs vary between 171-189 dB SPL (National Research Council 2003; Au et al, 2001). In addition, Au et al., (2000) have demonstrated an increase in ambient sound levels to 120 dB SPL coinciding with the arrival of “chorusing” humpback whales in Hawaii and peaking during the mid-February to mid-March winter season.

Anthropogenic Sound in the Ocean

Anthropogenic noise that could affect ambient noise arises from the following general types of activities in and near the sea, any combination of which, can contribute to the total noise at any one place and time. These noises include: transportation; dredging; construction; oil, gas, and mineral exploration in offshore areas; geophysical seismic and/or mapping surveys; commercial and military sonar; explosions; and ocean research activities (Richardson et al., 1995a).

Mechanical noise from commercial fishing vessels, cruise ships, cargo transports, recreational boats, and aircraft, all contribute sound into the ocean (National Research Council, 2003; 2006). Mechanical noise from Navy ships, especially those engaged in ASW, is very quiet in comparison to civilian vessels of similar or larger size. This general feature is also enhanced by the use of additional quieting technologies as a means of limiting passive detection by opposing submarines.

Several investigators have argued that anthropogenic sources of noise have increased ambient noise levels in the ocean over the last 50 years (National Research Council 1994, 2000, 2003, 2005; Richardson et al., 1995a; Jasny et al., 2005; McDonald et al., 2006). Much of this increase is due to increased shipping due to ships becoming more numerous and of larger tonnage (National Research Council, 2003; McDonald et al., 2006). Andrew et al. (2002) compared ocean ambient sound from the 1960s with the 1990s for a receiver off the California coast. The data showed an increase in ambient noise of approximately 10 dB in the frequency range of 20 to 80 Hz and 200 and 300 Hz, and about 3 dB at 100 Hz over a 33-year period.

Urick (1983) provided a discussion of the ambient noise spectrum expected in the deep ocean. Shipping, seismic activity, and weather are the primary causes of deep-water ambient noise. The ambient noise frequency spectrum can be predicted fairly accurately for most deep-water areas based primarily on known shipping traffic density and wind state (wind speed, Beaufort wind force, or sea state) (Urick, 1983). For example, for frequencies between 100 and 500 Hz, Urick (1983) estimated the average deep water ambient noise spectra to be 73 to 80 dB for areas of heavy shipping traffic and high sea states, and 46 to 58 dB for light shipping and calm seas. In contrast to deep water, ambient noise levels in shallow waters (i.e., coastal areas, bays, harbors, etc.) are subject to wide variations in level and frequency depending on time and location. The primary sources of noise include distant shipping and industrial activities, wind and waves, marine animals (Urick, 1983). At any given time and place, the ambient noise is a mixture of all of these noise variables. In addition, sound propagation is also affected by the variable shallow water conditions, including the depth, bottom slope, and type of bottom. Where the bottom is reflective, the sounds levels tend to be higher than when the bottom is absorptive.

Most observations of behavioral responses of marine mammals to the sounds produced have been limited to short-term behavioral responses, which included the cessation of feeding, resting, or social interactions. Carretta et al. (2001) and Jasny et al. (2005) identified increasing levels of anthropogenic noise as a habitat concern for whales and other marine mammals because of its potential to affect their ability to communicate. Acoustic devices have also been used in fisheries nets to prevent marine mammal entanglement and to deter seals from salmon cages (Johnson and Woodley 1998), little is known about their effects on non-target species.

Noise from Aircraft and Vessel Movement

Surface shipping is the most widespread source of anthropogenic, low frequency (0 to 1,000 Hz) noise in the oceans and may contribute to over 75 percent of all human sound in the sea (Simmonds and Hutchinson 1996, International Council for the Exploration of the Sea, 2005c). The Navy estimated that the 60,000 vessels of the world's merchant fleet, annually emit low-frequency sound into the world's oceans for the equivalent of 21.9 million days, assuming that 80 percent of the merchant ships are at sea at any one time (U.S. Department of the Navy, 2001b). Ross (1976) has estimated that between 1950 and 1975, shipping had caused a rise in ambient noise levels of 10 dB. He predicted that this would increase by another 5 dB by the beginning of the 21st century. The National Research Council (1997) estimated that the background ocean noise level at 100 Hz has been increasing by about 1.5 dB per decade since the advent of propeller-driven ships. Michel et al. (2001) suggested an association between long-term exposure to low-frequency sounds from shipping and an increased incidence of marine mammal mortalities caused by collisions with ships.

As discussed in Appendix G, airborne sound from low-flying helicopters or airplanes may be heard by marine mammals and turtles while at the surface or underwater. Responses by mammals and turtles could include hasty dives or turns, or decreased foraging (Soto et al., 2006). Whales may also slap the water with flukes or flippers, or swim away from low flying aircraft. Due to the transient nature of sounds from aircraft involved in at-sea training and their generally high altitude, such sounds would not likely cause physical effects.

Sound emitted from large vessels, particularly in the course of transit, is the principal source of noise in the ocean today, primarily due to the properties of sound emitted by civilian cargo vessels (Richardson et al., 1995a; Arveson and Vendittis, 2000). Ship propulsion and electricity generation engines, engine gearing, compressors, bilge and ballast pumps, as well as hydrodynamic flow surrounding a ship's hull and any hull protrusions contribute to a large vessels' noise emission into the marine environment. Prop-driven vessels also generate noise through cavitation, which accounts for much of the noise emitted by a large vessel depending on its travel speed. Noise emitted by large vessels can be characterized as low-frequency, continuous, and tonal. The sound pressure levels at the vessel will vary according to speed, burden, capacity and length (Richardson et al., 1995a; Arveson and Vendittis, 2000). Vessels ranging from 135 to 337 meters generate peak source sound levels from 169–200 dB between 8 Hz and 430 Hz, although Arveson and Vendittis (2000) documented components of higher frequencies (10-30 kHz) as a function of newer merchant ship engines and faster transit speeds. As noted previously, Navy ships in general and in particular those engaged in ASW, are designed to be very quiet as a means of limiting passive detection by opposing submarines.

Whales have variable responses to vessel presence or approaches, ranging from apparent tolerance to diving away from a vessel. Unfortunately, it is not always possible to determine whether the whales are responding to the vessel itself or the noise generated by the engine and cavitation around the propeller. Apart from some disruption of behavior, an animal may be unable to hear other sounds in the environment due to masking by the noise from the vessel. Any masking of environmental sounds or conspecific sounds is expected to be temporary, as noise dissipates with a vessel's transit through an area.

Vessel noise primarily raises concerns for masking of environmental and conspecific cues. However, exposure to vessel noise of sufficient intensity and/or duration can also result in temporary or permanent loss of sensitivity at a given frequency range, referred to as temporary or permanent threshold shifts (TTS or PTS). Threshold shifts are assumed to be possible in marine mammal species as a result of prolonged exposure to large vessel traffic noise due to its intensity, broad geographic range of effectiveness, and constancy.

Collectively, significant cumulative exposure to individuals, groups, or populations can occur if they exhibit site fidelity to a particular area; for example, whales that seasonally travel to a regular area to forage or breed may be more vulnerable to noise from large vessels compared to transiting whales. Any permanent threshold shift in a marine animal's hearing capability, especially at particular frequencies for which it can normally hear best, can impair its ability to perceive threats, including ships.

Most observations of behavioral responses of marine mammals to human generated sounds have been limited to short-term behavioral responses, which included the cessation of feeding, resting, or social interactions. Nowacek et al. (2007) provide a detailed summary of cetacean response to underwater noise.

Given the sound propagation of low-frequency sounds, a large vessel in this sound range can be heard 139-463 kilometers away (Ross, 1976 in Polefka, 2004). Navy vessels, however, have incorporated significant underwater ship quieting technology to reduce their acoustic signature (as compared to a similarly-sized vessel) in order to reduce their vulnerability to detection by enemy passive acoustics (Southall, 2005). Therefore, the potential for TTS or PTS from Navy vessel and aircraft movement is extremely low given that the exercises and training events are transitory in time, with vessels moving over large area of the ocean. A marine mammal or sea turtle is unlikely to be exposed long enough at high levels for TTS or PTS to occur. Any masking of environmental sounds or conspecific sounds is expected to be temporary, as noise dissipates with a Navy vessel transiting through an area. If behavioral disruptions result from the presence of aircraft or vessels, it is expected to be temporary. Animals are expected to resume their migration, feeding, or other behaviors without any threat to their survival or reproduction. However, if an animal is aware of a vessel and dives or swims away, it may successfully avoid being struck.

Commercial and Research Sonar

Almost all vessels at sea are equipped with active sonar for use in measuring the depth of the water: a fathometer. In addition, many vessels engaged in commercial or recreational fishing also use active sonar commonly referred to as "fish-finders." Both types of sonar tend to be higher in frequency and lower in power as compared to the hull mounted MFA sonar used during Navy training; however, there are many more of these sonars, and they are in use much more often and in more locations than Navy sonars.

Although seismic oil and gas research taking place elsewhere is not conducted in the Hawaiian Islands, undersea research using active sound sources does occur. Sound sources employed include powerful multibeam and sidescan sonars that are generally used for mapping the ocean floor and include both mid-frequency and high-frequency systems. During mapping surveys, these sonars are run continuously, sweeping the large areas of ocean to accurately chart the complex bathymetry present on the ocean floor.

Navy Sonar

Naval sonars are designed for three primary functions: submarine hunting, mine hunting, and shipping surveillance. The Navy employs two classes of sonars: active sonars and passive sonars. Most active military sonars operate in a limited number of areas, and are most likely not a significant contributor to a comprehensive global ocean noise budget (International Council for the Exploration of the Sea, 2005c).

The effects of MFA/HFA naval sonar on marine wildlife have not been studied as extensively as the effects of air-guns used in seismic surveys (Madsen et al., 2006; Stone and Tasker, 2006; Wilson et al., 2006; Palka and Johnson, 2007; Parente et al., 2007). Maybaum (1989, 1993) observed changes in behavior of humpbacks during playback tapes of the M-1002 system (using 203 dB re 1 µPa-m for study); specifically, a decrease in respiration, submergence, and aerial behavior rates; and an increase in speed of travel and track linearity. Direct comparison of Maybaum's results, however, with Navy MFA sonar are difficult to make. Maybaum's signal source, the commercial M-1002, is not similar to how naval mid-frequency sonar operates. In addition, behavioral responses were observed during playbacks of a control tape, (i.e., a tape with no sound signal) so interpretation of Maybaum's results are inconclusive.

In the Caribbean, sperm whales were observed to interrupt their activities by stopping echolocation and leaving the area in the presence of underwater sounds surmised (since they did not observe any vessels) to have originated from submarines using sonar (Watkins and Schevill, 1975; Watkins et al., 1985). The authors did not report receive levels from these exposures, and also got a similar reaction from artificial noise they generated by banging on their boat hull. It was unclear if the sperm whales were reacting to the sonar signal itself or to a potentially new unknown sound in general.

Research by Nowacek, et al. (2004) on North Atlantic right whales using a 18 minute signal designed to alert whales to a vessel's presence suggests that received sound levels of only 133 to 148 pressure level (decibel [dB] re 1 micropascals per meter [µPa-m]) for the duration of the sound exposure may disrupt feeding behavior. The authors did note, however, that within minutes of cessation of the source, a return to normal behavior would be expected. Direct comparison of the Nowacek et al. (2004) sound source to MFA sonar, however, is not possible given the radically different nature of the two sources. Nowacek et al.'s source was a series of non-sonar like sounds designed to purposely alert the whale, lasting several minutes, and covering a broad frequency band. Direct differences between Nowacek et al. (2004) and MFA sonar is summarized below from Nowacek et al. (2004) and Nowacek et al. (2007):

(1) Signal duration: Time difference between the two signals is significant, 18-minute signal used by Nowacek et al. verses < 1-sec for MFA sonar.
(2) Frequency modulation: Nowacek et al. contained three distinct signals containing frequency modulated sounds:
  - Alternating 1-sec pure tone at 500 and 850 Hz
  - 2-sec logarithmic down-sweep from 4500 to 500 Hz
  - Pair of low-high (1500 and 2000 Hz) sine wave tones amplitude modulated at 120 Hz.
(3) Signal to noise ratio: Nowacek et al.'s signal maximized signal to noise ratio so that it would be distinct from ambient noise and resist masking.

(4) Signal acoustic characteristics: Nowacek et al.'s signal comprised of disharmonic signals spanning northern right whales' estimated hearing range.

Given these differences, therefore, the exact cause of apparent right whale behavior noted by the authors cannot be attributed to any one component since the source was such a mix of signal types.

Beaked Whales

Recent beaked whale strandings have prompted inquiry into the relationship between high-amplitude continuous-type sound and the cause of those strandings. For example, in the stranding in the Bahamas in 2000, the Navy MFA sonar was identified as the only contributory cause that could have lead to the stranding. The Bahamas exercise entailed multiple ships using MFA sonar during transit of a long constricted channel. The Navy participated in an extensive investigation of the stranding with the NMFS. The "Joint Interim Report, Bahamas Marine Mammal Stranding Event of 15-16 March 2000" concluded that the variables to be considered in managing future risk from tactical mid-range sonar were "sound propagation characteristics (in this case a surface duct), unusual underwater bathymetry, intensive use of multiple sonar units, a constricted channel with limited egress avenues, and the presence of beaked whales that appear to be sensitive to the frequencies produced by these sonars." (U.S. Department of Commerce and U.S. Department of the Navy, 2001).

The Navy analyzed the known range of operational, biological, and environmental factors involved in the Bahamas stranding and focused on the interplay of these factors to reduce risks to beaked whales from ASW training. Mitigation measures based on the Bahamas investigation are presented in Chapter 6.0. The confluence of these factors do not occur in the Hawaiian Islands although surface ducts may be present, there are rapid changes in bathymetry over relatively short distances, and beaked whales are present where MFA sonar is used. For example, beaked whales are present at PMRF and there are a few individual beaked whales that appear to be resident in the area off of the island of Hawaii and the Alenuihaha Channel between the island of Hawaii and Maui where ASW sonar operations occur regularly (Baird et al., 2006a; McSweeney et al., 2007). Although beaked whales are visually and acoustically detected in areas where sonar use routinely takes place, there has not been a stranding of beaked whales in the Hawaiian Islands associated with the 30-year use history of the present sonar systems.

This history would suggest that the simple exposure of beaked whales to sonar is not enough to cause beaked whales to strand. Brownell et al. (2004) have suggested that the high number of beaked whale strandings in Japan between 1980 and 2004 may be related to Navy sonar use in those waters given the presence of U.S. Naval Bases and exercises off Japan. The Center for Naval Analysis compiled the history of naval exercises taking place off Japan and found there to be no correlation in time for any of the stranding events presented in Brownell et al. (2004). Like the situation in Hawaii, there are clearly beaked whales present in the waters off Japan (as evidenced by the strandings); however, there is no correlation in time to strandings and sonar use. Sonar did not cause the strandings identified by Brownell et al. (2004), and more importantly, this suggests sonar use in the presence of beaked whales over two decades has not resulted in strandings related to sonar use.

In Hawaii, there have been no detected beaked whales strandings associated with the use of MFA sonar. While the absence of evidence does not prove there have been no affects on beaked whales, 30 years of history with no evidence of any impacts or strandings would seem to indicate that problems encountered in locations far from Hawaii involving beaked whales are location and context specific and do not apply in Hawaiian waters.

It has been suggested that there is an absence of strandings and floating dead marine mammals in Hawaii related to sonar use because (it is argued) dead marine mammals will not float, are eaten by sharks, are carried out to sea, or end up on remote shorelines in Hawaii and are never discovered. In Hawaii, floating dead marine mammals have been documented as persisting for a number of days even while being consumed by sharks, and strandings occur on a regular basis on most of the islands. Typically, dead marine mammals will initially sink, then refloat, and finally sink again after substantial deterioration (Spitz, 1993). The timeline of this process will vary depending primarily upon water temperature and water depth, as well as other factors such as gut content, amount of body fat, etc., that affect bacterial and other decomposition processes. Generally, refloating occurs within a few days while final sinking may require, for a large whale, several weeks. Considering the intense use and observation of the shorelines and waters around Hawaii given prevalent fishing and tourism, the claim that a significant number of whale carcasses have been consistently missed is unreasonable, and is contrary to the Pacific Island Region Marine Mammal Response Stranding Network's regular observations of strandings and dead floating marine mammals documented in Hawaii.

Stranding Analysis

Over the past two decades, several mass stranding events involving beaked whales have been documented. While beaked whale strandings have been reported since recordkeeping began in the 1800s (Geraci and Lounsbury, 1993; Cox et al., 2006; Podesta et al., 2006), several mass strandings since have been associated with naval training that may have included MFA sonar (Simmonds and Lopez-Jurado, 1991; Frantzis, 1998; Jepson et al., 2003; Cox et al., 2006). As Cox et al. (2006) concludes, the state of science can not yet determine if a sound source such as MFA sonar alone causes beaked whale strandings, or if other factors (acoustic, biological, or environmental) must co-occur in conjunction with a sound source.

A review of historical data (mostly anecdotal) maintained by the Marine Mammal Program in the National Museum of Natural History, Smithsonian Institution reports 49 beaked whale mass stranding events between 1838 and 1999. The largest beaked whale mass stranding occurred in the 1870s in New Zealand when 28 Gray's beaked whales (*Mesoplodon grayi*) stranded. Blainville's beaked whale (*Mesoplodon densirostris*) strandings are rare, and records show that they were involved in one mass stranding in 1989 in the Canary Islands. Cuvier's beaked whales (*Ziphius cavirostris*) are the most frequently reported beaked whale to strand, with at least 19 stranding events from 1804 through 2000 (U.S. Department of the Navy and Department of Commerce, 2001). By the nature of the data, much of the historic information on strandings over the years is anecdotal, which has been condensed in various reports, and some of the data have been misquoted.

The discussion below centers on those worldwide stranding events that may have some association with naval training, and global strandings that the Navy feels are either inconclusive or can not be associated with naval training.

Naval Association

In the following sections, specific stranding events that have been putatively linked to potential sonar operations are discussed. Of note, these events represent a small overall number of animals over an 11-year period (40 animals), and not all worldwide beaked whale strandings can be linked to naval activity (International Council for the Exploration of the Sea, 2005b; 2005c; Podesta et al., 2006). Four of the five events occurred during North Atlantic Treaty Organization (NATO) exercises or events where Navy presence was limited (Greece, Portugal, Spain). One of the five events involved only Navy ships (Bahamas).

Beaked whale stranding events associated with potential naval training:

- 1996 May Greece (NATO/United States)
- 2000 March Bahamas (United States)
- 2000 May Portugal, Madeira Islands (NATO/United States)
- 2002 September Spain, Canary Islands (NATO/United States)
- 2006 January Spain, Mediterranean Sea coast (NATO/United States)

The following sections provide details and analysis concerning the five events noted above in addition to other events where MFA sonar use has been alleged to be potentially causal and/or a factor contributing to the stranding event.

4.1.2.4.10.2 Stranding Events Associated with Navy Sonar

Greece Stranding Event, May 12–13, 1996

Description

Twelve Cuvier’s beaked whales (*Ziphius cavirostris*) stranded along a 38.2-kilometer strand of the coast of the Kyparissiakos Gulf on May 12 and 13, 1996 (Frantzis, 1998). From May 11 through May 15, the NATO research vessel Alliance was conducting sonar tests with signals of 600 Hz and 3 kHz and rms SPL of 228 and 226 dB re: 1μPa, respectively (D'Amico and Verboom, 1998; D’Spain et al., 2006). The timing and the location of the testing encompassed the time and location of the whale strandings (Frantzis, 1998).

Findings

Necropsies of eight of the animals were performed, but were limited to basic external examination and sampling of stomach contents, blood, and skin. No ears or organs were collected, and no histological samples were preserved because of problems related to permits, lack of trained specialists, and lack of facilities and means (International Council for the Exploration of the Sea, 2005a).

- At least 12 of the 14 animals stranded alive in an atypical way (International Council for the Exploration of the Sea, 2005a). The spread of strandings were also atypical in location and time, as mass-strandings usually occur at the same place and at the same time (Frantzis, 1998).
- No apparent abnormalities or wounds were found (Frantzis, 2004).

- Examination of photos of the animals revealed that the eyes of at least four of the individuals were bleeding. Photos were taken soon after their death (Frantzis, 2004).
- Stomach contents contained the flesh of cephalopods, indicating that feeding had recently taken place (Frantzis, 1998).
- No unusual environmental events occurred before or during the stranding (Frantzis, 2004).

Conclusions

All available information regarding the conditions associated with this stranding were compiled, and many potential causes were examined including major pollution events, important tectonic activity, unusual physical or meteorological events, magnetic anomalies, epizootics, and conventional military activities (International Council for the Exploration of the Sea, 2005a). However, none of these potential causes coincided in time with the mass stranding, or could explain its characteristics (International Council for the Exploration of the Sea, 2005a). The robust condition of the animals, plus the recent stomach contents, is not consistent with pathogenic causes (Frantzis, 2004). In addition, environmental causes can be ruled out as there were no unusual environmental circumstances or events before or during this time period (Frantzis, 2004).

It was determined that because of the rarity of this mass stranding of Cuvier's beaked whales in the Kyparissiakos Gulf (first one in history), the probability for the two events (the military exercises and the strandings) to coincide in time and location, while being independent of each other, was extremely low (Frantzis, 1998).

Because full necropsies had not been conducted, and no abnormalities were noted, the cause of the strandings cannot be precisely determined (Cox et al., 2006). The analysis of this stranding event provided support for, but no clear evidence for, the cause-and-effect relationship of sonar operations and beaked whale strandings (Cox et al., 2006).

Bahamas Marine Mammal Stranding Event, March 15-16, 2000

Description

On March 15-16, 2000, seventeen marine mammals comprised of four different species (Cuvier's beaked whales, Blainville's beaked whales, Minke whales, and one spotted dolphin) stranded along the Northeast and Northwest Providence Channels of the Bahamas Islands (National Marine Fisheries Service, 2001b; U.S. Department of the Navy and Department of Commerce, 2001). The strandings occurred over a 36-hour period and coincided with Navy use of MFA sonar within the channel. Navy ships were involved in tactical sonar exercises for approximately 16 hours on March 15. The ships, which operated the AN/SQS-53C and AN/SQS-56, moved through the channel while emitting sonar pings approximately every 24 seconds. The timing of pings was staggered between ships and average source levels of pings varied from a nominal 235 dB SPL (AN/SQS-53C) to 223 dB SPL (AN/SQS-56). The center frequency of pings was 3.3 kHz and 6.8 to 8.2 kHz, respectively.

Because of the unusual nature and situation surrounding these strandings, a comprehensive investigation into every possible cause was quickly launched (U.S. Department of the Navy and Department of Commerce, 2001).

Strandings were first reported at the southern end of the channels, and proceeded northwest throughout March 15, 2000. It is probable that all of the strandings occurred on March 15, even though some of the animals were not found or reported until March 16. Seven of the animals died, while ten animals were returned to the water alive; however, it is unknown if these animals survived or died at sea at a later time. (U.S. Department of the Navy and Department of Commerce, 2001)

The animals that are known to have died include five Cuvier's beaked whales, one Blainville's beaked whale, and the single spotted dolphin (U.S. Department of the Navy and Department of Commerce, 2001). Six necropsies were performed, but only three out of the six (one Cuvier's beaked whale, one Blainville's beaked whale, and the spotted dolphin) were fresh enough to permit identification of pathologies by computerized tomography. Tissues from the remaining three animals were in a state of advanced decomposition at the time of inspection. Results from the spotted dolphin necropsy revealed that the animal died with systemic debilitation disease, and is considered unrelated to the rest of the mass stranding (U.S. Department of the Navy and Department of Commerce, 2001).

Findings

Based on necropsies performed on the other five beaked whales, it was preliminarily determined that they had experienced some sort of acoustic or impulse trauma which led to their stranding and ultimate demise (U.S. Department of the Navy and Department of Commerce, 2001). Detailed microscopic tissue studies followed in order to determine the source of the acoustic trauma and the mechanism by which trauma was caused.

- All five necropsied beaked whales were in good body condition, showing no signs of infection, disease, ship strike, blunt trauma, or fishery related injuries, and three still had food remains in their stomachs. (U.S. Department of the Navy and Department of Commerce, 2001).
- Auditory structural damage was discovered in four of the whales, specifically bloody effusions or hemorrhaging around the ears (U.S. Department of the Navy and Department of Commerce, 2001).
- Bilateral intracochlear and unilateral temporal region subarachnoid hemorrhage with blood clots in the lateral ventricles were found in two of the whales (U.S. Department of the Navy and Department of Commerce, 2001).
- Three of the whales had small hemorrhages in their acoustic fats (located along the jaw and in the melon) (U.S. Department of the Navy and Department of Commerce, 2001).
- Passive acoustic monitor recordings within the area during the time of the stranding showed no signs of an explosion or other geological event such as an earthquake (U.S. Department of the Navy and Department of Commerce, 2001).
- The beaked whales showed signs of overheating, physiological shock, and cardiovascular collapse, all of which commonly result in death following a stranding (U.S. Department of the Navy and Department of Commerce, 2001).

Conclusions

The post-mortem analyses of stranded beaked whales lead to the conclusion that the immediate cause of death resulted from overheating, cardiovascular collapse, and stresses associated with being stranded on land. However, the presence of subarachnoid and intracochlear hemorrhages were believed to have occurred prior to stranding and were hypothesized as being related to an acoustic event. Passive acoustic monitoring records demonstrated that no large-scale acoustic activity besides the Navy sonar exercise occurred in the times surrounding the stranding event. The mechanism by which sonar could have caused the observed traumas or caused the animals to strand was undetermined. The spotted dolphin was in overall poor condition for examination, but showed indications of long-term disease. No analysis of baleen whales (minke whale) was conducted. Baleen whale stranding events have not been associated with either low-frequency or mid-frequency sonar use (International Council for the Exploration of the Sea, 2005b, 2005c).

May 10–14, 2000 Stranding Event, Madeira Island, Portugal

Description

From May 10–14, 2000, three Cuvier's beaked whales were found stranded on two islands in the Madeira archipelago, Portugal (Cox et al., 2006)—two on Porto Santo Island, and one on the northeast coast of Madeira Island (Freitas, 2004). A fourth animal was reported floating in the Madeiran waters by fisherman, but did not come ashore (Woods Hole Oceanographic Institution, 2005).

Joint NATO amphibious training peacekeeping exercises involving participants from 17 countries took place in Portugal during May 2–15, 2000. The NATO exercises were conducted across an area that stretched from the Island of Madeira to the Gulf of Gascony, and was named "Linked Seas 2000." It involved Greek, British, Spanish, Portuguese, French, Romanian, and U.S. forces, and included 80 warships and several thousand men landing on the beaches (U.S. Army Corps of Engineers, 2001). The NATO exercises occurred concurrently with this atypical mass stranding of beaked whales (Freitas, 2004).

Findings

The bodies of the three stranded whales were examined post mortem (Woods Hole Oceanographic Institution, 2005). Two heads were taken to be examined, one intact and the other partially seared from a fire started by locals during an attempt to dispose of the corpse (Woods Hole Oceanographic Institution, 2005). Only one of the stranded whales was fresh enough (24 hours after stranding) to be necropsied (Cox et al., 2006).

- Results from the necropsy revealed evidence of hemorrhage and congestion in the right lung and both kidneys (Cox et al., 2006).
- There was also evidence of intercochlear and intracranial hemorrhage similar to that which was observed in the whales that stranded in the Bahamas event (Cox et al., 2006).
- There were no signs of blunt trauma, and no major fractures (Woods Hole Oceanographic Institution, 2005).

- The cranial sinuses and airways were found to be quite clear with little or no fluid deposition, which may indicate good preservation of tissues (Woods Hole Oceanographic Institution, 2005).

Conclusions

Several observations on the Madeira stranded beaked whales, such as the pattern of injury to the auditory system, are the same as those observed in the Bahamas strandings. Blood in and around the eyes, kidney lesions, pleural hemorrhages, and congestion in the lungs are particularly consistent with the pathologies from the whales stranded in the Bahamas, and are consistent with stress and pressure related trauma. The similarities in pathology and stranding patterns between these two events suggest that a similar pressure event may have precipitated or contributed to the strandings at both sites. (Woods Hole Oceanographic Institution, 2005)

Even though no causal link can be made between the stranding event and naval exercises, certain conditions may have existed in the exercise area that, in their aggregate, may have contributed to the marine mammal strandings (Freitas, 2004).

- Exercises were conducted in areas of at least 547 fathoms depth near a shoreline where there is a rapid change in bathymetry on the order of 547 to 3,281 fathoms occurring a cross a relatively short horizontal distance (Freitas, 2004).
- Multiple ships were operating around Madeira. It is not known if MFA sonar was used, and the specifics of the sound sources used the Linked Seas 2000 exercises, and their propagation characteristics, are unknown (Cox et al., 2006, Freitas, 2004).
- Exercises took place in an area surrounded by landmasses separated by less than 35 nm and at least 10 nm in length, or in an embayment. Exercises involving multiple ships employing MFA near land may produce sound directed towards a channel or embayment that may cut off the lines of egress for marine mammals (Freitas, 2004).

September 24, 2002 Canary Islands Stranding Event

Description

The southeastern area within the Canary Islands is well known for aggregations of beaked whales due to its ocean depths of greater than 547 fathoms within a few hundred meters of the coastline (Fernandez et al., 2005). On September 24, 2002, 14 beaked whales were found stranded on Fuerteventura and Lanzaote Islands in the Canary Islands (International Council For Exploration of the Sea, 2005a). Seven whales died, while the remaining seven live whales were returned to deeper waters (Fernandez et al., 2005). Four beaked whales were found stranded dead over the next 3 days either on the coast or floating offshore.

These strandings occurred within near proximity of an international naval exercise named Neo-Tapon 2002 that involved numerous surface warships and several submarines. Spanish naval sources indicated that tactical mid-range frequency sonar was utilized during the exercises, but no explosions occurred (Fernandez et al., 2005). Strandings began about 4 hours after the onset of MFA sonar activity (International Council For Exploration of the Sea, 2005a; Fernandez et al., 2005).

Findings

Eight Cuvier's beaked whales, one Blainville's beaked whale, and one Gervais' beaked whale were necropsied, six of them within 12 hours of stranding (Fernández et al., 2005).

- No pathogenic bacteria were isolated from the carcasses (Jepson et al., 2003)
- The animals displayed severe vascular congestion and hemorrhage especially around the tissues in the jaw, ears, brain, and kidneys, displaying marked disseminated microvascular hemorrhages associated with widespread fat emboli (Jepson et al., 2003; International Council For Exploration of the Sea, 2005a).
- Several organs contained intravascular bubbles, although definitive evidence of gas embolism *in vivo* is difficult to determine after death (Jepson et al., 2003).
- The livers of the necropsied animals were the most consistently affected organ, which contained macroscopic gas-filled cavities and had variable degrees of fibrotic encapsulation. In some animals, cavitary lesions had extensively replaced the normal tissue (Jepson et al., 2003).
- Stomachs contained a large amount of fresh and undigested contents, which suggests a rapid onset of disease and death (Fernandez et al., 2005).
- Head and neck lymph nodes were enlarged and congested, and parasites were found in the kidneys of all animals (Fernandez et al., 2005).

Conclusions

The association of NATO MFA sonar use close in space and time to the beaked whale strandings, and the similarity between this stranding event and previous beaked whale mass strandings coincident with sonar use, suggests that a similar scenario and causative mechanism of stranding may be shared between the events. Beaked whales stranded in this event demonstrated brain and auditory system injuries, hemorrhages, and congestion in multiple organs, similar to the pathological findings of the Bahamas and Madeira stranding events. In addition, the necropsy results of Canary Islands stranding event lead to the hypothesis that the presence of disseminated and widespread gas bubbles and fat emboli were indicative of nitrogen bubble formation, similar to what might be expected in decompression sickness (Jepson et al., 2003; Fernández et al., 2005). Whereas gas emboli would develop from the nitrogen gas, fat emboli would enter the blood stream from ruptured fat cells (presumably where nitrogen bubble formation occurs) or through the coalescence of lipid bodies within the blood stream.

The possibility that the gas and fat emboli found by Fernández et al. (2005) was due to nitrogen bubble formation has been hypothesized to be related to either direct activation of the bubble by sonar signals or to a behavioral response in which the beaked whales flee to the surface following sonar exposure. The first hypothesis is related to rectified diffusion (Crum and Mao, 1996), the process of increasing the size of a bubble by exposing it to a sound field. This process is facilitated if the environment in which the ensonified bubbles exist is supersaturated with gas. Repetitive diving by marine mammals can cause the blood and some tissues to accumulate gas to a greater degree than is supported by the surrounding environmental pressure (Ridgway and Howard, 1979). Deeper and longer dives of some marine mammals, such as those conducted by beaked whales, are theoretically predicted to induce greater levels of supersaturation (Houser et al., 2001). If rectified diffusion were possible in marine mammals exposed to high-level sound, conditions of tissue supersaturation could theoretically speed the rate and increase the size of bubble growth. Subsequent effects due to tissue trauma and emboli would presumably mirror those observed in humans suffering from decompression sickness.

It is unlikely that the short duration of sonar pings would be long enough to drive bubble growth to any substantial size, if such a phenomenon occurs. However, an alternative but related hypothesis has also been suggested: stable bubbles could be destabilized by high-level sound exposures such that bubble growth then occurs through static diffusion of gas out of the tissues. In such a scenario the marine mammal would need to be in a gas-supersaturated state for a long enough period of time for bubbles to become of a problematic size. The second hypothesis speculates that rapid ascent to the surface following exposure to a startling sound might produce tissue gas saturation sufficient for the evolution of nitrogen bubbles (Jepson et al., 2003; Fernández et al., 2005). In this scenario, the rate of ascent would need to be sufficiently rapid to compromise behavioral or physiological protections against nitrogen bubble formation. Tyack et al. (2006) showed that beaked whales often make rapid ascents from deep dives suggesting that it is unlikely that beaked whales would suffer from decompression sickness. Zimmer and Tyack (2007) speculated that if repetitive shallow dives that are used by beaked whales to avoid a predator or a sound source, they could accumulate high levels of nitrogen because they would be above the depth of lung collapse (above about 210 ft) and could lead to decompression sickness. There is no evidence that beaked whales dive in this manner in response to predators or sound sources and other marine mammals such as Antarctic and Galapagos fur seals, and pantropical spotted dolphins make repetitive shallow dives with no apparent decompression sickness (Kooyman and Trillmich, 1984; Kooyman et al., 1984; Baird et al., 2001). Although theoretical predictions suggest the possibility for acoustically mediated bubble growth, there is considerable disagreement among scientists as to its likelihood (Piantadosi and Thalmann, 2004). Sound exposure levels predicted to cause in vivo bubble formation within diving cetaceans have not been evaluated and are suspected as needing to be very high (Evans, 2002; Crum et al., 2005). Moore and Early (2004) reported that in analysis of sperm whale bones spanning 111 years, gas embolism symptoms were observed indicating that sperm whales may be susceptible to decompression sickness due to natural diving behavior. Further, although it has been argued that traumas from recent beaked whale strandings are consistent with gas emboli and bubble-induced tissue separations (Jepson et al., 2003), there is no conclusive evidence supporting this hypothesis, and there is concern that at least some of the pathological findings (e.g., bubble emboli) are artifacts of the necropsy. Currently, stranding networks in the United States have agreed to adopt a set of necropsy guidelines to determine, in part, the possibility and frequency with which bubble emboli can be introduced into marine mammals during necropsy procedures (Arruda et al., 2007).

January 26, 2006, Spain

Description

The Spanish Cetacean Society reported an atypical mass stranding of four beaked whales that occurred January 26, 2006, on the southeast coast of Spain, near Mojacar (Gulf of Vera) in the Western Mediterranean Sea. According to the report, two of the whales were discovered the evening of January 26 and were found to be still alive. Two other whales were discovered during the day on January 27, but had already died. A following report stated that the first three animals were located near the town of Mojacar and were examined by a team from the University of Las Palmas de Gran Canarias, with the help of the stranding network of Ecologistas en Acción Almería-PROMAR and others from the Spanish Cetacean Society. The fourth animal was found dead on the afternoon of May 27, a few kilometers north of the first three animals.

From January 25-26, 2006, Standing North Atlantic Treaty Organization (NATO) Response Force Maritime Group Two (five of seven ships including one U.S. ship under NATO Operational Control) had conducted active sonar training against a Spanish submarine within 50 nm of the stranding site.

Findings

Veterinary pathologists necropsied the two male and two female beaked whales (*Ziphius cavirostris*, family *Ziphiidae*).

Conclusions

According to the pathologists, the most likely primary cause of this type of beaked whale mass stranding event is anthropogenic acoustic activities, most probably anti-submarine MFA sonar used during the military naval exercises. However, no positive acoustic link was established as a direct cause of the stranding.

Even though no causal link can be made between the stranding event and naval exercises, certain conditions may have existed in the exercise area that, in their aggregate, may have contributed to the marine mammal strandings (Freitas, 2004).

- Exercises were conducted in areas of at least 547 fathoms depth near a shoreline where there is a rapid change in bathymetry on the order of 547 to 3,281 fathoms occurring across a relatively short horizontal distance (Freitas, 2004).
- Multiple ships (in this instance, five) were operating (in this case, MFA sonar) in the same area over extended periods of time (in this case, 20 hours) in close proximity.
- Exercises took place in an area surrounded by landmasses, or in an embayment. Exercises involving multiple ships employing MFA sonar near land may produce sound directed towards a channel or embayment that may cut off the lines of egress for marine mammals (Freitas, 2004).

4.1.2.4.10.3 Other Global Stranding Discussions

In the following sections, stranding events that have been linked to Navy activity in popular press are presented. As detailed in the individual case study conclusions, the Navy believes that there is enough to evidence available to refute allegations of impacts from MFA sonar, or at least indicate that a substantial degree of uncertainty in time and space that preclude a meaningful scientific conclusion.

May 5, 2003 USS SHOUP Washington State

On May 5, 2003 at 0855, USS SHOUP got underway from the pier at Naval Station Everett, Washington. USS SHOUP then transited from Everett through Admiralty Inlet to the west side of Whidbey Island, where at 1030 it began a training exercise. Use of USS SHOUP's MFA tactical sonar began at 1040. At 1420, USS SHOUP entered the Haro Strait at a speed of 18 knots. USS SHOUP terminated active sonar use at 1438.

Between May 2 and June 2, 2003, approximately 16 strandings involving 15 harbor porpoise and one Dall's porpoise were reported to the Northwest Marine Mammal Stranding Network. A comprehensive review of all strandings and the events involving USS SHOUP on 5 May 2003 were presented in U.S. Department of Navy (2004b). Given that the USS SHOUP was known to have operated sonar in the strait on May 5, and that supposed behavioral reactions of killer whales had been putatively linked to these sonar operations (National Marine Fisheries Service, 2005a), the NMFS undertook an analysis of whether sonar caused the strandings of the harbor porpoises.

As a result of the allegations regarding USS SHOUP, NMFS initiated a necropsy study involving 11 of the stranded animals discovered between May 2 and June 2, 2003. Gross examination, histopathology, age determination, blubber analysis, and various other analyses were conducted on each of the carcasses (Norman et al., 2004). The necropsies took place at the National Marine Mammal Laboratory in Seattle.

Findings

All of the carcasses suffered from some degree of freeze-thaw artifact that hampered gross and histological evaluations. At the time of necropsy, three of the porpoises were moderately fresh, whereas the remainder of the carcasses was considered to have moderate to advanced decomposition.

- None of the 11 necropsied harbor porpoise showed signs of acoustic trauma (National Marine Fisheries Service, 2003).
- One of the animals had fibrinous peritonitis, one had salmonellosis, and another had profound necrotizing pneumonia (Norman et al., 2004).
- Two of the five had perimortem blunt trauma injury with associated broken bones in their heads (National Marine Fisheries Service, 2003)
- No cause of death could be determined for the remaining six animals, which is consistent with the expected percentage in most marine mammal necropsies from the region (National Marine Fisheries Service, 2003). It is important to note, however, that these determinations were based only on the evidence from the necropsy so as not to be biased with regard to determinations of the potential presence or absence of acoustic trauma. The result was that other potential causal factors, such as one animal (Specimen 33NWR05005) found tangled in a fishing net, was unknown to the investigators in their determination regarding the likely cause of death.

Conclusions

The NMFS concluded from a retrospective analysis of stranding events that the number of harbor porpoise stranding events in the approximate month surrounding the USS SHOUP use of sonar was higher than expected based on annual strandings of harbor porpoises (Norman et al., 2004). In this regard, it is important to note that the number of strandings in the May-June timeframe in 2003 was also higher for the outer coast indicating a much wider phenomena than use of sonar by USS SHOUP in Puget Sound for one day in May. The conclusion by NMFS that the number of strandings in 2003 was higher is also different from that of The Whale Museum, which has documented and responded to harbor porpoise strandings since 1980 (Osborne, 2003a). According to The Whale Museum, the number of strandings as of May 15, 2003, was consistent with what was expected based on historical stranding records and was less than that occurring in certain years. For example, since 1992 the San Juan Stranding Network has documented an average of 5.8 porpoise strandings per year. In 1997 there were 12 strandings in the San Juan Islands with 23 strandings throughout the general Puget Sound area. Disregarding the discrepancy in the historical rate of porpoise strandings and its relation to the USS SHOUP, NMFS acknowledged that the intense level of media attention focused on the strandings likely resulted in an increased reporting effort by the public over that which is normally observed (Norman et al., 2004). NMFS also noted in its report that the "sample size is too small and biased to infer a specific relationship with respect to sonar usage and subsequent strandings."

Seven of the porpoises collected and analyzed died prior to USS SHOUP departing to sea on May 5, 2003. Of these seven, one, discovered on May 5, 2003, was in a state of moderate decomposition, indicating it died before May 5; the cause of death was determined to be due, most likely, to salmonella septicemia. Another porpoise, discovered at Port Angeles on May 6, 2003, was in a state of moderate decomposition, indicating that this porpoise also died prior to May 5. One stranded harbor porpoise discovered fresh on May 6 is the only animal that could potentially be linked in time to USS SHOUP's May 5 active sonar use. Necropsy results for this porpoise found no evidence of acoustic trauma. The remaining eight strandings were discovered 1 to 3 weeks after USS SHOUP's May 5 transit of the Haro Strait, making it difficult to causally link the sonar activities of USS SHOUP to the timing of the strandings. Two of the eight porpoises died from blunt trauma injury and a third suffered from parasitic infestation, which possibly contributed to its death (Norman et al., 2004). For the remaining five porpoises, NMFS was unable to identify the causes of death.

The speculative association of the harbor porpoise strandings to the use of sonar by the USS SHOUP is inconsistent with prior stranding events linked to the use of MFA sonar. Specifically, in prior events, the stranding of whales occurred over a short period of time (less than 36 hours), stranded individuals were spatially co-located, traumas in stranded animals were consistent between events, and active sonar was known or suspected to be in use. Although MFA sonar was used by USS SHOUP, the distribution of harbor porpoise strandings by location and with respect to time surrounding the event do not support the suggestion that MFA sonar was a cause of harbor porpoise strandings. Rather, a complete lack of evidence of any acoustic trauma within the harbor porpoises, and the identification of probable causes of stranding or death in several animals, further supports the conclusion that harbor porpoise strandings were unrelated to the sonar activities of the USS SHOUP.

Additional allegations regarding USS SHOUP use of sonar having caused behavioral effects on Dall's porpoise, orca, and a minke whale also arose in association with this event (see U.S. Department of Navy 2004 for a complete discussion).

Dall's Porpoise. Information regarding the observation of Dall's porpoise on May 5, 2003 came from the operator of a whale watch boat at an unspecified location. This operator reported the Dall's porpoise were seen "going north" when the SHOUP was estimated by him to be 10 miles away. Potential reasons for the Dall's movement include the pursuit of prey, the presence of harassing resident orca or predatory transient orca, vessel disturbance from one of many whale watch vessels, or multiple other unknowable reasons including the use of sonar by USS SHOUP. In short, there was nothing unusual in the observed behavior of the Dall's porpoise on 5 May 2003 and no way to assess if the otherwise normal behavior was in reaction to the use of sonar by USS SHOUP, any other potential causal factor, or a combination of factors.

Orca. Observer opinions regarding orca J-Pod behaviors on May 5, 2003 were inconsistent, ranging from the orca being “at ease with the sound” or “resting” to their being “annoyed.” One witness reported observing “low rates of surface active behavior” on behalf of the orca J-Pod, which is in conflict with that of another observer who reported variable surface activity, tail slapping and spyhopping. Witnesses also expressed the opinion that the behaviors displayed by the orca on May 5, 2003 were “extremely unusual,” although those same behaviors are observed and reported regularly on the Orca Network Website, and are behaviors listed in general references as being part of the normal repertoire of orca behaviors. Given the contradictory nature of the reports on the observed behavior of the J-Pod orca, it is impossible to determine if any unusual behaviors were present. In short, there is no way to assess if any unusual behaviors were present or if present they were in reaction to vessel disturbance from one of many nearby whale watch vessels, use of sonar by USS SHOUP, any other potential causal factor, or a combination of factors.

Minke Whale. A minke whale was reported porpoising in Haro Strait on May 5, 2003, which is a rarely observed behavior. The cause of this behavior is indeterminate given multiple potential causal factors including but not limited to the presence of predatory Transient orca, possible interaction with whale watch boats, other vessels, or USS SHOUP’s use of sonar. The behavior of the minke whale was the only unusual behavior clearly present on May 5, 2003, however, no way to given the existing information if the unusual behavior observed was in reaction to the use of sonar by USS SHOUP, any other potential causal factor, or a combination of factors.

July 3, 2004, Hanalei Bay, Kauai Stranding Event

The majority of the following information is taken from the NMFS report on the stranding event (Southall et al., 2006) but is inclusive of additional and new information not presented in the NMFS report. On the morning of July 3, 2004, between 150-200 melon-headed whales (*Peponocephala electra*) entered Hanalei Bay, Kauai. Individuals attending a canoe blessing ceremony observed the animals entering the bay at approximately 7:00 a.m. The whales were reported entering the bay in a “wave as if they were chasing fish” (Braun, 2005). The whales were moving fast, but not at maximum speed.

At 6:45 a.m. on July 3, 2004, approximately 25 nm from Hanalei Bay, active sonar was tested briefly prior to the start of an ASW event; this was about 15 minutes before the whales were observed in Hanalei Bay. At the nominal swim speed for melon-headed whales (5 to 6 knots), the whales had to be minimally within 1.5 to 2 nm of Hanalei Bay before the sonar at PMRF was activated. The whales were not in their open ocean habitat but had to be close to shore at 6:45 a.m. when the sonar was activated, to have been observed inside Hanalei Bay from the beach by 7:00 a.m. (Hanalei Bay is very large area.)

The whales stopped in the southwest portion of the bay grouping tightly with lots of spy hopping and tail slapping. As people went in the water among the whales, spy hopping increased and the pod separated into two groups with individual animals moving between the two clusters (Braun, 2005). This continued through most of the day, with the animals slowly moving south and then southeast within the bay (Braun, 2005). By about 3:00 p.m. police arrived and kept people from interacting with the animals. The Navy believes that the abnormal behavior by the whales during this time is likely the result of people and boats in the water with the whales rather than the result of sonar activities taking place 25 or more miles off the coast.

At 4:45 p.m. on July 3, 2004, the RIMPAC Battle Watch Captain received a call from an NMFS representative in Honolulu, Hawaii, reporting the sighting of as many as 200 melon-headed whales in Hanalei Bay. At 4:47 p.m., out of caution, the Battle Watch Captain directed all ships in the area to cease all active sonar transmissions.

An NMFS representative arrived at Hanalei Bay at 7:20 p.m. on July 3, 2004, and observed a tight single pod 75 yards from the southeast side of the bay (Braun, 2005). The pod was circling in a tight group and there was frequent tail slapping and minimal spy hopping. No predators were observed in the bay and no animals were reported as having fresh injuries. Occasionally one or two sub-adult sized animals broke from the tight pod and came nearer the shore to apparently chase fish and be in the shore break (Braun, 2005). The pod stayed in the bay through the night of July 3, 2004.

On July 4, 2004, a 700–800-foot rope was constructed by weaving together beach morning glory vines. This vine rope was tied between two canoes and with the assistance of 30 to 40 kayaks, by about 11:30 a.m. on July 4, 2004, the pod was coaxed out of the bay (Braun, 2005).

A single neonate melon-headed whale was observed in the bay on the afternoon of July 4, after the whale pod had left the bay. The following morning on July 5, 2004, the neonate was found stranded on Lumahai Beach. It was pushed back into the water but was found stranded dead between 9 and 10 a.m. near the Hanalei pier. NMFS collected the carcass and had it shipped to California for necropsy, tissue collection, and diagnostic imaging. Preliminary findings indicated the cause of death was starvation (Farris, 2004) and this was later confirmed upon completion of the NMFS stranding report (Southall et al., 2006).

Following the stranding event, NMFS undertook an investigation of possible causative factors of the stranding. This analysis included available information on environmental factors, biological factors, and an analysis of the potential for sonar involvement. The latter analysis included vessels that utilized MFA sonar on the afternoon and evening of July 2. These vessels were to the southeast of Kauai, on the opposite side of the island from Hanalei Bay.

Findings

NMFS concluded from the acoustic analysis that the melon-headed whales would have had to have been on the southeast side of Kauai on July 2 to have been exposed to sonar from naval vessels on that day (Southall et al., 2006). There was no indication whether the animals were in that region or whether they were elsewhere on July 2. NMFS concluded that to reach Hanalei Bay, the animals would have had to swim around the island of Kauai at a speed of 1.4-4.0 m/s for between 6.5 to 17.5 hours after having possibly heard sonar off the west coast of Oahu and/or the channel between Kauai and Oahu on July 2, to reach Hanalei Bay by 7:00 a.m. on July 3. Sonar transmissions began on July 3, 25 nm to the north of Hanalei Bay as part of an ASW event that started at 6:45 a.m. and lasted until 4:47 p.m. Propagation analysis conducted by the 3rd Fleet estimated that the level of sound from these transmissions at the mouth of Hanalei Bay could have ranged from 138-149 dB re: 1 μPa for intervals during the day when the vessels were generally pointed toward Kauai.

NMFS was unable to determine any environmental factors (e.g., harmful algal blooms, weather conditions) that may have contributed to the stranding. However, additional analysis by Navy investigators found that a full moon occurred the evening before the stranding and was coupled with a squid run (Mobley et al., 2007). One of the first observations of the whales entering the bay reported the pod came into the bay in a line "as if chasing fish" (Braun, 2005). In addition, a group of 500-700 melon-headed whales were observed to come close to shore and interact with humans in Sasanhaya Bay, Rota, on the same morning as the whales entered Hanalei Bay (Jefferson et al., 2006). Previous records further indicated that, though the entrance of melon-headed whales into the shallows is rare, it is not unprecedented. A pod of melon-headed whales entered Hilo Bay in the 1870s in a manner similar to that which occurred at Hanalei Bay in 2004.

The necropsy of the melon-headed whale calf suggested that the animal died from a lack of nutrition, possibly following separation from its mother. The calf was estimated to be approximately one week old. Although the calf appeared not to have eaten for some time, it was not possible to determine whether the calf had ever nursed after it was born. The calf showed no signs of blunt trauma or viral disease and had no indications of acoustic injury.

Conclusions

Although it is not impossible, it is unlikely that the sound level from the sonar caused the melon-headed whales to enter Hanalei Bay. This conclusion by the Navy is based on a number of factors:

1. The speculation that the whales may have been exposed to sonar the day before and then fled to Hanalei Bay is not supported by reasonable expectation of animal behavior and swim speeds. The flight response of the animals would have had to persist for many hours following the cessation of sonar transmissions. The swim speeds, though feasible for the species, are highly unlikely to be maintained for the durations proposed, particularly since the pod was a mixed group containing both adults and neonates. Whereas adults may maintain a swim speed of 4.0 m/s for some time, it is improbable that a neonate could achieve the same for a period of many hours.

2. The area between the islands of Oahu and Kauai and the PMRF training range have been used in RIMPAC exercises for more than 20 years, and are used year-round for ASW training using MFA sonar. Melon-headed whales inhabiting the waters around Kauai are likely not naive to the sound of sonar and there has never been another stranding event associated in time with ASW training at Kauai or in the Hawaiian Islands. Similarly, the waters surrounding Hawaii contain an abundance of marine mammals, many of which would have been exposed to the same sonar operations that were speculated to have affected the melon-headed whales. No other strandings were reported coincident with the RIMPAC exercises. This leaves it uncertain as to why melon-headed whales, and no other species of marine mammal, would respond to the sonar exposure by stranding.

3. At the nominal swim speed for melon-headed whales, the whales had to be within 1.5 to 2 nm of Hanalei Bay before sonar was activated on July 3. The whales were not in their open ocean habitat but had to be close to shore at 6:45 a.m. when the sonar was activated to have been observed inside Hanalei Bay from the beach by 7:00 a.m. (Hanalei Bay is very large area). This observation suggests that other potential factors could be causative of the stranding event (see below).

4. The simultaneous movement of 500-700 melon-headed whales and Risso's dolphins into Sasanhaya Bay, Rota, in the Northern Marianas Islands on the same morning as the 2004

Hanalei stranding (Jefferson et al., 2006) suggests that there may be a common factor which prompted the melon-headed whales to approach the shoreline. A full moon occurred the evening before the stranding and a run of squid was reported concomitant with the lunar activity (Mobley, et al., 2007). Thus, it is possible that the melon-headed whales were capitalizing on a lunar event that provided an opportunity for relatively easy prey capture.

Both the Rota and Hanalei Bay incidents occurred on the same day, which followed a full moon (the date was different given the international date line). Analysis of 18 live and near strandings involving melon-headed whales for which specific dates were provided (Brownell et al. 2006), plus three additional live strandings not listed in that report, revealed a non-random pattern with respect to lunar phase. The majority of stranding events tended to occur during the full and third quarter phases, with fewer during the new moon and one during the first quarter. Squid and other species of the deep scattering layer show vertical migrations responsive to lunar cycles. Lunar influences have been shown with other squid-eating species, including the foraging behavior of Galapagos fur seals and stranding patterns of north Atlantic sperm whales. (Mobley, et al., 2007) In addition, a report of a pod entering Hilo Bay in the 1870s indicates that on at least one other occasion, melon-headed whales entered a bay in a manner similar to the occurrence at Hanalei Bay in July 2004. Thus, although melon-headed whales entering shallow embayments may be an infrequent event, and every such event might be considered anomalous, there is precedent for the occurrence.

5. The received noise sound levels at the bay were estimated to range from roughly 95 – 149 dB re: 1 μPa. Received levels as a function of time of day have not been reported, so it is not possible to determine when the presumed highest levels would have occurred and for how long. Received levels, however, in the upper range would have been audible by human participants in the bay. The statement by one interviewee that he heard "pings" that lasted an hour and that they were loud enough to hurt his ears is unreliable. Received levels necessary to cause pain over the duration stated would have been observed by most individuals in the water with the animals. No other such reports were obtained from people interacting with the animals in the water.

Although NMFS concluded that sonar use was a "plausible, if not likely, contributing factor in what may have been a confluence of events" (Southall et al., 2006), this conclusion was based primarily on the basis that there was an absence of any other compelling explanation. The authors of the NMFS report on the incident were unaware, at the time of publication, of the simultaneous event in Rota. In light of the simultaneous Rota event, the Navy believes the Hanalei stranding does not appear as anomalous as initially indicated in the NMFS report, and the speculation that sonar was a likely contributing factor is weakened. The Hanalei Bay incident does not share the characteristics observed with other mass strandings of whales coincident with sonar activity (e.g., specific traumas, species composition, etc.). In addition, the inability to conclusively link or exclude the impact of other environmental factors makes a causal link between sonar and the melon-headed whale strandings highly speculative at best.

1980–2004 Beaked Whale Strandings in Japan (Brownell et al. 2004)

Description

Brownell et al. (2004) compare the historical occurrence of beaked whale strandings in Japan (where there are U.S. Naval bases), with strandings in New Zealand (which lacks a U.S. Naval base) and concluded the higher number of strandings in Japan may be related to the presence of the Navy vessels using MFA sonar. While the dates for the strandings were well documented, the authors of the study did not attempt to correlate the dates of any navy activities or exercises with the dates of the strandings.

To fully investigate the allegation made by Brownell et al. (2004), the Center for Naval Analysis (CNA) looked at the past U.S. Naval exercise schedules from 1980 to 2004 for the water around Japan in comparison to the dates for the strandings provided by Brownell et al. (2004). None of the strandings occurred during or soon (within weeks) after any U.S. Navy exercises. While the CNA analysis began by investigating the probabilistic nature of any co-occurrences, the results were a 100 percent probability the strandings and sonar use were not correlated by time. Given there was no instance of co-occurrence in over 20 years of stranding data, it can be reasonably postulated that sonar use in Japan waters by U.S. Navy vessels did not lead to any of the strandings documented by Brownell et al. (2004).

2004 Alaska Beaked Whale Strandings (June 7-16, 2004)

Description

In the timeframe between June 17 and July 19, 2004, five beaked whales were discovered at various locations along 1,600 miles of the Alaskan coastline and one was found floating (dead) at sea. Because the Navy exercise Alaska Shield/Northern Edge 2004 occurred within the approximate timeframe of these strandings, it has been alleged that sonar may have been the probable cause of these strandings.

The Alaska Shield/Northern Edge 2004 exercise consisted of a vessel tracking event followed by a vessel boarding search and seizure event. There was no ASW component to the exercise, no use of MFA sonar, and no use of explosives in the water. There were no events in the Alaska Shield/Northern Edge exercise that could have caused in any of the strandings over this 33-day period covering 1,600 mi of coastline.

North Carolina Marine Mammal Mass Stranding Event, January 15-16, 2005

Description

On January 15 and 16, 2005, 36 marine mammals comprised of 3 separate species (33 short-finned pilot whales, 1 minke whale, and 2 dwarf sperm whales) stranded alive on the beaches of North Carolina (National Marine Fisheries Service, 2007i; Hohn et al., 2006) distributed over a 69-mi area between the northern part of the state down to Cape Hatteras (National Marine Fisheries Service, 2007j). Thirty-one different species of marine mammals have been known to strand along the North Carolina coast since 1992; all three of the species involved in this stranding occasionally strand in this area (National Marine Fisheries Service, 2007j). This stranding event was determined to be a UME because live strandings of three different species in one weekend in North Carolina are extremely rare; in fact, it is the only stranding of offshore species to occur within a 2- to 3-day period in the region on record (National Marine Fisheries Service, 2007i; Hohn et al., 2006).

The Navy indicated that from January 12-14 some unit-level training with MFA sonar was conducted by vessels that were 93 to 185 km from Oregon Inlet. An expeditionary strike group was also conducting exercises to the southeast, but the closest point of active sonar transmission to the inlet was 650 km away (National Marine Fisheries Service, 2007i). The unit-level operations were not unusual for the area or time of year and the vessels were not involved in ASW exercises (National Marine Fisheries Service, 2007j). Marine mammal observers located on the Navy vessels reported that they did not detect any marine mammals (National Marine Fisheries Service, 2007i). No sonar transmissions were made on January 15-16.

The National Weather Service reported that a severe weather event moved through North Carolina on January 13 and 14. The event was caused by an intense cold front that moved into an unusually warm and moist air mass that had been persisting across the eastern United States for about a week. The weather caused flooding in the western part of the state, considerable wind damage in central regions of the state, and at least three tornadoes that were reported in the north central part of the state. Severe, sustained (1 to 4 days) winter storms are common for this region.

Findings

On January 16 and 17, 2005, 2 dwarf sperm whales, 27 pilot whales, and the single minke whale were necropsied and sampled. Because of the uniqueness of the stranding, 9 locations of interest within 25 stranded cetacean heads were examined closely. The only common finding in all of the heads was a form of sinusitis (National Marine Fisheries Service, 2007i).

- The pilot whales and the dwarf sperm whale were not considered to be emaciated, even though none of them had recently-eaten food in their stomachs (National Marine Fisheries Service, 2007i).
- The minke whale was emaciated, and it is believed that this was a dependent calf that had become separated from its mother, and was not a part of the other strandings (National Marine Fisheries Service, 2007i).
- Most biochemistry abnormalities indicated deteriorating conditions from being on land for an extended amount of time, and are believed to be a result of the stranding itself (National Marine Fisheries Service, 2007i).
- Three pilot whales showed signs of pre-existing systemic inflammation (National Marine Fisheries Service, 2007i).
- Lesions involving all organ systems were seen, but consistent lesions were not observed across species (National Oceanic and Atmospheric Administration, 2006e; Hohn et al., 2006).
- Cardiovascular disease was present in one pilot whale and one dwarf sperm whale, while musculoskeletal disease was present in two pilot whales (National Marine Fisheries Service, 2007i).
- Parasites were found and collected from 26 pilot whales and 2 dwarf sperm whales; parasite loads were considered to be within normal limits for free-ranging cetaceans (National Marine Fisheries Service, 2007i).
- There were no harmful algal blooms present along the coastline during the months prior to the strandings (National Marine Fisheries Service, 2007i; Hohn et al., 2006).
- Sonar transmissions prior to the strandings were limited in nature and did not share the concentration identified in previous events associated with MFA sonar use (Evans and England, 2001).
- The operational/environmental conditions were also dissimilar (e.g., no constrictive channel and a limited number of ships and sonar transmissions).

- However, other severe storm conditions existed in the days surrounding the strandings and the impact of these weather conditions on at-sea conditions is unknown.
- No harmful algal blooms were noted along the coastline.
- Environmental conditions that are consistent with conditions under which other mass strandings have occurred were present (a gently sloping shore, strong winds, and changes in up-welling to down-welling conditions) (National Marine Fisheries Service, 2007i).

Conclusions

Several whales had pre-existing conditions that may have contributed to the stranding, but were not determined to be the cause of the stranding event (National Oceanic and Atmospheric Administration, 2006e; National Marine Fisheries Service, 2007j). The actual cause of death for many of the whales was determined to be a result of the stranding itself (National Marine Fisheries Service, 2007j). NMFS concluded that this mass stranding event occurred simultaneously in time and space with MFA sonar naval activities, and has several features in common with other possible sonar-related stranding events (National Marine Fisheries Service, 2007i). For this reason, along with the rarity of the event, NMFS believes that it is possible that there exists a causal rather than a coincidental association between naval sonar activity and the stranding event (National Marine Fisheries Service, 2007i). But they also acknowledge that there are differences in operational and environmental characteristics between this event and other possible sonar-related stranding events (National Marine Fisheries Service, 2007i), such as constricted channels (National Marine Fisheries Service, 2007j).

Even though the stranding occurred while active military sonar was being utilized off the North Carolina coast, the investigation team was unable to determine what role, if any, military activities played in the stranding events (Hohn et al., 2006). If MFA sonar played a part in the strandings, sound propagation models indicated that received acoustic levels would depend heavily on the position of the whales relative to the source; however, because the exact location of the cetaceans is unknown it is impossible to estimate the level of their exposure to active sonar transmissions (National Marine Fisheries Service, 2007i). Evidence to support a definitive association is lacking, and consistent lesions across species and individuals that could indicate a single cause of the stranding were not found (National Marine Fisheries Service, 2007i).

Based on the physical evidence, it cannot be definitively determined if there is a causal link between the strandings and anthropogenic sonar activity and/or environmental conditions, or a combination of both (National Marine Fisheries Service, 2007i).

Causal Associations for Stranding Events

Marine mammal strandings have been a historic and ongoing occurrence attributed to a variety of causes. Over the last 50 years, increased awareness and reporting has led to more information about species affected and raised concerns about anthropogenic sources of stranding. While there has been some marine mammal mortalities potentially associated with MFA sonar effects on a small number of species (primarily limited numbers of certain species of beaked whales), the significance and actual causative reason for any impacts is still subject to continued investigation.

By comparison and as described previously, potential impacts on all species of cetaceans worldwide from fishery related mortality can be orders of magnitude more significant (100,000s of animals vice 10s of animals) (Culik, 2002; International Council for the Exploration of the Sea, 2005c; Read et al., 2006). This does not negate the influence of any mortality or additional stressor to small, regionalized sub-populations which may be at greater risk from human related mortalities (fishing, vessel strike, sound) than populations with larger oceanic level distribution or migrations. International Council for the Exploration of the Sea (2005b) noted, however, that taken in context of marine mammal populations in general, sonar is not a major threat, or significant portion of the overall ocean noise budget.

In conclusion, a constructive framework and continued research based on sound scientific principles is needed in order to avoid speculation as to stranding causes, and to further our understanding of potential effects or lack of effects from military MFA sonar (Bradshaw et al., 2005; International Council for the Exploration of the Sea, 2005c; Barlow and Gisiner, 2006; Cox et al. 2006).

Several stranding events have been associated with Navy sonar activities, but relatively few of the total stranding events that have been recorded occurred spatially or temporally with Navy sonar activities. While sonar may be a contributing factor under certain rare conditions, the presence of sonar is not a necessary condition for stranding events to occur.

A review of past stranding events associated with sonar suggests that the potential factors that may contribute to a stranding event are steep bathymetry changes, narrow channels with limited egress avenues, multiple sonar ships, surface ducting, and the presence of beaked whales that in some geographic locations may be more susceptible to sonar exposures. The most important factors appear to be the presence of a narrow channel (e.g. Bahamas and Madeira Island, Portugal) that may prevent animals from avoiding sonar exposure and multiple sonar ships within that channel. There are no narrow channels (less than 35 nm wide and 10 nm in length) in the HRC, and the ships would be spread out over a wider area, allowing animals to move away from sonar activities if they choose. In addition, beaked whales may not be more susceptible to sonar but may favor habitats that are more conducive to sonar effects.

The RIMPAC Exercises have been conducted every other year since 1968 in the HRC, and along with other ASW training events have only been implicated in one stranding event which may have been simply animals following prey into a bay (Braun, 2005; Southall et al., 2006). Given the large military presence and private and commercial vessel traffic in the Hawaiian waters, it is likely that a mass stranding event would be detected. Therefore, it is unlikely that the conditions that may have contributed to past stranding events involving Navy sonar would be present in the HRC.

Evidence has also been presented indicating that there are resident populations and potentially genetically distinct populations of cetacea in the Hawaiian Islands (McSweeney et al., 2007). This would suggest that these species of cetacea have co-existed with sonar use in the Hawaiian Islands with residency indicating the animals remain in the area despite sonar use and genetic distinction indicative that they have done so for generations (of marine mammals).

4.1.2.4.11 Marine Mammal Mitigation Measures Related To Acoustic and Explosive Exposures

Chapter 6.0 provides the complete sonar and explosives mitigation measures for the HRC. The following paragraphs provide summary information about these mitigation measures.

4.1.2.4.11.1 Acoustic Exposure Mitigation Measures

Effective training in the HRC dictates that ship, submarine, and aircraft participants utilize their sensors and train with their weapons to their optimum capabilities as required by the mission. The Navy recognizes that such use has the potential to cause behavioral disruption of some marine mammal species in the vicinity of a training event. As part of their SOPs, the Navy has developed mitigation measures that would be implemented to protect marine mammals and Federally listed species during ASW training. These mitigation measures, which are part of the No-action Alternative, include the establishment of a safety zone and procedures to power down or shut off sonar if animals are detected within the safety zone. For detailed list of mitigation measures see Chapter 6.0. While conducting ASW training, Navy ships always have two, although usually more, personnel on watch serving as lookouts. In addition to the qualified lookouts, the bridge team present at a minimum also includes an Officer of the Deck and one Junior Officer of the Deck include observing the waters in the vicinity of the ship. At night, personnel engaged in ASW events may also use night vision goggles and infra-red detectors, as appropriate, which can aid in the detection of marine mammals. Passive acoustic detection of vocalizing marine mammals is used to alert bridge lookouts to the potential presence of marine mammals in the vicinity.

Navy lookouts undergo extensive training to qualify as watchstanders. This training includes on-the-job instruction under the supervision of an experienced watchstander, followed by completion of the Personal Qualification Standard program. The Navy includes marine species awareness as part of its training for its bridge lookout personnel on ships and submarines as required training for Navy lookouts. This training addresses the lookout's role in environmental protection, laws governing the protection of marine species, Navy stewardship commitments, and general observation information to aid in avoiding interactions with marine species.

Operating procedures are implemented to maximize the ability of personnel to recognize instances when marine mammals are close aboard and avoid adverse effects. These procedures include measures such as decreasing the source level and then shutting down active tactical sonar operations when marine mammals are encountered in the vicinity of a training event. Although these mitigation measures are SOPs, their use is also reinforced through promulgation of an Environmental Annex to the Operational Order for a training event. Sonar operators on ships, submarines, and aircraft use both passive and active sonar detection indicators of marine mammals as a measure of estimating when marine mammals are close. When marine mammals are detected nearby, all ships, submarines, and aircraft engaged in ASW will reduce MFA sonar power levels in accordance with specific guidelines developed for each type of training event.

NMFS and the Navy will continue coordination on the "Communications and Response Protocol for Stranded Marine Mammal Events During Navy Operations in the Pacific Islands Region" that was prepared by NMFS Pacific Region Pacific Island Region Office to facilitate communication during RIMPAC 2006. The Navy will continue to coordinate with the Hawaii NMFS Stranding Coordinator for any unusual marine mammal behavior, including stranding, beached live or dead cetaceans, floating marine mammals, or out-of-habitat/milling live cetaceans that may occur during or shortly after Navy activities in the vicinity of the stranding.

Long-Term Effects

Navy training activities are conducted in the same general areas throughout the HRC, so marine mammal populations can be exposed to repeated training over time. However, as described earlier, this HRC EIS/OEIS assumes that short-term non-injurious sound exposure levels predicted to cause TTS or temporary behavioral disruptions qualify as Level B harassment. Application of this criterion assumes an effect even though it is highly unlikely that all behavioral disruptions or instances of TTS will result in long-term significant impacts. There are resident populations of spinner dolphins and beaked whales in several areas throughout the HRC (Andrews et al., 2006; Baird et al., 2006c) that have been exposed to Navy activities but continue to use those areas. Also, the population of humpback whales in Hawaiian waters is increasing (Mobley 2004). Although this suggests that Navy activities do not have a long-term effect on marine mammals, it does not unequivocally confirm this assumption. There will be long-term monitoring program of the marine mammal populations within the HRC.

Likelihood of Prolonged Exposure

The proposed ASW training in the HRC would not result in prolonged exposure because the vessels are constantly moving, and the flow of the activity in the HRC when ASW training occurs reduces the potential for prolonged exposure.

4.1.2.4.11.2 Explosive Source Mitigation Measures

As part of the official Navy clearance procedure before an underwater detonation or Live Fire Exercise, the target area must be inspected visually (from vessels and available aircraft) and determined to be clear. The use of non-explosive rounds or weapons only has the potential to impact marine species if they are targeted at the water or if they miss the intended target. In a SINKEX for example, most of the weapons are guided munitions and gunfire that are generally very accurate. The required clearance zone at the target areas, and training within controlled ranges, minimizes the risk to marine mammals. Open ocean clearance procedures are the same for live or inert ordnance. Whenever ships and aircraft use the ranges for missile and gunnery practice, the weapons are used under controlled circumstances involving clearance procedures to ensure cetaceans, pinnipeds, or sea turtles are not present in the target area. These involve, at a minimum, a detailed visual search of the target area by aircraft reconnaissance, range safety boats, and range controllers and passive acoustic monitoring.

Ordnance cannot be released until the target area is determined to be clear. Training events are immediately halted if cetaceans, pinnipeds, or sea turtles are observed within the target area. Training events are delayed until the animal clears the target area. All observers are in continuous communication in order to have the capability to immediately stop the training. Training can be modified as necessary to obtain a clear target area. If the area cannot be cleared, it is canceled. All of these factors serve to avoid the risk of harming cetaceans, pinnipeds, or sea turtles.

The weapons used in most missile and Live Fire Exercises pose little risk to marine mammals unless they happen to be near the point of impact. Machine guns (0.50 caliber), 5-inch guns, 76-mm guns, and close-in weapons systems (anti-missile systems) exclusively fire non-explosive ammunition. The same applies to larger weapons firing inert ordnance for training. The rounds pose an extremely low risk of a direct hit and potential to directly affect a marine species. Target area clearance procedures will reduce this risk. A SINKEX uses a variety of weapons. The inert rounds pose a risk only at the point of impact and the non-inert weapons (with the exception of a live torpedo) only pose a risk of they miss the target. Target area clearance procedures will reduce this risk. Modeling results of the potential exposures of marine mammals to underwater sound from a SINKEX are summarized in Section 4.1.2.5.1.

The Navy has developed a mitigation plan to maximize the probability of sighting any ships or protected species in the vicinity of training. In order to minimize the likelihood of taking any threatened or endangered species that may be in the area, the following monitoring plan will be adhered to:

- All weapons firing will be conducted during the period 1 hour after official sunrise to 30 minutes before official sunset.
- Extensive range clearance operations will be conducted in the hours prior to commencement of the training, ensuring that no shipping is located within the hazard range of the longest-range weapon being fired for that event.
- An exclusion zone with a radius of 1.0 nm will be established around each target. This exclusion zone is based on calculations using a 990 lb H6 net explosive weight high explosive source detonated 5 ft below the surface of the water, which yields a distance of 0.85 nm (cold season) and 0.89 nm (warm season) beyond which the received level is below the 182 dB re: 1 μPa^2-s threshold established for the WINSTON S. CHURCHILL (DDG 81) shock trials. An additional buffer of 0.5 nm will be added to account for errors, target drift, and animal movements. Additionally, a safety zone, which extends from the exclusion zone at 1.0 nm out an additional 0.5 nm, will be surveyed. Together, the zones extend out 2 nm from the target.

A series of surveillance over-flights would be conducted within the exclusion and the safety zones, prior to and during training, when feasible. Survey protocol will be as follows:

- All visual surveillance operations will be conducted by Navy personnel trained in visual surveillance. In addition to the over flights, the exclusion zone will be monitored by passive acoustic means, when assets are available.
- If a protected species observed within the exclusion zone is diving, firing will be delayed until the animal is re-sighted outside the exclusion zone, or 30 minutes has elapsed. After 30 minutes, if the animal has not been re-sighted it will be assumed to have left the exclusion zone. This is based on a typical dive time of 30 minutes for listed species of concern. The Officer conducting the exercise will determine if the listed species is in danger of being adversely affected by commencement of the training event.

There is a long lead-time for set up and clearance of the impact area before any event using explosives takes place (may be one to several hours). There will, therefore, be a long period of area monitoring before any detonation or live fire event begins. Ordnance cannot be released until the target area is determined clear. Training is immediately halted if marine mammals are observed within the target area. Training is delayed until the animals clear the target area.

Most underwater detonations take place in shallow sandy areas that are generally not used by cetacea and are not feeding and resting areas for sea turtles. These factors, along with range clearance procedures and exercise set-up times, all serve to avoid the risk of harming cetaceans, pinnipeds, or sea turtles. Post event monitoring of underwater detonations has not produced any evidence of mortality of any protected marine species.

4.1.2.4.12 Sonar Marine Mammal Modeling

4.1.2.4.12.1 Active Acoustic Devices

Tactical military sonars are designed to search for, detect, localize, classify, and track submarines. There are two types of sonars, passive and active:

- Passive sonars only listen to incoming sounds and, since they do not emit sound energy in the water, lack the potential to acoustically affect the environment.
- Active sonars generate and emit acoustic energy specifically for the purpose of obtaining information concerning a distant object from the received and processed reflected sound energy.

Modern sonar technology has developed a multitude of sonar sensor and processing systems. In concept, the simplest active sonars emit omni-directional pulses ("pings") and time the arrival of the reflected echoes from the target object to determine range. More sophisticated active sonar emits an omni-directional ping and then rapidly scans a steered receiving beam to provide directional, as well as range, information. More advanced sonars transmit multiple preformed beams, listening to echoes from several directions simultaneously and providing efficient detection of both direction and range.

The tactical military sonars to be deployed during testing and training in the HRC are designed to detect submarines in tactical operational scenarios. This task requires the use of the sonar mid-frequency range (1 kHz to 10 kHz) and the high-frequency range (above 10 kHz). The types of tactical acoustic sources that would be used in training events are discussed in the following paragraphs.

- **Surface Ship Sonars.** A variety of surface ships participate in testing and training events, including cruisers, destroyers, and frigates. Some ships (e.g., aircraft carriers) do not have any onboard active sonar systems, other than fathometers. Others, like cruisers, are equipped with active as well as passive sonars for submarine detection and tracking. For purposes of the analysis, AN/SQS-53 surface ship sonars (present on cruisers and destroyers were modeled as having the nominal source level of 235 dB re 1 µPa at 1 m and transmitting at center frequencies of 2.6 kHz and 3.3 kHz. Sonar ping transmission durations were modeled as lasting 1 second per ping every 30 seconds and omni-directional, which is a conservative assumption that will calculate the maximum potential for effects. Actual ping durations will be less than 1 second. The AN/SQS-56 sonar present on frigates were modeled as having the nominal source level of 225 dB re 1 µPa at 1 m and transmitting at a center frequency of 7.5 kHz. Effects analysis modeling used frequencies that are required in tactical deployments such as those during RIMPAC and USWEX. Details concerning the tactical use of specific frequencies and the repetition rate for the sonar pings is classified but effects were modeled based on the required tactical training setting.

- **Submarine Sonars.** Submarine sonars are used to detect and target enemy submarines and surface ships. Submarine active sonar use is very rare and in those rare instances, the duration is very brief. It is extremely unlikely that use of active sonar by submarines would have any measurable effect on marine mammals.
- **Aircraft Sonar Systems.** Aircraft sonar systems that would operate in the HRC include sonobuoys and dipping sonar. Sonobuoys may be deployed by maritime patrol aircraft or helicopters; dipping sonars are used by carrier-based helicopters. A sonobuoy is an expendable device used by aircraft for the detection of underwater acoustic energy and for conducting vertical water column temperature measurements. Most sonobuoys are passive, but some can generate active acoustic signals, as well as listen passively. Dipping sonar is an active or passive sonar device lowered on cable by helicopters to detect or maintain contact with underwater targets. During ASW training, these systems active modes are only used briefly for localization of contacts and are not used in primary search capacity. Because active mode dipping sonar use is very brief, it is extremely unlikely its use would have any effect on marine mammals. However, the AN/AQS-22 dipping sonar was modeled based on estimated use during major exercises within the HRC.
- **Torpedoes.** Torpedoes are the primary ASW weapon used by surface ships, aircraft, and submarines. The guidance systems of these weapons can be autonomous or electronically controlled from the launching platform through an attached wire. The autonomous guidance systems are acoustically based. They operate either passively, exploiting the emitted sound energy by the target, or actively, ensonifying the target with a high-frequency sonar (20 kHz) and using the received echoes for guidance. Potential impacts from the use of torpedoes on the PMRF range areas were analyzed in the PMRF Enhanced Capability EIS and, consistent with NOAA's June 3, 2002, ESA Section 7 letter to the Navy for RIMPAC 2002 and the RIMPAC 2006 Biological Opinion, the Navy determined that the activities are not likely to adversely affect ESA listed species under the jurisdiction of the NMFS. The MK-48 torpedo was modeled for active sonar transmissions during specified training within the HRC.
- **Acoustic Device Countermeasures (ADC).** ADCs are, in effect, submarine simulators that make sound to act as decoys to avert localization and/or torpedo attacks. Previous classified analysis has shown that, based on the operational characteristics (source output level and/or frequency) of these acoustic sources, the potential to affect marine mammals was unlikely.
- **Training Targets.** ASW training targets are used to simulate target submarines. They are equipped with one or a combination of the following devices: (1) acoustic projectors emanating sounds to simulate submarine acoustic signatures; (2) echo repeaters to simulate the characteristics of the echo of a particular sonar signal reflected from a specific type of submarine; and (3) magnetic sources to trigger magnetic detectors. Based on the operational characteristics (source output level and/or frequency) of these acoustic sources, the potential to affect marine mammals is low, and therefore they were not modeled for this analysis. Consistent with NOAA's June 3, 2002, ESA Section 7 letter to the Navy for RIMPAC 2002 and the RIMPAC 2006 Biological Opinion, the Navy determined that the activities are not likely to adversely affect ESA listed species under the jurisdiction of NMFS.

- **Range Sources.** Range pingers are active acoustic devices that allow each of the in-water platforms on the range (e.g., ships, submarines, target simulators, and exercise torpedoes) to be tracked by the range transducer nodes. In addition to passively tracking the pinger signal from each range participant, the range transducer nodes also are capable of transmitting acoustic signals for a limited set of functions. These functions include submarine warning signals, acoustic commands to submarine target simulators (acoustic command link), and occasional voice or data communications (received by participating ships and submarines on range). Based on the operational characteristics (source output level and/or frequency) of these acoustic sources, the potential to affect marine mammals is low, and therefore they were not modeled for this analysis. Consistent with NOAA's June 3, 2002, ESA Section 7 letter to the Navy for RIMPAC 2002 and the RIMPAC 2006 Biological Opinion, the Navy determined that the activities are not likely to adversely affect ESA listed or MMPA protected species under the jurisdiction of NMFS.

4.1.2.4.12.2 Sonar Modeling Methodology

Modeling of the effects of MFA/HFA sonar and underwater detonations was conducted using methods described in brief below. A detailed description of the representative modeling areas, sound sources, model assumptions, acoustic and oceanographic parameters, underwater sound propagation and transmission models, and diving behavior of species modeled are presented in Appendix J.

The approach for estimating potential acoustic effects from HRC ASW training on cetacean species makes use of the methodology that was developed in cooperation with NOAA for the Navy's USWTR Draft OEIS/EIS (U.S. Department of the Navy, 2005a), USWEX EA/OEA (U.S. Department of the Navy, 2007b), RIMPAC EA/OEA (U.S. Department of the Navy, Commander Third Fleet, 2006) and COMPTUEX/JTFEX EA/OEA (U.S. Department of the Navy, 2007c). The methodology is provided here to determine the number and species of marine mammals for which incidental take authorization is requested.

In order to estimate acoustic effects from HRC ASW training, acoustic sources to be used were examined with regard to their operational characteristics as described in the previous section. Ship systems such as fathometers, with acoustic source levels below 201 dB re 1 µPa at 1 m were considered and were not included in the analysis given that at this source level (201 dB re 1 µPa at 1 m) or below, a ping would attenuate rapidly over distance. In addition, these sources are generally in the high-frequency range, which also reduces the propagation characteristics. It is important to note that odontocetes (toothed whales) are believed to have functional hearing in the range between approximately 40 Hz up to 80 kHz to 150 kHz and that mysticetes (baleen whales like humpbacks) are believed to have functional hearing below this upper limit (Richardson et al., 1995c). Filter-bank models of the humpback whale's ear investigated by Houser et al., (2001) suggested that humpbacks are sensitive to frequencies between 700 Hz and 10 kHz, and maximum sensitivity is between 2 kHz and 6 kHz. Research involving the recording of humpback vocalizations has found harmonics in the range up to 240 kHz (Au et al. 2001; 2006). These results do not, however, indicate that humpbacks can actually hear those high-frequency harmonics and given that sound of that frequency attenuates rapidly over distance, those sounds would not serve as a means of communication over distance. Since systems with an operating frequency greater than 150 kHz were not analyzed in the detailed modeling as these signals attenuate rapidly resulting in very short propagation distances. These acoustic sources, therefore, did not require further examination in this analysis.

Based on the information above, only AN/SQS 53, AN/SQS 56 hull-mounted MFA tactical sonar, DICASS MFA sonobuoy, MK-48 torpedo HFA sonar, and AN/AQS 22 (MFA dipping sonar), and submarine MFA sonar were determined to have the potential to affect marine mammals protected under the MMPA and ESA during HRC ASW training events.

For modeling purposes, sonar parameters (source levels, ping length, the interval between pings, output frequencies, etc.) were based on records from training events, previous exercises, and preferred ASW tactical doctrine to reflect the sonar use expected to occur during events in the HRC. The actual sonar parameters such as output settings, distance between ASW surface, subsurface, and aerial units, their deployment patterns, and the coordinated ASW movement (speed and maneuvers) across the exercise area are classified, however, modeling used to calculate exposures to marine mammals employed actual and preferred parameters to which the participants are trained and have used during past, used during ASW events in the HRC.

Every active sonar operation includes the potential to expose marine animals in the neighboring waters. The number of animals exposed to the sonar in any such action is dictated by the propagation field, the manner in which the sonar is operated (i.e., source level, depth, frequency, pulse length, directivity, platform speed, repetition rate), and the density of each marine species.

The modeling for surface ship active tactical sonar occurred in five broad steps, listed below. Results were calculated based on typical ASW training planned for the HRC. Acoustic propagation and mammal population data are analyzed for both the summer and winter timeframe. Marine mammal survey data for the offshore area beyond 25 nm (Barlow, 2006) and survey data for offshore areas within 25 nm (Mobley et al., 2000) provided marine mammal species density for modeling.

> Step 1. Environmental Provinces. The Hawaii Operating Area (OPAREA) is divided into six marine modeling areas, and each has a unique combination of environmental conditions. These are addressed by defining eight fundamental environments in two seasons that span the variety of depths, bottom types, sound speed profiles, and sediment thicknesses found in the Hawaii OPAREA. Each marine modeling area can be quantitatively described as a unique combination of these environments.
>
> Step 2. Transmission Loss. Since sound propagates differently in these eight environments, separate transmission loss calculations must be made for each, in both seasons. The transmission loss is predicted using CASS-GRAB sound modeling software.
>
> Step 3. Exposure Volumes. The transmission loss, combined with the source characteristics, gives the energy field of a single ping. The energy of over 10 hours of pinging is summed, carefully accounting for overlap of several pings, so an accurate average exposure of an hour of pinging is calculated for each depth increment. Repeating this calculation for each environment in each season gives the hourly ensonified volume, by depth, for each environment and season.
>
> Step 4. Marine Mammal Densities. The marine mammal densities were given in two dimensions, but using sources such as the North Pacific Acoustic Laboratory EIS, the

depth regimes of these marine mammals are used to project the two dimensional densities into three dimensions. Marine mammal densities (as provided by NMFS, e.g., Barlow, 2006) have high coefficients of variation.

Step 5. Exposure Calculations. Each marine mammal's three dimensional density is multiplied by the calculated impact volume—to that marine mammal depth regime. This provides the number of marine mammal density exposures per hour for that particular marine mammal species in each depth regime. In this way, each marine mammal species' (possibly fractional) exposure count per hour is based on its density, depth habitat, and the ensonified volume by depth. The marine mammal density exposures in each depth regime are then summed to predict the expected number of marine mammals harassed by activities within the HRC annually.

The movement of various units during an ASW event is largely unconstrained and dependent on the developing tactical situation presented to the commander of the forces. The planned sonar hours, by ASW training type, are given in the discussion for each type of training event for each alternative. The product of the hours of sonar and the hourly exposure count from the model provides the total exposures.

4.1.2.4.13 Explosive Source Marine Mammal Modeling

Underwater detonation activities can occur at various depths depending on the activity (SINKEX, EER/IEER, and Mine Neutralization), but may also include activities which may have detonations at or just below the surface (BOMBEX, GUNEX, or MISSILEX). Criteria for analysis of explosives potential impact on marine species is presented in Section 4.1.2.3, having application to both sea turtles and marine mammals.

4.1.2.4.13.1 Explosive Source Exercises

The exercises that use explosives are described in the following paragraphs.

Sinking Exercise (SINKEX)

In a SINKEX, a specially prepared, deactivated vessel is deliberately sunk using multiple weapons systems. The exercise provides training to ship and aircraft crews in delivering live ordnance on a real target. The target is a decommissioned and empty, cleaned, and environmentally-remediated ship hulk. It is towed to sea and set adrift at the SINKEX location. The duration of a SINKEX is unpredictable since it ends when the target sinks, sometimes immediately after the first weapon impact and sometimes only after multiple impacts by a variety of weapons fired one at a time in a series. Typically the exercise lasts for 4 to 8 hours. In the case of multiple SINKEX targets being used for an exercise, a SINKEX may be conducted on successive or multiple days. If at the end of the SINKEX or expenditure of all training ordnance the hulk has not been sunk, it will be sunk by detonation of explosive charges placed inside the hull. No SINKEX hulks would be left adrift overnight. SINKEXs occur only occasionally during HRC exercises. Modeling for an analysis of impacts from a SINKEX assumes all weapons are live (non-inert) and that all weapons used would impact the water. Some or all of the following weapons may be employed in a SINKEX:

- Three Harpoon surface-to-surface and air-to-surface missiles
- Two to eight air-to-surface Maverick missiles

- Two to four MK-82 General Purpose Bombs
- Two Hellfire air-to-surface missiles
- One SLAM-ER air-to-surface missile
- Two-hundred and fifty rounds for a 5-inch gun
- One MK-48 heavyweight submarine-launched torpedo

Air-to-Surface Gunnery Exercise (A-S GUNEX)

A-S GUNEX training is conducted by rotary-wing aircraft against stationary targets (Floating At-Sea Target [FAST] and smoke buoy). Rotary-wing aircraft involved in this training event would include a single SH-60 using either 7.62-mm or 0.50-caliber door-mounted machine guns. A typical GUNEX will last approximately 1 hour and involve the expenditure of approximately 400 rounds of 0.50-caliber or 7.62-mm ammunition. Due to the small size of these rounds, they are not considered to have an underwater detonation impact.

Surface-to-Surface Gunnery Exercise (S-S GUNEX)

S-S GUNEX take place in the open ocean to provide gunnery practice for Navy and Coast Guard ship crews. GUNEX training conducted in the Offshore OPAREA involves stationary targets such as a MK-42 FAST or a MK-58 marker (smoke) buoy. The gun systems employed against surface targets include the 5-inch, 76-millimeter (mm), 25-mm chain gun, 20-mm Close-in Weapon System, and 0.50-caliber machine gun. Typical ordnance expenditure for a single GUNEX is a minimum of 21 rounds of 5-inch or 76-mm ammunition, and approximately 150 rounds of 25-mm or .50-caliber ammunition. Both live and inert training rounds are used. After impacting the water, the rounds and fragments sink to the bottom of the ocean. A GUNEX lasts approximately 1 to 2 hours, depending on target services and weather conditions. The 5-inch and 76-mm rounds are considered in the underwater detonation modeling as live (non-inert), although typically not all ordnance will be live.

Naval Surface Fire Support Exercise (NSFS)

Navy surface combatants conduct NSFS at PMRF on a virtual range against “Fake Island,” located on Barking Sands Tactical Underwater Range (BARSTUR). Fake Island is unique in that it is a virtual landmass simulated in three dimensions. Ships conducting fire support exercise training against targets on the island are given the coordinates and elevation of targets. PMRF is capable of tracking fired rounds to an accuracy of 30 ft. The 5-inch and 76-mm rounds fired into ocean during this exercise are considered in the underwater detonation modeling as live (non-inert) although typically not all ordnance will be live.

Air-to-Surface Missile Exercise (A-S MISSILEX)

The A-S MISSILEX consists of the attacking platform releasing a forward-fired, guided weapon at the designated towed target. The exercise involves locating the target, then designating the target, usually with a laser.

A-S MISSILEX training that does not involve the release of a live weapon can take place if the attacking platform is carrying a captive air training missile (CATM) simulating the weapon involved in the training. The CATM MISSILEX is identical to an LFX in every aspect except that a weapon is not released. The training event requires a laser-safe range as the target is designated just as in an LFX.

From 1 to 16 aircraft, carrying live, inert, or CATMs, or flying without ordnance (dry runs) are used during the exercise. At sea, seaborne powered targets (SEPTARs), Improved Surface Towed Targets (ISTTs), and excess ship hulks are used as targets. A-S MISSILEX assets include helicopters and/or 1 to 16 fixed wing aircraft with air-to-surface missiles and anti-radiation missiles (electromagnetic radiation source seeking missiles). When a high-speed anti-radiation missile (HARM) is used, the exercise is called a HARMEX. Targets include SEPTARs, ISTTs, and excess ship hulks.

Surface-to-Surface Missile Exercise (S-S MISSILEX)

S-S MISSILEX involves the attack of surface targets at sea by use of cruise missiles or other missile systems, usually by a single ship conducting training in the detection, classification, tracking, and engagement of a surface target. Engagement is usually with Harpoon missiles or Standard missiles in the surface-to-surface mode. Targets could include virtual targets or the SEPTAR or ship deployed surface target. S-S MISSILEX training is routinely conducted on individual ships with embedded training devices.

S-S MISSILEX could include 4 to 20 surface-to-surface missiles, SEPTARs, a weapons recovery boat, and a helicopter for environmental and photo evaluation. All missiles are equipped with instrumentation packages or a warhead. Surface-to-air missiles can also be used in a surface-to-surface mode. S-S MISSILEX activities are conducted within PMRF Warning Area W-188. Each exercise typically lasts 5 hours. Future S-S MISSILEX could range from 4 to 35 hours.

Bombing Exercise (BOMBEX)

Fixed-wing aircraft conduct BOMBEX (Sea) training events against stationary targets (MK 42 FAST or MK 58 smoke buoy) at sea. An aircraft will clear the area, deploy a smoke buoy or other floating target, and then set up a racetrack pattern, dropping on the target with each pass. At PMRF, a range boat might be used to deploy the target for an aircraft to attack. BOMBEX are considered in the underwater detonation modeling as live (non-inert), although typically not all bombs will be live.

Mine Neutralization

Mine Neutralization training events involve the detection, identification, evaluation, rendering safe, and disposal of mines and unexploded ordnance that constitutes a threat to ships or personnel. Mine neutralization training can be conducted by a variety of air, surface and sub-surface assets.

Tactics for neutralization of ground or bottom mines involve the diver placing a specific amount of explosives, which when detonated underwater at a specific distance from a mine results in neutralization of the mine. Floating, or moored, mines involve the diver placing a specific amount of explosives directly on the mine. Floating mines encountered by Fleet ships in open-ocean areas will be detonated at the surface. In support of an expeditionary assault, divers and Navy marine mammal assets deploy in very shallow water depths (10 to 40 ft) to locate mines and obstructions. Divers are transported to the mines by boat or helicopter. Inert dummy mines are used in the exercises. The total net explosive weight used against each mine ranges from less than 1 lb to a maximum of 20 lb.

Various types of bottom surveying equipment may be used during RIMPAC. Examples include the Canadian Route Survey System that hydrographically maps the ocean floor using multi-beam side scan sonar and the Bottom Object Inspection Vehicle used for object identification. These units can help in supporting mine detection prior to Special Warfare Operations (SPECWAROPS) and amphibious exercises.

Mine Neutralization training events take place offshore in the Pu`uloa Underwater Range (called Keahi Point in earlier documents);Naval Station Pearl Harbor; Lima Landing; Barbers Point Underwater Range off-shore of Coast Guard Air Station Barbers Point/Kalaeloa Airport (formerly Naval Air Station Barbers Point); PMRF, Kauai (Majors Bay area); PMRF and Oahu Training Areas; and in Open Ocean Areas.

All demolition activities are conducted in accordance with Commander Naval Surface Forces Pacific Instruction 3120.8F, Procedures for Disposal of Explosives at Sea/Firing of Depth Charges and Other Underwater Ordnance (U.S. Department of the Navy, 1993). Before any explosive is detonated, divers are transported a safe distance away from the explosive. Standard practices require tethered mine explosive charges in Hawaiian waters require ground mine explosive charges to be suspended 10 ft below the surface of the water.

Extended Echo Ranging and Improved Extended Echo Ranging (EER/IEER) SSQ-110

The EER/IEER Systems are airborne ASW systems used in conducting searches for submarines. These systems are made up of airborne avionics ASW acoustic processing and sonobuoys. The sonobuoys are deployed in pairs. The EER/IEER System's active sonobuoy component is the AN/SSQ-110 Sonobuoy. The AN/SSQ-110 Sonobuoy is an expendable and remote controlled sonobuoy, which will generate a sonar "ping," and the passive AN/SSQ-101 ADAR Sonobuoy, which will "listen" for the return echo of the sonar ping that has been bounced off the surface of a submarine. These sonobuoys are designed to provide underwater acoustic data necessary for naval aircrews to quickly and accurately detect submerged submarines. The sonobuoy pairs are dropped from a fixed-wing aircraft into the ocean in a predetermined pattern with a few buoys covering a very large area. Upon command from the aircraft, the first payload is released to sink to a designated operating depth and detonate generating a "ping." A second command is required from the aircraft to cause the second payload to release, detonate, and generate a second and final "ping." There is only one detonation in the total deployed pattern of buoys at a time.

Mitigation measures and modeling approaches are still being coordinated between the Navy and NMFS. Primarily, however, buoys are not dropped or activated if marine species of concern are observed or marine mammals are acoustically detected.

4.1.2.4.13.2 Explosive Source Modeling Criteria

As described in Section 4.1.2.3 for sea turtles there are several criterions for mortality, injury and TTS. The criterion for mortality for marine mammals used in the Churchill FEIS (U.S. Department of the Navy, 2001c) is "onset of severe lung injury." This is conservative in that it corresponds to a 1 percent chance of mortal injury, and yet any animal experiencing onset severe lung injury is counted as a lethal exposure.

- The threshold is stated in terms of the Goertner (1982) modified positive impulse with value "indexed to 31 psi-ms." Since the Goertner approach depends on propagation, source/animal depths, and animal mass in a complex way, the actual impulse value corresponding to the 31-psi-ms index is a complicated calculation. Again, to be conservative, CHURCHILL used the mass of a calf dolphin (at 27 lb), so that the threshold index is 30.5 psi-ms.

Two criteria are used for injury: onset of slight lung hemorrhage and 50 percent eardrum rupture (TM rupture). These criteria are considered indicative of the onset of injury.

- The threshold for onset of slight lung injury is calculated for a small animal (a dolphin calf weighing 27 lb), and is given in terms of the "Goertner modified positive impulse," indexed to 13 psi-ms in the (U.S. Department of the Navy, 2001b). This threshold is conservative since the positive impulse needed to cause injury is proportional to animal mass, and therefore, larger animals require a higher impulse to cause the onset of injury.
- The threshold for TM rupture corresponds to a 50 percent rate of rupture (i.e., 50 percent of animals exposed to the level are expected to suffer TM rupture); this is stated in terms of an EL value of 205 dB re 1 μPa^2-s. The criterion reflects the fact that TM rupture is not necessarily a serious or life-threatening injury, but is a useful index of possible injury that is well correlated with measures of permanent hearing impairment (e.g., Ketten, 1998 indicates a 30 percent incidence of PTS at the same threshold).

Three criteria are considered for non-injurious harassment or TTS, which is a temporary, recoverable, loss of hearing sensitivity (National Marine Fisheries Service, 2001a; U.S. Department of the Navy, 2001b).

- The first criterion for TTS is 182 dB re 1 μPa^2-s maximum EL level in any 1/3-octave band.
- The second criterion for estimating TTS threshold, 12 pounds per square inch (psi) peak pressure was developed for 10,000-lb charges as part of the Churchill FEIS (U.S. Department of the Navy, 2001b, [National Oceanic Atmospheric Administration, 2005, 2006h]). It was introduced to provide a safety zone for TTS when the explosive or the animal approaches the sea surface (for which case the explosive energy is reduced but the peak pressure is not). Navy policy is to use a 23 psi criterion for explosive charges less than 2,000 lb and the 12 psi criterion for explosive charges larger than 2,000 lb. All explosives modeled for the HRC EIS/OEIS are less than 1,500 lb.
- The third criterion is used for estimation of behavioral disturbance before TTS (sub-TTS) for cases with multiple successive explosions (having less than 2 seconds separation between explosions). The threshold is 177 dB re 1 μPa^2-s (EL) to account for behavioral effects significant enough to be judged as harassment, but occurring at lower sound energy levels than those that may cause TTS. Since there

may be rare occasions when multiple explosions in succession (separated by less than 2 seconds) occur during BOMBEX, GUNEX, and NSFS using other than inert rounds, the Churchill approach was extended to cover multiple exposure events at the same location. For multiple exposures, accumulated energy over the entire training time is the natural extension for energy thresholds since energy accumulates with each subsequent shot; this is consistent with the treatment of multiple arrivals in Churchill. For positive impulse, it is consistent with Churchill to use the maximum value over all impulses received. The original research on pure tone exposures reported in Schlundt et al. (2000) and Finneran and Schlundt (2004) provided the pure-tone threshold of 192 dB as the lowest TTS value. This value is modified for explosives by (a) interpreting it as an energy metric, (b) reducing it by 10 dB to account for the time constant of the mammal ear, and (c) measuring the energy in 1/3 octave bands, the natural filter band of the ear. The resulting TTS threshold for explosives is 182 dB re 1 μPa^2-s in any 1/3 octave band. As reported by Schlundt et al. (2000) and Finneran and Schlundt (2004), instances of altered behavior in the pure tone research generally began 5 dB lower than those causing TTS. The sub-TTS threshold is therefore derived by subtracting five dB from the 182 dB re 1 μPa^2-s in any 1/3 octave band threshold, resulting in a 177 dB re 1 μPa^2-s sub-TTS behavioral disturbance threshold for multiple successive explosives. Previous modeling undertaken for other Navy compliance documents using the sub-TTS 177 dB threshold has demonstrated that for most explosive events, the footprint of the explosives TTS criteria pressure component (23 psi) dominates and supersedes any exposures at a received level involving the 177 dB threshold. For analysis in the HRC EIS/OEIS, therefore, given that multiple successive explosions are rare, in consideration of range clearance procedures designed to preclude the presence of marine species within the target area, and because previous modeling efforts have not resulted in expected exposures at the sub-TTS threshold level, modeling for these rare live fire events (BOMBEX, GUNEX, and NSFS) was not undertaken.

Model Results Explanation

Acoustic exposures are evaluated based on their potential direct effects on marine mammals, and these effects are then assessed in the context of the species biology and ecology to determine if there is a mode of action that may result in the acoustic exposure warranting consideration as a harassment level effect.

A large body of research on terrestrial animal and human response to airborne sound exists, but results from those studies are not readily applicable to the development of behavioral criteria and thresholds for marine mammals. Differences in hearing thresholds, dynamic range of the ear, and the typical exposure patterns of interest (e.g., human data tend to focus on 8-hour-long exposures), and the difference between acoustics in air and in water make extrapolation of human sound exposure standards inappropriate.

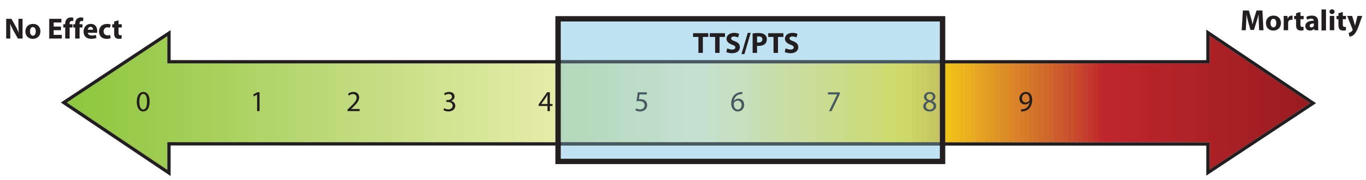
Behavioral observations of marine mammals exposed to anthropogenic sound sources exists, however, there are few observations and no controlled measurements of behavioral disruption of cetaceans caused by sound sources with frequencies, waveforms, durations, and repetition rates comparable to those employed by the tactical sonars described in this EIS/OEIS (Deecke, 2006) or for multiple explosives. Controlled studies in the laboratory have been conducted to determine physical changes (TTS) in hearing of marine mammals associated with sound exposure (Finneran et al., 2001, 2003, 2005). Research on behavioral effects has been difficult because of the difficulty and complexity of implementing controlled conditions.

At the present time there is no general scientifically accepted consensus on how to account for behavioral effects on marine mammals exposed to anthropogenic sounds including military sonar and explosions (National Research Council, 2003, National Research Council, 2005). While the first elements in Figure 4.1.2.4.13.2-1 can be easily defined (source, propagation, receiver) the remaining elements (perception, behavior, and life functions) are not well understood given the difficulties in studying marine mammals at sea (National Research Council 2005). The National Research Council (2005) acknowledges "there is not one case in which data can be integrated into models to demonstrate that noise is causing adverse affects on a marine mammal population."

For purposes of predicting the number of marine mammals that will be behaviorally harassed or sustain either temporary or permanent threshold shift, the Navy uses an acoustic impact model process with numeric criteria agreed upon with the NMFS.

There are some caveats necessary to understand in order to put these exposures in context. For instance, (1) significant scientific uncertainties are implied and carried forward in any analysis using marine mammal density data as a predictor for animal occurrence within a given geographic area; (2) there are limitations to the actual model process based on information available (animal densities, animal depth distributions, animal motion data, impact thresholds, type of sound source and intensity, behavior (involved in reproduction or foraging), previous experience and supporting statistical model); and determination of what constitutes a significant behavioral effect in a marine mammal is still unresolved (National Research Council, 2005). The sources of marine mammal densities used in this EIS/OEIS are derived from NMFS surveys (Barlow, 2003, 2006; Mobley et al., 2001a). These ship board surveys cover significant distance around the Hawaiian Islands. Although survey design includes statistical placement of survey tracks, the survey itself can only cover so much ocean area. Post-survey statistics are used to calculate animal abundances and densities (Barlow and Forney, 2007). There is often significant statistical variation inherit within the calculation of the final density values depending on how many sightings were available during a survey. Occurrence of marine mammals within any geographic area including Hawaii is highly variable and strongly correlated to oceanographic conditions, bathymetry, and ecosystem level patterns (prey abundance and distribution) (Benson et al., 2002; Moore et al., 2002; Tynan, 2005; Redfern, 2006). An example of high correlation of bathymetry in Hawaii is the distribution of humpback whales (particularly mothers with calves), generally within the 100-fathom isobath. Even as the population has increased, habitat use patterns have remained fairly constant, resulting in wider distribution over the available habitat. For some species, distribution may be even more highly influenced by relative small scale biological or oceanographic features over both short and long-term time scales (Ballance et al., 2006; Etnoyer et al., 2006; Ferguson et al., 2006; Skov et al., 2007). Unfortunately, the scientific understanding of some large scale and most small scale processes thought to influence marine mammal distribution is incomplete.

Behavioral Responses



0 - No observable response
1 - Brief orientation response (investigation / visual orientation)
2 - Moderate or multiple orientation behaviors
- Brief or minor cessation/modification of vocal behavior
- Brief or minor change in respiration rates
3 - Prolonged orientation behavior
- Individual alert behavior
- Minor changes in locomotion speed, direction, and/or dive profile but no avoidance of sound source
- Moderate change in respiration rate
- Minor cessation or modification of vocal behavior (duration < duration of source operation), including the Lombard Effect
4 - Moderate changes in locomotion speed, direction, and/or dive profile, but no avoidance of sound source
- Brief, minor shift in group distribution
- Moderate cessation or modification of vocal behavior (approximate duration of source operation)
5 - Extensive or prolonged changes in locomotion speed, direction, and/or dive profile, but not avoidance of sound source
- Moderate shift in group distribution
- Change in inter-animal distance and/or group size (aggregation or separation)
- Prolonged cessation or modifications of vocal behavior (duration > duration of source operation)
6 - Minor or moderate individual and/or group avoidance of sound source
- Brief or minor separation of females and dependent offspring
- Aggressive behavior related to noise exposure (e.g., tail/flipper slapping, fluke display, jaw clapping/gnashing teeth, abrupt directed movement, bubble clouds)
- Extended cessation or modification of vocal behavior
- Visible startle response
- Brief cessation of reproductive behavior
7 - Excessive or prolonged aggressive behavior
- Moderate separation of females and dependent offspring
- Clear antipredator response
- Severe and/or sustained avoidance of sound source
- Moderate cessation of reproductive behavior
8 - Obvious aversion and/or progressive sensitization
- Prolonged or significant separation of females and dependent offspring with disruption of acoustic reunion mechanisms
- Long-term avoidance of area (> source operation)
- Prolonged cessation of reproductive behavior
9 - Outright panic, fight, stampede, attach of conspecifics, or stranding events
- Avoidance behavior related to predator detection

Source: Southall et al., 2007

Proposed Marine Mammal Response Severity Scale Spectrum to Anthropogenic Sounds in Free Ranging Marine Mammals

Figure 4.1.2.4.13.2-1

Given the uncertainties in marine mammal density estimation and localized distributions, the Navy's acoustic impact models can not currently take into account locational data for any marine mammals within specific areas of the Hawaiian Islands with the exception of generalized information for humpback whales and Hawaiian monk seals. To resolve this issue and allow modeling to precede, animals are "artificially and uniformly distributed" within the modeling provinces described in Appendix J.

Behavioral Responses

Behavioral responses to exposure from MFA and HFA sonar and underwater detonations in Hawaii can range from no response, to avoidance and behavioral reaction (Figure 4.1.2.4.13.2-1). The intensity of the behavioral responses exhibited by marine mammals depends on a number of conditions including the age, reproductive condition, experience, behavior (foraging or reproductive), species, received sound level, type of sound (impulse or continuous) and duration (including whether exposure occurs once or multiple times) of sound (Reviews by Richardson et al., 1995a; Wartzok et al., 2003; Cox et al., 2006, Nowacek et al., 2007; Southall et al., 2007). Many behavioral responses may be short term (seconds to minutes orienting to the sound source or over several hours if they move away from the sound source) and of little immediate consequence for the animal. However, certain responses may lead to a stranding or mother-offspring separation (Baraff and Weinrich, 1994; Gabriele et al., 2001). Active sonar exposure is brief as the ship is constantly moving and the animal will likely be moving as well. Generally the louder the sound source the more intense the response although duration is also very important (Southall et al., 2007). There are no exposures exceeding the PTS threshold in the Preferred Alternative (Alternative 3).

According to the severity scale response spectrum (Figure 4.1.2.1.13.2-1) proposed by Southall et al. (2007), responses classified as from 0-3 are brief and minor, those from 4-6 have a higher potential to affect foraging, reproduction, or survival and those from 7-9 are likely to affect foraging, reproduction and survival. Sonar and explosive mitigation measures (sonar power-down or shut-down zones and explosive exclusion zones) would likely prevent animals from being exposed to the loudest sonar sounds or explosive effects that could potentially result in TTS or PTS and more intense behavioral reactions (i.e. 7-9) on the response spectrum.

There are little data on the consequences of sound exposure on vital rates of marine mammals. Several studies have shown the effects of chronic noise (either continuous or multiple pulses) on marine mammal presence in an area exposed to seismic survey airguns or ship noise (e.g., Malme et al., 1984; McCauley et al., 1998; Nowacek et al., 2004). MFA sonar use in Hawaii is not new and has occurred using the same basic sonar equipment and output for over 30 years. Given this history the Navy believes that risk to marine mammals from sonar training is low. As noted previously, it has been suggested that the absence of strandings and floating dead marine mammals in Hawaii is because (it is argued) dead marine mammals will not float, are eaten by sharks, are carried out to sea, or end up on remote shorelines in Hawaii and are never discovered. In Hawaii, floating dead marine mammals persist for a number of days even while being consumed by sharks, and strandings occur on a regular basis on most of the islands. Considering the Pacific Island Region Marine Mammal Response Stranding Network's regular observations of strandings and dead floating marine mammals and the intense use and observation of the shorelines and waters around Hawaii given prevalent fishing and tourism, it is unreasonable to assume that a significant number of whale carcasses have been consistently missed.

Even for more cryptic species such as beaked whales, the main determinant of causing a stranding appears to be exposure in a limited egress areas (a long narrow channel) with multiple ships. The result is that animals may be exposed for a prolonged period rather than several sonar pings over a several minutes and the animals having no means to avoid the exposure. Under these specific circumstances and conditions MFA sonar is believed to have contributed to the stranding and mortality of a small number of beaked whales in locations other than the HRC. There are no limited egress areas (long narrow channels) in the HRC, therefore, it is unlikely that the proposed sonar use would result in any strandings. Although the Navy has substantially changed operating procedures to avoid the aggregate of circumstances that may have contributed to previous strandings, it is important that future unusual stranding events be reviewed and investigated so that any human cause of the stranding can understood and avoided.

There have been no beaked whales strandings in Hawaii associated with the use of MFA/HFA sonar. This is a critically important contextual difference between Hawaii and areas of the world where strandings have occurred (Southall et al., 2007). While the absence of evidence does not prove there have been no impacts on beaked whales, decades of history with no evidence cannot be lightly dismissed.

Temporary Threshold Shift

A temporary threshold shift is a temporary recoverable, loss of hearing sensitivity over a small range of frequencies related to the sound source to which it was exposed. The animal may not even be aware of the TTS and does not become deaf, but requires a louder sound stimulus (relative to the amount of TTS) to detect that sound within the affected frequencies. TTS may last several minutes to several days and the duration is related to the intensity of the sound source and the duration of the sound (including multiple exposures). Sonar exposures are generally short in duration and intermittent (several sonar pings per minute from a moving ship), and with mitigation measures in place, TTS in marine mammals exposed to mid- or high-frequency active sonar and underwater detonations are unlikely to occur. There is currently no information to suggest that if an animal has TTS, that it will decrease the survival rate or reproductive fitness of that animal. TTS range from a MFA sonar's 235 dB source level one second ping is approximately 110 m from the bow of the ship under nominal oceanographic conditions.

Permanent Threshold Shift

A permanent threshold shift a non-recoverable and results from the destruction of tissues within the auditory system and occur over a small range of frequencies related to the sound exposure. The animal does not become deaf but requires a louder sound stimulus (relative to the amount of PTS) to detect that sound within the affected frequencies. Sonar exposures are general short in duration and intermittent (several sonar pings per minute from a moving ship), and with mitigation measures in place, PTS in marine mammals exposed to MFA or HFA sonar is unlikely to occur. There is currently no information to suggest that if an animal has PTS that it decrease the survival rate or reproductive fitness of that animal. The distance to PTS from a MFA sonar's 235 dB source level one second ping is approximately 10 m from the bow of the ship under nominal oceanographic conditions.

Population Level Effects

Some HRC training activities will be conducted in the same general areas, so marine mammal populations could be exposed to repeated activities over time. This does not mean, however, that there will be a repetition of any effects given the vast number of variables involved. The acoustic analyses assume that short-term non-injurious sound levels predicted to cause TTS or temporary behavioral disruptions qualify as Level B harassment. However, it is unlikely that most behavioral disruptions or instances of TTS will result in long-term significant effects. The majority of the exposures modeled for the HRC would be below 170 dB SPL and are below the previously used behavioral threshold for RIMPAC, USWEX and COMPTUEX-JTFEX exercises (173 db re 1 µPa-s). Mitigation measures reduce the likelihood of exposures to sound levels that would cause significant behavioral disruption (the higher levels of 7-9 in Figure 4.1.2.4.13.2), TTS or PTS. Based on modeling the Navy has estimated that 27,570 marine mammals per year might be behaviorally harassed as a result of the Proposed Actions under the Preferred Alternative (Alternative 3). The Navy does not anticipate any mortality to result from the Proposed Actions. It is unlikely that the short term behavioral disruption would adversely affect the species or stock through effects on annual rates of recruitment or survival.

4.1.2.5 MARINE MAMMALS NO-ACTION ALTERNATIVE (BIOLOGICAL RESOURCES—OPEN OCEAN)

The discussions regarding potential impacts on fish (Section 4.1.2.2) and sea turtles (Section 4.1.2.3), as well as the discussion of non-acoustic impacts (Section 4.1.2.4.1) apply to the No-action Alternative.

4.1.2.5.1 No-action Alternative Summary of Exposures

The sonar modeling input includes a total of 1,284 hours of AN/AQS 53 and 383 hours of AN/AQS 56 tactical sonar, plus associated DICASS sonobuoy, MK-48 torpedo HFA sonar, EER/IEER, and dipping sonar modeling inputs (see of Appendix J for a detailed description of the sonar modeled). The resulting exposure numbers are generated by the model without consideration of mitigation measures that would reduce the potential for marine mammal exposures to sonar and other activities. Table 4.1.2.5.1-1 provides a summary of the total sonar exposures from all No-action Alternative ASW training that will be conducted over the course of a year. The number of exposures from each type of exercise are presented separately in Sections 4.1.2.5.5, 4.1.2.5.6, and 4.1.2.5.7.

The explosive modeling input includes Mine Neutralization, MISSILEX, BOMBEX, SINKEX, EER/IEER, GUNEX, and NSFS. The modeled explosive exposure harassment numbers by species are presented in Table 4.1.2.5.1-2. The table indicates the potential for non-injurious (Level B) harassment, as well as the onset of injury (Level A) harassment to cetaceans. Estimates for the sub-TTS behavioral threshold indicate there may be 62 exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS

Table 4.1.2.5.1-1. No-action Alternative Sonar Modeling Summary—Yearly Marine Mammal Exposures from All ASW (RIMPAC, USWEX, and Other ASW Training)

Marine Mammals	Risk Function	TTS[3]	PTS[4]
Bryde's whale	64	0	0
Fin whale[1, 2]	46	0	0
Sei whale[1, 2]	46	0	0
Humpback whale[1]	9,677	199	0
Sperm whale[1]	758	9	0
Dwarf sperm whale	2,061	35	0
Pygmy sperm whale	842	14	0
Cuvier's beaked whale	1,121	5	0
Longman's beaked whale	104	1	0
Blainville's beaked whale	347	6	0
Unidentified beaked whale	36	0	0
Bottlenose dolphin	716	17	0
False killer whale	46	0	0
Killer whale	46	0	0
Pygmy killer whale	192	4	0
Short-finned pilot whale	1,751	40	0
Risso's dolphin	486	10	0
Melon-headed whale	583	13	0
Rough-toothed dolphin	1,053	18	0
Fraser's dolphin	1,216	19	0
Pantropical spotted dolphin	2,144	49	0
Spinner dolphin	410	7	0
Striped dolphin	3,126	73	0
Monk seal[1]	104	3	0
TOTAL	26,975	522	0

Notes: [1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC (see Barlow 2006).
[3]195 dB – TTS 195-215 dB re 1 µPa^2-s; for monk seals TTS is 204-224 dB re 1 µPa^2-s (Kastak et al., 1999a; 2005)
[4]215 dB- PTS >215 dB re 1 µPa^2-s; for monk seals PTS is >224 dB re 1 µPa^2-s (Kastak et al., 1999b; 2005)
dB = decibel
TTS = temporary threshold shift
PTS = permanent threshold shift

Table 4.1.2.5.1-2. No-action Alternative Explosives Modeling Summary—Yearly Marine Mammal Exposures from All Explosive Sources

Marine Mammal Species	Sub-TTS	TTS Modeled at < 182 dB re 1 µPa^2–s or 23 psi								Total Exposures		
	Sub-TTS 177 dB	EER/IEER	Mine Neutralization	Air-to-Surface Missile Exercise	Surface-to-Surface Missile Exercise	Bombing Exercise	Sinking Exercise	Surface-to-Surface Gunnery Exercise	Naval Surface Fire Support	TTS 182 dB, 23 psi	Slight Lung/ TM Injury	Onset Mass-ive Lung Injury
Bryde's whale	0	0	0	0	0	0	0	0	0	0	0	0
Fin whale[1, 2]	0	0	0	0	0	0	0	0	0	0	0	0
Sei whale	0	0	0	0	0	0	0	0	0	0	0	0
Humpback whale[1]	5	1	1	0	0	3	0	0	0	5	0	0
Sperm whale[1]	9	0	0	0	0	1	3	0	0	4	0	0
Dwarf sperm whale	13	1	0	0	0	2	4	0	0	7	0	0
Pygmy sperm whale	4	1	0	0	0	1	2	0	0	4	0	0
Cuvier's beaked whale	15	0	0	0	0	2	5	0	0	7	0	0
Longman's beaked whale	0	0	0	0	0	0	0	0	0	0	0	0
Blainville's beaked whale	2	0	0	0	0	0	1	0	0	1	0	0
Unidentified beaked whale	0	0	0	0	0	0	0	0	0	0	0	0
Bottlenose dolphin	0	0	0	0	0	0	0	0	0	0	0	0
False killer whale	0	0	0	0	0	0	0	0	0	0	0	0
Killer whale	0	0	0	0	0	0	0	0	0	0	0	0
Pygmy killer whale	0	0	0	0	0	0	0	0	0	0	0	0
Short-finned pilot whale	2	1	0	0	0	0	1	0	0	2	0	0
Risso's dolphin	0	0	0	0	0	0	0	0	0	0	0	0
Melon-headed whale	0	0	0	0	0	0	0	0	0	0	0	0
Rough-toothed dolphin	2	1	0	0	0	1	1	0	0	3	0	0
Fraser's dolphin	6	1	0	0	0	1	2	0	0	4	0	0
Pantropical spotted dolphin	0	1	0	0	0	0	0	0	0	1	0	0
Spinner dolphin	2	0	0	0	0	0	1	0	0	1	0	0
Striped dolphin	2	1	0	0	0	1	1	0	0	3	0	0
Monk seal[1]	0	1	0	0	0	0	0	0	0	1	0	0
Total	62	9	1	0	0	12	21	0	0	43	0	0

Note:
[1] Endangered Species
2 Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
dB = decibel
µPa^2-s = squared micropascal-second
NMFS = National Marine Fisheries Service
PTS = permanent threshold shift
TM = tympanic membrane
TTS = temporary threshold shift

behavioral threshold. The modeling indicates 43 annual exposures from underwater detonations that could result in TTS. The modeling indicates no exposures from pressure from underwater detonations that could cause injury. These exposure modeling results are estimates of marine mammal underwater detonation sound exposures without consideration of standard mitigation and monitoring procedures. The implementation of the mitigation and monitoring procedures presented in Chapter 6.0 will minimize the potential for marine mammal exposure and harassment through range clearance procedures.

4.1.2.5.2 Estimated Effects on ESA Listed Species—No-action Alternative

The endangered species that may be affected as a result of implementation of the HRC No-action Alternative include the blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), Hawaiian monk seal (*Monachus schauinslandi*) humpback whale (*Megaptera novaeangliae*), North Pacific right whale (*Eubalaena japonica*), sei whale (*Balaenoptera borealis*) and sperm whale (*Physeter macrocephalus*).

For the No-action Alternative, modeling results predict that if there were no mitigation measures in place, exposures that that are temporary, non-injurious physiological effects (TTS) or behavioral effects will occur. The modeling predicts no exposures to energy in excess of 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

The following sections discuss the exposure of ESA listed species to sonar and to underwater detonations from all No-action ASW Exercises per year. The exposure numbers are given without consideration of mitigation measures. However, mitigation measures that are implemented during the ASW or underwater detonation will reduce the potential for marine mammal exposures. For each species the likelihood of detection is given based on systematic line transect surveys (Barlow, 2006) but the ability to detect marine mammals will depend on sea state conditions.

Blue Whale (*Balaenoptera musculus*)

There is no density information available for blue whales in Hawaiian waters given they have not been seen during any surveys. Given they are so few in number, it is unlikely that HRC MFA/HFA sonar training events will result in the exposure of any blue whales to accumulated acoustic energy in excess of any energy flux threshold or an SPL that would result in a behavioral response. No blue whales will be exposed to impulsive sound or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or cause physical injury.

Mitigation measures call for continuous visual observation during training with active sonar Given the large size (up to 98 ft) of individual blue whales (Leatherwood et al., 1982), pronounced vertical blow, and aggregation of approximately two to three animals in a group (probability of trackline detection = 0.90 in Beaufort Sea States of 6 or less; Barlow, 2003), it is likely that lookouts will detect a group of blue whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound;

and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

In the unlikely event that blue whales are exposed to MFA/HFA sonar, the anatomical information available on blue whales suggests that they are not likely to hear sounds at or above mid-frequency sounds (Ketten, 1997). There are no audiograms of baleen whales. Available information on blue whale vocalizations indicate a variety of low-frequency sounds in the 10 to 300 Hz band. Blue whales tend to react to anthropogenic sound below 1 kHz (e.g., seismic air guns), suggesting that they are more sensitive to low-frequency sounds (Richardson et al., 1995a; Croll et al., 2002). Because the MFA/HFA tactical sonar proposed for HRC ASW training is outside the frequency typically used by the blue whales, they are not likely to hear or have a physiological or behavioral response to the sonar (National Oceanic and Atmospheric Administration, 2006e).

Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of blue whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury, effects on their behavior or physiology, or abandonment of areas that are regularly used by blue whales. In accordance with ESA requirements, the Navy has undertaken Section 7 consultation with NMFS based on the determination that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect blue whales.

Fin Whale (*Balaenoptera physalus*)

There is no density information for fin whales in the Hawaiian Islands (Barlow, 2006). For purposes of acoustic effects analysis, it was assumed that the number and density of fin whales did not exceed that of false killer whales (given they have a similar reported abundance, Barlow 2006), and the modeled number of exposures for both species will therefore be the same. The risk function and Navy post-modeling analysis estimates 46 fin whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect but is not likely to adversely affect fin whales; therefore, the Navy has initiated ESA Section 7 consultation with NMFS (Table 4.1.2.5.1-1).

Modeling indicates there would be no exposures to accumulated acoustic energy above 195 dB re 1 µPa^2-s, which is the threshold established indicative of onset TTS. No fin whales will be exposed to impulsive sound or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or cause physical injury (Table 4.1.2.5.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given the large size (up to 78 ft) of individual fin whales (Leatherwood et al., 1982), pronounced vertical blow, and mean aggregation of three animals in a group (probability of trackline detection = 0.90 in Beaufort Sea States of 6 or less; Barlow, 2003), it is likely that lookouts will detect a group of fin whales at the surface during ASW training events. Implementation of mitigation measures and probability of detecting a large fin whale reduce the likelihood of exposure and potential effects. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

In the unlikely event that fin whales are exposed to MFA/HFA sonar, the anatomical information available on fin whales suggests that they are not likely to hear mid-frequency (1 kHz to 10 kHz) sounds (Richardson et al., 1995a; Ketten, 1997). Fin whales primarily produce low-frequency calls (below 1 kHz) with source levels up to 186 dB re 1µPa at 1 m, although it is possible they produce some sounds in the range of 1.5 to 28 kHz (review by Richardson et al., 1995a; Croll et al., 2002). There are no audiograms of baleen whales, but they tend to react to anthropogenic sound below 1 kHz, suggesting that they are more sensitive to low-frequency sounds (Richardson et al., 1995a). Based on this information, if they do not hear these sounds, they are not likely to respond physiologically or behaviorally to those received levels.

In the St. Lawrence estuary area, fin whales avoided vessels with small changes in travel direction, speed and dive duration, and slow approaches by boats usually caused little response (MacFarlane, 1981). Fin whales continued to vocalize in the presence of boat sound (Edds and MacFarlane, 1987). Even though any undetected fin whales transiting the HRC may exhibit a reaction when initially exposed to active acoustic energy, field observations indicate the effects will not cause disruption of natural behavioral patterns to a point where such behavioral patterns will be abandoned or significantly altered.

Based on the model results, the nature of Navy's MFA sonar operations, behavioral patterns and acoustic abilities of fin whales, observations made during HRC training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events will likely not result in any population level effects, death or injury to fin whales. In accordance with ESA requirements, the Navy has undertaken Section 7 consultation with NMFS based on the determination that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect fin whales.

Humpback Whale (*Megaptera novaeangliae*)

The risk function and Navy post-modeling analysis estimates 9,677 humpback whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect but is not likely to adversely affect humpback whales; therefore, the Navy has initiated ESA Section 7 consultation with NMFS (Table 4.1.2.5.1-1).

Modeling indicates there would be 199 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling indicates there would be no exposures for humpback whales to accumulated acoustic energy above 215 dB re 1 μPa^2-s.

Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral disturbance threshold. Without consideration of clearance procedures, modeling estimates five exposures from impulsive sound or pressures from underwater detonations that would exceed the TTS threshold, and no exposures that would exceed the slight injury threshold or the massive lung injury threshold (Table 4.1.2.5.1-2). Target area clearance procedures described in Section 4.1.2.5.1 would make sure there are no humpback whales within the safety zone, and therefore potential exposure of humpback whales to sound levels from underwater detonations that exceed TTS or injury levels is highly unlikely.

Mitigation measures call for continuous visual observation during training with active sonar. Given the large size (up to 53 ft) of individual humpback whales (Leatherwood et al., 1982), and pronounced vertical blow, it is very likely that lookouts would detect humpback whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

As noted previously, filter-bank models of the humpback whale's ear by Houser et al., (2001) suggest that humpbacks are sensitive to frequencies between 700 Hz and 10 kHz, and have a maximum sensitivity is between 2 kHz and 6 kHz. Recent reporting by Au et al., (2006) indicating high-frequency harmonics in humpback whale "song" at 24 kHz and beyond does not demonstrate that humpbacks can actually hear those harmonics, which may simply be correlated harmonics of the frequency fundamental. Most social vocalizations, including female vocalizations, are below 3 kHz (Silber, 1986); therefore, are below MFA sonar range. Male songs range from 20 Hz to 24 kHz, but most of the components range from 200 Hz to 3 kHz (Au et al., 2001). A single study suggested that humpback whales responded to MFA sonar (3.1-3.6 kHz re 1 μPa^2-s) sound (Maybaum, 1989). The hand-held sonar system had a sound artifact below 1,000 Hz which caused a response to the control playback (a blank tape) and may have affected the response to sonar (i.e., the humpback whale responded to the low-frequency artifact rather than the MFA sonar sound).

While acoustic modeling results indicate MFA/HFA sonar may expose humpback whales to accumulated acoustic energy levels resulting in temporary behavioral effects, these exposures would have negligible impact on annual survival, recruitment, and birth rates and not likely result in population level effects. The aggregation of humpback whales in Hawaii has been increasing at up to 7 percent annually (Mobley, 2004) despite frequent encounters with tour boats. There have been no observed or reported mother calf separations as a result of Navy activities. There have been no reported or identified humpback whale strandings in Hawaii associated with the use of MFA/HFA sonar. While the absence of evidence does not prove there have been no impacts on humpback whales, decades of history with no evidence should not be dismissed. Mitigation measures presented in Chapter 6.0 would further reduce the potential acoustic exposure.

Per Navy policy, based on the quantitative analysis results that trigger a "may affect" determination, Navy has initiated Section 7 consultation with NMFS based on the determination that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect humpback whales.

North Pacific Right Whale (*Eubalaena japonica*)

There is no density information available for North Pacific right whales in Hawaiian waters since they have not been seen during survey. Given they are so few in number, it is unlikely that HRC training events will result in the exposure of any North Pacific right whales to accumulated acoustic energy in excess of any energy flux threshold or an SPL that would result in a behavioral response. No right whales would be exposed to impulsive sound or pressures from underwater detonations that would cause TTS or physical injury.

Mitigation measures call for continuous visual observation during training with active sonar. Given their large size (up to 56 ft) of individual North Pacific right whales (Leatherwood et al., 1982), surface behavior (e.g., breaching), pronounced blow, and mean group size of approximately three animals (probability of trackline detection = 0.90 in Beaufort Sea States of 6 or less; Barlow, 2003), it is very likely that lookouts would detect a group of North Pacific right whales at the surface during ASW training events. Implementation of mitigation measures and probability of detecting a large North Pacific right whale reduce the likelihood of exposure and potential effects. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of North Pacific right whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would likely not result in any population level effects, death or injury to North Pacific right whales, and will not affect their behavior, physiology or cause abandonment of areas that are regularly used by North Pacific right whales. In accordance with ESA requirements, the Navy has undertaken Section 7 consultation with NMFS based on the determination that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect North Pacific right whales.

Sei Whale (*Balaenoptera borealis*)

For purposes of the acoustic effects analysis, the same assumptions made previously regarding fin whales are also made for sei whales. It was therefore assumed that the number and density of sei whales did not exceed that of false killer whales (given they have a similar reported abundance, Barlow 2006), and the modeled number of exposures for both species would therefore be the same.

The risk function and Navy post-modeling analysis estimates 46 sei whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect but is not likely to adversely affect sei whales; therefore, the Navy has initiated ESA Section 7 consultation with NMFS (Table 4.1.2.5.1-1).

Modeling indicates there would be no exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling indicates no exposures for sei whales to accumulated acoustic energy above 215 dB re 1 μPa^2-s. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. No sei whales would be exposed to impulsive sound or pressures from underwater detonations that would cause TTS or physical injury (Table 4.1.2.5.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given the large size (up to 53 ft) of individual sei whales (Leatherwood et al., 1982), pronounced vertical blow, and aggregation of approximately three animals (probability of trackline detection = 0.90 in Beaufort Sea States of 6 or less; Barlow, 2003), it is likely that lookouts will detect a group of sei whales at the surface during ASW training events. Implementation of mitigation measures and probability of detecting a large sei whale reduce the likelihood of exposure and potential effects. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There is little information on the acoustic abilities of sei whales or their response to human activities. The only recorded sounds of sei whales are frequency modulated sweeps in the range of 1.5 to 3.5 kHz (Thompson et al., 1979; Knowlton et al., 1991), but it is likely that they also vocalized at frequencies below 1 kHz as do fin whales. There are no audiograms of baleen whales, but they tend to react to anthropogenic sound below 1 kHz, suggesting that they are more sensitive to low-frequency sounds (Richardson et al., 1995a). Sei whales were more difficult to approach than were fin whales and moved away from boats but were less responsive when feeding (Gunther, 1949).

Based on the model results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of sei whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not likely result in any population level effects, death or injury to sei whales. The proposed ASW Exercises may affect sei whales but are not likely to cause long-term effects on their behavior or physiology or abandonment of areas that are regularly used by sei whales. In accordance with ESA requirements, the Navy has undertaken Section 7 consultation with NMFS based on the determination that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect sei whales.

Sperm Whales (*Physeter macrocephalus*)

The risk function and Navy post-modeling analysis estimates 758 sperm whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect but is not likely to adversely affect sperm whales; therefore, the Navy has initiated ESA Section 7 consultation with NMFS (Table 4.1.2.5.1-1).

Modeling also indicates there would be nine exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling indicates no exposures for sperm whales to accumulated acoustic energy above 215 dB re 1 μPa^2-s.

Estimates for the sub-TTS behavioral threshold indicate there may be nine exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS threshold. Without consideration of clearance procedures, there would be four exposures from impulsive sound or pressures from underwater detonations that would exceed the TTS threshold (Table 4.1.2.5.1-2). Target area clearance procedures described in Section 4.1.2.5.1 would make sure there are no sperm whales within the safety zone, and therefore potential exposure of sperm whales to sound levels that exceed TTS is highly unlikely.

Mitigation measures call for continuous visual observation during training with active sonar. Given the large size (up to 56 ft) of individual sperm whales (Leatherwood et al., 1982), pronounced blow (large and angled), mean group size of approximately seven animals (probability of trackline detection = 0.87 in Beaufort Sea States of 6 or less; Barlow, 2003; 2006), it is very likely that lookouts would detect a group of sperm whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

In the unlikely event that sperm whales are exposed to MFA/HFA sonar, the information available on sperm whales exposed to received levels of MFA sonar suggests that the response to mid-frequency (1 kHz to 10 kHz) sounds is variable (Richardson et al., 1995a). In the Caribbean, Watkins et al. (1985) observed that sperm whales exposed to 3.25 kHz to 8.4 kHz pulses interrupted their activities and left the area. The pulses were surmised to have originated from submarine sonar signals given that no vessels were observed. The authors did not report receive levels from these exposures, and also got a similar reaction from artificial noise they generated by banging on their boat hull. It was unclear if the sperm whales were reacting to the sonar signal itself or to a potentially new unknown sound in general.

Other studies involving sperm whales indicate that, after an initial disturbance, the animals return to their previous activity. During playback experiments off the Canary Islands, André et al. (1997) reported that foraging whales exposed to a 10 kHz pulsed signal did not exhibit any general avoidance reactions. When resting at the surface in a compact group, sperm whales initially reacted strongly, then ignored the signal completely (André et al., 1997).

Based on the model results, the nature of the Navy's MFA sonar training, behavioral patterns and acoustic abilities of sperm whales, observations made during past training events, and the planned implementation of procedure mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to sperm whales. The proposed ASW Exercises may affect sperm whales but are not likely to cause long-term effects on their behavior or physiology or abandonment of areas that are regularly used by sperm whales. In accordance with ESA requirements, the Navy has undertaken Section 7 consultation with NMFS based on the determination that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect sperm whales.

Hawaiian Monk Seal (*Monachus schauinslandi*)

The risk function and Navy post-modeling analysis estimates 104 Hawaiian monk seals will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect but is not likely to adversely affect Hawaiian monk seals; therefore, the Navy has initiated ESA Section 7 consultation with NMFS (Table 4.1.2.5.1-1).

Modeling also indicates there would be three exposures to accumulated acoustic energy between 204 dB and 224 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling indicates there would be no exposures for monk seals to accumulated acoustic energy above 224 dB re 1 μPa^2-s.

As noted previously, modeling undertaken for monk seals does not take into consideration the effect of mitigation measures or foraging habitat preferences. Monk seals generally forage at depths of less than 100 m, but occasionally dive to depths of over 500 m (National Marine Fisheries Service, 2007d). The majority of ASW training in the HRC, however, takes place in waters 4 to 8 times deeper than even this known (500 m) maximum and it is very rare for ASW training to take place in waters as shallow as 100 m in depth. Additionally, mitigation measures call for continuous visual observation during training with active sonar. It would, therefore, be rare for a Hawaiian monk seal to be present in the vicinity of an ASW event and the potential for detection by aircraft and lookouts aboard ship would further preclude the possibility that monk seals would be in the vicinity of ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS threshold. There would be one exposure from impulsive sound or pressures from underwater detonations that would exceed the TTS threshold and no exposures that would exceed the injury threshold (Table 4.1.2.5.1-2). In the rare event that a monk seal was present, target area clearance procedures described in Section 4.1.2.5.1 would be used to detect monk seals within the safety zone, and therefore potential exposure of monk seals to exposures that exceed TTS is highly unlikely.

Critical habitat was designated 1986 as the area extending out to the 10-fathom depth (60 ft) for the Northwestern Hawaiian Islands (National Marine Fisheries Service, 1986). Critical habitat was extended out to the 20-fathom depth in 1988 (National Marine Fisheries Service, 1988). ASW events should not occur inside the 20-fathom isobath and given mitigation measures and range clearance procedures, activities in the HRC will not have an effect on Monk Seal Critical Habitat.

Based on the model results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of monk seals, observations made during past training events, and the planned implementation of procedure mitigation measures, the Navy finds that the training events would not likely result in any death or injury to Hawaiian monk seals. In accordance with ESA requirements, the Navy has undertaken Section 7 consultation with NMFS based on the determination that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect monk seals.

4.1.2.5.3 Estimated Exposures for Non-ESA Species—No-action Alternative

Bryde's Whale (*Balaenoptera edeni*)

The risk function and Navy post-modeling analysis estimates 64 Bryde's whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1 1).

Modeling also indicates there would be no exposures to accumulated acoustic energy above 195 dB re 1 µPa^2-s, which is the threshold established indicative of onset TTS. No Bryde's whales would be exposed to impulsive noise or pressures from underwater detonations that would exceed the sub-TTS behavioral threshold or cause physical injury (Table 4.1.2.5.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given the large size (up to 46 ft) of individual Bryde's whales, pronounced blow, and mean group size of approximately 1.5 animals and (probability of trackline detection = 0.87 in Beaufort Sea States of 6 or less; Barlow 2003; 2006), it is very likely that lookouts would detect a group of Bryde's whales at the surface during ASW events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 64 exposures of Bryde's whale to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Bryde's whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Bryde's whales.

Minke Whale (*Balaenoptera acutorostrata*)

Despite several reports of seasonal acoustic detections of minke whales in Hawaiian waters (e.g. Rankin and Barlow, 2005), there is no density information available for minke whales in Hawaiian waters given they have rarely been visually sighted during surveys. Taken conservatively, the acoustic detections suggest that minke whales may be more common than the survey data indicates. Therefore, although acoustic effects modeling cannot be undertaken without density estimates, the Navy will assume 65 minke whales may exhibit behavioral responses that NMFS would classify as harassment under the MMPA. This exposure number is based on the modeled exposures for the Bryde's whale, another seasonal baleen whale, that has a reported abundance of 469 whales in the HRC (Barlow 2006). Based upon the Navy's protective measures, it is unlikely that HRC MFA/HFA sonar training events will result in the exposure of any minke whales to accumulated acoustic energy in excess of any energy flux threshold or an SPL that would result in a behavioral response. No minke whales would be exposed to impulsive noise or pressures from underwater detonations that would exceed the sub-TTS behavioral threshold or cause physical injury.

Mitigation measures call for continuous visual observation during training with active sonar. Given the large size (up to 27 ft) of individual minke whales (Barlow, 2003), it is possible that lookouts may detect minke whales at the surface during ASW training events although a systematic survey in the Hawaiian Islands failed to visually detect minke whales but were able to detect them acoustically (Barlow, 2006). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of minke whales, observations made during past training events, and the planned implementation mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to minke whales.

Blainville's Beaked Whale (*Mesoplodon densirostris*)

The risk function and Navy post-modeling analysis estimates 347 Blainville's beaked whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates six exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no Blainville's beaked whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s.

Modeling indicates there would be one exposure to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause physical injury (Table 4.1.2.5.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the possibility of detecting Blainville's beaked whales at the surface, any exposures should be precluded from occurring.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS threshold. Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the possibility of detecting Blainville's beaked whales at the surface, these two exposures should be precluded from occurring. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 356 exposures of Blainville's beaked whale to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Blainville's beaked whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Blainville's beaked whales.

Bottlenose Dolphin (*Tursiops truncatus*)

The risk function and Navy post-modeling analysis estimates 716 bottlenose dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates 17 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no bottlenose dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s. No bottlenose dolphins would be exposed to impulsive noise or pressures from underwater detonations that would exceed the sub-TTS behavioral threshold or would cause physical injury (Table 4.1.2.5.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given the frequent surfacing, aggregation of approximately nine animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow, 2003), it is very likely that lookouts would detect a group of bottlenose dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 733 exposures of bottlenose dolphins to potential Level B harassment annually. Based on the model results, the nature of the Navy's MFA sonar, behavioral patterns and acoustic abilities of bottlenose dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to bottlenose dolphins.

Cuvier's Beaked Whale (*Ziphius cavirostris*)

The risk function and Navy post-modeling analysis estimates 1,121 Cuvier's beaked whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates five exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no Cuvier's beaked whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s. Estimates for the sub-TTS behavioral threshold indicate there may be 15 exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS threshold. Modeling indicates there would seven exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury (Table 4.1.2.5.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the possibility of detecting Cuvier's beaked whales at the surface, these seven exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar. Given the medium size (up to 23 ft) of individual Cuvier's beaked whales (Barlow, 2006), it is possible that lookouts may detect Cuvier's beaked whales at the surface during ASW training events although beaked whales make long duration dives that may last for 45 min (Baird et al., 2006b). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be four exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations.

There may be up to 1,148 exposures of Cuvier's beaked whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Cuvier's beaked whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Cuvier's beaked whales.

Dwarf Sperm Whale (*Kogia sima*)

The risk function and Navy post-modeling analysis estimates 2,061 dwarf sperm whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates 35 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling indicates that seven dwarf sperm whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, and 13 exposures to noise from underwater detonations that could exceed the sub-TTS behavioral threshold (Table 4.1.2.5.1-2). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, behavioral patterns, acoustic abilities of dwarf sperm whales, results of past training, and the implementation of procedure mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to dwarf sperm whale. There may be up to 2,116 exposures of dwarf sperm whales to potential Level B harassment annually.

False Killer Whale (*Pseudorca crassidens*)

The risk function and Navy post-modeling analysis estimates 46 false killer whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates no exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no false killer whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s. No false killer whales would be exposed to impulsive noise or pressures from underwater detonations that would exceed the sub-TTS behavioral threshold or cause physical injury (Table 4.1.2.5.1-2).

Given their size (up to 19.7 ft) and large mean group size of 10.3 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow 2003), it is very likely that lookouts would detect a group of false killer whales at the surface. Additionally, mitigation measures call for continuous visual observation during training with active sonar; therefore, false killer whales that are present in the vicinity of ASW training events would be detected by visual observers. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 46 exposures of false killer whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of dwarf sperm whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to dwarf sperm whales.

Fraser's Dolphin (*Lagenodelphis hosei*)

The risk function and Navy post-modeling analysis estimates 1,216 Fraser's dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates 19 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling also indicates that no Fraser's dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s. Estimates for the sub-TTS behavioral threshold indicate there may be six exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Modeling indicates there would be four exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or onset of massive lung injury (Table 4.1.2.5.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the high probability of detecting Fraser's dolphins at the surface, these four exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 19.7 ft) and large mean group size of 10.3 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow 2003), it is very likely that lookouts would detect a group of false killer whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 1,245 exposures of Fraser's dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of false killer whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to false killer whales.

Killer Whale (*Orcinus orca*)

The risk function and Navy post-modeling analysis estimates 46 killer whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates that there would be no exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling indicates that no killer whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s. No killer whales would be exposed to impulsive noise or pressures from underwater detonations that would exceed the sub-TTS threshold or cause physical injury (Table 4.1.2.5.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 23 ft), conspicuous coloring, pronounced dorsal fin and large mean group size of 6.5 animals (probability of trackline detection = 0.90; Barlow, 2003), is very likely that lookouts would detect a group of killer whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 46 exposures of killer whale to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of killer whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death, or injury to killer whales.

Longman's Beaked Whale (*Indopacetus pacificus*)

The risk function and Navy post-modeling analysis estimates 104 Longman's beaked whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates one exposure to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling indicates that no Longman's beaked whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s. No Longman's beaked whales would be exposed to impulsive noise or pressures from underwater detonations that would exceed the sub-TTS threshold or cause physical injury (Table 4.1.2.5.1-2).

Mitigation measures call for continuous visual observation during training with active sonar; Given the medium size (up to 24 ft) of individual Longman's beaked whale, aggregation of approximately 17.8 animals (Barlow, 2006), it is likely that lookouts would detect a group of

Longman's beaked whale at the surface during ASW training events although beaked whales dive for long periods. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 105 exposures of Longman's beaked whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Longman's beaked whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Longman's beaked whales.

Melon-headed Whale (*Peponocephala electra*)

The risk function and Navy post-modeling analysis estimates 583 melon-headed whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates 13 exposures to accumulated acoustic energy. Modeling for indicates that no melon-headed whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s. No melon-headed whales would be exposed to impulsive noise or pressures from underwater detonations that would exceed the sub-TTS threshold or cause physical injury (Table 4.1.2.5.1-2).

Mitigation measures call for continuous visual observation during training with active sonar; Given their size (up to 8.2 ft) and large group size (mean of 89.2 whales) or more animals (probability of trackline detection = 1.00 in Beaufort Sea States of 6 or less; Barlow, 2003), it is very likely that lookouts would very likely detect a group of melon-headed whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 596 exposures of melon-headed whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of melon-headed whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to melon-headed whales.

Pantropical Spotted Dolphin (*Stenella attenuata*)

The risk function and Navy post-modeling analysis estimates 2,144 pantropical spotted dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Modeling indicates 49 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling also indicates one exposure to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or massive lung injury (Table 4.1.2.5.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the high probability of detecting pantropical spotted dolphins at the surface, this exposure should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar and underwater detonations. Given their frequent surfacing and large group size hundreds of animals (Leatherwood et al., 1982), mean group size of 60.0 animals in Hawaii and probability of trackline detection of 1.00 in Beaufort Sea States of 6 or less (Barlow, 2006), it is very likely that lookouts would detect a group of pantropical spotted dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 2,194 exposures of pantropical spotted dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of pantropical spotted dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to pantropical spotted dolphins.

Pygmy Killer Whale (*Feresa attenuata*)

The risk function and Navy post-modeling analysis estimates 192 pygmy killer whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates four exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for indicates that no pygmy killer whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s. No pygmy killer whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.5.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 8.5 ft) and mean group size of 14.4 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow, 2003), it is very likely that lookouts would detect a group of pygmy killer whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 196 exposures of pygmy killer whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of pygmy killer whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to pygmy killer whales.

Pygmy Sperm Whale (*Kogia breviceps*)

The risk function and Navy post-modeling analysis estimates 842 pygmy sperm whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates 14 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no pygmy sperm whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s.

Estimates for the sub-TTS behavioral threshold indicate there may be four exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Modeling indicates four exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury (Table 4.1.2.4.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the possibility of detecting pygmy sperm whales at the surface, these four exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar and underwater detonations. Given their size (up to 10 ft) and behavior of resting at the surface (Leatherwood et al., 1982), it is very possible that lookouts would detect a pygmy sperm whale at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 864 exposures of pygmy sperm whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of pygmy sperm whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to pygmy sperm whales.

Risso's Dolphin (*Grampus griseus*)

The risk function and Navy post-modeling analysis estimates 486 Risso's dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates 10 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling indicates that no Risso's dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s. No Risso's dolphins would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.5.1-2).

Mitigation measures call for continuous visual observation during training with active sonar and underwater detonations. Given their frequent surfacing, light coloration, and large group size of up to several hundred animals (Leatherwood et al., 1982), mean group size of 15.4 dolphins in Hawaii and probability of trackline detection of 0.76 in Beaufort Sea States of 6 or less (Barlow, 2006), it is very likely that lookouts would detect a group of Risso's dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 496 exposures of Risso's dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Risso's dolphin, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Risso's dolphins.

Rough-Toothed Dolphin (*Steno bredanensis*)

The risk function and Navy post-modeling analysis estimates 1,053 rough-toothed dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates 18 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for indicates that no rough-toothed dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Modeling indicates there would three exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or massive lung injury (Table 4.1.2.5.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the high probability of detecting rough-toothed dolphins at the surface, these three exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar and underwater detonations. Given their frequent surfacing and mean group size of 14.8 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow, 2006), it is very likely that lookouts would detect a group of rough-toothed dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 1,076 exposures of rough-toothed dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of rough-toothed dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to rough-toothed dolphins.

Short-finned Pilot Whale (*Globicephala macrorhynchus*)

The risk function and Navy post-modeling analysis estimates 1,751 short-finned pilot whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates 40 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no short-finned pilot whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Modeling indicates there would two exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or massive lung injury (Table 4.1.2.5.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the high probability of detecting short-finned pilot whales at the surface, these two exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 20 ft), and large mean group size of 22.5 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow 2006), it is very likely that lookouts would detect a group of short-finned pilot whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 1,795 exposures of short-finned pilot whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of short-finned pilot whales, observations made during past training events, and the planned implementation of mitigation measures, the

Navy finds that the HRC training events would not result in any population level effects, death or injury to short-finned pilot whales.

Spinner Dolphin (*Stenella longirostris*)

The risk function and Navy post-modeling analysis estimates 410 spinner dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates seven exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for indicates that no spinner dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Modeling indicates there would one exposure to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury massive lung injury (Table 4.1.2.5.1-2). Taking into consideration range clearance procedures for underwater detonation with the high probability of detecting spinner dolphins at the surface, this one exposure should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar. Given their frequent surfacing, aerobatics, and large mean group size of 31.7 animals (probability of trackline detection = 1.00 in Beaufort Sea States of 6 or less; Barlow, 2006), it is very likely that lookouts would detect a group of spinner dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 420 exposures of spinner dolphins to potential Level B harassment annually Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of spinner dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to spinner dolphins.

Striped Dolphin (*Stenella coeruleoalba*)

The risk function and Navy post-modeling analysis estimates 3,126 striped dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates 73 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for indicates no exposures to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Modeling indicates three exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or massive lung injury (Table 4.1.2.5.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the high probability of detecting striped dolphins at the surface, these three exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar. Given their frequent surfacing, aerobatics and large mean group size of 37.3 animals (probability of trackline detection = 1.00 in Beaufort Sea States of 6 or less; Barlow, 2006), it is very likely that lookouts would detect a group of striped dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 3,204 exposures of striped dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of striped dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to striped dolphins.

Unidentified Beaked Whales

The risk function and Navy post-modeling analysis estimates 36 unidentified beaked whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.5.1-1).

Modeling also indicates there would be no exposures to accumulated acoustic energy above 195 dB re 1 µPa^2-s, which is the threshold established indicative of onset TTS. No unidentified beaked whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.5.1-2). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 36 exposures of unidentified beaked whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of unidentified beaked whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to unidentified beaked whales.

4.1.2.5.4 Summary of Compliance with MMPA and ESA—No-action Alternative

Endangered Species Act

Based on analytical risk function modeling results, NMFS conclusions in the Biological Opinions issued regarding RIMPAC 2006 and USWEX 2007, and in accordance with the ESA, the Navy finds these estimates of harassment resulting from the proposed use of MFA/HFA sonar may affect endangered blue whales, North Pacific right whales, fin whales, Hawaiian monk seals, humpback whales, sei whales, and sperm whales. Modeling results indicate no PTS exposures. Implementation of mitigation measures would further reduce the potential for TTS exposures. Based on the analysis presented in the previous section, the Navy concludes that proposed and ongoing activities in the HRC may affect but not adversely affect blue whales, North Pacific right whales, fin whales, humpback whales, sei whales, sperm whales and Hawaiian monk seals.

Mitigation measures would be implemented to minimize exposure of marine mammals to impulsive sound or sound pressures from underwater detonations that would cause injury.

Five species of sea turtles could potentially occur within the HRC. All are protected under the ESA. All available acoustic information suggests that sea turtles are likely not capable of hearing mid-frequency or high-frequency sounds in the range produced by the active sonar systems considered in this analysis. Mitigation measures would be implemented to minimize exposure of sea turtles to impulsive sound or sound pressures from underwater detonations that would cause injury.

In accordance with ESA requirements, the Navy has initiated Section 7 consultation with NMFS on the potential that HRC training may affect blue whales, North Pacific right whales, fin whales, Hawaiian monk seals, humpback whales, sei whales, and sperm whales.

Marine Mammal Protection Act

Level A Harassment of Cetaceans

Modeling results for the sum of exposures for all ASW training for a year indicate no exposures that exceeds the Level A harassment threshold. In addition, the following considerations further reduce the potential for injury from tactical sonar and underwater explosions:

- Level A zone of influence radii for tactical sonar are so small that on-board observers would readily observe an approaching marine mammal.
- Many species are large and/or travel in large pods and are easily visible from an elevated platform; a marine mammal would readily be seen from a ship or aircraft in time to implement mitigation measures.

Level B Harassment of Cetaceans

As shown in Table 4.1.2.5.1-1 for sonar, the risk function (including post-modeling analysis) plus an estimate of 64 minke whale exposures results in the estimate that 27,039 marine mammals will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. Modeling for the No-action Alternative for sonar indicates 522 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling also indicates no exposures to accumulated acoustic energy above 215 dB re 1 μPa^2-s. Should the Navy decide to implement the No-action Alternative, the effects on marine mammals will need to be considered by NMFS for purposes of MMPA authorization and ESA consultation.

Therefore, it is estimated that in total, 27,666 marine mammals will exhibit behavioral responses NMFS will classify as Level B harassment. This includes 522 TTS and 27,039 risk function exposures (26,975 plus an estimated 64 minke whales) as a result of MFA/HFA sonar use (27,561 exposures) in addition to 105 exposures (62 sub-TTS exposures and 43 TTS exposures) as a result of underwater detonations (for explosives see Table 4.1.2.5.1-2).

Mitigation measures will be in place to further minimize the potential for temporary harassment, although there is currently no data to quantify the mitigation efforts to successfully reduce the number of marine mammal exposures. The Navy has begun development of a comprehensive Monitoring Plan to determine the effectiveness of these measures. Many species of small cetaceans travel in very large pods, and therefore would be easily observed from an elevated platform. In addition, large baleen whales travel slowly and are easily observed on the surface. In the years of conducting Major Exercises in the HRC, there have been no documented incidences of harassments or beach strandings of marine mammals associated with active sonar or underwater detonations. In the one event associated with RIMPAC 2004, NMFS found sonar use was a plausible if not likely contributing factor (Southall et al., 2006) although it was later discovered that a similar event occurred on the same day in a bay at Rota Island, Northern Marianas Islands with no associated sonar (Jefferson et al., 2006). The Navy believes the 2004 event may be related to oceanographic changes that influenced prey distribution (see Southall, 2006; Ketten, 2006; Mobley et al., 2007). The HRC open ocean waters continue to support diverse populations of cetaceans.

4.1.2.5.5 HRC Training—No-action Alternative

The HRC training involving sonar includes ASW training activities as described in Table 2.2.2.3-1 and Appendix D. The No-action Alternative modeling for these activities includes analysis of surface ship and submarine MFA sonar, associated sonobuoys, MK-48 torpedo HFA sonar, and dipping sonars for activities other than occurring during Major Exercises on an annual basis. The modeled exposures for marine mammals during this ASW training, without consideration of mitigation measures are presented in 4.1.2.5.5-1 for the No-action Alternative. Effects on marine mammals from these exposures are included in the discussion in Sections 4.1.2.5.2 for ESA listed species and 4.1.2.5.3 for non-ESA listed species.

Exposures from underwater detonations (i.e., SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS are presented in the summary numbers in Table 4.1.2.5.1-2.

Table 4.1.2.5.5-1. No-action Alternative Sonar Modeling Summary—Yearly Marine Mammal Exposures from Other HRC ASW Training

Marine Mammals	Risk Function	TTS[3]	PTS[4]
Bryde's whale	14	0	0
Fin whale[1, 2]	10	0	0
Sei whale[1, 2]	10	0	0
Humpback whale[1]	1,561	57	0
Sperm whale[1]	166	2	0
Dwarf sperm whale	451	10	0
Pygmy sperm whale	185	4	0
Cuvier's beaked whale	266	1	0
Longman's beaked whale	22	0	0
Blainville's beaked whale	76	2	0
Unidentified beaked whale	9	0	0
Bottlenose dolphin	152	5	0
False killer whale	10	0	0
Killer whale	10	0	0
Pygmy killer whale	41	1	0
Short-finned pilot whale	376	12	0
Risso's dolphin	104	3	0
Melon-headed whale	125	4	0
Rough-toothed dolphin	230	5	0
Fraser's dolphin	264	5	0
Pantropical spotted dolphin	459	14	0
Spinner dolphin	89	2	0
Striped dolphin	669	21	0
Monk seal[1]	29	1	0
TOTAL	5,328	149	0

Note: [1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
[3] 195 dB – TTS 195-215 dB re 1 µPa^2-s; for monk seals TTS is 204-224 dB re 1 µPa^2-s (Kastak et al., 1999a; 2005)
[4] 215 dB- PTS >215 dB re 1 µPa^2-s; for monk seals PTS is >224 dB re 1 µPa^2-s (Kastak et al., 1999b; 2005)
dB = decibel
TTS = temporary threshold shift
PTS = permanent threshold shift

4.1.2.5.6 HRC RDT&E Activities—No-action Alternative

Other sources such as UAVs, underwater communications, and electronic warfare systems that may be deployed in the ocean are beyond the frequency range or intensity level to affect marine animals. Other RDT&E activities identified as ASW do not include sonar or include very limited use of sonar and short durations (<1.5 hours). These activities would have minimal effects on fish, sea turtles, and marine mammals.

4.1.2.5.7 Major Exercises—No-action Alternative

RIMPAC

The training events and impacts on marine mammals from RIMPAC Exercises were summarized in the RIMPAC 2006 Supplement to the 2002 RIMPAC EA (U.S. Department of the Navy Commander Third Fleet, 2006). The No-action Alternative modeling included 399 hours of AN/SQS 53 and 133 hours of AN/SQS 56 surface ship sonar plus dipping sonar, sonobuoys, and MK-48 torpedo high-frequency sonar per RIMPAC (conducted every other year). The modeled exposures for marine mammals during RIMPAC, without consideration of mitigation measures are presented in Table 4.1.2.5.7-1. Effects on marine mammals from these exposures are included in the discussion in Sections 4.1.2.5.2 for ESA listed species and 4.1.2.5.3 for non-ESA listed species. Exposures from underwater detonations (i.e., SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS are included in the summary numbers in Table 4.1.2.5.1-2. Sections 4.1.2.2 and 4.1.2.3 discuss the potential effects on fish and sea turtles respectively.

USWEX

The training events and impacts on marine mammals from USWEX have been summarized in the USWEX Programmatic EA/OEA (U.S. Department of the Navy, 2007b). The No-action Alternative modeling assumes there would be five USWEXs annually, including 525 hours of AN/SQS 53 and 175 hours of AN/SQS 56 surface ship sonar plus the associated dipping sonar and sonobuoys per year. The exposures for marine mammals during up to five USWEXs per year, are quantified without consideration of mitigation measures, and are presented in Table 4.1.2.5.7-2. Effects on marine mammals from these exposures are included in the discussion in Sections 4.1.2.5.2 for ESA listed species and 4.1.2.5.3 for non-ESA listed species. Exposures from underwater detonations (i.e., SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS) are included in the summary numbers in Table 4.1.2.5.7-2. Sections 4.1.2.2 and 4.1.2.3 discuss the potential effects on fish and sea turtles respectively.

Table 4.1.2.5.7-1. No-action Alternative Sonar Modeling Summary—Yearly Marine Mammal Exposures for RIMPAC (Conducted Every Other Year)

Marine Mammals	Risk Function	TTS[3]	PTS[4]
Bryde's whale	19	0	0
Fin whale[1, 2]	14	0	0
Sei whale[1, 2]	14	0	0
Humpback whale[1]	0	0	-
Sperm whale[1]	245	3	0
Dwarf sperm whale	608	11	0
Pygmy sperm whale	248	4	0
Cuvier's beaked whale	347	2	0
Longman's beaked whale	32	0	0
Blainville's beaked whale	102	2	0
Unidentified beaked whale	11	0	0
Bottlenose dolphin	225	5	0
False killer whale	14	0	0
Killer whale	14	0	0
Pygmy killer whale	58	1	0
Short-finned pilot whale	547	12	0
Risso's dolphin	152	3	0
Melon-headed whale	182	4	0
Rough-toothed dolphin	311	6	0
Fraser's dolphin	361	6	0
Pantropical spotted dolphin	682	15	0
Spinner dolphin	122	2	0
Striped dolphin	994	23	0
Monk seal[1]	35	1	0
TOTAL	5,337	100	0

Note: [1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
[3] 195 dB – TTS 195-215 dB re 1 µPa^2-s; for monk seals TTS is 204-224 dB re 1 µPa^2-s (Kastak et al., 1999a; 2005)
[4] 215 dB- PTS >215 dB re 1 µPa^2-s; for monk seals PTS is >224 dB re 1 µPa^2-s (Kastak et al., 1999b; 2005)
dB = decibel
TTS = temporary threshold shift
PTS = permanent threshold shift

Table 4.1.2.5.7-2. No-action Alternative Sonar Modeling Summary - Yearly Marine Mammal Exposures from USWEX (5 per year)

Marine Mammals	Risk Function	TTS[3]	PTS[4]
Bryde's whale	31	0	0
Fin whale[1, 2]	22	0	0
Sei whale[1, 2]	22	0	0
Humpback whale[1]	8,116	142	0
Sperm whale[1]	347	4	0
Dwarf sperm whale	1,002	14	0
Pygmy sperm whale	409	6	0
Cuvier's beaked whale	508	2	0
Longman's beaked whale	50	1	0
Blainville's beaked whale	169	2	0
Unidentified beaked whale	16	0	0
Bottlenose dolphin	339	7	0
False killer whale	22	0	0
Killer whale	22	0	0
Pygmy killer whale	93	2	0
Short-finned pilot whale	828	16	0
Risso's dolphin	230	4	0
Melon-headed whale	276	5	0
Rough-toothed dolphin	512	7	0
Fraser's dolphin	591	8	0
Pantropical spotted dolphin	1,003	20	0
Spinner dolphin	199	3	0
Striped dolphin	1,463	29	0
Monk seal[1]	40	1	0
TOTAL	16,310	273	0

Note: [1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
[3]195 dB – TTS 195-215 dB re 1 μPa^2-s; for monk seals TTS is 204-224 dB re 1 μPa^2-s (Kastak et al., 1999a; 2005)
[4]215 dB- PTS >215 dB re 1 μPa^2-s; for monk seals PTS is >224 dB re 1 μPa^2-s (Kastak et al., 1999b; 2005)
dB = decibel
TTS = temporary threshold shift
PTS = permanent threshold shift

4.1.2.6 MARINE MAMMALS ALTERNATIVE 1 (BIOLOGICAL RESOURCES—OPEN OCEAN)

The discussion under the No-action Alternative regarding potential non-acoustic impacts (Section 4.1.2.5.1) and potential ASW Impacts (Section 4.1.2.5.2) also apply for Alternative 1.

4.1.2.6.1 Alternative 1 Summary of Exposures

The increased training and RDT&E activities under Alternative 1 result in an increase in the number of hours of ASW training. The modeling input includes a total of 1,788 hours of AN/SQS 53 and 551 hours of AN/SQS 56 MFA tactical sonar plus the associated DICASS sonobuoy, MK-48 torpedo HFA sonar, and dipping sonar modeling inputs (see Appendix J for a detailed description of the sonar modeled). These exposure numbers are generated by the model without consideration of mitigation measures that would reduce the potential for marine mammal exposures to sonar. Table 4.1.2.6.1-1 provides a summary of the total sonar exposures from all Alternative 1 ASW Exercises that would be conducted over the course of a year. The number of exposures from each type of exercise are presented separately in Sections 4.1.2.6.5, 4.1.2.6.6, 4.1.2.6.7, and 4.1.2.6.8.

The explosive modeling input includes Mine Neutralization, MISSILEX, BOMBEX, SINKEX, EER/IEER, GUNEX, and NSFS. Estimates for the sub-TTS behavioral threshold indicate there may be 62 exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. The modeled explosive exposure harassment numbers by species are presented in Table 4.1.2.6.1-2. The table indicates the potential for non-injurious (Level B) harassment, as well as the onset of injury (Level A) harassment to cetaceans. The modeling indicates 73 annual exposures to pressure from underwater detonations that could result in TTS. The modeling indicates three exposures (an annual total) from pressure or acoustics from underwater detonations that could cause slight injury. These exposure modeling results are estimates of marine mammal underwater detonation sound exposures without consideration of standard mitigation and monitoring procedures. The implementation of the mitigation and monitoring procedures presented in Chapter 6.0 will minimize the potential for marine mammal exposure and harassment through range clearance procedures.

Table 4.1.2.6.1-1. Alternative 1 Sonar Modeling Summary—Yearly Marine Mammal Exposures from All ASW (RIMPAC, USWEX, and Other ASW Training)

Marine Mammals	Risk Function	TTS[3]	PTS[4]
Bryde's whale	89	0	0
Fin whale[1, 2]	66	2	0
Sei whale[1, 2]	66	2	0
Humpback whale[1]	9,685	199	0
Sperm whale[1]	1,067	12	0
Dwarf sperm whale	2,827	48	0
Pygmy sperm whale	1,155	20	0
Cuvier's beaked whale	1,559	7	0
Longman's beaked whale	145	2	0
Blainville's beaked whale	478	9	0
Unidentified beaked whale	50	0	0
Bottlenose dolphin	994	24	0
False killer whale	66	2	0
Killer whale	66	2	0
Pygmy killer whale	266	6	0
Short-finned pilot whale	2,430	56	0
Risso's dolphin	675	15	0
Melon-headed whale	811	18	0
Rough-toothed dolphin	1,445	25	0
Fraser's dolphin	1,674	28	0
Pantropical spotted dolphin	2,988	69	0
Spinner dolphin	561	9	0
Striped dolphin	4,361	101	0
Monk seal[1]	147	4	0
TOTAL	33,671	660	0

Note: [1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
[3] 195 dB – TTS 195-215 dB re 1 μPa^2-s; for monk seals TTS is 204-224 dB re 1 μPa^2-s (Kastak et al., 1999a; 2005)
[4] 215 dB- PTS >215 dB re 1 μPa^2-s; for monk seals PTS is >224 dB re 1 μPa^2-s (Kastak et al., 1999b; 2005)
dB = decibel
TTS = temporary threshold shift
PTS = permanent threshold shift

Table 4.1.2.6.1-2. Alternative 1 Explosives Modeling Summary—Yearly Marine Mammal Exposures from All Explosive Sources

Marine Mammal Species	Sub-TTS	TTS Modeled at < 182 dB re 1 μPa²–s or 23 psi								Total Exposures		
	Sub-TTS 177 dB	EER/IEER	Mine Neutralization	Air to Surface Missile Exercise	Surface to Surface Missile Exercise	Bombing Exercise	Sinking Exercise	Surface to surface Gunnery Exercise	Naval Surface Fire Support	TTS 182 dB, 23 psi	Slight Lung/ TM Injury	Onset Massive Lung Injury
Bryde's whale	0	0	0	0	0	0	0	0	0	0	0	0
Fin whale[1, 2]	0	0	0	0	0	0	0	0	0	0	0	0
Sei whale	0	0	0	0	0	0	0	0	0	0	0	0
Humpback whale[1]	5	5	1	0	0	3	0	0	0	9	1	0
Sperm whale[1]	9	1	0	0	0	1	3	0	0	5	0	0
Dwarf sperm whale	13	5	0	0	0	2	4	1	1	13	0	0
Pygmy sperm whale	4	2	0	0	0	1	2	0	0	5	0	0
Cuvier's beaked whale	15	1	0	0	0	2	5	0	0	8	0	0
Longman's beaked whale	0	0	0	0	0	0	0	0	0	0	0	0
Blainville's beaked whale	2	1	0	0	0	0	1	0	0	2	0	0
Unidentified beaked whale	0	0	0	0	0	0	0	0	0	0	0	0
Bottlenose dolphin	0	1	0	0	0	0	0	0	0	1	0	0
False killer whale	0	0	0	0	0	0	0	0	0	0	0	0
Killer whale	0	0	0	0	0	0	0	0	0	0	0	0
Pygmy killer whale	0	0	0	0	0	0	0	0	0	0	0	0
Short-finned pilot whale	2	2	0	0	0	0	1	0	0	3	0	0
Risso's dolphin	0	1	0	0	0	0	0	0	0	1	0	0
Melon-headed whale	0	1	0	0	0	0	0	0	0	1	0	0
Rough-toothed dolphin	2	2	0	0	0	1	1	0	0	4	0	0
Fraser's dolphin	6	3	0	0	0	1	2	0	0	6	0	0
Pantropical spotted dolphin	0	3	0	0	0	0	0	0	0	3	1	0
Spinner dolphin	2	1	0	0	0	0	1	0	0	2	0	0
Striped dolphin	2	4	0	0	0	1	1	1	1	8	1	0
Monk seal[1]	0	2	0	0	0	0	0	0	0	2	0	0
Total	62	35	1	0	0	12	21	2	2	73	3	0

Note:
[1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
dB = decibel
μPa²-s = squared micropascal-second
TM = tympanic membrane
TTS = temporary threshold shift

4.1.2.6.2 Estimated Effects on ESA Listed Species—Alternative 1

The endangered species that may be affected as a result of implementation of Alternative 1 include the blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), Hawaiian monk seal (*Monachus schauinslandi*), humpback whale (*Megaptera novaeangliae*), North Pacific right whale (*Eubalaena japonica*), sei whale (*Balaenoptera borealis*) and sperm whale (*Physeter macrocephalus*).

For Alternative 1, modeling results predict that if there were no mitigation measures in place, exposures that that are temporary, non-injurious physiological effects (TTS) or behavioral effects would occur. The modeling predicts one humpback whale exposure to energy in excess of the criteria for slight lung injury. The criteria for lung injury are extremely conservative with regard to humpback whales given that the established threshold, which corresponds to body mass in a complex manner, was based on a calf dolphin (at 26.9 lb) as compared to the approximate 4,000 lb mass of a newborn humpback whale. Mitigation measures call for continuous visual observation during training with active sonar. Given the large size (up to 53 ft) of individual humpback whales (Leatherwood et al., 1982), and pronounced vertical blow, it is very likely that lookouts would detect humpback whales at the surface during training events and preclude this exposure from occurring.

The following sections discuss the exposure of ESA listed species to sonar and underwater detonations from all Alternative 1 exercises per year. The exposure numbers are given without consideration of mitigation measures. However, mitigation measures that are implemented during the ASW and underwater detonation Exercises would reduce the potential for marine mammal exposures.

Blue Whale (*Balaenoptera musculus*)

There is no density information available for blue whales in Hawaiian waters given they have not been seen during survey. Given they are so few in number, it is unlikely that HRC MFA/HFA sonar training events will result in the exposure of any blue whales to accumulated acoustic energy in excess of any energy flux threshold or an SPL that would result in a behavioral response. No blue whales would be exposed to impulsive sound or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause TTS or physical injury. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of blue whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury, effects on their behavior or physiology, or abandonment of areas that are regularly used by blue whales. In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 1 that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect blue whales.

Fin Whale (*Balaenoptera physalus*)

There is no density information for fin whales in the Hawaiian Islands (Barlow, 2006). For purposes of acoustic effects analysis, it was assumed that the number and density of fin whales did not exceed that of false killer whales and the modeled number of exposures for both species will therefore be the same. The risk function and Navy post-modeling analysis estimates 66 fin whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect, but is not likely to adversely affect, fin whales; therefore, the Navy has initiated ESA Section 7 consultation with NMFS (Table 4.1.2.6.1-1).

Modeling also indicates that there would be two exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling indicates no exposures for fin whales to accumulated acoustic energy above 215 dB re 1 μPa^2-s. No fin whales would be exposed to impulsive sound or pressures from underwater detonations that would exceed the sub-TTS behavioral threshold or cause physical injury (Table 4.1.2.6.1-2). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, the nature of Navy's MFA sonar operations, behavioral patterns and acoustic abilities of fin whales, observations made during HRC training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events will likely not result in any population level effects, death or injury to fin whales. In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 1, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect fin whales.

Humpback Whale (*Megaptera novaeangliae*)

The acoustic effects analysis for Alternative 1 based the risk function and Navy post-modeling analysis estimates 9,685 humpback whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect but is not likely to adversely affect humpback whales; therefore, the Navy has initiated ESA Section 7 consultation with NMFS (Table 4.1.2.6.1-1).

Modeling also indicates there would be 199 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling indicates no exposures for humpback whales to accumulated acoustic energy above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be five exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of clearance procedures, modeling indicates there would be nine exposures from impulsive sound or pressures from underwater detonations that would exceed the TTS threshold, one exposure that would exceed the injury threshold, and no exposures that would exceed the massive injury threshold (Table 4.1.2.6.1-2). Target area clearance procedures described in Section 4.1.2.5.1 would make sure there are no humpback whales within the safety zone, and therefore potential exposure of humpback whales to sound levels from underwater detonations that exceed TTS or injury levels is highly unlikely. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

As noted previously, filter-bank models of the humpback whale's ear by Houser et al., (2001) suggest that humpbacks are sensitive to frequencies between 700 Hz and 10 kHz, and have a maximum sensitivity is between 2 kHz and 6 kHz. Recent reporting by Au et al., (2006) indicating high-frequency harmonics in humpback whale "song" at 24 kHz and beyond does not demonstrate that humpbacks can actually hear those harmonics, which may simply be correlated harmonics of the frequency fundamental. Most social vocalizations, including female vocalizations, are below 3 kHz (Silber, 1986); therefore, are below MFA sonar range. Male songs range from 20 Hz to 24 kHz, but most of the components range from 200 Hz to 3 kHz (Au et al., 2001). A single study suggested that humpback whales responded to MFA sonar (3.1-3.6 kHz re 1 μPa^2-s) sound (Maybaum, 1989). The hand-held sonar system had a sound artifact below 1,000 Hz which caused a response to the control playback (a blank tape) and may have affected the response to sonar (i.e., the humpback whale responded to the low-frequency artifact rather than the MFA sonar sound).

While acoustic modeling results indicate MFA/HFA sonar may expose humpback whales to accumulated acoustic energy levels resulting in temporary behavioral effects, these exposures would have negligible impact on annual survival, recruitment, and birth rates and not likely result in population level effects. The aggregation of humpback whales in Hawaii has been increasing at up to 7 percent annually (Mobley, 2004) despite frequent encounters with tour boats. There have been no observed or reported mother calf separations as a result of Navy activities. There have been no reported or identified humpback whale strandings in Hawaii associated with the use of MFA/HFA sonar. While the absence of evidence does not prove there have been no impacts on humpback whales, decades of history with no evidence should not be dismissed. Mitigation measures presented in Chapter 6.0 would further reduce the potential acoustic exposure.

Per Navy policy, based on the quantitative analysis results that trigger a "may affect" determination, Navy has initiated Section 7 consultation with NMFS based on the determination that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect humpback whales.

North Pacific Right Whale (*Eubalaena japonica*)

There is no density information available for North Pacific right whales in Hawaiian waters given they have not been seen during survey. Given they are so few in number, it is unlikely that HRC MFA/HFA sonar training events will result in the exposure of any right whales to accumulated acoustic energy in excess of any energy flux threshold or an SPL that would result in a behavioral response. No right whales would be exposed to impulsive sound or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause TTS or physical injury. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of North Pacific right whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would likely not result in any population level effects, death or injury to North Pacific right whales, and will not affect their behavior, physiology or cause abandonment of areas that are regularly used by North Pacific right whales. In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 1, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect North Pacific right whales.

Sei Whale (*Balaenoptera borealis*)

For purposes of the acoustic effects analysis, the same assumptions made previously regarding fin whales are also made for sei whales. It was therefore assumed that the number and density of sei whales did not exceed that of false killer whales, and the modeled number of exposures for both species would therefore be the same. The risk function and Navy post-modeling analysis estimates 66 sei whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect, but is not likely to adversely affect, sei whales; therefore, the Navy has initiated Section 7 consultation with NMFS (Table 4.1.2.6.1-1).

Modeling also predicts two exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling predicts no exposures for sei whales to accumulated acoustic energy above 215 dB re 1 μPa^2-s. No sei whales would be exposed to impulsive sound or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause TTS or physical injury (Table 4.1.2.6.1-2). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of sei whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not likely result in any population level effects, death or injury to sei whales. The proposed ASW Exercises may affect sei whales but are not likely to cause long-term effects on their behavior or physiology or abandonment of areas that are regularly used by sei whales. In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 1, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect sei whales.

Sperm Whales (*Physeter macrocephalus*)

The risk function and Navy post-modeling analysis estimates 1,067 sperm whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect, but is not likely to adversely affect, sperm whales; therefore, the Navy has initiated ESA Section 7 consultation with NMFS (Table 4.1.2.6.1-1).

Modeling also predicts 12 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling predicts no exposures for sperm whales to accumulated acoustic energy above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be nine exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of clearance procedures, modeling indicates there would be five exposures from impulsive sound or pressures from underwater detonations that would exceed the TTS threshold (Table 4.1.2.6.1-2). Target area clearance procedures described in Section 4.1.2.5.1 would make sure there are no sperm whales within the safety zone, and therefore potential exposure of sperm whales to sound levels that exceed TTS is highly unlikely. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, the nature of the Navy's MFA sonar training, behavioral patterns and acoustic abilities of sperm whales, observations made during past training events, and the planned implementation of procedure mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to sperm whales. The proposed ASW Exercises may affect sperm whales but are not likely to cause long-term effects on their behavior or physiology or abandonment of areas that are regularly used by sperm whales. In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 1, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect sperm whales.

Hawaiian Monk Seal (*Monachus schauinslandi*)

The risk function and Navy post-modeling analysis estimates 147 Hawaiian monk seals will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect, but is not likely to adversely affect, Hawaiian monk seals; therefore, the Navy has initiated ESA Section 7 consultation with NMFS (Table 4.1.2.6.1-1).

Modeling also predicts four exposures to accumulated acoustic energy between 204 dB and 224 dB re 1 µPa^2-s (the Hawaiian monk seal thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling predicts there would be no exposures for monk seals to accumulated acoustic energy above 224 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS for Hawaiian monk seals.

Modeling undertaken for monk seals does not take into consideration the effect of mitigation measures or foraging habitat preferences. Monk seals generally forage at depths of less than 100 m, but occasionally dive to depths of over 500 m. The majority of ASW training in the HRC, however, takes place in waters 4 to 8 times deeper than even this known (500 m) maximum and it is very rare for ASW training to take place in waters as shallow as 100 m in depth. Additionally, mitigation measures call for continuous visual observation during training with active sonar. It would, therefore, be rare for a Hawaiian monk seal to be present in the vicinity of an ASW event and the potential for detection by aircraft and lookouts aboard ship would further preclude the possibility that monk seals would be in the vicinity of ASW training events.

Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of clearance procedures, modeling indicates there would be two exposures from impulsive sound or pressures from underwater detonations that would exceed the TTS threshold and no exposures that would exceed the injury threshold (Table 4.1.2.6.1-2). In the rare event that a monk seal was present, target area clearance procedures described in Section 4.1.2.5.1 would be used to detect monk seals within the safety zone, and therefore potential exposure of monk seals to exposures that exceed TTS is highly unlikely. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Critical habitat was designated 1986 as the area extending out to the 10-fathom depth (60 ft) for the Northwestern Hawaiian Islands (National Marine Fisheries Service, 1986). Critical habitat was extended out to the 20-fathom depth in 1988 (National Marine Fisheries Service, 1988). ASW events should not occur inside the 20-fathom isobath and given mitigation measures and range clearance procedures, activities in the HRC will not have an effect on Monk Seal Critical Habitat.

Based on the model results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of monk seals, observations made during past training events, and the planned implementation of procedure mitigation measures, the Navy finds that the training events would not likely result in any death or injury to Hawaiian monk seals. In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 1, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect Hawaiian monk seals.

4.1.2.6.3 Estimated Exposures for Non-ESA Species—Alternative 1

Bryde's Whale (*Balaenoptera edeni*)

The risk function and Navy post-modeling analysis estimates 89 Bryde's whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1). Modeling indicates there would be no exposures to accumulated acoustic energy above 195 dB re 1 μPa^2-s, which is the threshold established indicative of onset TTS. Modeling for all alternatives indicates that no Bryde's whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS. No Bryde's whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.6.1-2).

Given the large size (up to 46 ft) of individual Bryde's whales, pronounced blow, and mean group size of approximately 1.5 animals and (probability of trackline detection = 0.87 in Beaufort Sea States of 6 or less; Barlow, 2003; 2006), it is very likely that lookouts would detect a group of Bryde's whales at the surface. Additionally, mitigation measures call for continuous visual observation during training with active sonar; therefore, Bryde's whales that are present in the vicinity of ASW training events may be detected by visual observers. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 89 exposures of Bryde's whale to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Bryde's whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Bryde's whales.

Minke Whale (*Balaenoptera acutorostrata*)

Despite several reports of seasonal acoustic detections of minke whales in Hawaiian waters (e.g. Rankin and Barlow, 2005), there is no density information available for minke whales in Hawaiian waters given they have rarely been visually sighted during surveys. Taken conservatively, the acoustic detections suggest that minke whales may be more common than the survey data indicates. Therefore, although acoustic effects modeling cannot be undertaken without density estimates, the Navy will assume 89 minke whales may exhibit behavioral responses that NMFS would classify as harassment under the MMPA. This exposure number is based on the modeled exposures for the Bryde's whale, another seasonal baleen whale, that has a reported abundance of 469 whales in the HRC (Barlow 2006). Based upon the Navy's protective measures, it is unlikely that HRC MFA/HFA sonar training events will result in the exposure of any minke whales to accumulated acoustic energy in excess of any energy flux threshold or an SPL that would result in a behavioral response. No minke whales would be exposed to impulsive noise or pressures from underwater detonations that would exceed the sub-TTS behavioral threshold or cause physical injury. No minke whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause TTS or physical injury.

Given the large size (up to 27 ft) of individual minke whales (Barlow, 2003), it is possible that lookouts may detect a minke whales at the surface although a systematic survey in the Hawaiian Islands failed to visually detect minke whales but were able to detect using acoustic methods (Barlow, 2006). Additionally, mitigation measures call for continuous visual observation during training with active sonar; therefore, minke whales that are present in the vicinity of ASW training events would be detected by visual observers. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, behavioral patterns, acoustic abilities of minke whales, results of past training, and the implementation of procedure mitigation measures, the Navy finds that the

HRC training events would not result in any population level effects, death or injury to minke whales.

Blainville's Beaked Whale (*Mesoplodon densirostris*)

The risk function and Navy post-modeling analysis estimates 478 Blainville's beaked whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates nine exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no Blainville's beaked whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates there would be two exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause physical injury (Table 4.1.2.6.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the possibility of detecting Blainville's beaked whales at the surface, these two exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar. Given the size (up to 15.5 ft) of individual Blainville's beaked whales, it is possible that lookouts may detect Blainville's beaked whales at the surface although beaked whales dive for long periods. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 491 exposures of Blainville's beaked whale to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Blainville's beaked whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Blainville's beaked whales.

Bottlenose Dolphin (*Tursiops truncatus*)

The risk function and Navy post-modeling analysis estimates 994 bottlenose dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates 24 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no bottlenose dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS. Modeling indicates that one bottlenose dolphin would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold and no exposures to impulsive noise or pressures from underwater detonations that would cause physical injury (Table 4.1.2.6.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given the frequent surfacing, aggregation of approximately nine animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow, 2003), it is very likely that lookouts would detect a group of bottlenose dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 1,019 exposures of bottlenose dolphins to potential Level B harassment annually. Based on the model results, the nature of the Navy's MFA sonar, behavioral patterns and acoustic abilities of bottlenose dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to bottlenose dolphins.

Cuvier's Beaked Whale (*Ziphius cavirostris*)

The risk function and Navy post-modeling analysis estimates 1,559 Cuvier's beaked whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates seven exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no Cuvier's beaked whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be 15 exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates there would eight exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury (Table 4.1.2.6.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the possibility of detecting Cuvier's beaked whales at the surface, these exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar. Given the medium size (up to 23 ft) of individual Cuvier's beaked whales (Barlow, 2006), it is possible that lookouts may detect Cuvier's beaked whales at the surface during ASW training events although beaked whales dive for long periods (Baird et al., 2006b). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 1,,589 exposures of Cuvier's beaked whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Cuvier's beaked whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Cuvier's beaked whales.

Dwarf Sperm Whale (*Kogia sima*)

The risk function and Navy post-modeling analysis estimates 2,827 dwarf sperm whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates 48 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no dwarf sperm whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be 13 exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates 13 exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or onset of massive lung injury (Table 4.1.2.6.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the possibility of detecting pygmy sperm whales at the surface, these 13 exposures should be precluded from occurring. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 2,901 exposures of dwarf sperm whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of dwarf sperm whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the

HRC training events would not result in any population level effects, death or injury to dwarf sperm whales.

False Killer Whale (*Pseudorca crassidens*)

The risk function and Navy post-modeling analysis estimates 66 false killer whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates two exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no false killer whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS. No false killer whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.6.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 19.7 ft) and large mean group size of 10.3 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow 2003), it is very likely that lookouts would detect a group of false killer whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 68 exposures of false killer whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of false killer whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to false killer whales.

Fraser's Dolphin (*Lagenodelphis hosei*)

The risk function and Navy post-modeling analysis estimates 1,674 Fraser's dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates 28 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no Fraser's dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be six exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates there would be six exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or onset of massive lung injury (Table 4.1.2.6.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the high probability of detecting Fraiser's dolphins at the surface, these six exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar. Given their large aggregations, mean group size of 286.3 animals (probability of trackline detection = 1.00 in Beaufort Sea States of 6 or less; Barlow 2006), it is very likely that lookouts would detect a group of Fraser's dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 1,714 exposures of Fraser's dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Fraser's dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Fraser's dolphins.

Killer Whale (*Orcinus orca*)

The risk function and Navy post-modeling analysis estimates 66 killer whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates two exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no killer whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS. No killer whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.6.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 23 ft), conspicuous coloring, pronounced dorsal fin and large mean group size of 6.5 animals (probability of trackline detection = 0.90; Barlow, 2003), is very likely that lookouts would detect a group of killer whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 68 exposures of killer whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of killer whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to killer whales.

Longman's Beaked Whale (*Indopacetus pacificus*)

The risk function and Navy post-modeling analysis estimates 145 Longman's beaked whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates two exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no Longman's beaked whale would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS. No Longman's beaked whale would be exposed to impulsive noise or pressures from underwater detonations will exceed the sub-TTS behavioral disturbance threshold or that would cause physical injury (Table 4.1.2.6.1-2).

Mitigation measures call for continuous visual observation during training with active sonar; Given the medium size (up to 24 ft) of individual Longman's beaked whale, aggregation of approximately 17.8 animals (Barlow, 2006), it is likely that lookouts would detect a group of Longman's beaked whale at the surface during ASW training events although beaked whales dive for long periods. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 147 exposures of Longman's beaked whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Longman's beaked whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Longman's beaked whales.

Melon-headed Whale (*Peponocephala electra*)

The risk function and Navy post-modeling analysis estimates 811 melon-headed whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates 18 exposures to accumulated acoustic energy. Modeling for Alternative 1 indicates that no melon-headed whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS. No melon-headed whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold. One melon-headed whale may be exposed to impulsive noise or pressures from underwater detonations that would cause TTS (Table 4.1.2.6.1-2).

Mitigation measures call for continuous visual observation during training with active sonar; Given their size (up to 8.2 ft) and large group size (mean of 89.2 whales) or more animals (probability of trackline detection = 1.00 in Beaufort Sea States of 6 or less; Barlow, 2003), it is very likely that lookouts would very likely detect a group of melon-headed whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 830 exposures of melon-headed whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of melon-headed whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to melon-headed whales.

Pantropical Spotted Dolphin (*Stenella attenuata*)

The risk function and Navy post-modeling analysis estimates 2,988 pantropical spotted dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates 69 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no pantropical spotted dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates three exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, one exposure to impulsive noise or pressures from underwater detonations that would cause slight physical injury, and none that would cause massive lung injury (Table 4.1.2.6.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the high probability of detecting pantropical spotted dolphins at the surface, these three exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar and underwater detonations Given their frequent surfacing and large group size hundreds of animals (Leatherwood et al., 1982), mean group size of 60.0 animals in Hawaii and probability of trackline detection of 1.00 in Beaufort Sea States of 6 or less (Barlow, 2006), it is very likely that lookouts would detect a group of pantropical spotted dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 3,060 exposures of pantropical spotted dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of pantropical spotted dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to pantropical spotted dolphins.

Pygmy Killer Whale (*Feresa attenuata*)

The risk function and Navy post-modeling analysis estimates 266 pygmy killer whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates six exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no pygmy killer whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS. No pygmy killer whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.6.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 8.5 ft) and mean group size of 14.4 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow, 2003), it is likely that lookouts would detect a group of pygmy killer whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 272 exposures of pygmy killer whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of pygmy killer whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to pygmy killer whales.

Pygmy Sperm Whale (*Kogia breviceps*)

The risk function and Navy post-modeling analysis estimates 1,155 pygmy sperm whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates 20 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no pygmy sperm whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be four exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates five exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury (Table 4.1.2.6.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the possibility of detecting pygmy sperm whales at the surface, these exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar and underwater detonations. Given their size (up to 10 ft) and behavior of resting at the surface (Leatherwood et al., 1982), it is very possible that lookouts would detect a pygmy sperm whale at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 1,184 exposures of pygmy sperm whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of pygmy sperm whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to pygmy sperm whales.

Risso's Dolphin (*Grampus griseus*)

The risk function and Navy post-modeling analysis estimates 675 Risso's dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates 15 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no Risso's dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS. One Risso's dolphin would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold and none would be exposed to levels that would cause physical injury (Table 4.1.2.6.1-2).

Mitigation measures call for continuous visual observation during training with active sonar and underwater detonations. Given their frequent surfacing, light coloration, and large group size of up to several hundred animals (Leatherwood et al., 1982), mean group size of 15.4 dolphins in Hawaii and probability of trackline detection of 0.76 in Beaufort Sea States of 6 or less (Barlow, 2006), it is very likely that lookouts would detect a group of Risso's dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 691 exposures of Risso's dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Risso's dolphin, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Risso's dolphins.

Rough-Toothed Dolphin (*Steno bredanensis*)

The risk function and Navy post-modeling analysis estimates 1,445 rough-toothed dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates 25 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no rough-toothed dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates there would be four exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or massive lung injury (Table 4.1.2.6.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the high probability of detecting rough-toothed dolphins at the surface, these four exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar and underwater detonations. Given their frequent surfacing and mean group size of 14.8 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow, 2006), it is very likely that lookouts would detect a group of rough-toothed dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 1,476 exposures of rough-toothed dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of rough-toothed dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to rough-toothed dolphins.

Short-finned Pilot Whale (*Globicephala macrorhynchus*)

The risk function and Navy post-modeling analysis estimates 2,430 short-finned pilot whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates 56 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no short-finned pilot whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates there would be three exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or massive lung injury (Table 4.1.2.6.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 20 ft), and large mean group size of 22.5 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow 2006). It is very likely that lookouts would detect a group of short-finned pilot whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 2,491 exposures of short-finned pilot whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of short-finned pilot whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to short-finned pilot whales.

Spinner Dolphin (*Stenella longirostris*)

The risk function and Navy post-modeling analysis estimates 561 spinner dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates nine exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates that no spinner dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates there would be two exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury massive lung injury (Table 4.1.2.6.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their frequent surfacing, aerobatics, and large mean group size of 31.7 animals (probability of trackline detection = 1.00 in Beaufort Sea States of 6 or less; Barlow, 2006), it is very likely that lookouts would detect a group of spinner dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 574 exposures of spinner dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of spinner dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to spinner dolphins.

Striped Dolphin (*Stenella coeruleoalba*)

The risk function and Navy post-modeling analysis estimates 4,361 striped dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates 101 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 1 indicates no exposures to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates eight exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, one exposure to impulsive noise or pressures from underwater detonations that would cause slight physical injury, and none that would cause massive lung injury (Table 4.1.2.6.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their frequent surfacing, aerobatics and large mean group size of 37.3 animals (probability of trackline detection = 1.00 in Beaufort Sea States of 6 or less; Barlow, 2006), it is very likely that lookouts would detect a group of striped dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 4,472 exposures of striped dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of striped dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to striped dolphins.

Unidentified Beaked Whales
The risk function and Navy post-modeling analysis estimates 50 unidentified beaked whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.6.1-1).

Modeling also indicates there would be no exposures to accumulated acoustic energy above 195 dB re 1 μPa^2-s, which is the threshold established indicative of onset TTS. No unidentified beaked whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.6.1-2). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 50 exposures of unidentified beaked whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of unidentified beaked whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to unidentified beaked whales.

4.1.2.6.4 Summary of Compliance with MMPA and ESA—Alternative 1

Endangered Species Act

Based on analytical modeling results, five endangered marine mammal species occurring within the Hawaii OPAREA may be exposed to acoustic energy that could result in TTS or behavioral modification, including the fin whale, humpback whale, sei whale, sperm whale, and Hawaiian monk seal. Modeling indicates no PTS exposures. Based on the analysis presented in the previous section and in accordance with ESA requirements, the Navy would undertake Section

7 consultation with NMFS based on the determination for Alternative 1, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect blue whales, fin whale, humpback whales, North Pacific right whales, sei whales, sperm whales, and Hawaiian monk seals.

Mitigation measures would be implemented to prevent exposure of marine mammals to impulsive sound or sound pressures from underwater detonations that would cause injury.

Five species of sea turtles could potentially occur within the HRC. All are protected under the ESA. All available acoustic information suggests that sea turtles are likely not capable of hearing mid-frequency or high-frequency sounds in the range produced by the sound sources analyzed. Mitigation measures would be implemented to prevent exposure of sea turtles to impulsive sound or sound pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause injury.

Marine Mammal Protection Act

Level A Harassment of Cetaceans

Modeling results for the sum of exposures for all ASW Exercises for a year indicate no exposures that exceeds the Level A harassment threshold. Modeling for explosives indicates three potential exposures that may result in slight injury, however, the following considerations reduce the potential for injury from tactical sonar and underwater explosions:

- Level A zone of influence radii are small that observers would readily observe an approaching marine mammal.
- Many species are large and/or travel in large pods and are easily visible from an elevated platform; a ship or aircraft would readily see a marine mammal in time to implement mitigation measures.

Level B Harassment of Cetaceans

As shown in Table 4.1.2.6.1-1, quantitative modeling results indicate potential for exposures at thresholds that equate to Level B harassment of cetaceans (TTS and behavioral). Based on an estimate for minke whales and the risk function including post-modeling analysis, the Navy estimates 33,760 marine mammals will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. Modeling for Alternative 1 indicates 660 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Estimates for the sub-TTS behavioral threshold indicate there may be 62 exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Estimates for underwater detonations indicate there may be 73 TTS exposures. Modeling indicates no exposures to accumulated acoustic energy above 215 dB re 1 μPa^2-s.

Therefore, it is estimated that in total, 34,555 marine mammals will exhibit behavioral responses NMFS will classify as Level B harassment. This includes 660 TTS and 33,760 risk function exposures (33,671 plus an estimated 89 minke whales) as a result of MFA/HFA sonar use

(34,420 exposures) in addition to 135 exposures (62 sub-TTS exposures and 73 TTS exposures) as a result of underwater detonations (for explosives see Table 4.1.2.6.1-2). Should the Navy decide to implement Alternative 1, the effects on marine mammals will need to be considered by NMFS for purposes of MMPA authorization and ESA consultation.

Mitigation measures will be in place to further minimize the potential for temporary harassment, although there is currently no data to quantify the mitigation efforts to successfully reduce the number of marine mammal exposures. The Navy has begun development of a comprehensive Monitoring Plan to determine the effectiveness of these measures. Many species of small cetaceans travel in very large pods, and therefore would be easily observed from an elevated platform. In addition, large baleen whales travel slowly and are easily observed on the surface. In the years of conducting Major Exercises in the HRC, there have been no documented incidences of harassments or beach strandings of marine mammals associated with active sonar or underwater explosives. In the one event associated with RIMPAC 2004, sonar was suggested to be a plausible contributing factor (Southall et al., 2006) although a similar event occurred on the same day in a bay at Rota Island, Northern Marianas Islands with no associated sonar (Jefferson et al., 2006) and may be related to oceanographic changes that influenced prey distribution (Southall 2006; Ketten, 2006). The HRC Open Ocean waters continue to support diverse and stable populations of cetaceans.

4.1.2.6.5 Increased Tempo and Frequency of Training—Alternative 1

The HRC training for Alternative 1 involving sonar includes ASW training activities as described in Table 2.2.2.3-1 and Appendix D. The number of hours of sonar modeled for Alternative 1 included 360 hours of AN/SQS-53 and 75 hours of AN/SQS-56 surface ship sonar, plus the associated sonobuoys, MK-48 HFA sonar, and submarine sonar use on an annual basis. Modeled exposures for marine mammals during other HRC ASW training, without consideration of mitigation measures are presented in Table 4.1.2.6.5-1. Effects on marine mammals from these exposures are included in the discussion in Sections 4.1.2.6.2 for ESA listed species and 4.1.2.6.3 for non-ESA listed species. Exposures from underwater detonations (i.e., SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS) are included in the summary numbers in Table 4.1.2.6.1-2.

4.1.2.6.6 Enhanced and Future RDT&E Activities—Alternative 1

There are no new or future RDT&E activities that would affect marine animals. Sources such as UAVs, underwater communications, and electronic warfare systems that may be deployed in the ocean are generally transmitting above the frequency range or below the intensity level to affect marine animals. Other RDT&E activities identified as ASW do not include sonar or include very limited use of sonar and are generally of short durations (<1.5 hours). These activities would have minimal effects on fish, sea turtles, and marine mammals.

4.1.2.6.7 HRC Enhancements—Alternative 1

There are no new HRC enhancements that would affect marine animals. Other sources such as the Portable Undersea Tracking Range, underwater communications, and electronic warfare systems that may be deployed in the ocean are beyond the frequency range or intensity level to affect marine animals. The Navy would develop appropriate habitat data and any necessary Best Management Practices and mitigations in coordination with NMFS and USFWS. The Navy will continue to work with regulatory agencies throughout the planning and development process to minimize the potential for impacts on marine mammals.

Table 4.1.2.6.5-1. Alternative 1 Sonar Modeling Summary—Yearly Marine Mammal Exposures from Other HRC ASW Training

Marine Mammals	Risk Function	TTS[3]	PTS[4]
Bryde's whale	14	0	0
Fin whale[1, 2]	10	0	0
Sei whale[1, 2]	10	0	0
Humpback whale[1]	1,569	57	-
Sperm whale[1]	167	2	0
Dwarf sperm whale	454	10	0
Pygmy sperm whale	186	4	0
Cuvier's beaked whale	267	1	0
Longman's beaked whale	23	0	0
Blainville's beaked whale	77	2	0
Unidentified beaked whale	9	0	0
Bottlenose dolphin	153	5	0
False killer whale	10	0	0
Killer whale	10	0	0
Pygmy killer whale	41	1	0
Short-finned pilot whale	377	12	0
Risso's dolphin	105	3	0
Melon-headed whale	126	4	0
Rough-toothed dolphin	232	5	0
Fraser's dolphin	266	5	0
Pantropical spotted dolphin	461	14	0
Spinner dolphin	90	2	0
Striped dolphin	672	21	0
Monk seal[1]	30	1	0
TOTAL	5,359	149	0

Note: [1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
[3] 195 dB – TTS 195-215 dB re 1 μPa^2-s; for monk seals TTS is 204-224 dB re 1 μPa^2-s (Kastak et al., 1999a; 2005)
[4] 215 dB- PTS >215 dB re 1 μPa^2-s; for monk seals PTS is >224 dB re 1 μPa^2-s (Kastak et al., 1999b; 2005)
dB = decibel
TTS = temporary threshold shift
PTS = permanent threshold shift

4.1.2.6.8 Major Exercises—Alternative 1

RIMPAC

The training events and impacts on marine mammals from RIMPAC Exercises have been summarized in the RIMPAC 2006 Supplement to the 2002 RIMPAC EA (U.S. Department of the Navy, Commander Third Fleet, 2006). The Alternative 1 RIMPAC differs from the assessment in the EA by assuming there could be two Carrier Strike Groups (CSG) instead of a single CSG. An Alternative 1 RIMPAC, therefore, would include 1,064 hours of 53C surface ship sonar plus associated dipping sonar, sonobuoys, and MK-48 torpedoes per RIMPAC (conducted every other year). The modeled exposures for marine mammals during RIMPAC, without consideration of mitigation measures are presented in Table 4.1.2.6.8-1. Effects on marine mammals from these exposures are included in the discussion in Sections 4.1.2.6.2 for ESA listed species and 4.1.2.6.3 for non-ESA listed species. Exposures from underwater detonations (i.e., SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS are included in the summary numbers in Table 4.1.2.6.1-2. Sections 4.1.2.2 and 4.1.2.3 discuss the potential effects on fish and sea turtles, respectively.

USWEX

The training events and impacts on marine mammals from USWEX have been summarized in the USWEX Programmatic EA/OEA (U.S. Department of the Navy, 2007b). The number of hours of sonar modeled for Alternative 1 for USWEX is calculated based on there being six USWEXs annually; an increase of one USWEX from the No-action Alternative. Six USWEX would total 630 hours of AN/SQS 53 and 210 hours of AN/SQS 56 surface ship sonar, plus the associated sonobuoys, dipping sonar, MK-48 HFA sonar, and submarine sonar use on an annual basis. The modeled exposures for marine mammals during up to six USWEXs per year, without consideration of mitigation measures are presented in Table 4.1.2.6.8-2. Effects on marine mammals from these exposures are included in the discussion in Sections 4.1.2.6.2 for ESA listed species and 4.1.2.6.3 for non-ESA listed species. Exposures from underwater detonations (i.e., SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS are included in the summary numbers in Table 4.1.2.6.1-2. Sections 4.1.2.2 and 4.1.2.3 discuss the potential effects on fish and sea turtles respectively.

Table 4.1.2.6.8-1. Alternative 1 Sonar Modeling Summary—Yearly Marine Mammal Exposures for RIMPAC with 2 Strike Groups (Conducted Every Other Year)

Marine Mammals	Risk Function	TTS[3]	PTS[4]
Bryde's whale	39	0	0
Fin whale[1, 2]	29	1	0
Sei whale[1, 2]	29	1	0
Humpback whale[1]	0	0	-
Sperm whale[1]	486	6	0
Dwarf sperm whale	1,208	21	0
Pygmy sperm whale	493	9	0
Cuvier's beaked whale	690	3	0
Longman's beaked whale	63	1	0
Blainville's beaked whale	204	4	0
Unidentified beaked whale	22	0	0
Bottlenose dolphin	442	11	0
False killer whale	29	1	0
Killer whale	29	1	0
Pygmy killer whale	116	3	0
Short-finned pilot whale	1,079	25	0
Risso's dolphin	300	7	0
Melon-headed whale	360	8	0
Rough-toothed dolphin	618	11	0
Fraser's dolphin	719	13	0
Pantropical spotted dolphin	1,341	31	0
Spinner dolphin	240	4	0
Striped dolphin	1,957	45	0
Monk seal[1]	70	2	0
TOTAL	10,563	208	0

Note: [1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
[3] 195 dB – TTS 195-215 dB re 1 μPa^2-s; for monk seals TTS is 204-224 dB re 1 μPa^2-s (Kastak et al., 1999a; 2005)
[4] 215 dB- PTS >215 dB re 1 μPa^2-s; for monk seals PTS is >224 dB re 1 μPa^2-s (Kastak et al., 1999b; 2005)
dB = decibel
TTS = temporary threshold shift
PTS = permanent threshold shift

Table 4.1.2.6.8-2. Alternative 1 Sonar Modeling Summary—Yearly Marine Mammal Exposures from USWEX (6 per year)

Marine Mammals	Risk Function	TTS[3]	PTS[4]
Bryde's whale	36	0	0
Fin whale[1, 2]	27	1	0
Sei whale[1, 2]	27	1	0
Humpback whale[1]	8,116	142	0
Sperm whale[1]	414	4	0
Dwarf sperm whale	1,165	17	0
Pygmy sperm whale	476	7	0
Cuvier's beaked whale	602	3	0
Longman's beaked whale	59	1	0
Blainville's beaked whale	197	3	0
Unidentified beaked whale	19	0	0
Bottlenose dolphin	399	8	0
False killer whale	27	1	0
Killer whale	27	1	0
Pygmy killer whale	109	2	0
Short-finned pilot whale	974	19	0
Risso's dolphin	270	5	0
Melon-headed whale	325	6	0
Rough-toothed dolphin	595	9	0
Fraser's dolphin	689	10	0
Pantropical spotted dolphin	1,186	24	0
Spinner dolphin	231	3	0
Striped dolphin	1,732	35	0
Monk seal[1]	47	1	0
TOTAL	17,749	303	0

Note: [1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
[3]195 dB – TTS 195-215 dB re 1 µPa^2-s; for monk seals TTS is 204-224 dB re 1 µPa^2-s (Kastak et al., 1999a; 2005)
[4]215 dB- PTS >215 dB re 1 µPa^2-s; for monk seals PTS is >224 dB re 1 µPa^2-s (Kastak et al., 1999b; 2005)
dB = decibel
TTS = temporary threshold shift
PTS = permanent threshold shift

4.1.2.7 MARINE MAMMALS ALTERNATIVE 2 (BIOLOGICAL RESOURCES—OPEN OCEAN)

The discussion under the No-action Alternative regarding potential non-acoustic impacts (Section 4.1.2.5.1) and potential ASW Impacts (Section 4.1.2.5.2) also apply for Alternative 2.

4.1.2.7.1 Alternative 2 Summary of Exposures

The increased training under Alternative 2 results in an increase in the number of hours of ASW training. The modeling input includes a total of 2,496 hours of AN/SQS 53 and 787 hours of AN/SQS 56 surface ship sonar plus associated sonobuoys, dipping sonar, MK-48 HFA sonar, and submarine sonar use as modeling inputs (see Appendix J for a detailed description of the sonar modeled). These exposure numbers are generated by the model without consideration of mitigation measures that would reduce the potential for marine mammal exposures to sonar. Table 4.1.2.7.1-1 provides a summary of the total sonar exposures from all Alternative 2 ASW Exercises that would be conducted over the course of a year. The number of exposures from each type of exercise are presented separately in Sections 4.1.2.7.5, 4.1.2.7.6, 4.1.2.7.7, and 4.1.2.7.8.

The explosive modeling input includes Mine Neutralization, MISSILEX, BOMBEX, SINKEX, EER/IEER, GUNEX, and NSFS. The modeled explosive exposure harassment numbers by species are presented in Table 4.1.2.7.1-2. Estimates for the sub-TTS behavioral threshold indicate there may be 63 exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, the table indicates the potential for non-injurious (Level B) harassment, as well as the onset of injury (Level A) harassment to cetaceans. The modeling indicates 80 annual exposures to pressure or acoustics from underwater detonations that could result in TTS. Modeling indicates three exposures from underwater detonations that could cause slight injury. To reiterate, these exposure modeling results are estimates of marine mammal underwater detonation sound exposures without consideration of standard mitigation and monitoring procedures. Implementation of the mitigation and monitoring procedures presented in Chapter 6.0 will minimize the potential for marine mammal exposure and harassment through range clearance procedures.

Table 4.1.2.7.1-1. Alternative 2 Sonar Modeling Summary - Yearly Marine Mammal Exposures from All ASW (RIMPAC, USWEX, Multiple Strike Group, and Other ASW Training)

Marine Mammals	Risk Function	TTS[3]	PTS[4]
Bryde's whale	135	0	0
Fin whale[1, 2]	99	3	0
Sei whale[1, 2]	99	3	0
Humpback whale[1]	12,583	329	0
Sperm whale[1]	1,535	16	0
Dwarf sperm whale	4,288	66	0
Pygmy sperm whale	1,751	27	0
Cuvier's beaked whale	2,273	10	0
Longman's beaked whale	217	3	0
Blainville's beaked whale	725	12	0
Unidentified beaked whale	73	0	0
Bottlenose dolphin	1,460	33	0
False killer whale	99	3	0
Killer whale	99	3	0
Pygmy killer whale	399	9	0
Short-finned pilot whale	3,580	77	0
Risso's dolphin	994	21	0
Melon-headed whale	1,194	25	0
Rough-toothed dolphin	2,194	34	0
Fraser's dolphin	2,536	40	0
Pantropical spotted dolphin	4,344	95	0
Spinner dolphin	853	13	0
Striped dolphin	6,341	139	0
Monk seal[1]	206	6	0
TOTAL	48,077	967	0

Note: [1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
[3] 195 dB – TTS 195-215 dB re 1 μPa^2-s; for monk seals TTS is 204-224 dB re 1 μPa^2-s (Kastak et al., 1999a; 2005)
[4] 215 dB- PTS >215 dB re 1 μPa^2-s; for monk seals PTS is >224 dB re 1 μPa^2-s (Kastak et al., 1999b; 2005)
Assumes 3 Strike Group Exercise in winter
dB = decibel
TTS = temporary threshold shift
PTS = permanent threshold shift

Table 4.1.2.7.1-2. Alternative 2 Explosives Modeling Summary - Yearly Marine Mammal Exposures from All Explosive Sources

Marine Mammal Species	Sub-TTS	TTS Modeled at < 182 dB re 1 µPa²–s or 23 psi								Total Exposures		
	Sub-TTS 177 dB	EER/IEER	Mine Neutralization	Air to Surface Missile Exercise	Surface to Surface Missile Exercise	Bombing Exercise	Sink Exercise	Surface to surface Gunnery Exercise	Naval Surface Fire Support	TTS 182 dB, 23 psi	Slight Lung/TM Injury	Onset Massive Lung Injury
Bryde's whale	0	0	0	0	0	0	0	0	0	0	0	0
Fin whale[1, 2]	0	0	0	0	0	0	0	0	0	0	0	0
Sei whale	0	0	0	0	0	0	0	0	0	0	0	0
Humpback whale[1]	5	5	1	0	0	4	0	0	2	12	1	0
Sperm whale[1]	9	1	0	0	0	1	3	0	0	5	0	0
Dwarf sperm whale	13	5	0	0	0	2	4	1	1	13	0	0
Pygmy sperm whale	4	2	0	0	0	1	2	0	0	5	0	0
Cuvier's beaked whale	16	1	0	0	0	2	5	0	0	8	0	0
Longman's beaked whale	0	0	0	0	0	0	0	0	0	0	0	0
Blainville's beaked whale	2	1	0	0	0	0	1	0	0	2	0	0
Unidentified beaked whale	0	0	0	0	0	0	0	0	0	0	0	0
Bottlenose dolphin	0	1	0	0	0	0	0	0	0	1	0	0
False killer whale	0	0	0	0	0	0	0	0	0	0	0	0
Killer whale	0	0	0	0	0	0	0	0	0	0	0	0
Pygmy killer whale	0	0	0	0	0	0	0	0	0	0	0	0
Short-finned pilot whale	2	2	0	0	0	0	1	1	1	5	0	0
Risso's dolphin	0	1	0	0	0	0	0	0	0	1	0	0
Melon-headed whale	0	1	0	0	0	0	0	0	0	1	0	0
Rough-toothed dolphin	2	2	0	0	0	1	1	0	0	4	0	0
Fraser's dolphin	6	3	0	0	0	1	2	0	0	6	0	0
Pantropical spotted dolphin	0	3	0	0	0	0	0	1	1	5	1	0
Spinner dolphin	2	1	0	0	0	0	1	0	0	2	0	0
Striped dolphin	2	4	0	0	0	1	1	1	1	7	1	0
Monk seal[1]	0	2	0	0	0	0	0	0	1	3	0	0
Total	63	35	1	0	0	13	21	4	7	80	3	0

Note:
[1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
dB = decibel
µPa²-s = squared micropascal-second
TM = tympanic membrane
TTS = temporary threshold shift

4.1.2.7.2 Estimated Effects on ESA Listed Species—Alternative 2

The endangered species that may be affected as a result of implementation of Alternative 2 include the blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), Hawaiian monk seal (*Monachus schauinslandi*) humpback whale (*Megaptera novaeangliae*), North Pacific right whale (*Eubalaena japonica*), sei whale (*Balaenoptera borealis*), and sperm whale (*Physeter macrocephalus*).

For Alternative 2, modeling results presented in Table 4.1.2.7.1-1 predict that if there were no mitigation measures in place, exposures would result in temporary, non-injurious physiological effects (TTS) and behavioral harassment. The modeling predicts that as a result of summing all annual expected values resulting from the acoustic impact modeling, those fractional exposures mathematically round to one exposure of a humpback whale at slight injury threshold. Target area clearance procedures described in Section 4.1.2.5.1 would make sure there are no humpback whales within the safety zone. Potential exposure of humpback whales to levels that exceed thresholds for TTS or injury levels from underwater detonations is, therefore, highly unlikely. In addition, the established positive impulse criteria for lung injury are extremely conservative with regard to large whales in that the established lung injury threshold, which corresponds to body mass in a complex manner, was based on a calf dolphin (at 26.9 lb) as compared to the approximate 4,000 lb mass of a newborn humpback whale.

The HRC training involving sonar includes ASW training activities as described in Table 2.2.2.3-1 and Appendix D. The No-action Alternative modeling for these activities includes analysis of surface ship and submarine MFA sonar, associated sonobuoys, MK-48 torpedo HFA sonar, and dipping sonars for activities other than occurring during Major Exercises on an annual basis. The modeled exposures for marine mammals during this ASW training, without consideration of mitigation measures are presented in 4.1.2.5.5-1 for the No-action Alternative. Effects on marine mammals from these exposures are included in the discussion in Sections 4.1.2.7.2 for ESA listed species and 4.1.2.7.3 for non-ESA listed species.

Exposures from underwater detonations (i.e., SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS) are presented in the summary numbers in Table 4.1.2.7.1-2.

The following sections present details concerning the exposure of ESA listed species to sonar from all Alternative 2 ASW Exercises per year. The exposure numbers are given without consideration of mitigation measures. However, mitigation measures that are implemented during the ASW Exercises would reduce the potential for marine mammal exposures to sonar.

Blue Whale (*Balaenoptera musculus*)

There is no density information available for blue whales in Hawaiian waters given they have not been seen during survey. Given they are so few in number, it is unlikely that HRC MFA/HFA sonar training events will result in the exposure of any blue whales to accumulated acoustic energy in excess of any energy flux threshold or an SPL that would result in a behavioral response. No blue whales would be exposed to impulsive sound or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause TTS or physical injury. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of blue whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury, effects on their behavior or physiology, or abandonment of areas that are regularly used by blue whales. In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 2, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect blue whales.

Fin Whale (*Balaenoptera physalus*)

There is no density information for fin whales in the Hawaiian Islands (Barlow, 2006). As described previously, for purposes of acoustic effects analysis estimates, it was assumed that the number and density of fin whales did not exceed that of false killer whales (given similar abundance estimates), and the modeled number of exposures for both species would therefore be the same.

The risk function and Navy post-modeling analysis estimates 99 fin whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect but is not likely to adversely affect fin whales; therefore, the Navy has initiated ESA Section 7 consultation with NMFS (Table 4.1.2.7.1-1).

Modeling also indicates there would be three exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling indicates no exposures for fin whales to accumulated acoustic energy above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS. No fin whales would be exposed to impulsive sound or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause TTS or physical injury (Table 4.1.2.7.1-2). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, the nature of Navy's MFA sonar operations, behavioral patterns and acoustic abilities of fin whales, observations made during HRC training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events will likely not result in any population level effects, death or injury to fin whales. In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 2, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect fin whales.

Humpback Whale (*Megaptera novaeangliae*)

The risk function and Navy post-modeling analysis estimates 12,583 humpback whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table

4.1.2.7.1-1). The Navy believes this may affect but is not likely to adversely affect humpback whales; therefore, the Navy has initiated ESA Section 7 consultation with NMFS

Modeling also indicates there would be 329 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling indicates no exposures for humpback whales to accumulated acoustic energy above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be five exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral disturbance threshold. Without consideration of clearance procedures during events involving underwater detonations, modeling estimates there would be 12 exposures from impulsive sound or pressures from underwater detonations that would exceed the TTS threshold, one exposure that would exceed the slight injury threshold, and no exposures that exceed the massive injury threshold (Table 4.1.2.7.1-2). Target area clearance procedures described in Section 4.1.2.5.1 would make sure there are no humpback whales within the safety zone. Potential exposure of humpback whales to levels that exceed thresholds for TTS or injury levels from underwater detonations is, therefore, highly unlikely. In addition, the established positive impulse criteria for lung injury are extremely conservative with regard to large whales in that the established threshold, which corresponds to body mass in a complex manner, was based on a calf dolphin (at 26.9 lb) as compared to the approximate 4,000 lb mass of a newborn humpback whale. Mitigation measures call for continuous visual observation during training with active sonar. Given the large size (up to 53 ft) of individual humpback whales (Leatherwood et al., 1982), and pronounced vertical blow, it is very likely that lookouts would detect humpback whales at the surface during training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

As noted previously, filter-bank models of the humpback whale's ear by Houser et al., (2001) suggest that humpbacks are sensitive to frequencies between 700 Hz and 10 kHz, and have a maximum sensitivity is between 2 kHz and 6 kHz. Recent reporting by Au et al., (2006) indicating high-frequency harmonics in humpback whale "song" at 24 kHz and beyond does not demonstrate that humpbacks can actually hear those harmonics, which may simply be correlated harmonics of the frequency fundamental. Most social vocalizations, including female vocalizations, are below 3 kHz (Silber, 1986); therefore, are below MFA sonar range. Male songs range from 20 Hz to 24 kHz, but most of the components range from 200 Hz to 3 kHz (Au et al., 2001). A single study suggested that humpback whales responded to MFA sonar (3.1-3.6 kHz re 1 μPa^2-s) sound (Maybaum, 1989). The hand-held sonar system had a sound artifact below 1,000 Hz which caused a response to the control playback (a blank tape) and may have affected the response to sonar (i.e., the humpback whale responded to the low-frequency artifact rather than the MFA sonar sound).

While acoustic modeling results indicate MFA/HFA sonar may expose humpback whales to accumulated acoustic energy levels resulting in temporary behavioral effects, these exposures would have negligible impact on annual survival, recruitment, and birth rates and not likely result in population level effects. The aggregation of humpback whales in Hawaii has been increasing at up to 7 percent annually (Mobley, 2004) despite frequent encounters with tour boats. There have been no observed or reported mother calf separations as a result of Navy activities. There have been no reported or identified humpback whale strandings in Hawaii associated with the use of MFA/HFA sonar. While the absence of evidence does not prove there have been no impacts on humpback whales, decades of history with no evidence should not be dismissed. Mitigation measures presented in Chapter 6.0 would further reduce the potential acoustic exposure.

Per Navy policy, based on the quantitative analysis results that trigger a “may affect” determination, Navy has initiated Section 7 consultation with NMFS based on the determination that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect humpback whales.

North Pacific Right Whale (*Eubalaena japonica*)

There is no density information available for North Pacific right whales in Hawaiian waters given they have not been seen during survey. Given they are so few in number, it is unlikely that HRC MFA/HFA sonar training events will result in the exposure of any right whales to accumulated acoustic energy in excess of any energy flux threshold or an SPL that would result in a behavioral reaction. No right whales would be exposed to impulsive sound or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause TTS or physical injury. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, the nature of the Navy’s MFA sonar operations, behavioral patterns and acoustic abilities of North Pacific right whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would likely not result in any population level effects, death or injury to North Pacific right whales, and will not affect their behavior, physiology or cause abandonment of areas that are regularly used by North Pacific right whales. In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 2, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect North Pacific right whales.

Sei Whale (*Balaenoptera borealis*)

There is no density information for sei whales in the Hawaiian Islands (Barlow, 2006). As described previously, for purposes of acoustic effects analysis estimates, it was assumed that the number and density of sei whales did not exceed that of false killer whales (given similar abundance estimates), and the modeled number of exposures for both species would therefore be the same.

The risk function and Navy post-modeling analysis estimates 99 sei whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect but is not likely to adversely affect sei whales; therefore, the Navy has initiated ESA Section 7 consultation with NMFS (Table 4.1.2.7.1-1).

Modeling also predicts three exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling predicts no exposures for sei whales to accumulated acoustic energy above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS. No sei whales would be exposed to impulsive sound or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause TTS or physical injury (Table 4.1.2.7.1-2). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of sei whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not likely result in any population level effects, death or injury to sei whales. The proposed ASW Exercises may affect sei whales but are not likely to cause long-term effects on their behavior or physiology or abandonment of areas that are regularly used by sei whales. In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 2, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect sei whales.

Sperm Whales (*Physeter macrocephalus*)

The risk function and Navy post-modeling analysis estimates 1,535 sperm whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also predicts 16 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling predicts there would be no exposures for sperm whales to accumulated acoustic energy above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be nine exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of clearance procedures, there would be five exposures from impulsive sound or pressures from underwater detonations that would exceed the TTS threshold (Table 4.1.2.7.1-2). Target area clearance procedures described in Section 4.1.2.5.1 would make sure there are no sperm whales within the safety zone, and therefore potential exposure of sperm whales to sound levels from underwater detonations that exceed TTS is highly unlikely. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, the nature of the Navy's MFA sonar training, behavioral patterns and acoustic abilities of sperm whales, observations made during past training events, and the planned implementation of procedure mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to sperm whales. The proposed ASW Exercises may affect sperm whales but are not likely to cause long-term effects on their behavior or physiology or abandonment of areas that are regularly used by sperm whales. In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 2, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect sperm whales.

Hawaiian Monk Seal (*Monachus schauinslandi*)

The risk function and Navy post-modeling analysis estimates 206 Hawaiian monk seals will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. The Navy believes this may affect but is not likely to adversely affect Hawaiian monk seals; therefore, the Navy has initiated ESA Section 7 consultation with NMFS (Table 4.1.2.7.1-1).

Modeling also predicts six exposures to accumulated acoustic energy between 204 dB and 224 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively for monk seals). Modeling predicts there would be no exposures for monk seals to accumulated acoustic energy above 224 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS for monk seals.

Modeling undertaken for monk seals does not take into consideration the effect of mitigation measures or foraging habitat preferences. Monk seals generally forage at depths of less than 100 m, but occasionally dive to depths of over 500 m. The majority of ASW training in the HRC, however, takes place in waters 4 to 8 times deeper than even this known (500 m) maximum and it is very rare for ASW training to take place in waters as shallow as 100 m in depth. Additionally, mitigation measures call for continuous visual observation during training with active sonar. It would, therefore, be rare for a Hawaiian monk seal to be present in the vicinity of an ASW event and the potential for detection by aircraft and lookouts aboard ship would further preclude the possibility that monk seals would be in the vicinity of ASW training events.

Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of clearance procedures, modeling estimates there would be three exposures from impulsive sound or pressures from underwater detonations that would exceed the TTS threshold and no exposures that would exceed the injury threshold (Table 4.1.2.7.1-2). In the rare event that a monk seal was present, target area clearance procedures described in Section 4.1.2.5.1 would be used to detect monk seals within the safety zone, and therefore potential exposure of monk seals to underwater detonations that exceed the TTS threshold is highly unlikely. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Critical habitat for Hawaiian monk seals was designated 1986 as the area extending out to the 10-fathom depth (60 ft) for the Northwestern Hawaiian Islands (National Marine Fisheries Service, 1986). Critical habitat was extended out to the 20-fathom depth in 1988 (National Marine Fisheries Service, 1988). ASW events should not occur inside the 20-fathom isobath and given mitigation measures and range clearance procedures, activities in the HRC will not have an effect on Monk Seal Critical Habitat.

Based on the model results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of monk seals, observations made during past training events, and the planned implementation of procedure mitigation measures, the Navy finds that the training events would not likely result in any death or injury to Hawaiian monk seals. In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 2, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect Hawaiian monk seals.

4.1.2.7.3 Estimated Exposures for Non-ESA Species—Alternative 2

Bryde's Whale (*Balaenoptera edeni*)

The risk function and Navy post-modeling analysis estimates 135 Bryde's whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1). Modeling indicates there would be no exposures to accumulated acoustic energy above 195 dB re 1 µPa^2-s, which is the threshold established indicative of onset TTS. Modeling for all alternatives indicates that no Bryde's whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS. No Bryde's whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.7.1-2).

Given the large size (up to 46 ft) of individual Bryde's whales, pronounced blow, and mean group size of approximately 1.5 animals and (probability of trackline detection = 0.87 in Beaufort Sea States of 6 or less; Barlow 2003; 2006), it is very likely that lookouts would detect a group of Bryde's whales at the surface. Additionally, mitigation measures call for continuous visual observation during training with active sonar; therefore, Bryde's whales that are present in the vicinity of ASW training events may be detected by visual observers. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 135 exposures of Bryde's whale to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Bryde's whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Bryde's whales.

Minke Whale (*Balaenoptera acutorostrata*)

Despite several reports of seasonal acoustic detections of minke whales in Hawaiian waters (e.g. Rankin and Barlow, 2005), there is no density information available for minke whales in Hawaiian waters given they have rarely been visually sighted during surveys. Taken conservatively, the acoustic detections suggest that minke whales may be more common than the survey data indicates. Therefore, although acoustic effects modeling cannot be undertaken without density estimates, the Navy will assume 135 minke whales may exhibit behavioral responses that NMFS would classify as harassment under the MMPA. This exposure number is based on the modeled exposures for the Bryde's whale, another seasonal baleen whale, that has a reported abundance of 469 whales in the HRC (Barlow 2006). Based upon the Navy's protective measures, it is unlikely that HRC MFA/HFA sonar training events will result in the exposure of any minke whales to accumulated acoustic energy in excess of any energy flux threshold or an SPL that would result in a behavioral response. No minke whales would be exposed to impulsive noise or pressures from underwater detonations that would exceed the sub-TTS behavioral threshold or cause physical injury.. No minke whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause TTS or physical injury (Table 4.1.2.7.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given the large size (up to 27 ft) of individual minke whales (Barlow, 2003), it is possible that lookouts may detect minke whales at the surface during ASW training events, although a systematic survey in the Hawaiian Islands failed to visually detect minke whales but was able to detect them acoustically (Barlow, 2006). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

Based on the model results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of minke whales, observations made during past training events, and the planned implementation mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to minke whales.

Blainville's Beaked Whale (*Mesoplodon densirostris*)

The risk function and Navy post-modeling analysis estimates 725 Blainville's beaked whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 12 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no Blainville's beaked whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates there would be two exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause physical injury (Table 4.1.2.7.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation, most if not all exposures as a result of that event should be precluded.

Mitigation measures call for continuous visual observation during training with active sonar. Given the size (up to 15.5 ft) of individual Blainville's beaked whales and aggregation of 2.3 animals, it is possible that lookouts may detect Blainville's beaked whales at the surface although beaked whales dive for long periods. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 741 exposures of Blainville's beaked whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Blainville's beaked whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Blainville's beaked whales.

Bottlenose Dolphin (*Tursiops truncatus*)

The risk function and Navy post-modeling analysis estimates 1,460 bottlenose dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 33 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no bottlenose dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS. No bottlenose dolphin would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold. Modeling indicates there would be one exposure to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause physical injury (Table 4.1.2.7.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given the frequent surfacing, aggregation of approximately nine animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow, 2003), it is very likely that lookouts would detect a group of bottlenose dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS. Without consideration of range clearance procedures, modeling indicates there would be one exposure to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury (Table 4.1.2.7.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation, most if not all exposures as a result of that event should be precluded.

There may be up to 1,494 exposures of bottlenose dolphins to potential Level B harassment annually. Based on the model results, the nature of the Navy's MFA sonar, behavioral patterns and acoustic abilities of bottlenose dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to bottlenose dolphins.

Cuvier's Beaked Whale (*Ziphius cavirostris*)

The risk function and Navy post-modeling analysis estimates 2,273 Cuvier's beaked whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 10 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no Cuvier's beaked whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be 16 exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates there would be 8 exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury (Table 4.1.2.7.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation, most if not all exposures as a result of that event should be precluded.

Mitigation measures call for continuous visual observation during training with active sonar. Given the medium size (up to 23 ft) of individual Cuvier's beaked whales (Barlow, 2006), it is possible that lookouts may detect Cuvier's beaked whales at the surface during ASW training events, although beaked whales make long duration dives that may last for 45 min (Baird et al., 2006b). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 2,307 exposures of Cuvier's beaked whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Cuvier's beaked whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Cuvier's beaked whales.

Dwarf Sperm Whale (*Kogia sima*)

The risk function and Navy post-modeling analysis estimates 4,288 dwarf sperm whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 66 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no dwarf sperm whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be 13 exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates 13 exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or onset of massive lung injury (Table 4.1.2.7.1-2). Range clearance procedures for underwater detonation, however, should preclude most if not all exposures as a result of that event. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 4,380 exposures of dwarf sperm whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of dwarf sperm whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to dwarf sperm whales.

False Killer Whale (*Pseudorca crassidens*)

The risk function and Navy post-modeling analysis estimates 99 false killer whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates three exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no false killer whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS. No false killer whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.7.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 19.7 ft) and large mean group size of 10.3 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow 2003), it is very likely that lookouts would detect a group of false killer whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 102 exposures of false killer whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of false killer whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to false killer whales.

Fraser's Dolphin (*Lagenodelphis hosei*)

The risk function and Navy post-modeling analysis estimates 2,536 Fraser's dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 40 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no Fraser's dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be six exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates there would be six exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or onset of massive lung injury (Table 4.1.2.7.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their large aggregations, mean group size of 286.3 animals (probability of trackline detection = 1.00 in Beaufort Sea States of 6 or less; Barlow 2006), it is very likely that lookouts would detect a group of Fraser's dolphins at the surface during ASW training events The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 2,588 exposures of Fraser's dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Fraser's dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Fraser's dolphins.

Killer Whale (*Orcinus orca*)

The risk function and Navy post-modeling analysis estimates 99 killer whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates three exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no killer whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS. No killer whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.7.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 23 ft), conspicuous coloring, pronounced dorsal fin and large mean group size of 6.5 animals (probability of trackline detection = 0.90; Barlow, 2003), is very likely that lookouts would detect a group of killer whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 102 exposures of killer whale to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of killer whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to killer whales.

Longman's Beaked Whale (*Indopacetus pacificus*)

The risk function and Navy post-modeling analysis estimates 217 Longman's beaked whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates three exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no Longman's beaked whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS. No Longman's beaked whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.7.1-2).

Mitigation measures call for continuous visual observation during training with active sonar; Given the medium size (up to 24 ft) of individual Longman's beaked whale, aggregation of approximately 17.8 animals (Barlow, 2006), it is likely that lookouts would detect a group of Longman's beaked whales at the surface during ASW training events although beaked whales dive for long periods. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 220 exposures of Longman's beaked whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Longman's beaked whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Longman's beaked whales.

Melon-headed Whale (*Peponocephala electra*)

The risk function and Navy post-modeling analysis estimates 1,194 melon-headed whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 25 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no melon-headed whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS. One melon-headed whale would be exposed to impulsive noise or pressures from underwater detonations that will exceed the TTS behavioral disturbance threshold, and none would be exposed to levels that would cause physical injury (Table 4.1.2.7.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 8.2 ft) and large group size (mean of 89.2 whales) or more animals (probability of trackline detection = 1.00 in Beaufort Sea States of 6 or less; Barlow, 2003), it is very likely that lookouts would very likely detect a group of melon-headed whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 1,220 exposures of melon-headed whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of melon-headed whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to melon-headed whales.

Pantropical Spotted Dolphin (*Stenella attenuata*)

The risk function and Navy post-modeling analysis estimates 4,344 pantropical spotted dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 95 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no pantropical spotted dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling estimates five exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, one exposure to impulsive noise or pressures from underwater detonations that would cause slight injury, and no exposures resulting in massive lung injury (Table 4.1.2.7.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the high probability of detecting pantropical spotted dolphins at the surface, these exposures associate with underwater detonations should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar and underwater detonations. Given their frequent surfacing and mean group size of 60.0 animals in Hawaii with a probability of trackline detection of 1.00 in Beaufort Sea States of 6 or less (Barlow, 2006) it is very likely that lookouts would detect a group of pantropical spotted dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 4,444 exposures of pantropical spotted dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of pantropical spotted dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to pantropical spotted dolphins.

Pygmy Killer Whale (*Feresa attenuata*)

The risk function and Navy post-modeling analysis estimates 399 pygmy killer whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates nine exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no pygmy killer whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS. No pygmy killer whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.7.1-2).

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 8.5 ft) and mean group size of 14.4 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow 2003), it is very likely that lookouts would detect a group of pygmy killer whales at the during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 408 exposures of pygmy killer whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of pygmy killer whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to pygmy killer whales.

Pygmy Sperm Whale (*Kogia breviceps*)

The risk function and Navy post-modeling analysis estimates 1,751 pygmy sperm whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 27 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no pygmy sperm whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be four exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates five exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury (Table 4.1.2.7.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation, these five exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar and underwater detonations. Given their size (up to 10 ft) and behavior of resting at the surface (Leatherwood et al., 1982), it is very possible that lookouts would detect a pygmy sperm whale at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 1,787 exposures of pygmy sperm whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of pygmy sperm whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to pygmy sperm whales.

Risso's Dolphin (*Grampus griseus*)

The risk function and Navy post-modeling analysis estimates 994 Risso's dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 21 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no Risso's dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS. One Risso's dolphin would be exposed to impulsive noise or pressures from underwater detonations that will exceed the TTS behavioral disturbance threshold, and none would be exposed to levels that would cause physical injury (Table 4.1.2.7.1-2).

Mitigation measures call for continuous visual observation during training with active sonar and underwater detonations. Given their frequent surfacing, light coloration, and large group size of up to several hundred animals (Leatherwood et al., 1982), mean group size of 15.4 dolphins in Hawaii and probability of trackline detection of 0.76 in Beaufort Sea States of 6 or less (Barlow, 2006), it is very likely that lookouts would detect a group of Risso's dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 1,016 exposures of Risso's dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of Risso's dolphin, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to Risso's dolphins.

Rough-Toothed Dolphin (*Steno bredanensis*)

The risk function and Navy post-modeling analysis estimates 2,194 rough-toothed dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 34 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no rough-toothed dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates there would be four exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or massive lung injury (Table 4.1.2.7.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the high probability of detecting rough-toothed dolphins at the surface, these four exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar and underwater detonations. Given their frequent surfacing and mean group size of 14.8 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow, 2006), it is very likely that lookouts would detect a group of rough-toothed dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 2,234 exposures of rough-toothed dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of rough-toothed dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to rough-toothed dolphins.

Short-finned Pilot Whale (*Globicephala macrorhynchus*)

The risk function and Navy post-modeling analysis estimates 3,580 short-finned whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 77 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 µPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no short-finned pilot whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 µPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates there would be five exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, and no exposures to impulsive noise or pressures from underwater detonations that would cause slight physical injury or massive lung injury (Table 4.1.2.7.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the high probability of detecting short-finned pilot whales at the surface, these five exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar. Given their size (up to 20 ft), and large mean group size of 22.5 animals (probability of trackline detection = 0.76 in Beaufort Sea States of 6 or less; Barlow 2006). It is very likely that lookouts would detect a group of short-finned pilot whales at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 3,664 exposures of short-finned pilot whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of short-finned pilot whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to short-finned pilot whales.

Spinner Dolphin (*Stenella longirostris*)

The risk function and Navy post-modeling analysis estimates 853 spinner dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 13 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no spinner dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling estimates there would be two exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, no exposure to impulsive noise or pressures from underwater detonations that would cause slight injury or massive lung injury (Table 4.1.2.7.1-2). Given range clearance procedures for underwater detonation and the high probability of detecting spinner dolphins at the surface, these exposures from underwater detonations should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar. Given their frequent surfacing, aerobatics, and large mean group size of 31.7 animals (probability of trackline detection = 1.00 in Beaufort Sea States of 6 or less; Barlow, 2006), it is very likely that lookouts would detect a group of spinner dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 870 exposures of spinner dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of spinner dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to spinner dolphins.

Striped Dolphin (*Stenella coeruleoalba*)

The risk function and Navy post-modeling analysis estimates 6,341 striped dolphins will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates 139 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling for Alternative 2 indicates that no striped dolphins would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS.

Estimates for the sub-TTS behavioral threshold indicate there may be two exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Without consideration of range clearance procedures, modeling indicates seven exposures to impulsive noise or pressures from underwater detonations of 182 dB or 23 psi, which is the threshold indicative of onset TTS, one exposure to impulsive noise or pressures from underwater detonations that would cause slight physical injury, and none that would cause massive lung injury (Table 4.1.2.7.1-2). Given that many of these events occur in relatively shallow water and taking into consideration range clearance procedures for underwater detonation with the high probability of detecting striped dolphins at the surface, these exposures should be precluded from occurring.

Mitigation measures call for continuous visual observation during training with active sonar. Given their frequent surfacing, aerobatics and large mean group size of 37.3 animals (probability of trackline detection = 1.00 in Beaufort Sea States of 6 or less; Barlow, 2006), it is very likely that lookouts would detect a group of striped dolphins at the surface during ASW training events. The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 6,489 exposures of striped dolphins to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of striped dolphins, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to striped dolphins.

Unidentified Beaked Whales

The risk function and Navy post-modeling analysis estimates 73 unidentified beaked whales will exhibit behavioral responses that NMFS will classify as harassment under the MMPA (Table 4.1.2.7.1-1).

Modeling also indicates no exposures to accumulated acoustic energy above 195 dB re 1 μPa^2-s, which is the threshold established indicative of onset TTS. Modeling for all alternatives indicates that no unidentified beaked whales would be exposed to accumulated acoustic energy at or above 215 dB re 1 μPa^2-s, which is the threshold indicative of onset PTS. No unidentified beaked whales would be exposed to impulsive noise or pressures from underwater detonations that will exceed the sub-TTS behavioral disturbance threshold or would cause physical injury (Table 4.1.2.7.1-2). The implementation of mitigation measures to reduce exposure to high levels of sonar sound; and the short duration and intermittent exposure to sonar, reduces the likelihood that exposure to MFA/HFA sonar sound would cause a behavioral response that may affect vital functions (foraging, reproduction, or survival), TTS or PTS.

There may be up to 73 exposures of unidentified beaked whales to potential Level B harassment annually. Based on these modeling results, the nature of the Navy's MFA sonar operations, behavioral patterns and acoustic abilities of unidentified beaked whales, observations made during past training events, and the planned implementation of mitigation measures, the Navy finds that the HRC training events would not result in any population level effects, death or injury to unidentified beaked whales.

4.1.2.7.4 Summary of Compliance with MMPA and ESA—Alternative 2

Endangered Species Act

Based on analytical risk function modeling results, NMFS conclusions in the Biological Opinions issued regarding RIMPAC 2006 and USWEX 2007, and in accordance with the ESA, the Navy finds the estimates of harassment resulting from the proposed use of MFA sonar may affect endangered blue whale, North Pacific right whale, fin whales, Hawaiian monk seals, humpback whales, sei whales, and sperm whales. Based on the analysis presented in the previous section the Navy concludes that HRC ASW Exercises may affect fin whale, humpback whales, sei whales, sperm whales, and Hawaiian monk seals.

Mitigation measures would be implemented to prevent exposure of marine mammals to impulsive sound or sound pressures from underwater detonations that would cause injury.

Five species of sea turtles could potentially occur within the HRC. All are protected under the ESA. All available acoustic information suggests that sea turtles are likely not capable of hearing MFA/HFA sounds in the range produced by the sources analyzed in this document. Mitigation measures would be implemented to reduce or prevent the potential exposure of sea turtles to impulsive sound or sound pressures from underwater detonations that would cause injury.

In accordance with ESA requirements, the Navy would undertake Section 7 consultation with NMFS based on the determination for Alternative 2, that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect blue whales, fin whales, humpback whales, North Pacific right whales, sei whales, sperm whales, and Hawaiian monk seals.

Marine Mammal Protection Act

Level A Harassment of Cetaceans

Modeling results for the sum of exposures for all ASW Exercises for a year indicate no exposures that exceed the Level A harassment threshold. However, given implementation of mitigation measures, it is unlikely that ASW training would result in injury to marine mammals. Modeling for explosives indicates three potential exposures that may result in slight injury, however, the following considerations reduce the potential for injury from tactical sonar and underwater explosions:

- Level A zone of influence radii are small that observers would readily observe an approaching marine mammal.
- Many species are large and/or travel in large pods and are easily visible from an elevated platform; a ship or aircraft would readily see a marine mammal in time to implement mitigation measures.

Level B Harassment of Cetaceans

As shown in Table 4.1.2.6.1-1 for sonar, the risk function (including post-modeling analysis) plus an estimate of 135 minke whale exposures results in the estimate that 48,212 marine mammals will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. Modeling for Alternative 2 indicates 967 exposures from sonar to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s (the thresholds established to be indicative of onset TTS and onset PTS respectively). Modeling also indicates no exposures to accumulated acoustic energy above 215 dB re 1 μPa^2-s for sonar.

Estimates for the sub-TTS behavioral threshold indicate there may be 63 exposures resulting in behavioral harassment from successive explosions in a single event involving underwater detonations. Given that successive multiple explosions are rare events and considering range clearance, it is extremely unlikely there would be any exposures exceeding the sub-TTS behavioral threshold. Estimates for underwater detonations indicate there may be 80 TTS exposures. Modeling indicates no exposures to accumulated acoustic energy above 215 dB re 1 μPa^2-s resulting in PTS from explosives.

Therefore, under Alternative 2, it is estimated that in total, 49,322 marine mammals will exhibit behavioral responses NMFS will classify as Level B harassment. This includes 976 TTS and 48,221 risk function exposures (48,077 plus an estimated 135 minke whales) as a result of MFA/HFA sonar use (49,188 exposures) in addition to 143 exposures (63 sub-TTS exposures and 80 TTS exposures) as a result of underwater detonations (for explosives see Table 4.1.2.7.1-2).

Mitigation measures will be in place to further minimize the potential for temporary harassment, although there is currently no data to quantify the mitigation efforts to successfully reduce the number of marine mammal exposures. The Navy is developing a comprehensive Monitoring Plan to determine the effectiveness of these measures. Many species of small cetaceans travel in very large pods, and therefore would be easily observed from an elevated platform. In addition, large baleen whales travel slowly and are easily observed on the surface. In the decades of conducting Major Exercises in the HRC, there have been no documented incidences of harassments or beach strandings of marine mammals associated with active sonar or underwater explosives. In the one event associated with RIMPAC 2004, sonar was suggested to be a plausible contributing factor (Southall et al., 2006) although a similar event occurred on the same day in a bay at Rota Island, Northern Marianas Islands with no associated sonar (Jefferson et al., 2006) and may be related to oceanographic changes that influenced prey distribution (Southall, 2006; Ketten, 2006). The HRC Open Ocean waters continue to support diverse and stable populations of cetaceans. Based on the potential for Level B harassment, the Navy will consult with NMFS and apply for a 5-year Letter of Authorization under the MMPA.

Table 4.1.2.7.5-1. Alternative 2 Sonar Modeling Summary—Yearly Marine Mammal Exposures from Other HRC ASW Training

Marine Mammals	Risk Function	TTS[3]	PTS[4]
Bryde's whale	15	0	0
Fin whale[1, 2]	10	0	0
Sei whale[1, 2]	10	0	0
Humpback whale[1]	1,651	61	-
Sperm whale[1]	169	2	0
Dwarf sperm whale	462	10	0
Pygmy sperm whale	189	4	0
Cuvier's beaked whale	273	1	0
Longman's beaked whale	24	0	0
Blainville's beaked whale	78	2	0
Unidentified beaked whale	9	0	0
Bottlenose dolphin	155	5	0
False killer whale	10	0	0
Killer whale	10	0	0
Pygmy killer whale	42	1	0
Short-finned pilot whale	382	12	0
Risso's dolphin	106	3	0
Melon-headed whale	127	4	0
Rough-toothed dolphin	236	5	0
Fraser's dolphin	271	6	0
Pantropical spotted dolphin	466	14	0
Spinner dolphin	92	2	0
Striped dolphin	680	21	0
Monk seal[1]	30	1	0
TOTAL	5,497	154	0

Note: [1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
[3] 195 dB – TTS 195-215 dB re 1 μPa^2-s; for monk seals TTS is 204-224 dB re 1 μPa^2-s (Kastak et al., 1999a; 2005)
[4] 215 dB- PTS >215 dB re 1 μPa^2-s; for monk seals PTS is >224 dB re 1 μPa^2-s (Kastak et al., 1999b; 2005)
TTS = temporary threshold shift
PTS = permanent threshold shift

4.1.2.7.5 Increased Tempo and Frequency of Training—Alternative 2

The HRC training for Alternative 2 involving sonar includes ASW training as described in Table 2.2.2.3-1 and Appendix D. The number of hours of sonar modeled for Alternative 2 included 2,496 hours of AN/SQS 53 and 787 hours of AN/SQS 56 surface ship sonar, plus the associated sonobuoys, dipping sonar, MK-48 HFA sonar, and submarine sonar use on an annual basis. Modeled exposures for marine mammals during other HRC ASW training, without consideration of mitigation measures are presented in Table 4.1.2.7.5-1. Effects on marine mammals from these exposures are included in the discussion in Section 4.1.2.7.2 for ESA listed species and Section 4.1.2.7.3 for non-ESA listed species. Exposures from underwater detonations (i.e., SINKEX, EER/IEER, A-S MISSILEX, S-S MISSILEX, BOMBEX, S-S GUNEX, and NSFS) are included in the summary numbers in Table 4.1.2.7.1-2.

4.1.2.7.6 Enhanced and Future RDT&E Activities—Alternative 2

There are no new or future RDT&E activities that would affect marine animals. Noise sources such as UAVs, underwater communications, and electronic warfare systems that may be deployed in the ocean are generally transmitting above the frequency range or below the intensity level to affect marine animals. Other RDT&E activities identified as ASW do not include sonar or include very limited use of sonar and are generally of short durations (<1.5 hours). These activities would have minimal effects on fish, sea turtles, and marine mammals.

4.1.2.7.7 HRC Enhancements—Alternative 2

There are no new HRC enhancements that would affect marine animals. Other sources such as underwater communications and electronic warfare systems that may be deployed in the ocean are beyond the frequency range or intensity level to affect marine animals.

4.1.2.7.8 Major Exercises—RIMPAC, USWEX, and Multiple Strike Group Training—Alternative 2

RIMPAC

The number of hours of sonar modeled for Alternative 2 for RIMPAC is the same as detailed in the discussion for Alternative 1. An Alternative 2 RIMPAC, includes 798 hours of AN/SQS 53 and 266 hours of AN/SQS 56 surface ship sonar, plus the associated sonobuoys, dipping sonar, MK-48 HFA sonar, and submarine sonar use per RIMPAC (conducted every other year). The modeled exposures for marine mammals during RIMPAC for Alternative 2, without consideration of mitigation measures, are the same as presented in Table 4.1.2.6.8-1 for Alternative 1. Effects on marine mammals from these exposures under Alternative 2 are included in the discussion in Section 4.1.2.7.2 for ESA listed species and Section 4.1.2.7.3 for non-ESA listed species.

USWEX

The number of hours of sonar modeled for Alternative 2 for USWEX is the same as detailed in the discussion for Alternative 1. The training events and impacts on marine mammals from USWEX have been summarized in the USWEX Programmatic EA/OEA (U.S. Department of the Navy, 2007b). The number of hours of sonar modeled for Alternative 2 for USWEX is calculated based on there being six USWEXs annually. Six USWEX would total 630 hours of AN/SQS 53 and 210 hours of AN/SQS 56 surface ship sonar, plus associated sonobuoys, dipping sonar, MK-48 HFA sonar, and submarine sonar use on an annual basis. The exposures for marine mammals during up to six USWEXs per year are modeled without consideration of mitigation measures, and are the same presented in Table 4.1.2.6.8-2 for Alternative 1. Effects on marine mammals from these exposures under Alternative 2 are included in the discussion in Sections 4.1.2.7.2 for ESA listed species and 4.1.2.7.3 for non-ESA listed species.

Multiple Strike Group Training Exercise

Up to three Strike Groups would conduct training simultaneously in the HRC in a Multiple Strike Group Training Exercise. The Strike Groups would not be homeported in Hawaii, but would stop in Hawaii en route to a final destination. The Strike Groups would be in Hawaii for up to 10 days per exercise. Training would be provided to submarine, ship, and aircraft crews in tactics, techniques, and procedures for ASW, Defensive Counter Air, Maritime Interdiction, and operational level C2 of maritime forces. The three Strike Group marine mammal exposure modeling included 708 hours of AN/SQS 53 and 236 hours of AN/SQS 56 surface ship sonar plus the associated dipping sonar, sonobuoys, and MK-48 torpedoes using HFA. The modeled exposures for marine mammals during the Multiple Strike Group training exercise, without consideration of mitigation measures are presented in Table 4.1.2.7.8-1. Modeling assumed the exercise is conducted during the winter to account for potential humpback whale exposures. Effects on marine mammals from these exposures under Alternative 2 are included in the discussion in Sections 4.1.2.7.2 for ESA listed species and 4.1.2.7.3 for non-ESA listed species.

4.1.2.8 MARINE MAMMALS ALTERNATIVE 3 (BIOLOGICAL RESOURCES—OPEN OCEAN)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Sonar usage for Alternative 3 and the impacts associated with ASW training, therefore, would be identical to the sonar usage and analysis presented for the No-action Alternative (Tables 4.1.2.5.1-1, 4.1.2.5.5-1, 4.1.2.5.7-1, and 4.1.2.5.7-2). Impacts associated with explosives would be as described in Section 4.1.2.7 and shown in Table 4.1.2.7.1-2.

4.1.2.8.1 Summary of Compliance with ESA and MMPA—Alternative 3

Potential impacts on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are the same as those analyzed for the No-action Alternative. Potential impacts on marine biological resources from non-ASW (sonar usage) training activities and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2. Conclusions regarding the potential for impact are based on analytical modeling results, the history of ongoing activities in the HRC, NMFS conclusions in the Biological Opinions issued regarding RIMPAC 2006 and USWEX 2007 and after-action reports from those exercises. Modeling and estimates for explosives indicates three potential exposures that may result in slight injury, however, given the standard mitigation measures and range clearance procedures, these exposures are unlikely. Navy finds that the HRC training events analyzed for

Alternative 3 would not result in any injury or death to any sea turtles or marine mammal species and would have negligible impact on annual survival, recruitment, and birth rates.

Table 4.1.2.7.8-1. Alternative 2 Sonar Modeling Summary—Yearly Marine Mammal Exposures for Multiple Strike Group Training Exercise

Marine Mammals	Risk Function	TTS[3]	PTS[4]
Bryde's whale	45	0	0
Fin whale[1, 2]	33	1	0
Sei whale[1, 2]	33	1	0
Humpback whale[1]	2,816	126	0
Sperm whale[1]	466	4	0
Dwarf sperm whale	1,453	18	0
Pygmy sperm whale	593	7	0
Cuvier's beaked whale	708	3	0
Longman's beaked whale	71	1	0
Blainville's beaked whale	246	3	0
Unidentified beaked whale	23	0	0
Bottlenose dolphin	464	9	0
False killer whale	33	1	0
Killer whale	33	1	0
Pygmy killer whale	132	3	0
Short-finned pilot whale	1,145	21	0
Risso's dolphin	318	6	0
Melon-headed whale	382	7	0
Rough-toothed dolphin	745	9	0
Fraser's dolphin	857	11	0
Pantropical spotted dolphin	1,351	26	0
Spinner dolphin	290	4	0
Striped dolphin	1,972	38	0
Monk seal[1]	59	2	0
TOTAL	14,268	302	0

Note: [1] Endangered Species
[2] Due to a lack of density data for fin and sei whales, false killer whale results were used because they have a similar size population within the HRC.
[3] 195 dB – TTS 195-215 dB re 1 µPa^2-s; for monk seals TTS is 204-224 dB re 1 µPa^2-s (Kastak et al., 1999a; 2005)
[4] 215 dB- PTS >215 dB re 1 µPa^2-s; for monk seals PTS is >224 dB re 1 µPa^2-s (Kastak et al., 1999b; 2005)
dB = decibel
TTS = temporary threshold shift
PTS = permanent threshold shift

ESA

In accordance with Section 7 of the ESA, the Navy has undertaken Section 7 consultation with NMFS for the proposed and ongoing activities in the HRC under Alternative 3 as the preferred alternative for listed species under the jurisdiction of NMFS. The Navy finds that activities under Alternative 3 are not likely to affect green, olive ridley, loggerhead, hawksbill, or leatherback sea turtles. The Navy additionally finds that the proposed and ongoing activities in the HRC may affect but are not likely to adversely affect endangered blue whale, North Pacific right whale, fin whales, Hawaiian monk seals, humpback whales, sei whales, and sperm whales.

MMPA

The Navy has initiated consultation with NMFS in accordance with the MMPA on Alternative 3. The Navy estimates 27,704 marine mammals will exhibit behavioral responses that NMFS will classify as harassment under the MMPA. From this total, modeling for Alternative 3 indicates 522 exposures to accumulated acoustic energy between 195 dB and 215 dB re 1 μPa^2-s, which are the thresholds established to be indicative of onset TTS and onset PTS respectively. Modeling indicates no exposures to accumulated acoustic energy above 215 dB re 1 μPa^2-s. Modeling and estimates for explosives indicates three potential exposures that may result in slight injury, however, given the standard mitigation measures and range clearance procedures, these exposures are unlikely.

Therefore, the Navy estimates that in total, 27,704 marine mammals will exhibit behavioral responses NMFS will classify as Level B harassment. This includes 522 TTS and 27,039 risk function exposures (26,975 plus an estimated 64 minke whales) as a result of MFA/HFA sonar use (27,561 exposures) in addition to 143 exposures (63 sub-TTS exposures and 80 TTS exposures) as a result of underwater detonations (for explosives see Table 4.1.2.7.1-2). The Navy remains in consultation with NMFS, and would request authorization from NMFS for 27,704 MMPA Level B harassment takes and no Level A harassments under Alternative 3 (the preferred alternative).

4.1.2.9 MARINE MAMMAL MORTALITY REQUEST

Under the MMPA, the Navy is requesting a Letter of Authorization (LOA) for the incidental harassment of marine mammals pursuant to Section 101 (a)(5)(A) of the MMPA for the proposed and ongoing activities analyzed under Alternative 3 as the preferred alternative. The authorization requested is for the incidental harassment of marine mammals by behavioral disruption. It is understood that an LOA is applicable for up 5 years, and is appropriate where authorization for serious injury or mortality of marine mammals is requested. In this case, per Navy policy developed in conjunction with NMFS based on assessment of prior stranding events, a subset of beaked whales that experience disruption of natural behavioral patterns could experience secondary effects leading to serious injury or mortality. The request is for exercises and training events conducted within the HRC. These include training that use MFA/HFA sonar or underwater detonations. The request is for a 5-year period beginning at the issuance of the LOA (estimated to be November 2008) or the date of expiration for the NDE II on 20 January 2009; whichever comes first.

The acoustic modeling approach taken in the HRC EIS/OEIS and the LOA request attempts to quantify potential exposures to marine mammals resulting from operation of MFA/HFA sonar and underwater detonations. Results from this conservative modeling approach are presented without consideration of mitigation measures employed per Navy SOPs. For example, securing or turning off an active sonar when an animal approaches closer than a specified distance reduces potential exposure since the sonar is no longer transmitting. Modeling results from the HRC analysis does not predict any marine mammal mortalities. Modeling results do predict that one humpback whale could be exposed to sonar in excess of PTS threshold indicative of Level A injury under Alternative 2. However, given standard mitigation measures presented in Chapter 6.0, and the high likelihood that humpback whales can be readily detected, a single Level A exposure is very unlikely.

To reiterate an important point, the history of Navy activities in the HRC and analysis in this document indicate that military readiness activities are not expected to realistically result in any sonar–induced Level A injury or mortalities to marine mammals.

There are natural and manmade sources of mortality other than sonar and underwater detonation that may contribute to stranding events as described in the Cetacean Stranding Section (Section 4.1.2.4.10). Documented marine mammal strandings are a regular occurrence within the Hawaiian Islands since early record keeping began in the 1930's (Mazzuca et al., 1999, Maldini et al., 2005). For instance, 22 cetacean and 14 Hawaiian monk seal strandings or boat strikes were reported in Hawaiian waters during 2006 (National Marine Fisheries Service, Pacific Islands Region Office, 2007a). Of these 22 strandings (involving 7 species), 17 are attributed to either vessel strikes or fisheries interaction. In a review of mass strandings within Hawaii, approximately two-thirds occurred during the summer (Mazzuca et al., 1999). The actual cause of a particular stranding may not be immediately apparent when there is little evidence of physical trauma, especially in the case of disease or age-related mortalities. These events require careful scientific investigation by a collaborative team of subject matter experts to determine actual cause of death.

In a letter from NMFS to Navy dated October 2006, NMFS indicated that Section 101(a)(5)(A) authorization is appropriate for MFA/HFA sonar activities because it allows NMFS to consider the potential for incidental mortality. NMFS' letter indicated, "Because mid-frequency sonar has been implicated in several marine mammal stranding events including some involving serious injury and mortality, and because there is no scientific consensus regarding the causal link between sonar and stranding events, NMFS cannot conclude with certainty the degree to which mitigation measures would eliminate or reduce the potential for serious injury or mortality." In addition, given the frequency of naturally occurring marine mammal strandings in Hawaii (e.g., natural mortality), it is conceivable that a stranding could co-occur with a Navy exercise even though the stranding is actually unrelated to and not caused by Navy activities. Accordingly, the Navy's LOA application will include requests for take, by mortality, of the most commonly stranded non ESA-listed species.

Evidence from five beaked whale strandings, all of which have taken place outside the HRC, and have occurred over approximately a decade, suggests that the exposure of beaked whales to MFA sonar in the presence of certain conditions (e.g., multiple units using tactical sonar, steep bathymetry, constricted channels, strong surface ducts, etc.) may result in strandings, potentially leading to mortality. Although these physical factors believed to contribute to the likelihood of beaked whale strandings are not present, in their aggregate, in the Hawaiian Islands, scientific uncertainty exists regarding what other factors, or combination of factors, may contribute to beaked whale strandings.

There have been no beaked whales strandings in Hawaii associated with the use of MFA/HFA sonar. This is a critically important contextual difference between Hawaii and areas of the world where strandings have occurred (rf. Southall et al., 2007). While the absence of evidence does not prove there have been no impacts on beaked whales, decades of history with no evidence cannot be lightly dismissed. Accordingly, however, to allow for scientific uncertainty regarding contributing causes of beaked whale strandings and the exact mechanisms of the physical effects, the Navy will also request authorization for take, by mortality, of the beaked whale species present in the Hawaiian Islands. Neither NMFS nor the Navy anticipates that marine mammal strandings or mortality will result from the operation of MFA/HFA sonar during Navy exercises within the HRC. Authorization for a very small number of mortalities for beaked whales and commonly stranded species is prudent given the potential for a single individual of these species to be found dead coincident with Navy activities given an average of two strandings per month occur in Hawaii.

Through the MMPA process (which allows for adaptive management), NMFS and the Navy will determine the appropriate way to proceed in the unlikely event that a causal relationship were to be found between Navy activities and a future stranding. The Navy's LOA application requests the take, by serious injury or mortality, of 2 each of 10 species (bottlenose dolphin, Kogia *spp*., melon-headed whale, pantropical spotted dolphin, pygmy killer whale, short-finned pilot whale, striped dolphin, Cuvier's, Longman's, and Blainville's beaked whales), however, these numbers may be modified through the MMPA process, based on available data.

4.1.3 CULTURAL RESOURCES—OPEN OCEAN

4.1.3.1 NO-ACTION ALTERNATIVE, ALTERNATIVE 1, ALTERNATIVE 2, AND ALTERNATIVE 3 (CULTURAL RESOURCES OPEN OCEAN)

There are numerous submerged cultural resources (primarily shipwrecks) widely scattered throughout the region of influence for Open Ocean training and RDT&E activities (see Figures 3.1.3-1 through 3.1.3-3). There are no dense clusters of resources and, according to NOAA shipwreck maps, the features are situated at considerable depths. With the exception of resources within Naval Station Pearl Harbor (e.g., *USS Arizona*, *USS Utah*), there are no shipwrecks listed in the National or State Registers of Historic Places. Humpback whales and other marine mammals, which are considered culturally significant to Native Hawaiians, seasonally transit the area.

The only training event with the potential to affect submerged cultural resources in the open (deep) ocean areas is SINKEX. SINKEX involves the sinking of surface targets (typically excess vessel hulks) by air, surface, or submarine weapons systems. After the target is destroyed, the remaining expended material settles to the sea floor. Because of the significant depths and scattered distribution of shipwrecks within this 235,000 nm^2 area, the likelihood of the expended material from the target coming in contact with a shipwreck is very low. In the remote chance that target material does sink onto a shipwreck, effects on the feature would be minimal because of the size of the material involved and the cushioning effect that water has on the weight of materials at those depths. In addition, if the exact locations of shipwrecks can be determined prior to training, they will be avoided. As a result, adverse effects on cultural resources within open ocean areas from any of the alternatives are not expected.

Animals, including humpback whales and other marine mammals that may have cultural significance to Native Hawaiians, are not directly protected by the NHPA; however, they are protected under the ESA and MMPA. Any anticipated effects and associated mitigation measures on marine mammals under these acts are presented within the biological sections of this EIS/OEIS.

Although effects on underwater cultural resources are not anticipated, the potential for unanticipated discovery of underwater resources always exists. To ensure that previously unidentified submerged cultural resources are adequately protected, the Commander, Naval Region (COMNAVREG), the Advisory Council on Historic Preservation (Council), and the Hawaii SHPO entered into a Programmatic Agreement (PA) in 2003 regarding Navy undertakings in Hawaii (Appendix H). Among the stipulations of the PA is one focused on unanticipated discoveries: Stipulation XI(A). The PA stipulates; “If during the performance of an undertaking, historic properties, including submerged archaeological sites and TCPs, are discovered or unanticipated effects are found, or a previously unidentified property which may be eligible for listing on the National Register of Historic Places is discovered, COMNAVREG Hawaii will take all reasonable measures to avoid or minimize harm to the property until it concludes consultation with the State Historic Preservation Office and any Native Hawaiian organization, including OCHCC, which has made known to COMNAVREG Hawaii that it attaches religious and cultural significance to the historic property.”

4.1.4 HAZARDOUS MATERIALS & WASTES—OPEN OCEAN

4.1.4.1 NO-ACTION ALTERNATIVE (HAZARDOUS MATERIALS AND WASTES—OPEN OCEAN)

4.1.4.1.1 HRC Training—No-action Alternative

Hazardous Materials

Navy training conducted under the No-action Alternative will require the use of a variety of solid and liquid hazardous materials. Hazardous materials required on the open ocean ranges can be broadly classified as shipboard materials necessary for normal operations and maintenance, such as fuel and paint, and training materials. Training materials include both live and practice munitions (considered to be hazardous materials because they contain explosives or propellants), and non-munition training materials. Table 4.1.4.1.1-1 lists training involving the use of training materials containing hazardous materials.

Under the No-action Alternative, the use of hazardous materials for shipboard operations will not increase from baseline levels. Hazardous materials will continue to be controlled in compliance with OPNAVINST 5090.1B (2002), Chapter 19. The No-action Alternative will not affect hazardous materials management practices aboard ship.

Table 4.1.4.1.1-1. HRC Training with Hazardous Materials No-action Alternative—Open Ocean Areas

Training Event	Training Materials Containing Hazardous Material		
	Item	# per training event	Total #
Air Combat Maneuver (ACM)	Chaff	6	4,428
	Flare	3	2,214
Surface-to-Air Gunnery Exercise (S-A GUNEX)	5-in projectile	3	258
	7.62-mm projectile	3	258
	JATO bottle	1	86
	20-mm projectile	1,900	163,000
Surface-to-Air Missile Exercise (S-A MISSILEX)	Missile	3	51
	JATO Bottle	1	17
Chaff Exercise (CHAFFEX)	MK-36 super rapid bloom offboard chaff	7.5	255
Naval Surface Fire Support (NSFS)	5-in or 76-mm ammunition	82	1,804
	20-mm projectile	8	176
Visit, Board, Search, and Seizure (VBSS)	0.50 caliber gun ammunition	2,000	120,000
Surface-to-Surface Gunnery Exercise (S-S GUNEX)	5-in or 76-mm ammunition	20	1,380
	Smoke canister	0.52	36
	7.62-mm or .50-cal ammunition	150	10,400
Surface-to-Surface Missile Exercise (S-S MISSILEX)	Missile	2	14
Air-to-Surface Gunnery Exercise (A-S GUNEX)	0.50-cal or 7.62-mm ammunition	400	51,200
	Smoke canister	1	128
Air-to-Surface Missile Exercise (A-S MISSILEX)	Missile	2	72
Bombing Exercise (BOMBEX) (Sea)	MK-76	9	315
	MK-82	3	105
	BDU-45	1.7	60
	CBU	1	35
	MK-83	0.5	18
	Smoke canister	1	35
Sinking Exercise (SINKEX)	5-in or 76-mm ammunition	700	4,200
	Missiles	11	66
	MK-82	4	24
	MK-83	4	24
	MK-84	4	24
Anti-Surface Warfare (ASUW) Torpedo Exercise (TORPEX) (Submarine-Surface)	MK-48 torpedo	3	105
Anti-Submarine Warfare Tracking Exercise (ASW TRACKEX)	Sonobuoys	24-43	12,500
	Smoke canister	1-2	558
	MK-39	0-1	305
Anti-Submarine Warfare Torpedo Exercise (ASW TORPEX)	Recoverable Exercise Torpedo (REXTORP)	1	500
	MK-39	1	500
Flare Exercise	Flare	1	6

Expended Training Materials

Various types of training items will be shot, launched, dropped, or placed within the Open Ocean Area under the No-action Alternative. Some training materials, including gun ammunition, bombs and missiles, targets, sonobuoys, chaff, and flares, will be expended on the range and not recovered. Items that are expended on the water, and fragments that are not recognizable as training material (e.g., flare residue or candle mix), typically will not be recovered. Sonobuoys and flares, smoke buoys and markers, and other pyrotechnic training devices expended in the water can leak or leach small amounts of toxic substances as they degrade and decompose. Section 4.1.7, Water Resources – Open Ocean, has a more comprehensive analysis effects of expended materials on ocean water quality.

Based on the assumed expenditure rates and training tempo (see Table 4.1.4.1.1-1), about 654 tons of training materials will be expended in the 235,000 nm^2 HRC annually, or about 5.6 lb/nm^2. If an additional assumption is made that these materials will not be distributed uniformly over the range, but that >99 percent of the material will be expended over only about 20 percent of the range, then about 28 lb/nm^2 will be deposited annually. If the debris remains in the top 6 inches of bottom sediments, and the bottom sediments have about the same density, dry weight, as terrestrial soils, then the concentration of these materials in bottom sediments will increase at a rate of about 15 parts per billion (ppb) per year.

A small percentage of training items containing energetic materials will fail to function properly, and—if not recovered—will remain on the sea floor as unexploded ordnance (UXO). Based on an assumed “dud” rate of 5 percent, approximately 1,500 ordnance items per year may become UXO. Over a 20-year period of use, for example, this UXO would reach a concentration of about 1 item per 10 nm^2.

Expended training items will decompose very slowly, so the volume of decomposing training material within the training areas, and the amounts of toxic substances being released to the environment, will gradually increase over the period of military use. Concentrations of some substances in sediments surrounding the disposed items will increase over time, possibly inhibiting benthic flora and fauna.

Within the approximately 235,000 nm^2 of ocean encompassed by the HRC, however, the amount of ocean bottom habitat affected by a few tons per year of training material will be insignificant, even assuming that some portions of the training areas are used more heavily than others. Over a 20-year period, for example, based on the assumptions made above for annual expenditures, the total concentration of these materials will be about 0.3 parts per million (ppm). Sediment transport via currents can eventually disperse these contaminants outside of the training areas, where they will be present at very low concentrations and, thus, have no effect on the environment.

<u>Sonobuoys</u>

Sonobuoys are electromechanical devices used for a variety of ocean sensing and monitoring tasks. Approximately 12,500 sonobuoys, weighing a total of about 244 tons will be deployed annually for training under the No-action Alternative. Lead solder, lead weights, and copper anodes are used in the sonobuoys. Sonobuoys also may contain lithium sulfur dioxide, lithium, or thermal batteries.

A sonobuoy's seawater batteries can release copper, silver, lithium, or other metals. During operation, the sonobuoy floats in the water column, releasing these materials to the surrounding marine environment; the amounts released depend on the type of battery used. Marine organisms in its vicinity can be exposed to battery effluents for up to 8 hours. Once expended and scuttled, the sonobuoy sinks to the ocean floor. Various types of sonobuoys can be used, so the exact amounts of hazardous materials that will be expended on the ranges are not known. Table 4.1.4.1.1-2 provides estimates of potentially hazardous sonobuoy materials, based on the common types of sonobuoys now in use by the Navy.

Table 4.1.4.1.1-2: Sonobuoy Hazardous Materials, No-action Alternative (based on average amounts of constituents)

Sonobuoy Constituent	Annual Amount (pounds)
Fluorocarbons	250
Copper	4,250
Lead	11,800
Copper thiocyanate	19,900
Tin/lead-plated steel	750
TOTAL	37,000

Pyrotechnic Residues

About 757 smoke grenades and about 2,220 flares will be used annually under the No-action Alternative. Solid flare and pyrotechnic residues may contain, depending on their purpose and color, aluminum, magnesium, zinc, strontium, barium, cadmium, nickel, and perchlorates. At an average residue weight of about 0.85 lb per item, an estimated 1.3 tons per year of these residues will be deposited on the sea floor. Based on an area of 235,000 nm^2, the rate of deposition of these materials will be about 0.01 lb/nm^2 per year.

Hazardous constituents in pyrotechnic residues are typically present in small amounts or low concentrations, and are bound up in relatively insoluble compounds. As inert, incombustible solids with low concentrations of leachable metals, these materials typically do not meet the Resource Conservation and Recovery Act (RCRA) criteria for characteristic hazardous wastes. The perchlorate compounds present in the residues are highly soluble, although persistent (i.e., do not break down readily into other compounds under natural conditions) in the environment, and should disperse quickly.

Chaff

Chaff is a thin polymer with an aluminum coating used to decoy enemy radars. All of the components of the aluminum coating are present in seawater in trace amounts, except magnesium, which is present at 0.1 percent. The stearic acid coating is biodegradable and nontoxic. The chaff is shot out of launchers using a propellant charge. Under the No-action Alternative, it is estimated that 34 CHAFFEX and 738 ACMs will be held per year, releasing about 4,700 packages of chaff over the Open Ocean Area. About 4.4 tons of chaff would be released annually, or about 0.04 lb/nm^2, but these releases would be distributed over the year, such that the chaff from one exercise would disperse prior to a subsequent event.

The chaff fibers are well-dispersed upon ejection from the launcher. The fine, neutrally buoyant chaff streamers act like fine particulates upon entering the water, temporarily increasing the turbidity and reducing the clarity of the ocean's surface waters. The fibers are quickly dispersed more widely by wind, waves, and currents.

The fibers are too short and fine to pose an entanglement risk. They may be accidentally or intentionally ingested by marine life, but the fibers are non-toxic. Chemicals leached from the chaff will be diluted by the surrounding seawater, reducing the potential for concentrations of these chemicals to build up to levels that can affect sediment quality and benthic habitats. The widely spaced releases will have no discernable effect on the marine environment. (U.S. Department of the Air Force, 1997)

Hazardous Wastes

Used hazardous materials and chemical byproducts generated at sea are not considered to be hazardous wastes until offloaded in port. The accumulation of used hazardous materials aboard ship will not increase. Used and excess hazardous wastes will continue to be managed in compliance with OPNAVINST 5090.1B (2003), Chapter 12. The No-action Alternative will not affect hazardous materials management practices aboard ship. Hazardous wastes will be offloaded upon reaching port in Hawaii, and enter the Navy's shore-side waste management system, which has sufficient long-term capacity for these waste streams.

4.1.4.1.2 HRC RDT&E Activities—No-action Alternative

HRC RDT&E activities under the No-action Alternative will consist of the Naval Undersea Warfare Center (NUWC) shipboard tests on the Fleet Operational Readiness (FORACS) and Shipboard Electronic Systems Evaluation Facility (SESEF) ranges. Navy vessels engaged in these activities will use small quantities of hazardous materials and generate small quantities of used hazardous materials during routine ship operations. These materials will be managed in accordance with OPNAVINST 5090.1B. Hazardous materials inventories will be replenished and used hazardous materials will be offloaded while the vessels are in port.

4.1.4.1.3 Major Exercises—No-action Alternative

Major Exercises under the No-action Alternative, such as RIMPAC and USWEX, include combinations of unit-level training and, in some cases, RDT&E activities that have been occurring in the HRC for decades. Potential impacts from Major Exercises will be similar to those described earlier for training and RDT&E activities.

4.1.4.2 ALTERNATIVE 1 (HAZARDOUS MATERIALS AND WASTES—OPEN OCEAN)

4.1.4.2.1 Increased Tempo and Frequency of Training—Alternative 1

Hazardous Materials

Increases in shipboard hazardous materials transport, storage, and use to support increased training under Alternative 1 would be managed in compliance with OPNAVINST 5090.1B (2002), Chapter 19. No new types of hazardous materials would be required under Alternative 1, and existing hazardous materials storage and handling facilities, equipment, supplies, and procedures would continue to provide for adequate management of these materials. No releases of hazardous materials to the environment and no unplanned exposures of personnel to hazardous materials are anticipated under this alternative.

Open Ocean Area training involving hazardous materials would increase by varying degrees from current levels in support of the Fleet Response Training Plan (FRTP). Those increases are described in Table 4.1.4.2.1-1; the amounts of hazardous wastes from sonobuoys would be the same as under the No-action Alternative (see Table 4.1.4.1.1-2). Only the number of training events would increase; no new types of training would be introduced. Air-to-surface gunnery and air combat maneuvers would experience the largest percentage increases from baseline levels under Alternative 1. Amounts of expended training materials would increase in rough proportion to the overall increases in training.

Under Alternative 1, the total amount of expended training materials would increase by about 80 tons over the No-action Alternative, a 12 percent increase. Under the same assumptions as presented above for the No-action Alternative, the annual rate of deposition of expended training materials would be about 31 lb/nm^2, or an annual increase in concentration of about 17 ppb. Over 20 years, the concentration of expended training materials in bottom sediments (top 6 inches) would increase by about 0.34 ppm, compared to about 0.3 ppm under the No-action Alternative. Annual deposits of UXO would be about 1,580 items compared with about 1,500 under the No-action Alternative.

Hazardous Wastes

The amounts of hazardous wastes generated by training under Alternative 1 would be incrementally greater than those under the No-action Alternative (see Table 4.1.4.2.1-1). These incremental increases, however, would still be well within the capacity of the Navy's hazardous waste management system. All hazardous wastes would continue to be managed in compliance with OPNAVINST 5090.1B (2003). No substantial changes in hazardous waste management are anticipated for operating Navy assets under Alternative 1.

4.1.4.2.2 Enhanced RDT&E Activities—Alternative 1

RDT&E activities under Alternative 1 would consist of the NUWC shipboard tests on the FORACS and SESEF ranges. Navy vessels engaged in these activities would use minor quantities of hazardous materials and generate minor quantities of used hazardous materials during routine ship operations. These materials would be managed in accordance with OPNAVINST 5090.1B. Hazardous materials inventories would be replenished and used hazardous materials would be offloaded while the vessels are in port.

4.1.4.2.3 HRC Enhancements—Alternative 1

None of the HRC enhancements would have a substantial effect on hazardous materials use or hazardous waste generation under Alternative 1.

4.1.4.2.4 Major Exercises—Alternative 1

Major Exercises consist of training and, in some cases, RDT&E activities, both addressed above. Potential impacts would be similar to those described earlier for training and RDT&E activities.

Table 4.1.4.2.1-1. HRC Training with Hazardous Training Materials Alternative 1—Open Ocean Areas

Training Event	Training Material			
	Item	Annual Quantity (#)		
		No-action	Alt 1	Change
Air Combat Maneuver (ACM)	Chaff	4,428	4,644	216
	Flare	2,214	2,322	108
Surface-to-Air Gunnery Exercise (S-A GUNEX)	5-in projectile	258	324	66
	7.62-mm projectile	258	324	66
	JATO Bottle	86	108	22
	20-mm projectile	163,000	205,000	42,000
Surface-to-Air Missile Exercise (S-A MISSILEX)	Missile	51`	78	27
	JATO Bottle	17	26	9
Chaff Exercise (CHAFFEX)	MK-36 Super Rapid Bloom Offboard Chaff	255	255	0
Naval Surface Fire Support (NSFS)	5-in or 76-mm ammunition	1,804	2,296	492
	20-mm projectile	176	224	48
Visit, Board, Search, and Seizure (VBSS)	0.50-caliber gun ammunition	120,000	120,000	0
Surface-to-Surface Gunnery Exercise (S-S GUNEX)	5-in or 76-mm ammunition	1,380	1,820	440
	Smoke canister	36	47	11
	7.62-mm / 0.50-cal ammunition	10,400	13,700	3,300
Surface-to-Surface Missile Exercise (S-S MISSILEX)	Missile	14	24	10
Air-to-Surface Gunnery Exercise (A-S GUNEX)	7.62-mm / 0.50-cal ammunition	51,200	60,800	9,600
	Smoke canister	128	152	24
Air-to-Surface Missile Exercise (A-S MISSILEX)	Missile	72	100	28
Bombing Exercise (BOMBEX) (Sea)	MK-76	315	315	0
	MK-82	105	105	0
	BDU-45	60	60	0
	CBU	35	35	0
	MK-83	18	18	0
	Smoke canister	35	35	0
Sinking Exercise (SINKEX)	5-in or 76-mm ammunition	700	700	0
	Missiles	66	66	0
	MK-82	24	24	0
	MK-83	24	24	0
	MK-84	24	24	0
Anti-Surface Warfare Torpedo Exercise (ASUW TORPEX) (Submarine-Surface)	MK-48 torpedo	105	105	0
Anti-Submarine Warfare Tracking Exercise (ASW TRACKEX)	Sonobuoy	12,500	12,500	0
	Smoke canister	558	558	0
	MK-39	305	305	0
Anti-Submarine Warfare Torpedo Exercise (ASW TORPEX)	Recoverable Exercise Torpedo (REXTORP)	500	500	0
	MK-39	500	500	0
Flare Exercise (FLAREX)	Flare	6	6	0

Note: Training events not listed above are assumed to have no hazardous materials associated with them.

4.1.4.3 ALTERNATIVE 2 (HAZARDOUS MATERIALS AND WASTES—OPEN OCEAN)

4.1.4.3.1 Increased Tempo and Frequency of Training—Alternative 2

Hazardous Materials

Increases in shipboard hazardous materials transport, storage, and use to support increased training under Alternative 2 would be managed in compliance with OPNAVINST 5090.1B (2002). No substantial changes in hazardous materials management practices for ordinary ship operations and maintenance are anticipated under Alternative 2.

Open-ocean training involving hazardous materials would increase by varying degrees from current levels in support of the FRTP. Only the number of training events would increase; no new types of training would be introduced. Amounts of expended training materials would increase in rough proportion to the overall increase in training (see Table 4.1.4.3.1-1). Table 4.1.4.3.1-2 shows the increase in releases of hazardous materials for sonobuoys.

Under Alternative 2, the total amount of expended training materials would increase by about 113 tons over the No-action Alternative, a 17 percent increase. Under the same assumptions as presented above for the No-action Alternative, the annual rate of deposition of expended training materials would be about 33 lb/nm^2, or an annual increase in concentration of about 18 ppb. Over 20 years, the concentration of expended training materials in bottom sediments (top 6 inches) would increase by about 0.35 ppm, compared to about 0.3 ppm under the No Action Alternative. Annual deposits of UXO would be about 1,690 items compared with about 1,500 under the No-action Alternative, or less than one per 100 nm^2.

Hazardous Wastes

The overall amount of hazardous waste generated by normal vessel and aircraft operation and maintenance during training under Alternative 2 would be more than that generated under the No-action Alternative. This increase would be due primarily to the increased number of training events anticipated under Alternative 2. All hazardous wastes would continue to be managed in compliance with OPNAVINST 5090.1B (2003), Chapter 12. No substantial changes in hazardous materials management practices are anticipated under Alternative 2.

4.1.4.3.2 Enhanced RDT&E Activities—Alternative 2

RDT&E activities under Alternative 2 would consist of the NUWC shipboard tests on the FORACS and SESEF ranges. Navy vessels engaged in these activities would use minor quantities of hazardous materials and generate minor quantities of used hazardous materials during routine ship operations. These materials would be managed in accordance with OPNAVINST 5090.1B. Hazardous materials inventories would be replenished, and used hazardous materials would be offloaded while the vessels are in port.

Table 4.1.4.3.1-1. HRC Training with Hazardous Training Materials Alternative 2—Open Ocean Areas

Training Event	Training Material			
	Item	Annual Quantity (#)		
		No-action	Alt 2	Change
Air Combat Maneuver (ACM)	Chaff	4,428	4,884	456
	Flare	2,214	2,442	228
Surface-to-Air Gunnery Exercise (S-A GUNEX)	5-in projectile	258	324	66
	7.62-mm projectile	258	324	66
	JATO Bottle	86	108	22
	20-mm projectile	163,000	205,000	42,000
Surface-to-Air Missile Exercise (S-A MISSILEX)	Missile	51	78	27
	JATO Bottle	17	26	9
Chaff Exercise (CHAFFEX)	MK-36 Super Rapid Bloom Offboard Chaff	255	278	23
Naval Surface Fire Support (NSFS)	5-in or 76 mm ammunition	1,804	2,296	492
	20-mm projectile	176	224	48
Visit, Board, Search, and Seizure (VBSS)	0.50 caliber gun ammunition	120,000	132,000	12,000
Surface-to-Surface Gunnery Exercise (S-S GUNEX)	5-in or 76-mm ammunition	1,380	1,820	440
	Smoke canister	36	47	11
	7.62-mm / 0.50-cal ammunition	10,400	13,700	3,300
Surface-to-Surface Missile Exercise (S-S MISSILEX)	Missile	14	24	10
Air-to-Surface Gunnery Exercise (A-S GUNEX)	7.62-mm / 0.50-cal ammunition	51,200	60,800	9,600
	Smoke canister	128	152	24
Air-to-Surface Missile Exercise (A-S MISSILEX)	Missile	72	100	28
Bombing Exercise (BOMBEX) (Sea)	MK-76	315	342	27
	MK-82	105	114	9
	BDU-45	60	65	5
	CBU	35	38	3
	MK-83	18	19	1
	Smoke canister	35	38	3
Sinking Exercise (SINKEX)	5-in or 76-mm ammunition	700	700	0
	Missiles	66	66	0
	MK-82	24	24	0
	MK-83	24	24	0
	MK-84	24	24	0
Anti-Surface Warfare Torpedo Exercise (ASUW TORPEX) (Submarine-Surface)	MK-48 torpedo	105	114	9
Anti-Submarine Warfare Tracking Exercise (ASW TRACKEX)	Sonobuoy	12,500	13,900	1,400
	Smoke canister	558	621	63
	MK-39	305	339	34
Anti-Submarine Warfare Torpedo Exercise (ASW TORPEX)	Recoverable Exercise Torpedo (REXTORP)	500	650	150
	MK-39	500	650	150
Flare Exercise (FLAREX)	Flare	6	7	1

Note: Training events not listed above are assumed to have no hazardous materials associated with them.

Table 4.1.4.3.1-2. Sonobuoy Hazardous Materials, Alternative 2 (based on average amounts of constituents)

Sonobuoy Constituent	Annual Amount lb	Increase Over Baseline (percent)
Fluorocarbons	278	11
Copper	4,730	11
Lead	13,100	11
Copper thiocyanate	22,100	11
Tin/lead-plated steel	834	11
TOTAL	41,000	11

Note: values rounded to three significant digits.
Source: U.S. Department of the Navy, no date. San Clemente Island Ordnance Database

4.1.4.3.3 Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Hazardous Materials

Up to three Strike Groups would be allowed to conduct training simultaneously in the HRC. Vessels, aircraft, and other military assets employed in training would carry and use hazardous materials for routine operation and maintenance. Increased hazardous materials storage, transport, or use resulting from these additional training events would be managed in compliance with OPNAVINST 5090.1B (2002).

Hazardous Wastes

Vessels, aircraft, and other military assets employed in the Strike Group Exercises would generate hazardous wastes from routine operation and maintenance activities. Increased hazardous wastes storage, transport, and disposal resulting from these additional training events would be managed in compliance with OPNAVINST 5090.1B (2002), Chapter 19. This alternative would not affect hazardous materials management practices aboard ship.

4.1.4.4 ALTERNATIVE 3 (HAZARDOUS MATERIALS AND WASTES—OPEN OCEAN)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on hazardous materials and waste under Alternative 3 would be the same as those described for Alternative 2.

4.1.5 HEALTH AND SAFETY—OPEN OCEAN

4.1.5.1 NO-ACTION ALTERNATIVE (HEALTH AND SAFETY—OPEN OCEAN)

4.1.5.1.1 HRC Training—No-action Alternative

Public Safety

Training that occurs over the Open Ocean Area will continue to be conducted mainly in Warning Areas. Range Safety officials will ensure that projectiles, lasers, targets, and missiles are operated safely, and that Air Operations and other potentially hazardous training events are safely executed in controlled areas. The Navy's standard range safety procedures are designed to minimize risks to the public and to Navy training and its personnel. Before any potentially hazardous training is allowed to proceed, the overwater target area will be determined to be clear using inputs from ship sensors, visual surveillance of the range from aircraft and range safety boats, and radar and acoustic data.

Target areas will be cleared of personnel prior to conducting training, so the only public health and safety issue will be if a training event has a significant failure leading to debris or expended materials outside the expected area. Risks to public health and safety are minimized by clearing a hazard area that accounts for potential failures. For some vehicles, the hazard area is sufficiently contained due to physical limits of the vehicle (such as an unguided rockets) that flight termination system is not required. For other test vehicles (such as guided missiles), a flight termination system is required, which provides high reliability that no debris will exit the hazard area.

In addition, all training must comply with DoD Directive 4540.1, "Use of Airspace by U.S. Military Seas" and OPNAVINST 3770.4A, "Use of Airspace by U.S. Military Aircraft and Firing Over the High Seas" which specify procedures for conducting Aircraft Operations and for firing missiles and projectiles. Safety procedures include:

- Missile and projectile firing areas are to be selected, "so that trajectories are clear of established oceanic air routes or areas of known surface or air activity."
- During use of ordnance from aircraft or surface vessels, range procedures, and safety practices ensure that there are no vessels or aircraft in the intended path or impact area of the ordnance.
- For training events with a large hazard footprint (e.g., MISSILEXs), special sea and air surveillance measures are taken to search for, detect, and clear the area of intended events.
- Aircraft are required to make a clearing pass over the intended target area to ensure that it is clear of boats, divers, or other non-participants.
- The Navy notifies the public of hazardous activities through the use of NOTAMs and NOTMARs.
- Aircraft carrying ordnance are not allowed to over-fly surface vessels.

The remoteness of the offshore ranges provides a large degree of isolation from population centers. The Navy establishes temporary access limitations for areas with risk of injury or property damage to the public.

Demolition Operations will be conducted in accordance with Commander, Naval Surface Force, U.S. Pacific Fleet Instruction 3120.8F. Commander, Naval Surface Force, U.S. Pacific Fleet Instruction 3120.8F specifies detonation procedures for underwater ordnance to avoid endangering the public or impacting other non-military activities, such as possible shipping, recreational boating, diving, and commercial or recreational fishing.

Recreational diving within the Open Ocean Area takes place primarily at known diving sites. The locations of popular diving sites are well-documented, dive boats are typically well-marked, and diver-down flags will be visible from the ships conducting the proposed training, so possible interactions between training events within the offshore areas and scuba diving will be minimized. The Navy will also notify the public of hazardous activities through NOTAMs and NOTMARs. Recreational dives typically take place in waters less than 125 ft deep, and usually within 3 mi of shore, while most Navy training occurs in deep waters more than 3 mi from shore, so popular dive sites and Navy training activities will overlap very little.

Offshore Operations include the use of MFA/HFA sonar. The effect of sonar on humans varies with the frequency of sonar involved. Of the three types of sonar (high-, mid-, and low-frequency), mid- frequency and low-frequency are the two with the greatest potential to affect humans. Research was conducted for MFA sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonars. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours. Exposure to MFA sonar in excess of 190 dB could result in slight visual-field shifts, fogging of the faceplate, spraying of any water within the mask, and general ear discomfort associated with loud sound.

Prior public notification of Navy training, use of known training areas, avoidance of non-military vessels and personnel, and the remoteness of the Open Ocean Area reduce the potential for interaction between the public and Navy vessels. To date, these safety strategies have been effective.

Public Health

Management of hazardous materials and hazardous wastes in conjunction with Navy training on the Open Ocean Area was addressed in Section 4.1.4. Materials expended on the sea ranges during Navy training will include liquid and soluble hazardous constituents that will quickly disperse in the water column. These materials also will include solid hazardous constituents that will quickly settle to the ocean floor and soon become buried in sediment, coated by corrosion, or encrusted by benthic organisms. Due to the very small quantities of these materials relative to the extent of the sea ranges (see Section 4.1.4.1.1), the volume of the ocean, and the remoteness of the sea ranges relative to human populations, their concentrations in areas of potential human contact generally will be undetectable. The analysis in Section 4.1.4 identified no significant impacts from use of hazardous materials or generation, transportation, and disposal of hazardous wastes in the HRC.

Sources of EMR include radar, navigational aids, and Electronic Warfare (EW). These systems are the same as, or similar to, civilian navigational aids and radars at local airports and television weather stations throughout the United States. EW systems emit EMR similar to that from cell phones, hand-held radios, commercial radio, and television stations. SOPs in place to protect Navy personnel and the public include setting the heights and angles of EMR transmission to avoid direct exposure, posting warning signs, establishing safe operating levels, and activating warning lights when radar systems are operational. To avoid excessive exposures from EMR, military aircraft are operated in accordance with standard procedures that establish minimum separations distances between EMR emitters and people, ordnance, and fuels. Based on the power levels emitted, the minimum safe separation distances established, and the additional measures identified above, no substantial adverse effects are anticipated.

4.1.5.1.2 HRC RDT&E Activities—No-action Alternative

RDT&E activities under the No-action Alternative will consist of the NUWC shipboard tests on the SESEF range and missile defense activities. Navy vessels engaged in activities on the SESEF range will pose no public health or safety risk during routine ship operations. Missile defense activities include aerial targets launched from PMRF, mobile sea-based platforms, or military cargo aircraft. During missile defense RDT&E activities, a ballistic missile target vehicle is launched from PMRF and intercepted by a ship-launched missile. Missile launches by their very nature involve some degree of risk, and it is for this reason that DoD and PMRF have specific launch and range safety policies and procedures to assure that any potential risk to the public and government assets (launch support facilities) are minimized.

Ship and Aircraft Exclusion Areas ensure that vehicles are not in areas of unacceptable risk. These areas include the places where planned debris may impact (such as dropped stages of multi-stage vehicles or debris from hit-to-kill intercept engagements) and also the regions at risk if there is a failure (such as under the planned flight path). Aircraft regions are designed in a similar fashion. The specific definition of each of these regions is determined by a probabilistic risk analysis that incorporates modeling of the vehicle response to malfunctions, mission rules (such as Destruct Limits), and the vulnerability of vehicles to debris. NOTMARs and NOTAMs are issued for the entire region that may be at risk, encompassing both exclusion areas and warning areas (areas with very remote probability of hazard). Surveillance by aircraft and satellite is used to ensure that there are no ships or aircraft in cleared areas, and also that the collective risk meets acceptable risk criteria for the mission.

Many procedures are in place to mitigate the potential hazards of an accident during the flight of one of these missiles. The PMRF Flight Safety Office prepares Range Safety Operational Procedures (RSOPs) for missions involving missiles, supersonic targets, or rockets. This RSOP addresses the safety aspects of debris from hit-to-kill intercept tests where an interceptor missile impacts a target missile. The Commanding Officer of PMRF approves each RSOP, which includes specific requirements and mission rules. The Flight Safety Office has extensive experience in analyzing the risks posed by such a mission. In spite of the developmental nature of missile activities (which leads to a significant probability of mission failure), the United States has an unblemished record of public safety during missile and rocket launches. Appendix K describes the general approach to protect the public and involved personnel from launch accident hazards.

Prior to each mission, a comprehensive analysis of the proposed mission, including flight plans, planned impact areas, vehicle response to malfunctions, and effects of flight termination action is performed. A probabilistic analysis is performed with sufficient conservative assumptions incorporated to ensure that the risks from the mission are acceptable. The guidance of the Range Commanders' Council (RCC) for acceptable risk (in RCC-321) is followed. These acceptable risk criteria are designed to ensure that the risk to the public from range operations is lower than the average background risk for other third-party activities (for example, the risk of a person on the ground being injured from an airplane crash).

4.1.5.1.3 Major Exercises—No-action Alternative

Major Exercises consist of training and, in some cases, RDT&E activities, both addressed above. Potential impacts will be similar to those described earlier for training and RDT&E activities.

4.1.5.2 ALTERNATIVE 1 (HEALTH AND SAFETY—OPEN OCEAN)

4.1.5.2.1 Increased Tempo and Frequency of Training—Alternative 1

Offshore training proposed under Alternative 1 would have all the components of the No-action Alternative, but training would increase and new weapons platforms and systems would be employed. The safety procedures implemented under this alternative are the same as those described under the No-action Alternative.

Public Safety

Several training events would experience increases from current levels in support of the FRTP. Table 2.2.2.3-1 describes those increases. Only the number of training events would increase; no new types of training would be introduced. Increases in the number of individual training events would increase the potential for conflicts with non-participants. Given the Navy's comprehensive safety procedures and its safety record for training, however, the actual potential for public safety impacts from training would remain low.

Public Health

Management of hazardous materials and hazardous wastes in conjunction with Navy training on the Open Ocean Area is addressed in Section 4.1.4. The quantities of materials expended on the sea ranges during Navy training would increase moderately under Alternative 1, as compared to the quantities expended under the No-action Alternative. Expended training materials would include liquid or soluble hazardous materials that would quickly disperse in the water column. They also would include solid hazardous constituents that would quickly settle to the ocean floor and soon become buried in sediment, coated by corrosion, or encrusted by benthic organisms. Due to the very small quantities of these materials relative to the extent of the sea ranges, the volume of the ocean, and the remoteness of the sea ranges relative to human populations, their concentrations in areas of potential human contact generally would be low to undetectable.

Sources of EMR include radar, navigational aids, and EW. These systems are the same as, or similar to, civilian navigational aids and radars at local airports and television weather stations throughout the United States. EW systems emit EMR similar to that from cell phones, hand-held radios, commercial radio, and television stations. SOPs in place to protect Navy personnel and the public include setting the heights and angles of EMR transmission to avoid direct exposure, posting warning signs, establishing safe operating levels, and activating warning lights when radar systems are operational. To avoid excessive exposures from EMR, military aircraft are operated in accordance with standard procedures that establish minimum separations distances between EMR emitters and people, ordnance, and fuels. Based on the power levels emitted, the minimum safe separation distances established, and the additional measures identified above, no substantial adverse effects are anticipated.

4.1.5.2.2 Enhanced RDT&E Activities—Alternative 1

RDT&E activities under Alternative 1 would consist of the NUWC shipboard tests on the FORACS and SESEF ranges and missile defense activities. Navy vessels engaged in NUWC activities would pose no public health or safety risk during routine ship operations. Proposed launches associated with enhanced and future RDT&E activities would have a similar impact on health and safety as those described for the No-action Alternative.

4.1.5.2.3 HRC Enhancements and Major Exercises—Alternative 1

Major Exercises consist of training and, in some cases, RDT&E activities, both addressed earlier. Potential impacts would be similar to those described earlier for training and RDT&E activities.

4.1.5.3 ALTERNATIVE 2 (HEALTH AND SAFETY—OPEN OCEAN)

4.1.5.3.1 Increased Tempo and Frequency of Training—Alternative 2

Public Safety

Several training events would experience increases from current levels in support of the FRTP. Table 2.2.2.3.1-1 describes those increases. Only the number of training events would increase; no new types of training would be introduced. Increases of over 100 percent in the number of individual training events would increase the potential for conflicts with non-participants. Given the Navy's safety procedures and its safety record for training, however, the actual potential for public safety impacts from training would remain low.

Public Health

Management of hazardous materials and hazardous wastes in conjunction with Navy training on the Open Ocean Area is addressed in Section 4.1.4. The quantities of materials expended on the sea ranges during Navy training would increase substantially under Alternative 2, as compared to the quantities expended under the No-action Alternative. Expended training materials would include liquid and soluble hazardous constituents that would quickly disperse in the water column. They also would include solid hazardous constituents that would quickly settle to the ocean floor and soon become buried in sediment, coated by corrosion, or encrusted by benthic organisms. Due to the very small quantities of these materials relative to the extent of the sea ranges, the volume of the ocean, and the remoteness of the sea ranges relative to human populations, their concentrations in areas of potential human contact generally would be low to undetectable.

Sources of EMR include radar, navigational aids, and EW. These systems are the same as, or similar to, civilian navigational aids and radars at local airports and television weather stations throughout the United States. EW systems emit EMR similar to that from cell phones, hand-held radios, commercial radio, and television stations. SOPs in place to protect Navy personnel and the public include setting the heights and angles of EMR transmission to avoid direct exposure, posting warning signs, establishing safe operating levels, and activating warning lights when radar systems are operational. To avoid excessive exposures from EMR, military aircraft are operated in accordance with standard procedures that establish minimum separations distances between EMR emitters and people, ordnance, and fuels. Based on the power levels emitted, the minimum safe separation distances established, and the additional measures identified above, no substantial adverse effects are anticipated.

4.1.5.3.2 Enhanced RDT&E Activities—Alternative 2

RDT&E activities under Alternative 2 would consist of the NUWC shipboard tests on the FORACS and SESEF ranges and missile defense activities. Navy vessels engaged in NUWC activities would pose no public health or safety risk during routine ship operations. Proposed launches associated with enhanced and future RDT&E activities would have a similar impact on health and safety as those described for the No-action Alternative.

4.1.5.3.3 Future RDT&E Activities—Alternative 2

Future RDT&E activities for the Open Ocean Area would include directed energy. PMRF would develop the necessary SOPs and range safety requirements necessary to provide safe training associated with future high-energy laser tests. PMRF Range Safety would require the proposed high-energy laser program to provide specific information about the proposed usage so that a safety analysis of all types of hazards could be completed and appropriate remedial procedures would be taken before initiation of potentially hazardous laser activities.

The high-energy laser program office would be responsible for providing all necessary documentation to PMRF prior to issuance of the Range Safety Approval (RSA) or RSOP. These include:

- Letter of Approval or a Letter of No Concern from the FAA for the use of the laser within Honolulu FAA airspace,
- Letter of Approval or a Letter of No Concern for the use of their laser if it will or has the potential of lasing above the horizon from United States Space Command (USSPACECOM) as well as clearance from USSPACECOM for each intended laser firing,
- Letter of Approval from the Laser Safety Review Board (LSRB) at Dahlgren for the use for their laser on Navy Ranges (this letter entails a survey and certification of the laser by the LSRB), and
- Range Safety Laser Data Package.

The Range Safety Laser Data Package is intended to provide the Range Safety Office with sufficient information to perform an evaluation of the safety of the laser and the proposed lasing activity and to approve the laser and its operation, and any risk mitigations required.

The PMRF Range Safety Office would analyze the submittal to ensure that it is in compliance with PMRF safety criteria, which is based on Range Commanders Council document RCC-316, OPNAVINST 5100.27A, and *2004 Laser Safety Survey Report for the Pacific Missile Range Facility Open Ocean Range*. PMRF would be responsible for publishing an RSA or an RSOP specifying hazard areas and safety guidelines for the operation of the laser. The RSA/RSOP process would include an onsite safety inspection of the system by a PMRF Laser Safety Specialist to ensure that it complies with the Navy guidelines for lasers. As appropriate, the Range Safety Office would review the proposed laser systems for other non-optical hazard mechanisms, such as toxic releases.

Safety assurance would include defining exclusion areas, ensuring that the NOTAM and NOTMAR requests are submitted to the responsible agencies (FAA and Coast Guard respectively), ensuring that the laser operation falls within the approved operational areas, surveillance/clearance of the operational area and scheduling of the appropriate airspace and surface space.

For general training scenarios of the proposed high-energy laser, the Range Safety Office would build on the *2004 Laser Safety Survey Report* performed by the Corona Division of the Naval Surface Warfare Center (Solis, 2004). This document defines the boundaries of the two laser target areas at PMRF: the outer W-186 Area and the outer W-188 Area are multipurpose bombing and laser target ranges used for aerial lasing. Only airborne laser designators may be used on the laser target areas. Procedures and restrictions for use of these areas are defined in this survey.

4.1.5.3.4 Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Vessels, aircraft, and other military assets employed in the Strike Group Exercises would increase the overall intensity and duration of Navy training on the sea ranges. The Strike Group training would be similar to other large-exercise training events held on the range, and similarly would consist of a number of individual training events spread over large areas among several ranges. As with those other training events, Multiple Strike Group training is not anticipated to pose a substantial risk to public safety.

4.1.5.4 ALTERNATIVE 3 (HEALTH AND SAFETY—OPEN OCEAN)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on health and safety under Alternative 3 would be the same as those described for Alternative 2.

4.1.6 NOISE—OPEN OCEAN

4.1.6.1 NO-ACTION ALTERNATIVE, ALTERNATIVE 1, ALTERNATIVE 2, AND ALTERNATIVE 3 (NOISE—OPEN OCEAN)

Potential airborne sound as a result of Navy training was examined to determine what effect the training and RDT&E activities would have in the overall ambient sound levels within the HRC that resulted in an effect on the traditionally analyzed sensitive human sound receptors (i.e., schools, hospitals, etc.).

The factors considered in determining the significance of sound effects on marine mammals, birds, and fish are discussed within other sections of this chapter. Potential sound effects on fish (to the extent that sound introduced into the sea can affect catch) and marine mammals are discussed in Section 4.1.2.

While HRC training does generate airborne sound, sound-generating events in the Open Ocean Area do not result in perceptible changes to the overall sound environment. In addition, training does not have an effect on sensitive sound receptors because these events are typically conducted away from populated areas and most sensitive sound receptors. For training events that involve the expenditure of munitions either from aircraft or surface vessels, the Navy uses advance notice and scheduling, and strict on-scene procedures to ensure the area is clear of civilian vessels or other non-participants. The public is notified of the location, date, and time of the hazardous activities via NOTMARs, thereby precluding any acoustical impacts on sensitive receptors. Proposed increases in training and RDT&E activities under Alternative 1, Alternative 2, and Alternative 3 would result in increases in sound events. The increases would contribute a negligible level of increased sound, however, because they would continue to occur within the open ocean where typically no sensitive sound receptors are present.

The HRC is approved for supersonic flight; however, no data are available that describe the exact location of supersonic activities. Supersonic activity in the HRC is generally restricted to altitudes greater than 30,000 ft above sea level or in areas at least 30 nm from shore. These restrictions prevent most sonic booms from reaching the ground. There would be no perceptible increase in long-term sound levels as a result of sonic booms, and populated areas are not likely to be affected since such flights would typically be conducted in areas greater than 30 nm offshore and above 30,000 ft. More-detailed information on sonic booms is provided in Appendix G.

4.1.7 WATER RESOURCES—OPEN OCEAN

4.1.7.1 NO-ACTION ALTERNATIVE (WATER RESOURCES—OPEN OCEAN)

4.1.7.1.1 HRC Training—No-action Alternative

Under the No-action Alternative, Navy training in the Open Ocean Area (see Table 4.1-1) will expend a wide variety of materials, a substantial portion of which will not be recovered. Types of unrecovered materials include the following:

- Incidental releases of fuel, hydraulic fluid, and oil;
- Expendable training materials and devices (e.g., sonobuoys, targets);
- Munitions, including bombs, projectiles, torpedoes, and missiles; and
- Chaff and flares

Incidental Releases

Potential impacts on water quality will primarily be associated with the incidental release of materials from aircraft, surface ships, submarines, or other vessels. Hazardous constituents of concern, possibly emitted from the surface ship or submarine (i.e., fuel, oil), are less dense than seawater; they will remain near the surface and, therefore, will not affect the benthic community. Sheens produced by these incidental releases will not cause any significant long-term impact on water quality because most of the toxic components (e.g., benzene, xylene) will evaporate within several hours to days or will be degraded by biogenic organisms (e.g., bacteria, phytoplankton, zooplankton).

Expended Training Materials

At-sea training and test activities involve numerous combatant ships, torpedo retrieval boats, and other support craft. These vessels are manned, and do not intentionally expend any munitions constituents into the water. Offshore training activities also expend bombs, missiles, torpedoes, sonobuoys, targets, flares, and chaff, and accessory materials such as guide wires and hoses, from ships, submarines, or aircraft. Various types of training items are shot, launched, dropped, or placed within the HRC. Training materials entering the ocean in large quantities could affect marine water quality.

Most weapons and other devices used during at-sea training exercises are removed at the conclusion of the exercises. Some training materials, including gun ammunition and naval shells, bombs and missiles, mortars and rockets, targets and sonobuoys, and chaff and flares, however, are used on the range and not recovered. Items expended on the water, and fragments not recognizable as expended training materials (e.g., flare residue or candle mix), typically are not recovered. The types of expendable training materials used in each category of at-sea training are generally discussed below. Following this discussion of expended training materials by warfare area is an evaluation of each type of expendable training material, and a summary of their constituents of concern.

The ordnance used in offshore training activities usually does not carry "live" warheads (i.e., those with explosives). Explosives and propellants in live rounds are mostly consumed during operation of the item, leaving only residues. Training items that do contain energetic materials may fail to function properly, however, and—if not recovered—remain on the range as UXO containing explosives or propellants that eventually will be released to the environment. Sonobuoys and flares, smoke grenades, and other pyrotechnic training devices expended in the water may leak or leach toxic substances as they degrade and decompose. Table 4.1.7.1.1-1 lists constituents of concern for some ordnance components.

Table 4.1.7.1.1-1. Ordnance Constituents of Concern

Training Munitions	Constituent of Concern
Pyrotechnics Tracers Spotting Charges	Barium chromate Potassium perchlorate
Oxidizers	Lead oxide
Delay Elements	Barium chromate Potassium perchlorate Lead chromate
Propellants	Ammonium perchlorate
20-mm projectiles	Depleted Uranium
Fuses	Potassium perchlorate
Detonators	Fulminate of mercury Potassium perchlorate
Primers	Lead azide

Anti-Air Warfare

Anti-Air Warfare (AAW) training includes Air Combat Maneuvers, Air Defense Exercise, and Air-to-Air Missile Exercise. Expended training materials for this warfare area consist mostly of spent projectiles and unrecovered targets from Surface-to-Air Gunnery Exercises (S-A GUNEXs), Surface-to-Air Missile Exercises (S-A MISSILEXs), and stinger missile exercises. The expenditure of about 294,000 small arms ammunition (see Table 4.1.4.1.1-1) would deposit about 6 tons per year (TPY) of mostly non-toxic metallic materials in bottom sediments in the HRC. Of the 163,000 rounds of 20 mm projectiles fired annually in S-A GUNEX training, as many as 10 percent (16,300) could include depleted uranium (DU). The 20 mm projectiles are fired from the Phalanx Close-In Weapon System (CIWS). The CIWS is the Navy's primary point defense Anti-Air-Warfare (AAW) weapon system and is found on nearly every aircraft carrier, surface combatant, and amphibious ship in the Navy's inventory. However, the CIWS is being replaced with a missile-based system. Also, as DU rounds are no longer manufactured for use by the Navy, the Navy's inventory and subsequent level of use is expected to decrease. MISSILEXs use missiles and aerial targets. Participating aircraft use a variety of air-to-air missiles, while surface ships use surface-to-air missiles. Typically, two NATO Seasparrow missiles and four BQM-74 aerial targets are expended during a MISSILEX. These items contain propellants, fuels, engine oil, hydraulic fluid, and batteries, all of which may affect water quality. The total amounts of expended training materials for this warfare area weigh about 94 TPY. The aggregate effects on water quality of training materials expended on the range under the No-action Alternative are addressed below.

Anti-Submarine Warfare

ASW encompasses Air ASW, Surface Ship ASW, and Submarine ASW. These training activities affect water and sediment quality by expending training materials that release constituents into the water column and accumulate in ocean bottom sediments over time. Air and Ship ASW exercises drop sonobuoys and targets (MK-30 and MK-39 Expendable Mobile ASW Training Targets [EMATTs]) into the ocean. The Submarine ASWs may expend MK-30 or MK-39 (EMATT) targets, although most exercises use another submarine as a target; no sonobuoys are used. Any training torpedoes used generally are recovered following each event.

Under the No-action Alternative, Air ASW, Ship ASW, and Submarine ASW events conducted each year use about 600 torpedoes, 800 targets, and 12,500 sonobuoys. Sonobuoys sink after use. About 55 percent of the EMATTs are recovered, all of the MK-30 targets are recovered, and all of the exercise torpedoes are recovered. The main sources of water quality impacts are the batteries or fuel used to propel or operate EMATTs and sonobuoys. The control wires, ballast, and other accessories from torpedo exercises mostly affect the bottom sediments. The aggregate effects on water quality of training materials expended on the range under the No-action Alternative are addressed below.

Mine Warfare

Small Object Avoidance training does not require targets or other devices that use or contain hazardous materials. Under the No-action Alternative, 22 MINEX exercises are conducted each year. Mine training shapes are made of non-toxic materials that do not affect water quality. Most of these events consist of one aircraft dropping inert mine training shapes. MINEXs are limited to physical effects on ocean bottom sediments by inert mine training shapes. Due to their chemical composition and size, these mine training shapes do not substantially affect the ocean bottom. Discarded mine training shapes do not substantially affect ocean bottom sediments at their settlement locations.

Anti-Surface Warfare

ASUW consists mostly of MISSILEXs, Bombing Exercises (BOMBEXs), GUNEXs, and Sinking Exercises (SINKEXs). GUNEXs expend projectiles against stationary and maneuverable surface targets. The A-S MISSILEXs fire AGM-114 Hellfire missiles at high-speed targets from SH-60 helicopters. In the BOMBEXs, FA-18 aircraft use MK-82 live and BDU-45 practice bombs to attack surface targets. The No-action Alternative includes six SINKEXs; these exercises use a variety of weapons platforms (e.g., aircraft, surface vessels, submarines) expending several different types of ordnance against an environmentally clean ship hulk. The total amounts of expended training materials for this warfare area are listed in Table 4.1.4.1.1-1. The aggregate effects on water quality of training materials expended on the range under the No-action Alternative are addressed below.

Electronic Combat

Typical Electronic Combat (EC) activities include threat avoidance training, signals analysis, use of airborne and surface electronic jamming devices, and firing of simulated (Smokey) Surface-to-Air Missiles (SAMs). When practicing tactics against simulated SAMs, aircrews deploy chaff and defensive flares when over water. Under the No-action Alternative, 50 EC events are conducted. The aggregate effects on water quality of training materials expended on the range under the No-action Alternative are addressed below.

Smokey SAMs, chaff, and flares are the only EC ancillary systems that can affect water quality resources. The main source of expended training materials is practice S-A Missiles (referred to as Smokey SAMs). Constituents of Smokey SAMs that end up in the ocean after use include a 2-foot long biodegradable Styrofoam-like body, and any unburned propellant.

The major constituents of chaff and flares are aluminum and magnesium. Some flares also contain chromium and lead. The aluminum fibers that make up chaff are generally non-toxic. Elemental aluminum in seawater tends to be converted by hydrolysis to aluminum hydroxide, which is relatively insoluble, and scavenged by particulates and transported to the bottom sediments (Monterey Bay Aquarium Research Institute, 2002).

Combustion products from flares are mostly non-hazardous, consisting of magnesium oxide, sodium carbonate, carbon dioxide, and water. Small amounts of metals are used to give flares and other pyrotechic materials bright and distinctive colors. The amounts of flare residues are negligible, and the chemical constituents do not substantially affect water quality resources.

Aggregated Expended Training Materials Deposited on the HRC

This section evaluates the aggregate effects of the unrecovered training materials from all training activities on the open ocean water quality of the HRC, based on the quantitative information provided in the Hazardous Materials and Wastes section (see Section 4.1.4.1).

Gun Shells, Small Arms, and Practice Bombs

These training materials generally remain intact upon contact with the surface of the ocean, and sink quickly through the water column to the bottom. They thus do not affect water quality directly. Degradation and dispersal of explosive and propellant residues, and explosives and propellants from items that do not function (i.e., UXO), would not substantially affect bottom sediments or water quality. Corrosion of metallic materials may affect the bottom sediments immediately surrounding expended items, but would not contaminate substantial portions of the ocean bottom. Corrosion of metallic materials and the leaching of toxic substances from them also may indirectly affect water quality in their vicinity, but not to a substantial degree due to the relatively insignificant amount of material, its slow rate of release into the environment, and the action of ocean currents in dispersing the materials once they enter the water column.

20-mm Depleted Uranium Projectiles

The CIWS fires 20-mm DU rounds during training and system calibration. It is the only Navy weapon system that employs DU rounds. A Nuclear Regulatory Commission (NRC) license to fire CIWS DU rounds was required before the system could be employed aboard naval vessels. The NRC approved Navy's license application which clearly stated that CIWS DU rounds would be fired at sea and not recovered. Consultations with the NRC and Environmental Protection Agency (EPA) determined that this practice was acceptable because of the absence of environmental risk.

Unlike other DU munitions, CIWS rounds are not intended for use against hardened armored targets. They are designed to penetrate the thin skin of an incoming missile. The DU portion of a CIWS round is less than 2 inches long and weighs 2.5 ounces. The CIWS rounds produce little pyrophoric (spark producing) action and consequential aerosolization of DU when they strike a target.

Uranium occurs naturally in seawater, marine sediments, and marine organisms. Depleted uranium is 40 percent less radioactive than naturally occurring uranium. A CIWS DU round contains approximately the same small amount of radioactivity as five household smoke detectors. Once fired, these rounds fall into the ocean mostly intact and sink to the bottom. CIWS DU rounds dissolve in seawater at a very slow rate, taking many years to completely dissolve. This very small amount of depleted uranium released to the environment combined with the turbidity and the large volume of water above the rounds does not significantly contribute to the concentration of uranium naturally in the marine environment. At 1 foot, the radiation levels from a CIWS DU round are indistinguishable from normal background radiation levels.

Missiles and Aerial Targets

Missiles and aerial targets used in training contain hazardous materials as normal parts of their functional components. Missiles contain igniters, explosive bolts, batteries, warheads, and solid propellants, and aerial targets contain fuels, engine oil, hydraulic fluid, and batteries, all of which may affect water quality. Exterior surfaces may be coated with anti-corrosion compounds containing toxic metals. Most of the missiles are equipped with non-explosive warheads that contain no hazardous materials. For missiles falling in the ocean, the principal contaminant is unburned solid propellant residue and batteries. Table 4.1.7.1.1-2 lists the missiles typically fired during training and their associated hazardous materials.

Table 4.1.7.1.1-2. Missiles Typically Fired in Training Exercises

Type	Hazardous Materials
AIM-7 Sparrow	The missile is propelled by a Hercules MK-58 dual-thrust solid propellant rocket motor. The explosive charge is an 88-lb WDU-27/B blast-fragmentation warhead.
AIM-9 Sidewinder	Depending on the model, the propulsion system contains up to 44 lb of solid double-base propellant. The warhead contains approximately 10 lb of PBX-N HE.
AIM-114B Hellfire	The missile is propelled by a solid propellant rocket motor, the Thiokol TX-657 (M120E1).
AIM-120 AMRAAM	The missile is propelled by a solid propellant (ATK WPU-6B booster and sustainer) rocket motor that uses RS HTPB solid propellant fuel). The warhead is 40 lb of HE.
SM-1 and SM-2 Standard Missile	Propulsion system has 1,550 lb of aluminum and ammonia propellant in the booster and 386 lb of propellant in the sustainer. The warhead is 75 - 80 lb, depending on the version. Potassium hydroxide battery 1.9 oz.

Missile propellants typically contain ammonium perchlorate, aluminum compounds, copper, and organic lead compounds. Perchlorate is an inorganic chemical used in the manufacture of solid rocket propellants and explosives. A typical surface-to-air missile (e.g., SM-2) initially has 150 lb of solid propellant and uses 99 to 100 percent of the propellant during the exercise (i.e., <1.5 lb remaining). The remaining solid propellant fragments sink to the ocean floor and undergo physical and chemical changes in the presence of seawater. Tests show that water penetrates only 0.06 inches into the propellant during the first 24 hours of immersion, and that fragments slowly release ammonium and perchlorate ions. These ions rapidly disperse into the surrounding seawater such that local concentrations are extremely low.

Because perchlorate historically has not been considered a widespread contaminant, no Federal or State water standards exist (California Department of Public Health, 2007). The Department of Health Services has adopted a notification level for perchlorate in drinking water of 6 micrograms per liter (µg/L); however, this action level is not applicable to this analysis involving missile testing over the ocean.

Assuming that all of the propellant on the ocean floor was in the form of 4-inch cubes, only 0.42 percent of it will be wetted during the first 24 hours of immersion. If all of the ammonium perchlorate leaches out of the wetted propellant, then approximately 0.01 lb will enter the surrounding seawater. The leaching rate will decrease over time as the concentration of perchlorate in the propellant declines. The aluminum in the propellant binder will eventually be oxidized by seawater to aluminum oxide. The remaining binder material and aluminum oxide will not pose a threat to the marine environment.

As noted above, most of the missiles would have non-explosive warheads that do not contain hazardous materials. Some missiles, however, could contain explosives. An estimated 99.997 percent of this material would be consumed in a high-order detonation, typically leaving less than 1.0 lb of residue. Explosives residues would degrade and disperse in a manner similar to that of propellants, and similarly would not be a substantial concern. Studies have concluded that munitions residues do not impact the marine environment.

Missile batteries are another source of contaminants. The batteries used for missiles are similar in type and size to those used for sonobuoys. The evaluation of the effects of expended sonobuoys (see below) concluded that they do not have a substantial effect on marine water or sediment quality.

Aerial Targets

Aerial targets are used on the HRC for testing and training. Most aerial targets contain jet fuel, oils, hydraulic fluid, batteries, and explosive cartridges. Following a training exercise, targets are generally flown (using remote control) to predetermined recovery points. Fuel is shut off by an electronic signal, the engine stops, and the target descends. A parachute is activated and the target lands on the ocean's surface, where it is retrieved by range personnel using helicopters or range support boats. Some targets are hit by missiles, however, and fall into the ocean. Table 4.1.7.1.1-3 lists hazardous materials from airborne targets typically used in Navy training.

Table 4.1.7.1.1-3. Hazardous Materials in Aerial Targets Typically Used in Navy Training

Type	Hazardous Materials
LUU-2	Flare materials, including magnesium and explosive bolts.
Tactical Air-Launched Decoy (TALD)	The tail section may contain a flare.
BQM-74	Oils, hydraulic fluids, a nickel-cadmium battery, and 16 gallons of JP-8 fuel.

Two types of aerial targets are used during MISSILEX: BQM-74 and the Ballistic Aerial Target System (BATS). The BQM-74 is the most common target used for this exercise. It is usually recovered after an exercise, unless it is severely damaged by a direct hit. The BATS are destroyed upon impact with the water, and are not recovered.

Hazardous materials in targets (e.g., BQM-74) include fuel and batteries. The hazardous constituents of concern for fuels, engine oil, and hydraulic fluids are hydrocarbons (compounds primarily containing carbon and hydrogen). They can be present in a wide variety of substances, such as petroleum-based fuels (diesel, JP-5, JP-4, bunker fuel, and gasoline), oils, and lubricants (Johnston et al., 1989; Grovhoug, 1992; Shineldecker, 1992). The most toxic components of fuel oils are aromatic hydrocarbons such as benzene, toluene, xylene, and Polycyclic Aromatic Hydrocarbons (PAHs) such as naphthalene, acenaphthene, and fluoranthene. Some PAHs are volatile and water-soluble (Curl and O'Donnell, 1977). PAHs may be hazardous to wildlife, and they also can be hazardous to human health (Hoffman et al. 1995).

A BQM-74 initially has 107 lb of liquid fuel. This analysis conservatively assumes that 20 percent of the fuel (i.e., 21.5 lb) remains at the completion of each mission, and that 5 percent of the fuel comprises PAHs (PAHs such as acenaphthene generally make up less than 4 percent of fuel oil, and naphthalene is generally less than 1 percent [National Research Council, 1985]). This analysis also assumes a worst-case scenario in which the BQM-74 is not recovered, but is destroyed on impact with the water. (Note: most targets are recovered by using an engine cut-off switch and a parachute. The target is retrieved from the water by helicopter.)

In the case of a severe malfunction and a crash, the target hits the water surface at a speed of at least 500 knots (600 miles per hour) and can realistically affect an area up to 10 times the size of the target (taking into consideration water displacement). A typical target (BQM-74) is approximately 12.9 ft long, 2.3 ft high, with a wingspan of approximately 5.8 ft. The analysis therefore assumes that a circle with a diameter of 58 ft encompasses the affected area. Given the low density of the hazardous constituents (e.g., fuel, oil) relative to seawater, the analysis also assumes that only the top 3 ft of the water column is affected. Based on these assumptions, the affected surface area is about 10,600 ft^2 and the affected volume of seawater is 2.5×10^5 gallons. The resulting concentration of PAHs is 503 µg/L.

Once concentrations are determined, comparisons with the NAWQC are possible for a single training event. The NAWQC provides both acute and chronic concentrations. Acute values are levels producing short-term effects (i.e., lethality), while chronic values produce long-term or sub-lethal effects. The estimated total PAHs concentration of 503 µg/L is below the threshold established in the NAWQC for individual PAHs: naphthalene (acute = 2,350 µg/L) and acenaphthene (acute = 970 µg/L; chronic = 710 µg/L). Thus, a crash of a BQM-74 would have no substantial effect on water quality.

The combined concentrations from multiple exercises throughout a year cannot be compared with the NAWQC because of the assumptions upon which these criteria are based. The criteria apply to instantaneous or short-term concentrations, not to chronic or long-term effects. Even if two events were to occur simultaneously, they are not likely to affect the same volume of water. Hence, the water quality analysis considers each proposed training activity separately.

The NAWQC includes maximum permissible concentrations to protect aquatic life from water contaminants. Saltwater criteria exist for benzene, toluene, and three PAH compounds: naphthalene, acenaphthene, and fluoranthene. Benzene and toluene are both very volatile, and are unlikely to be present after a short period. Fluoranthene is generally not present, or is found at <0.1 percent) in refined petroleum (National Research Council, 1985). These constituents were therefore not considered in this analysis.

Batteries are another source of contaminants from targets. The batteries used for targets are similar in type and size to those used for sonobuoys. The evaluation of the effects of expended sonobuoys (see below) concluded that they do not have a substantial effect on marine water or sediment quality.

Surface Targets

Surface targets generally include: (1) stationary targets such as the large (10 ft on a side) cube-shaped inflatable urethane balloon (called a "Killer Tomato"); (2) towable targets such as 14-ft long three hulled trimaran having a large billboard-like target area extending vertically from the center or a low profile 18-ft long 4-ft diameter inflatable cylinder pointed at both ends (called a "banana"); (3) mobile targets such as a "roboski", which is a remote controlled jet-ski; and (4) ship hulks. In general, these targets are constructed of non-toxic materials, and have few or no hazardous constituents. Ship hulks are cleaned of hazardous materials prior to use. Expended surface targets will sink to the bottom and eventually be buried in sediment, as with other non-hazardous expended training materials left on the range.

Subsurface Targets

Subsurface targets include the MK-30 and the MK-39. In the No-action Alternative, about 800 MK-39 targets would be used per year. The EMATT is a negatively buoyant, battery-operated device that is not recovered, and sinks to the seafloor at the conclusion of its operating life. It is powered by lithium sulfur dioxide batteries. Over time, the following chemical reactions occur as battery chemicals leach into the sea:

- Lithium bromide is an soluble salt that dissociates into bromine and lithium ions in seawater. Bromine and lithium are the seventh and 15th most abundant elements present in seawater, respectively. In addition to being found naturally in seawater, currents dilute the concentrations of these elements around the EMATT, so releases of lithium bromide would have no effect on water or sediment quality.
- The lithium metal contained in the EMATT is very reactive with water. When the lithium reacts with water it causes an exothermic (heat-liberating) reaction that generates soluble hydrogen gas and lithium hydroxide. The hydrogen gas eventually reenters the biosphere and the lithium hydroxide dissociates, forming lithium ions and hydroxide ions. The hydroxide is neutralized, ultimately forming water, so releases of lithium metal would have no effect on water or sediment quality.
- Sulfur dioxide, a gas that is highly soluble in water, is a major reactive component in the battery. The sulfur dioxide ionizes in the water, forming bisulfite that is easily oxidized to sulfate in the alkaline environment of the ocean. Sulfur is present as sulfate in large quantities (i.e., 885 milligrams per liter) in the ocean, so releases of sulfur dioxide would have no effect on water or sediment quality.

Because the chemical reactions of the lithium sulfur dioxide batteries are local and short-lived, the concentrations of the chemicals released by the EMATT battery are greatly diffused by the ocean currents. For this reason and in light of the reactions described above, the lithium sulfur dioxide batteries do not substantially affect marine water quality. The effects of the lead components used in the soldering of the internal wiring and trim weights and the corrosive components of the EMATTs are the same as from the sonobuoys (i.e., limited solubilities and slow release rates; discussed below), and do not substantially affect water quality.

At the conclusion of their operating life, EMATTs scuttle themselves and sink to the seafloor to be abandoned. Expended EMATTs are unlikely to result in any physical impacts on the seafloor. Expended EMATTs sink into a soft bottom or lie on a hard bottom, where they may be covered eventually by shifting sediments. Over time, the EMATTs degrade, corrode, and become incorporated into the sediments.

The MK-30 is powered by a rechargeable silver-zinc battery system. As the MK-30 degrades, the battery components leach out into the ocean. Similar to the EMATT system, chemicals leaching from the battery system are greatly diffused by ocean currents. However, MK-30 targets are recovered after their use. With few or no MK-30s expended in the ocean each year, the amount of hazardous constituents introduced into the ocean environment from this source are negligible.

Sonobuoys

Sonobuoys are expendable devices used for a variety of ocean sensing and monitoring tasks, such as to detect underwater acoustic sources and to measure water column temperatures. Three types of sonobuoys are tested: passive, active, and bathythermograph. Lead solder, lead weights, and copper anodes are used in sonobuoys. Sonobuoys also may contain lithium sulfur dioxide, lithium, or thermal batteries. Expendable Bathythermographs, do not use batteries and do not contain any hazardous materials. Analog Digital Converters have constituents similar to sonobuoys. Under the No-action Alternative, an estimated 12,500 sonobuoys will be used each year.

The three main types of batteries used in standard range sonobuoys are classified according to the type of cathode used: lead chloride, cuprous thiocyanate, or silver chloride (U.S. Department of the Navy, 1993). Each of these batteries uses a magnesium anode. These batteries are designed to have an active life ranging from one to eight hours, depending on the functional design of each particular sonobuoy. The chemical constituents of concern for water quality are lead, copper, and silver. Results by the Navy (U.S. Department of the Navy, 1993) indicate no substantial effects on marine water quality from sonobuoy batteries. Table 4.1.7.1.1-4 shows the estimated maximum concentrations of constituents of concern from sonobuoys, compared to the Federal water quality criteria.

Table 4.1.7.1.1-4. Concentration of Sonobuoy Battery Constituents and Criteria

Constituent	Concentration (micrograms / Liter)		
	Estimated Maximum, Proposed Action[1]	Federal Criteria[3]	
		1-Hour	Daily
Lead	11.0	210.0	8.1
Copper	0.015	4.8	3.1
Silver	0.0001	1.9	N/A

[1] Concentration (µg/L) of metal released into 1 cubic meter from scuttled seawater battery.

[2] Source: United States Environmental Protection Agency, 2005a.

Sonobuoys contain other metal and non-metal components, such as metal housing (nickel-plated, steel-coated with polyvinyl chloride [PVC] plastics to reduce corrosion), lithium batteries, and internal wiring that, over time, can release chemical constituents into the surrounding water. The lithium battery (used only in active sonobuoys) consists of an exterior metal jacket (nickel-plated steel) containing sulfur dioxide, lithium metal, carbon, acetonitrile, and lithium bromide. During battery operation, the lithium reacts with the sulfur dioxide and forms lithium dithionite. Since the reaction proceeds nearly to completion once the cell is activated, only residues are present when the battery life terminates. As a result, the lithium battery does not substantially degrade marine water quality.

Approximately 0.7 ounces (20 grams) of lead solder are used in the internal wiring (solder) of each sonobuoy, and 15 ounces (425 grams) of lead are used for the hydrophone and lead shot ballast. The lead source is in the un-ionized metallic form that is insoluble in water, so the lead shot and solder are not released into the seawater. Various lead salts (lead dichloride, lead carbonate, lead dihydroxide) likely form on the exposed metal surfaces. These metal salts have limited solubilities (9.9 grams per liter [g/L], 0.001 g/L, and 0.14 g/L, respectively) (U.S. Department of the Navy, 1993). For these reasons, lead components of the sonobuoy do not substantially degrade marine water quality.

Most of the other sonobuoy components are either coated with plastic to reduce corrosion or consist of solid metal. The slow rate at which solid metal components are corroded by seawater translates into slow release rates into the marine environment. Once the metal surfaces corrode, the rate of metal released into the environment decreases. Releases of chemical constituents from all metal and non-metal sonobuoy components are further reduced by natural encrustation of exposed surfaces. Therefore, corrosive components of the sonobuoy do not substantially degrade marine water quality.

Frequent training and testing activities involving sonobuoys result in the accumulation of scuttled sonobuoys on the ocean floor. The main source of contaminants in each sonobuoy is the seawater battery. These batteries have a maximum life of 8 hours, after which the chemical constituents in the battery have been consumed. Long-term releases of lead and other metal from the remaining sonobuoy components will be substantially slower than the release during seawater battery operation. Dispersion of released metals and other chemical constituents due to currents near the ocean floor will help minimize any long-term degradation of water quality in the project area. As a result, marine water quality will not be degraded by sonobuoy use during ASW activities.

Torpedoes

Torpedoes and torpedo targets typically contain hazardous materials, such as propellants. Other hazardous materials are used in the warheads, guidance system, and instruments. Potential effects of torpedoes on water or sediment quality are associated with propulsion systems, chemical releases, or expended accessories. The potentially hazardous or harmful materials are not normally released into the marine environment because the torpedo is sealed and, at the end of a run, the torpedoes are recovered. The OTTO Fuel II in a torpedo will not normally be released into the marine environment. In the worst-case scenario of a catastrophic failure, however, up to 59 lb of OTTO fuel can be released from a MK-46 torpedo (U.S. Department of the Navy, 1996a). In the event of such a maximum potential spill, temporary impacts on water quality may occur.

The MK-46 Recoverable Exercise Torpedo (REXTORP) and MK-50 REXTORP torpedo are non-explosive exercise torpedoes that use air charges or hydrostatic pressure to discharge ballast and float to the water's surface. They have no warheads, no propellant, and negligible amounts of hazardous materials. Table 4.1.7.1.1-5 describes torpedoes typically used in training, and Table 4.1.7.1.1-6 describes torpedo constituents.

Table 4.1.7.1.1-5. Torpedoes Typically Used in Navy Training Activities

Torpedo	Characteristics
MK-46 EXTORP	Hazardous materials include explosive bolts (less than 0.035 oz.), gas generator (130.9 lb), and a seawater battery (4 oz). The monopropellant is Otto Fuel.
MK-48 ADCAP EXTORP	The hazardous materials list is classified.
MK-54 EXTORP	This EXTORP is based on the propulsion system of the MK-46 torpedo and the search and homing capabilities of the MK-50 torpedo.

Notes: in - inch; lb - pound, oz - ounce.

Sources: Naval Institute Guide to Ships and Aircraft of the U.S. Fleet, 2001.

Table 4.1.7.1.1-6. MK-46 Torpedo Constituents

Materials	
Torpedo Hydraulic Fluid (MIL-H-5606E mineral oil base)	Practice Arming Rotor (Lead Azide)
Grease (Dow Corning 55M Grease)	Scuttle Valve (Lead Azide)
Lubricating and Motor Oils	Frangible Bolt (Lead Azide and Cyclonite)
Luminous Dye (Sodium Fluorescein)	Propellant (Ammonium Perchlorate)
Solder (QQ-S-571, SN60)	Gas Generator (Barium Chromate and Lead Azide)
Ethylene Glycol (two speed valve backfill fluid)	Release Mechanism (Barium Chromate and Lead Azide)
Ballast Lead Weight	Stabilizer (Barium Chromate and Lead Azide)
Explosive Bolts (Lead Azide and Cyclonite)	Cartridge Activated Cutter (Barium Chromate and Lead Azide)
Pressure Actuated Bolt (Potassium Perchlorate)	Propulsion Igniter
Practice Exploder (Lead Azide)	Exercise Head Battery

Source: U.S. Department of the Navy, 1996a

Propulsion Systems

OTTO Fuel II propulsion systems are used in both the MK-46 and the MK-48 torpedoes. OTTO Fuel II may be toxic to marine organisms (U.S. Department of the Navy, 1996a). There have been over 5,800 exercise test runs of the MK-46 torpedo worldwide between FY89 and FY96 (U.S. Department of the Navy, 1996a), and approximately 30,000 exercise test runs of the MK-48 torpedo over the last 25 years (U.S. Department of the Navy, 1996b). Most of these launches have been on Navy test ranges, where there have been no reports of deleterious impact on marine water quality from the effects of OTTO Fuel II or its combustion products (U.S. Department of the Navy, 1996a). Furthermore, Navy studies conducted at torpedo test ranges that have lower flushing rates than the open sea did not detect residual OTTO Fuel II in marine environment (U.S. Department of the Navy, 1996a). Thus, no adverse effects are anticipated from use of this fuel.

OTTO Fuel II would not be released into the marine environment during normal operation. During a catastrophic failure, however, up to 59 lb of fuel could be released from a MK-46 (U.S. Department of the Navy, 1996a). Even in the event of such a spill, no long-term adverse impacts on marine water quality would result, because:

- The water volume and depth would dilute the spill, and

- Common marine bacteria degrade and ultimately break down OTTO Fuel (U.S. Department of the Navy, 1996a)

Exhaust products from the combustion of OTTO Fuel II include nitrogen oxides, carbon monoxide, carbon dioxide, hydrogen, nitrogen, methane, ammonia, and hydrogen cyanide (U.S. Department of the Navy, 1996a). These combustion products are released to the sea, where they are dissolved, disassociated, or dispersed in the water column. Except for hydrogen cyanide, combustion products are not a concern (U.S. Department of the Navy, 1996a) because:

- Most OTTO Fuel II combustion products, specifically carbon dioxide, water, nitrogen, methane, and ammonia, occur naturally in seawater.
- Several of the combustion products are bioactive. Nitrogen is converted into nitrogen compounds through nitrogen fixation by certain cyanobacteria, providing nitrogen sources and essential micronutrients for marine phytoplankton. Carbon dioxide and methane are integral parts of the carbon cycle in the oceans and are taken up by many marine organisms.
- Carbon monoxide and hydrogen have low solubility in seawater, and excess gases would bubble to the surface.
- Trace amounts of nitrogen oxides may be present, but they are usually below detectable limits. Nitrogen oxides in low concentrations are not harmful to marine organisms, and are a micronutrient source of nitrogen for aquatic plant life.
- Ammonia can be toxic to marine organisms in high concentrations, but releases from OTTO fuel would be quickly diluted to negligible levels.

Hydrogen cyanide does not normally occur in seawater and, at high enough concentrations, could pose a risk to both humans and marine biota. The USEPA acute and chronic national recommendation for cyanide in marine waters is 1.0 µg/L, or approximately one ppb (U.S. Department of the Navy, 1996a). Hydrogen cyanide concentrations of 280 ppb would be discharged by MK-46 torpedoes and hydrogen cyanide concentrations ranging from 140 to 150 ppb would be discharged from MK-48 torpedoes (U.S. Department of the Navy, 1996a). These initial concentrations are well above the USEPA recommendations for cyanide. Because it is very soluble in seawater, however, hydrogen cyanide would be diluted to less than one µg/L at 17.7 ft from the center of the torpedo's path, and thus should pose no substantial threat to marine organisms. Even during the most intensive events, at most eight MK-48 exercise torpedoes would be used in a given day. These launches would occur over 24 hours, and are not likely to be conducted in the same portion of the HRC.

MK-50 Torpedoes. All the MK50s used on the range are Recoverable Exercise Torpedoes (REXTORPs). Hazardous materials may be found in components of the MK-50 torpedo. During normal exercises, no hazardous materials are released to the marine environment because the torpedo is sealed. At the end of an exercise, the torpedoes are recovered.

MK-46 Torpedoes. Several hazardous materials can be found in components of the MK-46 torpedo. During normal exercises, no hazardous materials are released to the marine environment because the torpedo is sealed. At the end of an exercise, the torpedoes are recovered (U.S. Department of the Navy, 1996a).

Hazardous materials could be released on impact with a target or the seafloor. During exercises, however, the guidance system of the torpedo is programmed for target and bottom avoidance (U.S. Department of the Navy, 1996a), minimizing accidental releases. Furthermore, the contaminants would be released instantaneously, so the area exposed to acutely toxic concentrations would be minimized.

During normal venting of excess pressure or upon failure of the torpedo's buoyancy bag, gaseous carbon dioxide, water, hydrogen, nitrogen, carbon monoxide, methane, ammonia, hydrochloric acid, hydrogen cyanide, formaldehyde, potassium chloride, ferrous oxide, potassium hydroxide, and potassium carbonate would be discharged (U.S. Department of the Navy, 1996a). Even in the event of a release, however, no long-term, adverse effects on marine water quality would result, because:

- Most of the discharges would be dissolved, disassociated, or dispersed in the water column.
- Most of the discharged compounds, specifically carbon dioxide, water, hydrogen, nitrogen, methane, and ammonia naturally occur in seawater.
- Several of the discharged compounds are bioactive. Nitrogen is converted into nitrogen compounds through nitrogen fixation by certain blue green algae, providing nitrogen sources and essential micronutrients for marine phytoplankton. Carbon dioxide and methane are integral parts of the carbon cycle in the oceans, and are taken up by many marine organisms.
- Hydrogen chloride, potassium chloride, potassium hydroxide, and dipotassium carbonate are soluble in seawater, and would disassociate into ions that naturally occur in seawater.
- Carbon monoxide and hydrogen have low solubility in seawater, and excess gases would bubble to the surface.
- Although insoluble in water, iron monoxide is nonhazardous.
- Formaldehyde normally does not occur in seawater. The total amount of formaldehyde that would be discharged from the rupture of the buoyancy bag is 3.93 µg (U.S. Department of the Navy, 1996a). This quantity would be diluted below 1 µg/l in less than 0.3 ft.

Hydrogen cyanide could pose a risk to both humans and marine biota. The USEPA acute and chronic national recommendation for cyanide in marine waters is one µg/L, or approximately one ppb (U.S. Department of the Navy, 1996a). An estimated 3.87 µg of hydrogen cyanide would be discharged into the marine environment if the Buoyancy Sub-system buoyancy bag ruptured (U.S. Department of the Navy, 1996a). This quantity of hydrogen cyanide would be diluted to below the USEPA limit in less than 0.3 ft. During normal Buoyancy Sub-system venting, fewer exhaust products would be released than during a buoyancy bag rupture and these products would be released in a greater volume of water, so, BSS venting would not affect water quality.

Torpedo Accessories

Various accessories are expended during the launch, operation, and recovery of MK-46, MK-48, MK-50, and MK-54 exercise torpedoes. An assortment of air launch accessories, all of which consist of non-hazardous materials, would be expended into the marine environment during air launching of MK-46 and MK-50 torpedoes. Depending on the type of launch craft used, MK-46 air launch accessories may comprise a nose cap, suspension bands, air stabilizer, release wire, and propeller baffle (U.S. Department of the Navy, 1996a). MK-50 air launch accessories may comprise a nose cap, suspension bands, air stabilizer, sway brace pad, arming wire, and fahnstock clip (U.S. Department of the Navy, 1996a).

All of these expendable materials would sink to the ocean bottom. The materials likely would not result in any physical impacts on the sea floor because they would sink into a soft bottom, where they would be covered eventually by shifting sediments. Over time, these materials would degrade, corrode, and become incorporated into the sediments. Rates of deterioration would vary, depending on material and conditions in the immediate marine and benthic environment.

Upon completion of a MK-46 REXTORP or MK-50 REXTORP launch, six steel-jacketed lead ballast weights are released to lighten the torpedo, allowing it to rise to the surface for recovery. The 180-lb ballasts sink rapidly to the bottom and, in areas of soft bottoms, are buried into the sediments. The MK-46 Exercise Torpedoes (EXTORPs) also use ballasts, which weigh 72 lb. MK-54 and MK-48 Advanced Capabilities (ADCAP) torpedoes use buoyancy bags to lift the torpedoes to the surface after their run.

Lead and lead compounds are designated as priority toxic pollutants pursuant to Section 304(a) of the CWA of 1977. The USEPA saltwater quality standard for lead is 8.1 µg/L, continuous, and 210 µg/L maximum concentration (U.S. Environmental Protection Agency, 2000). Lead is a minor constituent of seawater, with a background concentration of 0.02 to 0.4 µg/L (U.S. Department of the Navy, 1996a). Even if all of the expended lead ballasts and hoses from torpedo exercises were concentrated into less than 1 percent of the bottom area of the HRC and a high rate of its dissolution into the water column were assumed, the lead would not be sufficient to exceed the water quality standard.

The metallic lead of the ballast weights likely would not dissolve into the sediment or water as lead ions (U.S. Department of the Navy, 1996a). The lead is jacketed in steel, so the surface of the lead would not be in direct contact with the seawater. Also, in areas of soft bottoms, the lead weight would quickly be buried due to the velocity of its impact with the bottom and its greater density. As a result, releases of dissolved lead into bottom waters are expected to be negligible.

The MK-48 EXTORP is equipped with a single-strand control wire, which is laid behind the torpedo as it moves through the water. At the end of a torpedo run, the control wire is released from the firing vessel and the torpedo to enable recovery of the torpedo. The wire sinks rapidly and settles on the ocean floor, stretched into a long single line, as opposed to being looped or in tangles. The MK-48 torpedo also uses a flex hose to protect the control wire. The flex hose is expended into the ocean after completion of the torpedo run and, because of its weight, rapidly sinks to the bottom. Two types of flex hose are used: the Strong Flex Hose and Improved Flex Hose. The Improved Flex Hose is replacing the Strong Flex Hose in accordance with a phased schedule.

Chaff and Flares

Chaff is a thin polymer with a metallic (aluminum) coating used to decoy enemy radars. The chaff is shot out of launchers using a propellant charge. The fine chaff streamers act like particulates in the water, temporarily increasing the turbidity of the ocean's surface. They quickly disperse, however, and the widely spaced exercises have no discernable effect on the marine environment. The Air Force has studied chaff, and has reported no adverse impacts from chaff and said that chaff is generally nontoxic (U.S. Air Force, Air Combat Command, 1997).

Flares are used over water during training. Flares consist of powdered or pelleted magnesium imbedded in a matrix. They are incendiary and burn at high temperatures. Two types of flares are used: those ejected from aircraft to act as a decoy for enemy missiles, and those deployed under parachutes to provide illumination in support of other activities. The combustion products from flares are not hazardous, consisting primarily of sodium carbonate, carbon dioxide, water, and magnesium oxide.

Hazardous constituents are typically present in pyrotechnic residues, but are bound up in relatively insoluble compounds. Solid flare and pyrotechnic residues may contain, depending on their purpose and color, an average weight of up to 0.85 lb of aluminum, magnesium, zinc, strontium, barium, cadmium, nickel, and perchlorates. As inert, incombustible solids with low concentrations of leachable metals, these materials typically do not meet the RCRA criteria for characteristic hazardous wastes. The perchlorate[1] compounds present in the residues are relatively soluble, albeit persistent in the environment, and probably disperse quickly.

Laboratory leaching tests of flare pellets and residual ash using synthetic seawater found barium in the pellets, while boron and chromium were found in the ash. The pH of the test water was raised in both tests. Ash from flares will be dispersed over the water surface and then settle out. Chemicals will leach from the flare particles into the water column while it is settling. Any chemicals leaching from the particles after they reach the bottom will be dispersed by currents. Therefore, local and temporary impacts on water quality may occur, but no long-term impacts are anticipated.

Mine Shapes

Mine shapes are inert (i.e., containing no energetic materials) concrete and steel objects that are dropped in the mine training ranges. These ranges are used for training of air crews in offensive mine laying by delivery of inert mine shapes from aircraft. There are no hazardous materials in mine shapes. Trace amounts of chromium, nickel, or other toxic metals could leach out of the steel gradually over time as it corrodes, but ocean chemistry would not be affected because of the very low rate of these emissions and their rapid dispersal in the ocean.

Unexploded Ordnance (UXO)

A small percentage of the explosive training items, generally less than 5 percent, may fail to function as designed. The result can be no detonation or a low-order detonation. In the first case, the item likely will settle to the ocean floor intact. In the second case, some portion of the

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1 Perchlorates are water-soluble inorganic compounds that are relatively persistent in the environment; exposure to which has been found to cause adverse health effects.

original explosives or propellants may remain, and likely will be exposed to seawater. Given the wide range of training materials, varying failure rates and types of failures, and the wide range of explosives and propellants that may be involved, a quantitative estimate of these materials would be subject to numerous assumptions and caveats. However, these materials would be a small fraction of the total amount of unrecovered training materials, and a quantitative consideration of their effects would not change the overall conclusions of this water quality analysis.

Summary

Water Quality

Training and testing activities will introduce several types of water pollutants to the water column. These substances include propellant and explosives residues and battery constituents from missiles and aerial targets; battery constituents from sub-surface targets and sonobuoys; torpedo fuel, metals from rusting and corroding casings and accessory materials, and chaff and flare residues. Based on the qualitative and quantitative analyses of expended training materials presented above, however, these pollutants will be released in quantities and at rates such that they will not violate any water quality standard or criteria. The No-action Alternative will have no effect on the designated beneficial uses of marine waters.

Bottom Sediments

The environmental fates of hazardous constituents have been addressed above for each category of expended training material. The aggregate effects of expended training materials on ocean bottom sediments also can be assessed in terms of the number and weight of deposited items per unit area of bottom surface. A total of about 654 tons per year, are expended under the No-action Alternative (see Table 4.1.4.1.1-1). Assuming an ocean floor area of about 235,000 nm^2, and making a further conservative assumption that the training materials are concentrated within 20 percent of this area, this is about 5.6 lb per nm^2.

Expended training materials will settle to the ocean bottom and will be covered by sediment deposition over time. Most of the expended training material is inert, and thus harmless, but some of the expended training materials consists of toxic metals such as lead. These items decompose slowly, so the volume of decomposing training materials within the training areas, and the amounts of toxic substances being released to the environment, gradually increase over the period of military use. Concentrations of some substances in sediments surrounding the disposed items increase over time. Sediment transport via currents may eventually disperse these contaminants outside of the training areas. The density of discarded training materials in ocean bottom sediments is not high enough, however, to result in substantial sediment toxicity. Neither inert nor toxic expended training materials at this density will measurably affect sediment quality.

4.1.7.1.2 HRC RDT&E Activities—No-action Alternative

RDT&E activities under the No-action Alternative are listed in Table 4.1-1. Unrecovered materials associated with RDT&E activities will be similar to those discussed above for training, with the exception of Missile Defense activities. Therefore, the discussion presented above would apply here. Potential water quality impacts associated with Missile Defense activities include hydrocarbon chloride deposition and solid propellants released into the open ocean.

The effects of hydrogen chloride deposition were modeled from the Advanced Solid Rocket Motor (ASRM). Under nominal launch conditions, when the relative humidity is less than 100 percent, deposition of hydrogen chloride gas on the surface of the sea will not be significant. Analyses for the most conservative case, where rain will be present soon after test firing the ASRM, concluded that acid deposition on surface water will not affect larger surface water bodies in the area. This analysis was based on the buffering capacity of fresh water, which is considerably lower than the buffering capacity of sea water. It is expected, therefore, that even for the most conservative case, where all of the hydrogen chloride emissions fall over the Open Ocean Area, the pH will not be depressed by more than 0.2 standard units for more than a few minutes. (U.S. Army Space and Strategic Defense Command, 1994)

Mathematical modeling of ASRM tests indicate that the maximum deposition of aluminum oxide will be about 1.6 milligrams per square meter (mg/m^2) (0.0007 ounces per square inch (oz./in^2). Aluminum oxide is not toxic under natural conditions, but may contribute potentially harmful species of soluble aluminum forms under acidic conditions. The portion of aluminum oxide that reacts with hydrogen chloride to form additional toxic aluminum species is difficult to quantify. The most conservative approach assumes that all of the deposited aluminum oxide reacts with hydrogen chloride. With this extremely conservative assumption, the deposition of about 1.6 mg/m^2 (0.0007 oz./in^2) of aluminum oxide equals approximately 0.0054 mg per liter (mg/L) (5.4 parts per billion) of aluminum at a water depth of 0.5 ft. This analysis assumes that rain will not be falling at the time of the test event or within 2 hours after the event. Rainfall will increase the amount of deposition. (U.S. Army Space and Strategic Defense Command, 1994) Even in the most conservative scenario of an on-ship or early flight failure, where all of the propellant is ignited and all of the hydrogen chloride and aluminum oxide are deposited, any toxic concentration of these products will be buffered and diluted by seawater to non-toxic levels within minutes. Consequently, any impacts of an accidental release will be very transient.

Solid propellant is primarily composed of rubber (polybutadiene) mixed with ammonium perchlorate. The ammonium perchlorate contained within the matrix of rubber will dissolve slowly. While there is no definitive information on the solubility or toxicity of the propellant material in seawater, its toxicity is expected to be relatively low. In a most conservative case, toxic concentrations of ammonium perchlorate will be expected only within a few yards of the source. (U.S. Department of the Air Force, 2002) In the event of an ignition failure or other launch mishap, a fueled rocket motor or portions of the unburned fuel will likely fall into ocean waters. In that case, small fragments of fuel may float on the surface of the sea for a time, and some dissolution may occur. However, the fragments will become waterlogged and sink (U.S. Department of the Air Force, 2002). In terms of the potential for cumulative impacts, the effect of any hydrogen chloride deposition in the Open ocean Area will be very transient due to the buffering capacity of seawater. Similarly, deposition of aluminum compounds will be very small and dispersal by surface mixing will be rapid. Therefore, no incremental, additive impacts are anticipated.

NASA conducted a thorough evaluation of the effects of missile systems that are deposited in seawater. It concluded that the release of hazardous materials aboard missiles into seawater will not be significant. Materials will be rapidly diluted and, except in the vicinity of the debris, will not be found at concentrations identified as producing any adverse effect. The Pacific Ocean is thousands of feet deep in the vicinity of the launch area; consequently, the water quality impact from the fuel is expected to be minimal. Any area affected by the slow dissolution of the propellant will be relatively small due to the size of the rocket motor or propellant pieces relative to the quantity of seawater (U.S. Department of the Air Force, 2002).

4.1.7.1.3 Major Exercises—No-action Alternative

Major Exercises under the No-action Alternative, such as RIMPAC and USWEX, include combinations of unit-level training and, in some cases, RDT&E activities that have been occurring in the HRC for decades (see Table 4.1-1). Therefore, the potential impacts of Major Exercises will be the same as those described earlier for training and RDT&E activities.

4.1.7.2 ALTERNATIVE 1 (WATER RESOURCES—OPEN OCEAN)

4.1.7.2.1 Increased Tempo and Frequency of Training—Alternative 1

Under Alternative 1, several training events would increase from current levels. Only the number of training events would increase; no new types of training would be introduced in the Open Ocean Area. Increases in the number of individual training events would proportionately increase the amounts of water pollutants released. However, the quantities of these materials would still be very small, relative to the extent of the sea ranges, and the large volume of ocean waters into which they would disperse. Therefore, the potential for water quality effects from these constituents would not be significant.

4.1.7.2.2 Enhanced and Future RDT&E Activities—Alternative 1

Water quality effects of RDT&E activities under Alternative 1 would be the same as those described under the No-action Alternative. Future RDT&E activities (see Table 4.1-1) would not introduce any new types of expended materials or debris into the Open Ocean Area.

4.1.7.2.3 HRC Enhancement—Alternative 1

No new types of expended material or debris would be introduced into the Open Ocean Area. Therefore, proposed HRC enhancements would have no effect on open ocean water quality.

4.1.7.2.4 Major Exercises—Alternative 1

Major Exercises under Alternative 1, such as RIMPAC and USWEX, include combinations of unit-level training and, in some cases, RDT&E activities that have been occurring in the HRC for decades (see Table 4.1-1). Although training events associated with Major Exercises would increase under Alternative 1, potential impacts would still be the same as those described under the No-action Alternative.

4.1.7.3 ALTERNATIVE 2 (WATER RESOURCES—OPEN OCEAN)

4.1.7.3.1 Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, several training events would increase from current levels. Only the number of training events would increase; no new types of training would be introduced in the Open Ocean Area. Increases in the number of individual training events would proportionately increase the amounts of water pollutants released. However, the quantities of these materials would still be very small, relative to the extent of the sea ranges, and the large volume of ocean waters into which they would disperse. Therefore, the potential water quality effects of these constituents would not be significant.

4.1.7.3.2 Enhanced and Future RDT&E Activities—Alternative 2

Water quality effects of RDT&E activities under Alternative 2 would be the same as those described under the No-action Alternative. Future RDT&E activities (see Table 4.1-1) would not introduce any new types of expended materials or debris into the Open Ocean Area.

4.1.7.3.3 Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Vessels, aircraft, and other military assets employed during Multiple Strike Group training would increase the overall intensity and duration of Navy training on the sea ranges. The Strike Group training would be similar to other large-exercise training events held on the range. Although the intensity of training associated with Multiple Strike Group Training would increase under Alternative 2, potential impacts would still be the same as those described under the No-action Alternative, and no new types of expended material or debris would be introduced into the open ocean.

4.1.7.4 ALTERNATIVE 3 (WATER RESOURCES—OPEN OCEAN)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on water resources under Alternative 3 would be the same as those described for Alternative 2.

4.2 NORTHWESTERN HAWAIIAN ISLANDS

Table 4.2-1 lists ongoing research, development, test, and evaluation (RDT&E) activities for the No-action Alternative and proposed RDT&E activities for Alternatives 1, 2, and 3 near the Northwestern Hawaiian Islands. Alternative 3 is the preferred alternative.

Table 4.2-1. RDT&E Activities Near the Northwestern Hawaiian Islands

Research, Development, Test, and Evaluation (RDT&E) Activities
• Missile Defense

The Presidential Proclamation establishing the Papahānaumokuākea Marine National Monument requires that all training and RDT&E activities of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities. Current Navy activities associated with the Monument include missile defense RDT&E.

Missile defense RDT&E activities for the No-action Alternative (see Figure 2.2.2.5.1-3) and proposed RDT&E activities for Alternatives 1, 2, and 3 (see Figure 2.2.3.5-1) have overflights and intercepts that have the potential to generate debris that falls within areas of the Northwestern Hawaiian Islands.

4.2.1 NORTHWESTERN HAWAIIAN ISLANDS OFFSHORE

A review of the 13 resources against program offshore RDT&E activities under the No-action Alternative, and proposed RDT&E activities under Alternative 1, Alternative 2 and Alternative 3, was performed for the Northwestern Hawaiian Islands. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

Any airspace issues associated with the Northwestern Hawaiian Islands offshore are addressed in Section 4.1.1 (Airspace—Ocean Ocean). There are no current or proposed Hawaii Range Complex (HRC) activities that will affect air quality, health and safety, land use, noise; or the existing land forms, geology, or associated soils development of the islands. Socioeconomic characteristics (population size, employment, income generated, and housing cost) do not apply since all the islands are uninhabited. No transportation (roadways, railways, etc) and utility systems (water, wastewater, electricity, and natural gas) exist offshore. HRC activities within the Northwestern Hawaiian Islands do not generate any hazardous waste streams that could impact local water quality.

4.2.1.1 BIOLOGICAL RESOURCES—NORTHWESTERN HAWAIIAN ISLANDS—OFFSHORE

4.2.1.1.1 Nihoa—Biological Resources—Offshore

Less than 12 of the potential 46 annual missile flight trajectories could result in a missile flying over portions of the Papahānaumokuākea Marine National Monument. Of particular concern is the potential for debris landing on Nihoa and Necker islands at the southeastern end of the Northwestern Hawaiian Islands, the closest of the Northwestern Hawaiian Islands to the Main Hawaiian Islands. At this point in their flight, the boosters normally follow a ballistic trajectory and will not impact the monument resources. For select intercept missions the potential exists for limited debris to fall into the waters offshore of Necker and Nihoa in the Papahānaumokuākea Marine National Monument. All training and RDT&E activities conducted in the HRC will be performed in a manner that avoids, to the extent practicable and consistent with training requirements, adverse impacts on monument resources and qualities. Thus, as discussed in the beginning of Section 3.2, these military readiness activities are exempt from consultation requirements or monument regulations. All activities with the potential to affect the Northwestern Hawaiian Islands will be performed in accordance with ongoing practices, such as equipment inspections, to minimize the potential for contributing to the spread of invasive species.

4.2.1.1.1.1 No-action Alternative (Biological Resources—Nihoa—Offshore)

HRC RDT&E Activities—No-action Alternative

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Nihoa.

Wildlife

A debris analysis to identify weight and toxicity of the debris that could potentially impact Nihoa was performed by the Terminal High Altitude Area Defense (THAAD) (one of the missiles with a trajectory that could potentially result in debris offshore of Nihoa) Project Office. Low-force debris (under 0.5 foot-pound) is not expected to severely harm threatened, endangered, or other marine species occurring in offshore waters. Quantities of falling debris (e.g., small amount of solid rocket propellant remaining) will be low and widely scattered so as not to present a toxicity issue.

In a successful intercept, both missiles would be destroyed by the impact. Momentum would carry debris along the respective paths of the two missiles until the debris falls to earth. The debris would consist of a few large pieces (approximately 110 pounds [lb]), of each missile, many medium pieces (approximately 11 lb), and mostly tiny particles. This debris is subject to winds on its descent to the surface. The debris would generally fall into two elliptically-shaped areas. Most debris would fall to the earth within 3 to 40 minutes after intercept, but some of the lighter particles may drift airborne, for as long as 2 to 4 hours before landing. (U.S. Department of the Navy, 1998a)

The potential exists for debris greater than 0.5 foot-pound to impact the offshore waters of Nihoa. No estimate of the actual area impacted was calculated since the likelihood of impacts on submerged coral reef habitat at Nihoa is anticipated to be low. A debris analysis to identify weight and toxicity of the debris that could potentially impact Nihoa was performed by the

THAAD (one of the missiles with a trajectory that could potentially result in debris offshore of Nihoa) Project Office. Low-force debris (under 0.5 foot-pound) is not expected to severely harm threatened, endangered, or other marine species occurring in offshore waters. Quantities of falling debris (e.g., solid rocket propellant) will be low and widely scattered so as not to present a toxicity issue. The potential exists for debris greater than 0.5 foot-pound to impact the offshore waters of Nihoa. Since most of the coral present only survive at depths less than 40 feet, coral cover is not greater than 25 percent, the debris will be widely scattered, and the velocity will be slowed following impact at the water's surface, the likelihood of impacts on submerged coral reef habitat associated with Nihoa will be low.

According to the analysis in the Point Mugu Sea Range Environmental Impact Statement (EIS), less than 0.0149 marine mammals would be exposed to missile debris per year, and the probability of this debris affecting marine mammals or other marine biological resources is less than 10^{-6} (1 in 1 million). This probability calculation was based on the size of the Pacific Ocean area studied and the marine mammal population density within that area. The Point Mugu range area (27,183 square nautical miles [nm^2]) is 0.1 percent of the Pacific Missile Range Facility (PMRF) Temporary Operating Area (2.1 million nm^2), and the density of marine mammals is larger. It is reasonable to conclude that the probability of marine mammals being struck by debris from similar missile testing at PMRF will be even more remote than at Point Mugu. (U.S. Department of the Navy, 1998c)

The various trajectories, launch sites, and intercept areas are selected with consideration to both the mission requirements and to minimize the effects on any particular location. During training, dedicated Navy lookouts who have received extensive training would be posted to scan the ocean for anything detectible in the water. For both training and RDT&E activities, spotters in aircraft would also relay information on marine species observed in the projected intercept areas. Training is halted, or a launch delayed, if marine mammals or sea turtles are detected in a target area. For a marine mammal or sea turtle to be injured, it would have to enter the target area undetected and then surface at the exact point where a projectile, spent missile, or spent target landed.

Interceptor missile element test activities associated with the Missile Defense Agency lethality program could include development and testing of Nuclear, Biological, or Chemical material simulants. These activities were analyzed in the *Programmatic Environmental Assessment, Theater Missile Defense Lethality Program* (U.S. Army Space and Strategic Defense Command, 1993b). The only proposed chemical simulant that might be included as part of the No-action Alternative in a target payload will be small quantities of tributyl phosphate (TBP), which is a non-flammable, non-explosive, colorless, odorless liquid typically used as a component of aircraft hydraulic fluid, as a plasticizer, and as a solvent in commercial industry. The release of simulant will occur at a high altitude over the open ocean during a nominal flight test. The potential ingestion of toxins, such as the small amount of propellant or simulant remaining in the spent boosters or on pieces of missile debris, by marine mammals or fish species in the offshore area will be remote because of (1) atmospheric dispersion, (2) the diluting and neutralizing effects of seawater, and (3) the relatively small area that could potentially be affected.

According to tests performed on White Sands Missile Range using TBP (U.S. Army Space and Missile Defense Command, 2004), toxicity levels for aquatic species that include algae, crustaceans, water fleas, fathead minnows, and rainbow trout range from 0.0002 ounce (oz) per gallon (gal) to 0.002 oz/gal. Assuming as a worse case that TBP would penetrate to a depth of 1 foot, approximately 0.00004 oz/gal would be deposited within 1 cubic foot of water. This amount would be less than the toxicity level for the species mentioned.

Potential effects on marine biological resources from mid-frequency active/high-frequency active (MFA/HFA) sonar usage determined for the No-action Alternative are discussed in the applicable Open Ocean No-action Alternative sections.

4.2.1.1.1.2 Alternative 1 (Biological Resources—Nihoa—Offshore)

HRC RDT&E Activities—Alternative 1

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Nihoa.

Wildlife

No increase in the number of missile defense launches (46) would occur as part of Alternative 1, and the impacts on foraging birds or marine species would be the same as those discussed in the No-action Alternative. Payloads on some future RDT&E target vehicle launches from PMRF would incorporate additional chemical simulants (Section 2.2.3.5), which could include larger quantities of TBP and various glycols. Up to approximately 120 gal of simulant could be used in target vehicles. The release of simulant would continue to occur at a high altitude over the open ocean during a nominal flight test. Assuming as a worst case that TBP would penetrate to a depth of 1 foot, approximately 0.00009 oz/gal would be deposited within 1 cubic foot of water. This amount would be less than the toxicity level for species such as algae, crustaceans, and minnows. According to a Material Safety Data Sheet prepared for propylene glycol, this material is expected to be non-hazardous to aquatic species: The lethal concentration that kills 50 percent of test animals (LC50) over a 96-hour period for salmon is 0.42 oz/gal, and the effective concentration where 50 percent of its maximal effect is observed (EC50) over a 72-hour period for marine algae is 0.15 oz/gal. Propylene glycol is not expected to bioaccumulate. (Plastic Process Equipment, 2007) When released into water, ethylene glycol is expected to readily biodegrade and is expected to have a half-life between 1 and 10 days. This material is not expected to significantly bioaccumulate. The LC50 over a 96-hour period for fish is over 0.01 oz/gal. (Mallinckrodt Baker, Inc., 2007) According to Science Lab.com, the LC50/96 hours is 0.22 oz/gal for bluegill (Science Lab.com, 2007).

The potential ingestion of toxins, such as the small amount of propellant or simulant remaining in the spent boosters or on pieces of missile debris, by marine mammals or fish species would be remote because of (1) atmospheric dispersion, (2) the diluting and neutralizing effects of seawater, and (3) the relatively small area that could potentially be affected. Also as part of Alternative 1, launches from Wake Island, the Ronald Reagan Ballistic Missile Defense Test Site (Reagan Test Site) at U.S. Army Kwajalein Atoll, and Vandenberg Air Force Base toward the vicinity of PMRF are proposed. Launches from those sites would be from existing launch facilities, and the intercept areas would be in the Open Ocean Area and Temporary Operating Area of the PMRF Range. Targets would also be launched from ships and aircraft. The effects of these missile tests would be similar to those described above for the No-action Alternative and in Section 4.2.1.1.1.1.

Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 1 are discussed in the applicable Open Ocean Alternative 1 sections.

4.2.1.1.1.3 Alternative 2 (Biological Resources—Nihoa—Offshore)

HRC RDT&E Activities—Alternative 2

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Nihoa.

Wildlife

An increase in Missile Exercises from 46 per year to 50 per year could result in a slight increase in the potential for impacts on foraging birds or marine species offshore of Nihoa; however, the four additional events may not necessarily involve missiles that could impact offshore of Nihoa and the probability for widely scattered debris or simulant to affect fish, marine mammals, or sea turtles would continue to be low. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 2 are discussed in the applicable Open Ocean Alternative 2 sections.

4.2.1.1.1.4 Alternative 3 (Biological Resources—Nihoa—Offshore)

HRC RDT&E Activities—Alternative 3

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Nihoa.

Wildlife

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.2.1.1.2 Necker—Biological Resources—Offshore

4.2.1.1.2.1 No-action Alternative (Biological Resources—Necker—Offshore)

HRC RDT&E Activities—No-action Alternative

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Necker.

Wildlife

While missiles could overfly Necker, it is unlikely that missile debris would impact on or near the island; any impacts would be similar to those discussed above for Nihoa Island. Potential effects on marine biological resources from MFA/HFA sonar usage determined for the No-action Alternative are discussed in the applicable Open Ocean No-action Alternative sections.

4.2.1.1.2.2 Alternative 1 (Biological Resources—Necker—Offshore)

HRC RDT&E Activities—Alternative 1

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Necker.

Wildlife

Although missiles could overfly Necker, it is unlikely that missile debris would impact in the offshore waters of the island. No increase in the number of missile defense launches (46) would occur as part of Alternative 1, and any impacts on wildlife would be the same as those discussed above in the No-action Alternative for Nihoa. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 1 are discussed in the applicable Open Ocean Alternative 1 sections.

4.2.1.1.2.3 Alternative 2 (Biological Resources—Necker—Offshore)

HRC RDT&E Activities—Alternative 2

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Necker.

Wildlife

It is unlikely that missile debris would impact in the offshore waters of the island. An increase in Missile Exercises from 46 per year to 50 per year could result in a slight increase in the potential for impacts on wildlife on Necker; however, the four additional Missile Exercises may not necessarily involve missiles that could impact offshore, and the probability for widely scattered debris or simulant to affect fish, marine mammals, or sea turtles would continue to be low. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 2 are discussed in the applicable Open Ocean Alternative 2 sections.

4.2.1.1.2.4 Alternative 3 (Biological Resources—Necker—Offshore)

HRC RDT&E Activities—Alternative 3

Vegetation

No threatened or endangered marine vegetation has been identified offshore of Necker.

Wildlife

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action

Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.2.2 NORTHWESTERN HAWAIIAN ISLANDS ONSHORE

A review of the 13 resources against program RDT&E activities under the No-action Alternative, and proposed RDT&E activities under Alternative 1, Alternative 2, and Alternative 3, was performed for the Northwestern Hawaiian Islands onshore. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

Any airspace issues associated with the Northwestern Hawaiian Islands are addressed under 4.1.1 (Airspace—Open Ocean). There are no current or proposed HRC activities that will affect air quality, health and safety, land use, noise; or the existing land forms, geology, or associated soils development of the islands. Socioeconomic characteristics (population size, employment, income generated, and housing cost) do not apply since all the islands are uninhabited. No transportation (roadways, railways, etc) and utility systems (water, wastewater, electricity, and natural gas) exist onshore. HRC activities within the Northwestern Hawaiian Islands do not generate any hazardous waste streams that could impact local water quality.

4.2.2.1 BIOLOGICAL RESOURCES—NORTHWESTERN HAWAIIAN ISLANDS

4.2.2.1.1 Nihoa—Biological Resources

Of particular concern is the potential for debris on Nihoa at the southeastern end of the Northwestern Hawaiian Islands. At this point in their flight, the boosters follow a ballistic trajectory and should not impact monument resources. For select intercept missions the potential exists for limited debris to fall onto the island of Nihoa in the Papahānaumokuākea Marine National Monument.

4.2.2.1.1.1 No-action Alternative (Biological Resources—Nihoa)

HRC RDT&E Activities—No-action Alternative

Vegetation

Any falling debris from missile tests with trajectories that have the potential to affect Nihoa should cool down sufficiently prior to impact so as not to present a fire hazard for vegetation such as the endangered loulu, `ohai, *Amaranthus brownii*, and *Schiedea verticillata*. PMRF conducted a thermal degradation analysis of the potential debris. The analysis showed the maximum temperature of the potential debris would be 150°C at impact. Based on PMRF's literature review and conversations with a fire specialist with the U.S. Forest Service regarding the temperature required for a non-spark ignition of dry vegetation PMRF found ignition temperatures ranging between 200°C and 380°C. The debris would have to be in excess of 200°C and remain in contact with dry vegetation for a substantial amount of time in order to ignite the vegetation. Therefore, any debris potentially landing on Nihoa will not be a fire hazard. (Missile Defense Agency, 2006)

According to correspondence from the U.S. Fish and Wildlife Service Pacific Islands Fish and Wildlife Office, the Service's previous concurrence of no significant impact from THAAD activities remained valid (U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, 2007). If feasible, consideration will be given to alterations in the missile flight trajectory, to further minimize the potential for debris impacts on vegetation on the island.

Wildlife

A debris analysis to identify weight and toxicity of the debris that could potentially impact Nihoa was performed by the THAAD (one of the missiles with a trajectory that could potentially result in debris on Nihoa) Project Office. Preliminary results indicated that debris greater than 0.5 foot-pound is not expected to impact on Nihoa (U.S. Army Space and Missile Defense Command, 2002). Low-force debris (under 0.5 foot-pound) is not expected to severely harm threatened, endangered, migratory, or other endemic species occurring on the island. The probability for this widely scattered debris to hit birds, seals, or other wildlife will be low. Quantities of falling pieces of debris (e.g., small amount of solid rocket propellant remaining) will be low and widely scattered so as not to present a toxicity issue.

Appendix C includes a description of the Migratory Bird Treaty Act (MBTA). Section 704(a) of the MBTA prescribes regulations to exempt the Armed Forces for the incidental taking of migratory birds during military readiness activities authorized by the Secretary of Defense or the Secretary of the military department concerned. Congress determined that allowing incidental take of migratory birds as a result of military readiness activities is consistent with the MBTA and the treaties. The Armed Forces must give appropriate consideration to the protection of migratory birds when planning and executing military readiness activities, but not at the expense of diminishing the effectiveness of such activities. The low probability of debris capable of significantly impacting a population of a particular bird species should exempt the ongoing missile tests from the take prohibitions. (U.S. Fish and Wildlife Service, 2007a; U.S. Department of the Navy, 2007a)

Regular marine trash removal has been conducted within the Northwestern Hawaiian Islands since 1997 through a multi-agency effort led by the National Marine Fisheries Service, in collaboration with, among others, the Navy, Coast Guard, U.S. Fish and Wildlife Service, National Ocean Service, and State of Hawaii. This effort has resulted in the removal of more than 540 tons of fishing gear and other marine trash over the last 7 years. (National Oceanic and Atmospheric Administration, 2006c)

4.2.2.1.1.2 Alternative 1 (Biological Resources—Nihoa)

HRC RDT&E Activities—Alternative 1

Vegetation

Falling debris from enhanced and future RDT&E missile tests should cool down sufficiently before impact so as not to present a fire hazard for vegetation such as the endangered loulu, `ohai, *Amaranthus brownii*, and *Schiedea verticillata*. If feasible, consideration would be given to alterations in the missile flight trajectory, to further minimize the potential for debris impacts on vegetation on the island.

Wildlife

The release of simulant would continue to occur at a high altitude over the open ocean during a nominal flight test. No increase in the number of missile defense launches would occur as part of Alternative 1. The potential ingestion of toxins, such as the small amount of propellant or simulant remaining in the spent boosters or on pieces of missile debris, by birds or monk seals on the island would be remote because of (1) atmospheric dispersion, (2) the diluting and neutralizing effects of seawater, and (3) the relatively small area that could potentially be affected. It is also unlikely that enough simulant capable of affecting birds or monk seals would reach the island of Nihoa due to the dispersal by area winds of the material (which would be exo-atmospheric).

4.2.2.1.1.3 Alternative 2 (Biological Resources—Nihoa)

HRC RDT&E Activities—Alternative 2

Vegetation

The increase in the number of missile launches proposed (from 46 to 50) could result in a slight increase in the potential for additional impacts on vegetation on Nihoa. However, various trajectories, launch sites, and intercept areas are used that may or may not have the potential to affect the island. Any impacts on vegetation from proposed activities would be similar to those from the No-action Alternative and Alternative 1.

Wildlife

An increase in Missile Exercises from 46 per year to 50 per year could result in a slight increase in the potential for additional impacts on wildlife on Nihoa; however, the probability for widely scattered debris to hit birds, seals, or other wildlife would continue to be low. Quantities of falling debris (e.g., solid rocket propellant) would be low and widely scattered so as not to present a toxicity issue. Various trajectories, launch sites, and intercept areas would continue to be used, which would help to minimize the effects on any particular location. Effects would be similar to those discussed above in the No-action Alternative section.

4.2.2.1.1.4 Alternative 3 (Biological Resources—Nihoa)

HRC RDT&E Activities—Alternative 3

Vegetation

Effects on vegetation under Alternative 3 would be the same as those described for Alternative 2.

Wildlife

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential impacts on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are the same as those analyzed for the No-action Alternative. Potential impacts on marine and terrestrial biological resources from non-ASW (sonar usage) training activities and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.2.2.1.2 Necker—Biological Resources

4.2.2.1.2.1 No-action Alternative (Biological Resources—Necker)

HRC RDT&E Activities—No-action Alternative

Vegetation

Although missiles could overfly Necker, it is unlikely that missile debris would impact on or near the island; any falling debris should cool down sufficiently before impact so as not to present a fire hazard for the sparse vegetation on Necker, including the endangered `ohai as described in Section 4.2.2.1.1.1. If feasible, consideration would be given to alterations in the missile flight trajectory, to further minimize the potential for debris impacts on vegetation on the island.

Wildlife

Although missiles could overfly Necker, it is unlikely that missile debris would impact on or near the island; any impacts on wildlife would be similar to those discussed above for Nihoa Island. No increase in the number of missile defense launches would occur as part of Alternative 1.

4.2.2.1.2.2 Alternative 1 (Biological Resources—Necker)

HRC RDT&E Activities

Vegetation

It is unlikely that debris from enhanced and future RDT&E missile tests would impact on or near the island.

Wildlife

Although missiles could overfly Necker, it is unlikely that missile debris would impact on or near the island; any impacts would be similar to those discussed above for Nihoa Island. No increase in the number of missile defense launches would occur as part of Alternative 1.

4.2.2.1.2.3 Alternative 2 (Biological Resources—Necker)

HRC RDT&E Activities

Vegetation

It is unlikely that debris from an increase in Missile Exercises from 46 per year to 50 per year would impact on or near the island.

Wildlife

An increase in Missile Exercises from 46 per year to 50 per year would not necessarily result in additional impacts on wildlife on Necker, since the probability for widely scattered debris to hit birds, seals, or other wildlife would continue to be low. Although missiles could overfly Necker, it is unlikely that missile debris would impact on or near the island; any impacts would be similar to those discussed above for Nihoa Island.

4.2.2.1.2.4 Alternative 3 (Biological Resources—Necker)

HRC RDT&E Activities—Alternative 3

Vegetation

Effects on vegetation under Alternative 3 would be the same as those described for Alternative 2.

Wildlife

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential impacts on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are the same as those analyzed for the No-action Alternative. Potential impacts on marine and terrestrial biological resources from non-ASW (sonar usage) training activities and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.2.2.2 CULTURAL RESOURCES—NORTHWESTERN HAWAIIAN ISLANDS

4.2.2.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Cultural Resources—Northwestern Hawaiian Islands)

Missile defense RDT&E activities, including THAAD testing, have the potential to generate debris that falls within areas of the Northwestern Hawaiian Islands, particularly the vicinity of Nihoa. Some of these islands are known to have significant cultural resources sites, and the islands of Nihoa and Necker (Mokumanamana) are listed in the National and Hawaii State Registers of Historic Places. Debris analyses of the types, quantities, weights, and sizes associated with the PMRF Missile Exercises indicate that the potential to impact land resources of any type is very low and extremely remote (U.S. Army Space and Missile Defense Command 2002). In addition, trajectories can be altered under certain circumstances to further minimize the potential for impacts. As noted in Section 4.2.2.1, future missions will include consideration of missile flight trajectory alterations, if feasible, to minimize the potential for debris within these areas. As a result, impacts on cultural resources within the Northwestern Hawaiian Islands are not expected. In accordance with Section 106 of the National Historic Preservation Act, the Hawaii State Historic Preservation Office (SHPO) was provided a copy of the Draft EIS/OEIS and afforded an opportunity to comment. The SHPO responded on September 17, 2007, indicating that no historic properties will be affected.

4.3 KAUAI

4.3.1 KAUAI OFFSHORE

4.3.1.1 PMRF OFFSHORE (BARSTUR, BSURE, SWTR, KINGFISHER)

Table 4.3.1.1-1 lists ongoing Hawaii Range Complex (HRC) training and research, development, test, and evaluation (RDT&E) activities for the No-action Alternative and proposed training and RDT&E activities for Alternatives 1, 2, and 3 offshore of Pacific Missile Range Facility (PMRF). Alternative 3 is the preferred alternative.

Table 4.3.1.1-1. Training and RDT&E Activities at PMRF Offshore (BARSTUR, BSURE, SWTR, Kingfisher)

Training	Research, Development, Test, and Evaluation (RDT&E) Activities
• Naval Surface Fire Support Exercise (Barking Sands Tactical Underwater Range [BARSTUR], Barking Sands Underwater Range Extension [BSURE]) • Expeditionary Assault • Flare Exercise • Anti-Submarine Warfare (ASW) Tracking Exercise (BARSTUR, BSURE, Shallow Water Training Range [SWTR]) • ASW Torpedo Exercise (BARSTUR, BSURE, SWTR) • Major Integrated ASW Training Exercise (BARSTUR, BSURE, SWTR) • Electronic Combat Operations • Mine Countermeasures Exercise (MCM) • Mine Neutralization • Mine Laying • Swimmer Insertion/Extraction • Special Warfare Operations (SPECWAROPS)	• Anti-Air Warfare RDT&E • Electronic Combat/Electronic Warfare (EC/EW) • High-Frequency Radio Signals • Missile Defense • Additional Chemical Simulant (Alternative 1) • Launched SM-6 from Sea-Based Platform (AEGIS) (Alternative 1) • Test Unmanned Surface Vehicles (Alternative 1) • Test Unmanned Aerial Vehicles (UAVs) (Alternative 1) • Test Hypersonic Vehicles (Alternative 1) • Portable Undersea Tracking Range (Alternative 1) • Expanded Training Capability for Transient Air Wings (Alternative 1) • Kingfisher Underwater Training Area • Directed Energy (Alternative 2/3) • Advanced Hypersonic Weapon (Alternative 2/3)

A review of the 13 resources against training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for PMRF/Main Base Offshore training and RDT&E activities. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous material and hazardous waste, health and safety, land use, noise, and utilities.

There are no reports of emissions from Navy training and RDT&E activities affecting the air quality offshore of PMRF/Main Base. Use of the area offshore of PMRF could require control of the airspace; however, any issues associated with this airspace are included within the PMRF/Main Base discussion (Section 4.3.2.1.2). Because no ground disturbance or building modifications would occur offshore, there would be no impact on geology and soils. Training and RDT&E activities in the area offshore of PMRF would require small amounts of hazardous materials for maintenance and would generate small amounts of hazardous waste. All hazardous materials used and hazardous waste generated would continue to be managed in accordance with PMRF's hazardous materials management plans as described in Appendix C. No noise-sensitive land receptors are affected by existing noise levels at the site. All training and RDT&E activities offshore of PMRF/Main Base are conducted in accordance with health and safety guidance, as described in Appendix C. There is no public health and safety issue. There would be no impact on utilities and land use because the training population is transient and training sites remain the same for each alternative. Land use does not conflict with recreational activities occurring in or adjacent to PMRF. There are no utility issues associated with offshore training and RDT&E activities for PMRF/Main Base.

4.3.1.1.1 Biological Resources—PMRF Offshore (BARSTUR, BSURE, SWTR, Kingfisher)

Potential impacts of RDT&E activities, including missile launches on marine biological resources within the PMRF region of influence, have been addressed in detail in the Strategic Target System Environmental Impact Statement (EIS), the Restrictive Easement EIS, the PMRF Enhanced Capability EIS, and the Theater High Altitude Area Defense Pacific Flight Tests Environmental Assessment (EA), (U.S. Army Strategic Defense Command, 1992; U.S. Army Space and Strategic Defense Command 1993a; U.S. Department of the Navy, 1998a; U.S. Army Space and Missile Defense Command, 2002). Based on these prior analyses and the effects of current and past missile launch activities, the potential impacts of activities related to continuing RDT&E on offshore biological resources are expected to be minimal.

The analytical approach for biological resources involved evaluating the degree to which the proposed launch activities can impact vegetation, wildlife, threatened or endangered species, and sensitive habitat within the affected area. Offshore refers to ocean areas from 0 to 12 nautical miles (nm) offshore of PMRF/Main Base. Criteria for assessing potential impacts on biological resources are based on the following: the number or amount of the resource that will be impacted relative to its occurrence at the project site, the sensitivity of the resource to proposed training and RDT&E activities, and the duration of the impact. Impacts are considered substantial if they have the potential to result in reduction of the population size of Federally listed threatened or endangered species, degradation of biologically important unique habitats, substantial long-term loss of vegetation, or reduction in capacity of a habitat to support wildlife.

4.3.1.1.1.1 No-action Alternative (Biological Resources—PMRF Offshore ([BARSTUR, BSURE, SWTR, Kingfisher])

HRC Training and Major Exercises—No-action Alternative

Vegetation

No threatened or endangered vegetation is located in the offshore area.

Wildlife

Effects of the applicable training events on open ocean marine species more than 12 nm offshore will be the same or less than those described for the offshore region. Effects on marine species from underwater sound levels produced by the use of mid-frequency active/high-frequency active (MFA/HFA) sonar and from underwater explosions are addressed in Section

4.1.2. At PMRF, portions of the Bombing Exercise (BOMBEX), Mine Exercise (MINEX), gunnery/special weapons tests, and Sinking Exercise (SINKEX) can also occur within offshore waters. Effects on marine species are similar to those presented in Section 4.1.2 and are further discussed below.

The weapons used in most BOMBEX and Gunnery Exercises (GUNEX) pose little risk to foraging birds, whales, Hawaiian monk seals (*Monachus schauinslandi)*, or sea turtles within the offshore area unless they were to be near the surface at the point of impact. Both 0.50-caliber machine guns and the close-in weapons systems exclusively fire non-explosive ammunition. The same applies to larger weapons firing inert ordnance for training events. These rounds pose a risk only at the point of impact. To avoid harming animals, target areas are determined to be clear of marine mammals and sea turtles before training begins.

Expeditionary Assault or Special Warfare Operations (SPECWAROPS) amphibious landing training events on PMRF occur at Majors Bay, which has coral coverage of less than 2 percent. The training takes place in specific routes in order to minimize to the extent practicable impacts on coral and other sensitive marine life. Amphibious vehicles are washed down after completion of training to minimize the potential for introducing alien or invasive species. Potential impacts of past amphibious landings during Expeditionary Assault training have been monitored. The area of Majors Bay used for landing training is located in an area typically not used by sea turtles or monk seals. Within 1 hour prior to initiation of Expeditionary Assault landing training events, landing routes and beach areas are surveyed for the presence of sensitive wildlife. If any marine mammals or sea turtles are found to be present on the beach, the training is delayed until the animals leave the area.

Flares are used over water during training. They are composed of a magnesium pellet that burns quickly at a very high temperature leaving ash, end caps, and pistons. Ash from flares will be dispersed over the water surface and then settle out. Chemical leaching will occur throughout the settling period through the water column, and any leaching after the particles reach the bottom will be dispersed by currents. Therefore, localized and temporary impacts on benthic resources may occur, but no long-term impact is anticipated.

Impacts on sea turtles and marine mammals in the offshore area from Anti-Submarine Warfare (ASW) Exercises, mainly from sonar and underwater explosions, will be similar to those discussed in Section 4.1.2. Detection of another vessel is the goal of ASW. During ASW training there is a heightened awareness of the need to detect and identify everything within the water column since it may be the opponent. The Navy has conducted submarine training in and around the Hawaiian Islands for years. Before any explosive training, the range is carefully screened visually to ensure that no marine mammals or other intruders are present. When the divers enter the water, they also have an opportunity to detect marine mammals and humpback whales visually or audibly (if the whales are vocalizing). The training does not proceed if marine mammals are in the vicinity. The delay between initiating the fuse and the detonation of the explosives is only 30 minutes, minimizing the opportunity for marine mammals to enter the area. Given the relatively small size of the charge, the area within which marine mammals would be at risk from the explosive is quite limited. Most ASW training involving the launch of an exercise torpedo occur on the BARSTUR range under range control of PMRF, outside the 100-fathom isobath and well clear of the Hawaiian Islands Humpback Whale National Marine Sanctuary boundaries. (U.S. Department of the Navy, 1998a)

Electronic Combat Operations consist of air-, land-, and sea-based emitters simulating enemy systems electronic signals, designed to simulate threat radars. Ship and aircraft crews train to respond to these signals as appropriate with little potential for impacts on marine species. Appropriately configured aircraft fly threat profiles against the ships so that crews can be trained to detect electronic signatures of various threat aircraft, or so that ship crews can be trained to detect counter jamming of their own electronic equipment by the simulated threat.

In Mine Countermeasures Exercises, aircraft, ships, and submarines train to detect, then avoid or disable in-water mines and placing mines in the water respectively. Tactics for neutralizing ground or bottom mines involve a diver placing a specific amount of explosives which, when detonated underwater at a specific distance from a mine, results in neutralization of the mine. Floating, or moored, mines involve the diver placing a specific amount of explosives directly on the mine. Mine laying involves aircraft and submarines deploying mines into the water. As discussed in Section 4.1.2.3.1, there is a long period of area monitoring before any detonation or live fire event begins. Ordnance cannot be released until the target area is determined clear. Species are large or travel in large pods and are easily visible from an elevated platform; a ship or aircraft would readily see a marine mammal in time to implement mitigation measures. Activities are immediately halted if sea turtles or marine mammals are observed within the target area. Activities are delayed until the animal clears the target area. Most underwater detonations take place in sandy areas that are generally not used by sea turtles and are free of coral. All of these factors serve to avoid the risk of harming cetaceans, pinnipeds, or sea turtles. Post event monitoring of underwater detonations has not observed any mortality.

Swimmer Insertion/Extraction involves underwater training with a Sea, Air, and Land (SEAL) Delivery Vehicle (SDV) that transports SEALs between a submerged submarine and shore. Impacts will be minor and similar to those of Expeditionary Assault training events discussed above. Special training involving swimmers and small boats within the 100-fathom isobath pose a very low risk of potentially harmful direct or indirect effects on marine mammals. Similar training has been conducted in Hawaiian waters for many years without any indication that such training has had any effect on marine mammal populations. Small boat coxswains and special operations forces are aware of the environment around them and avoid both unidentified objects and marine mammals, which pose a more severe hazard to them than they pose to the mammals. Although most training is at night, special operations forces are specially trained for night training and the use of night vision devices. (U.S. Department of the Navy, 1998a)

SPECWAROPS are performed by Navy SEALs and U.S. Marines and include special reconnaissance, reconnaissance and surveillance, combat search and rescue, and direct action. These activities occur within regularly used range areas with little potential for long-term impacts on marine species.

High-frequency test and evaluation include the use of High-Frequency Radio Signals and the evaluation of their effectiveness. High frequency in the radio spectrum refers to frequencies between 3 megahertz (MHz) and 30 MHz. This frequency range is commonly used for maritime and amateur short-wave radio transmissions. These test and evaluation activities can take place both at PMRF shore sites and within W-188. No impacts on offshore marine species are anticipated.

In an Air-to-Air Missile Exercise (A-A MISSILEX), missiles are fired from aircraft against unmanned aerial target drones such as the subsonic BQM. The fired missiles and targets during MISSILEXs are not recovered, with the exception of BQMs, which have parachutes. Launches of target missiles and drones from PMRF as part of Missile Defense Activities occur from existing ground-based target launch sites at the PMRF launch complex and Kauai Test Facility (KTF). Their potential effects are discussed below.

Noise

The effects of noise on wildlife vary from serious to no effect in different species and situations. Behavioral responses to noise also vary from startling to retreat from favorable habitat. Animals can also be very sensitive to sounds in some situations and very insensitive to the same sounds in other situations. (Larkin, 1996) Noise from launches may startle nearby wildlife and cause flushing behavior in birds, but this startle reaction would be of short duration. The increased presence of personnel, vehicles, helicopters, and landing craft immediately before a launch would tend to cause birds and other mobile species of wildlife to temporarily leave the area that would be subject to the highest level of launch noise. However, training is usually short in duration and occurs within regularly used range areas. Major Exercises incorporate procedures to avoid wildlife that are foraging, resting, or hauled out, such as threatened green turtles (*Chelonia mydas*) or endangered Hawaiian monk seals.

Air Emissions

Within offshore waters, the potential ingestion of contaminants by fish and other marine species will be remote because of atmospheric dispersion of the emission cloud, the diluting effects of the ocean water, and the relatively small area of the Essential Fish Habitat (EFH) that will be affected. Further discussions on the effects of MISSILEX and other training and RDT&E activities on fish and EFH are presented in the Open Ocean Section (4.1.2) and in the Navy's *Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007a).

In the unlikely event of a launch mishap involving a liquid-propellant missile, if the fuel and/or oxidizer do not explode or burn, they will likely be deposited on the ground or water surface. Materials will be rapidly diluted in the seawater and, except for the immediate vicinity of the debris, will not be found at concentrations identified as producing adverse effects (U.S. Department of the Navy, 1998a). For Terminal High Altitude Area Defense (THAAD) missiles, a maximum of 0.5 gallon (gal) of hypergolic bi-propellants will be released from the Divert and Attitude Control System. For a Lance missile, up to several hundred pounds of inhibited red fuming nitric acid (IRFNA) and hydrazine can be released. The Liquid Fuel Target System has the potential to release up to several hundred gallons of IRFNA and coal tar distillate.

Bi-propellants are two liquid missile propellants, such as THAAD's monomethyl hydrazine and nitrogen tetroxide, stored in separate tanks and fed into the missile system separately as fuel and oxidizer. The nitric acid produced from the bi-propellant release will initially cause spattering, a localized increase in water temperature, and local lowering of the hydrogen ion concentration (pH) value. However the low levels of emission combined with the natural buffering capacity of seawater will neutralize the reaction in a relatively short period of time. The potential ingestion of toxins by fish species, which may be used for food sources, will be remote due to this buffering capacity, although some fish may be injured or killed if present at the bi-propellants' initial point of contact. (U.S. Army Space and Missile Defense Command, 2002)

When released, the IRFNA will volatize into the atmosphere. Residual nitric acid will cause a localized short-term pH change in the water; however, the acid will mix with the water and eventually be neutralized and diluted. The IRFNA (hypergolic oxidizer) will also form nitric and nitrous acid on contact with water, and will be quickly diluted and buffered by seawater. With regard to the initiator or hydrazine fuels, these highly reactive species quickly oxidize, forming amines and amino acids, which are beneficial nutrients to simple marine organisms. Prior to oxidation, there is some potential for exposure of marine life to toxic levels, but for a very limited area and time (National Aeronautic and Space Administration, 2002). Coal tar distillate fuel would not mix with the water, but would form a slick on the surface. Because of (1) the diluting and neutralizing effects of seawater, (2) the relatively small area that will be affected, and (3) the existing spill prevention, containment, and control measures in place at PMRF, minimal impacts on marine species are expected.

Debris

According to analysis contained in the PMRF Enhanced Capability EIS, debris from shore-based missile launch programs is not expected to produce any measurable impacts on offshore benthic (sea floor) resources.

The probability for a launch mishap is very low. However, an early flight termination or mishap will cause missile debris to impact along the flight corridor, potentially in offshore waters. Debris will be removed from shallow water if possible. In most cases, the errant missile will be moving at such a high velocity that resulting missile debris will strike the water further downrange. If humpback whales, monk seals, or sea turtles were observed in the offshore launch safety zone, the launch will be delayed (U.S. Department of the Navy, 1998a).

The potential impact on EFH from nominal launch activities would mainly be from spent boosters and missile debris to waters off the coast within the Temporary Operating Area (TOA). By the time the spent rocket motors impact in the ocean, generally all of the propellants in them will have been consumed. Any residual aluminum oxide, burnt hydrocarbons, or propellant materials are not expected to present toxicity concerns. In a successful intercept, both missiles will be destroyed by the impact over the ocean. Momentum will carry the debris along the respective paths of the two missiles until the debris falls to earth. The debris will consist of a few large pieces (10 to 100 pounds [lb]), many medium pieces (10 lb or less), but mostly tiny particles. Such missile components will immediately sink to the ocean bottom out of reach of most marine life. Some fish near the surface could be injured or killed by larger pieces of debris. It is unlikely that the smaller pieces of sinking debris will have sufficient velocity to harm individual marine mammals or fish.

According to the analysis in the Point Mugu Sea Range EIS, less than 0.0149 marine mammals in its affected area would be exposed to missile debris per year, and the probability of this debris affecting marine mammals or other marine biological resources is less than 10^{-6} (1 in 1 million). This probability calculation was based on the size of the Pacific Ocean area studied and the marine mammal population density within that area. The Point Mugu range area (27,183 square nautical miles [nm^2]) is 0.1 percent of the PMRF TOA (2.1 million nm^2), and the density of marine mammals is larger. It is reasonable to conclude that the probability of marine mammals being struck by debris from missile testing at PMRF would be even more remote than at Point Mugu. (U.S. Department of the Navy, 1998c)

In the unlikely event of a launch mishap, scattered pieces of burning propellant could enter coastal water and potentially affect EFH closer to shore. Concentrations of toxic materials would be highest in this shallow water and have a greater chance of being ingested by feeding animals. However, the potential for a launch mishap is relatively slight, and in most cases the errant missile would be moving at a rapid rate such that pieces of propellant and other toxic debris would strike the water further downrange. The debris would also be small and widely scattered, which would reduce the possibility of ingestion.

Interceptor missile element test activities associated with the Missile Defense Agency lethality program could include development and testing of nuclear, biological, or chemical material simulants. These activities were analyzed in the *Programmatic Environmental Assessment, Theater Missile Defense Lethality Program* (U.S. Army Space and Strategic Defense Command, 1993b). The use and effects of simulants have been analyzed in other PMRF-related documents (U.S. Department of the Navy, 1998a; U.S. Army Space and Missile Defense Command, 2002; U.S. Army Space and Missile Defense Command, 2003). The only proposed chemical simulant that might be included as part of the No-action Alternative in a target payload would be small quantities of tributyl phosphate (TBP), which is a non-flammable, non-explosive, colorless, odorless liquid typically used as a component of aircraft hydraulic fluid, as a plasticizer, and as a solvent in commercial industry. The release of simulant will occur at a high altitude over the open ocean during a nominal flight test. The potential ingestion of toxins, such as the small amount of propellant or simulant remaining in the spent boosters or on pieces of missile debris, by marine mammals or fish species in the offshore area will be remote because of (1) atmospheric dispersion, (2) the diluting and neutralizing effects of seawater, and (3) the relatively small area that could potentially be affected. Effects of TBP are further discussed in Section 4.2.1.1.1.1.

<u>Electromagnetic Radiation (EMR)</u>

Specific siting and orientation of the radar results in a cone shaped EMR zone being projected skyward yet within site boundaries. In terms of the potential for EMR impacts on wildlife, the main beam of the THAAD radar or other ground-based radar system during missile flight tests will not be directed toward the ground and will have a lower limit of 4 to 5 degrees above horizontal, which would preclude EMR impacts on green turtles or monk seals on the beach.

Marine mammals and sea turtles are normally found below the surface of the water. Radiofrequency radiation does not penetrate the surface of water to any great degree. The power density level just below the surface of the ocean will not exceed the permissible human exposure level for uncontrolled environments. (U.S. Department of the Navy, 2002a) No adverse impacts should occur to whales, other marine mammals, or sea turtles at least 0.5 inch below the surface. It is also highly unlikely that an individual whale or turtle would be on or substantially above the surface of the water for a significant amount of time within the main beam or side lobe areas during the particular time that the radar would be operating (U.S. Department of the Navy, 2002a). (U.S. Army Space and Missile Defense Command, 2003)

The potential for main-beam (airborne) exposure thermal effects on birds exists. The potential for impacts on birds and other wildlife was addressed in the Ground-Based Radar Family of Radars EA (U.S. Army Space and Strategic Defense Command, 1993c). The analysis was based on the conservative assumption that the energy absorption rate of a bird's body was equal to its resting metabolic rate, and that this could pose a potential for adverse effects. Birds in general typically expend energy at up to 20 times their resting metabolic rates during flight.

Mitigating these concerns is the fact that radar beams are relatively narrow. To remain in the beam for any period requires that the bird flies directly along the beam axis, or that a hovering bird such as a raptor does so for a significant time. There is presently insufficient information to make a quantitative estimate of the joint probability of such an occurrence (beam stationary/bird flying directly on-axis or hovering for several minutes), but it is estimated to be insubstantial. Since birds are not likely to remain continuously within the radar beam, the likelihood of harmful exposure is not great. The use of existing sensors is part of routine activities on PMRF as analyzed in the PMRF Enhanced Capability EIS. (U.S. Department of the Navy, 1998a)

Earlier analysis of ground-based radar's potential impacts on birds indicated that power densities of 243 to 390 milliwatts per square inch would be necessary to affect birds weighing up to 7.7 lbs. The power density of radars such as THAAD is not expected to exceed 32 milliwatts per square inch. (U.S. Army Space and Strategic Defense Command, 1993c)

HRC RDT&E Activities—No-action Alternative

PMRF's additional mission is supporting RDT&E projects. The at sea activities are analyzed in the Open Ocean Section (4.1.2). Land sensor and missile defense effects will be the same or similar to those discussed above. Other activities on PMRF include one-of-a-kind or short duration RDT&E activities conducted for both government and commercial customers. Examples include humpback whale detection, Maritime Synthetic Range, and numerous System Integration Checkout activities. Generally these types of activities have no or minimal effect on biological resources.

Major Exercises—No-action Alternative

In addition to routine training events at PMRF, Command and Control (C2), Aircraft Support Operations, Missile Launches, and SPECWAROPS are conducted during biennial and annual Major Exercises. C2 is achieved through a network of communication devices strategically located at selected Department of Defense (DoD) installations around the islands with no impacts on biological resources. The Major Exercises are combined forces performing different activities throughout the HRC. Potential impacts on biological resources offshore of PMRF/Main Base from a Major Exercise are similar to those described above for training and RDT&E activities.

A number of general mitigation measures help ensure that the risk of a harmful effect on marine mammals and humpback whales is extremely low. Since 1990, the Shipboard Environmental Coordinator's Guide to Environmental Compliance informs ships of the National Marine Fisheries Service (NMFS) restrictions on approaching humpback whales. Also, all Navy ships calling on Hawaiian ports are advised of important natural resource issues, including precautions regarding whales, in the reply to their request for a berth. Because this anticipates the actual date of arrival by approximately 2 days, the ships are advised of humpback precautions and other possible issues well before they approach Hawaii. This ensures that protection of the humpback whale is officially considered during the planning and conducting of training events, including Amphibious Warfare Operations. In addition, there is an annual ship, submarine, and aircraft notice in mid-November announcing the arrival of the whales, and reminding recipients of the existing restrictions. (U.S. Department of the Navy, 1998a)

4.3.1.1.1.2 Alternative 1 (Biological Resources—PMRF Offshore [BARSTUR, BSURE, SWTR, Kingfisher])

Increased Tempo and Frequency of Training, New Training, and Major Exercises—Alternative 1

Alternative 1 would include up to six Undersea Warfare Exercises (USWEXs) per year, the biennial Rim of the Pacific (RIMPAC) Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training events (See Table 2.2.2.3-1). This would amount to an average increase of approximately 9 percent for offshore training and RDT&E activities.

Vegetation

No threatened or endangered vegetation is located in the offshore area.

Wildlife

With the exception of impacts associated with MFA/HFA sonar use (Section 4.1.2), impacts to wildlife would be similar to those described previously for the No-action Alternative since the additional training and RDT&E activities would be performed throughout the HRC and not confined to one particular area. It is unlikely that an individual listed species or other wildlife offshore of PMRF would be repeatedly exposed to noise, debris, EMR, or emissions as a result of increased training and RDT&E activities.. The additional training would continue to comply with relevant Navy policies and procedures, such as existing clearance procedures, which would minimize the potential for effects on wildlife.

Transiting battle groups also conduct ASW training along their track, which typically lies at least 25 miles (mi) north of Kauai. Major Exercises are typically conducted over 50 mi from any island, but include portions close to land to simulate passage through straits or amphibious operations. ASW training during these phases must include shallow water operations, and is conducted off PMRF and in the channel between Kaula and Niihau. Effects would be the same as those discussed above in the No-action Alternative.

<u>New Training</u>

An additional proposed training event associated with Major Exercises is Field Carrier Landing Practice (FCLP). This event involves pilots from an aircraft carrier air wing using carrier planes to practice at a land runway. As discussed in Chapter 2.0, the runway at PMRF could be used for FCLP. For each pilot, the FCLP would include 8 to 10 touch-and-go landings at the PMRF runway during both daytime and at night. Sound levels from these training events would be similar to sound levels currently occurring at the PMRF runway. Other than startle effects, no substantial impacts on wildlife, including threatened and endangered species, are anticipated.

<u>Hawaii Range Complex Enhancements</u>

Sources such as the proposed Portable Undersea Tracking Range, underwater communications, and electronic warfare systems that may be deployed in the ocean are beyond the frequency range or intensity level to affect marine animals. Flat areas with no known coral concentration would be selected for the Portable Undersea Tracking Range when possible. In areas that have not been mapped for coral presence, the Navy would develop appropriate habitat data and any necessary Best Management Practices and mitigations in coordination with NMFS and USFWS. The Navy will continue to work with regulatory agencies throughout the planning and development process to minimize the potential for impacts on coral, fish, and marine mammals.

Enhanced and Future RDT&E Activities—Alternative 1

Payloads on some target vehicle launches from PMRF would incorporate additional chemical simulants, which include larger quantities of TBP and various glycols. Up to approximately 120 gal of simulant could be used in target vehicles. The families of chemicals were selected based on the criteria to minimize potential toxicity and maximize the potential to simulate the more dangerous chemical warfare agents. Potential effects from the use of these simulants are further discussed in Sections 4.2.1.1.1.1 and 4.2.1.1.1.2.

The release of simulant would continue to occur at a high altitude over the open ocean during a nominal flight test. The potential ingestion of toxins, such as the small amount of propellant or simulant remaining in the spent boosters or on pieces of missile debris, by marine mammals or fish species would be remote because of (1) atmospheric dispersion, (2) the diluting and neutralizing effects of seawater, and (3) the relatively small area that could potentially be affected.

As part of Alternative 1, PMRF would develop the capability to launch the Extended Range Active Missile, tentatively designated Standard Missile-6 (SM-6), from a sea-based platform. Standard Missiles are the Navy's primary surface-to-air fleet defense weapon. SM-1 entered production in 1967. The SM-6 is an upgrade in software and power to the existing SMs. It is vertically launched from a canister and compatible with existing Aegis cruisers and destroyers. It will have a Solid Rocket Booster and Dual Thrust Solid Rocket Motor on the proven SM-2 Block IV airframe (Raytheon, 2007). Impacts should be similar to those for other solid propellant missile launches previously discussed.

Also as part of Alternative 1, launches from Wake Island, the Reagan Test Site at U.S. Army Kwajalein Atoll (USAKA), and Vandenberg Air Force Base (AFB) toward the vicinity of PMRF are proposed. Launches from those sites would be from existing launch facilities and the intercept areas would be in the Open Ocean Area and TOA of the PMRF Range. Targets would also be launched from sea-based and air-based platforms. The effects of these missile tests would be similar to those described above for the No-action Alternative and in Section 4.1.2.

4.3.1.1.1.3 Alternative 2 (Biological Resources—PMRF Offshore [BARSTUR, BSURE, SWTR, Kingfisher])

Increased Tempo and Frequency of Training Activities—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. With the exception of impacts associated with MFA/HFA sonar use (Section 4.1.2), impacts on wildlife would be similar to those described previously for the No-action Alternative since the additional training would be performed throughout the HRC and would not be confined to one particular area. This dispersion of activity with identical mitigations should minimize any increase in potential effects. It is unlikely that a listed species or other wildlife offshore of PMRF would be injured or killed as a result of increased training. Likewise, increases in the number of training events would continue to comply with relevant Navy policies and procedures, such as existing clearance procedures, which would minimize the potential for increased likelihood of effects on wildlife.

Enhanced and Future RDT&E Activities—Alternative 2

PMRF would also add the capability to test non-eye-safe lasers. These types of lasers are associated with the Hellfire system and the GQM-163 Coyote. If Airborne Laser system testing were conducted at PMRF, separate environmental documentation would be required to analyze the specific test requirements.

Advanced Hypersonic Weapon

Launches of the Advanced Hypersonic Weapon for testing would be similar to launches of the Strategic Target System previously analyzed in the Strategic Target System EIS and the PMRF Enhanced Capability EIS (U.S. Army Strategic Defense Command, 1992; U.S. Department of the Navy, 1998a). No new facilities would be required. The launch azimuth and flight termination system would be the same as that of the existing Strategic Target System. Existing radars and hazard areas would also be the same. As a result, impacts on biological resources would be minimal.

Effects from reentry vehicles and missiles impacting Illeginni have been assessed in several documents including the 1977 EA Missile Impacts, Illeginni Island and the 2004 EA for Minuteman III Modification, which includes the Summary of the 1992 EA for Department of Energy (DOE) Reentry Vehicles, Flight Test Program, U.S. Army Kwajalein Atoll, Republic of the Marshall Islands (Ballistic Missile Defense System Command, 1977; U.S. Department of the Air Force, 2004). Reentry vehicles impacts on Illeginni most often occur in cleared or maintained areas in the center of the island. Mitigation measures include the use of best management practices developed by USAKA to prevent any unnecessary additional disturbance of bird nesting sites and the least possible disruption of vegetation and habitat in the post-test cleanup process.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during current Major Exercises, in various areas of the HRC, with impacts on biological resources being similar to those described above.

4.3.1.1.1.4 Alternative 3 (Biological Resources—PMRF Offshore [BARSTUR, BSURE, SWTR, Kingfisher])

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.3.1.1.2 Cultural Resources—PMRF Offshore (BARSTUR, BSURE, SWTR, Kingfisher)

4.3.1.1.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Cultural Resources—PMRF Offshore [BARSTUR, BSURE, SWTR, Kingfisher])

Training with the potential to affect cultural resources at PMRF Offshore include Swimmer Insertion/Extraction, Expeditionary Assault, Mine Countermeasures (MCM), and Humanitarian Assistance Operation and Non-Combatant Evacuation Operation (HAO/NEO). All three of these training events exhibit similar training that involves personnel and equipment (e.g., Amphibious Assault Vehicle (AAVs), SDVs, supply trucks) crossing beach areas or following existing roads from the shoreline and dispersing into designated areas for from 1 to 18 days of training.

According to the National Oceanic and Atmospheric Administration's shipwreck maps, there are also two known wrecks and two Native Hawaiian fishponds in the vicinity of PMRF. Both of the wrecks and one fishpond are near the northern extreme of the facility's shoreline (approximately 5.3 mi north of Majors Bay); the second fishpond is in central PMRF (Site 05-0721–Kawaiele Ditch) (approximately 2.6 mi north of Majors Bay) and is significant as a traditional cultural property associated with the Menehune (International Archaeological Resources Institute, Inc., 2005). Given the distance of these underwater resources from the Major's Bay training and RDT&E activities, no adverse effects on underwater cultural resources are expected.

Increases in the number of training events proposed for Alternative 1, Alternative 2, and Alternative 3 would have no effect on cultural resources at PMRF Offshore. Baseline training and RDT&E activities (i.e., the No-action Alternative) analyzed above will have no adverse effect on known cultural resources at PMRF, and established guidance (e.g., the PMRF Integrated Cultural Resources Management Plan [ICRMP] and a Memorandum of Agreement) is in place for protection. Increased tempo and frequency of training under Alternative 1 would not be anticipated to produce adverse effects. (International Archaeological Resources Institute, Inc., 2005)

If unanticipated cultural resources are encountered (particularly human remains) for any activity, training and RDT&E activities plans direct that all activities will cease in the immediate vicinity of the find and procedures outlined in the PMRF ICRMP, Standard Operating Procedure (SOP) II.3.3, followed (International Archaeological Resources Institute, Inc., 2005).

4.3.1.1.3 Socioeconomics—PMRF Offshore (BARSTUR, BSURE, SWTR, Kingfisher)

4.3.1.1.3.1 No-action Alternative (Socioeconomics—PMRF Offshore [BARSTUR, BSURE, SWTR, Kingfisher])

There will be no change in the nature, scope, or intensity of training and RDT&E activities within the HRC. Offshore PMRF training and RDT&E activities that have the potential to affect socioeconomics include: Expeditionary Assault, Swimmer Insertion/Extraction and SPECWAROPS, Anti-Air Warfare RDT&E, Electronic Combat/Electronic Warfare (EC/EW), High-Frequency Radio Signals, and Missile Defense. These training and RDT&E activities have the potential to temporarily disrupt commercial fishing, and tourism offshore of PMRF (there is no commercial shipping to PMRF). Due to the Navy's procedures for issuing Notices to Mariners (NOTMARs), such disruptions are limited. NOTMARs provide notice to commercial ship operators, commercial fisherman, recreational boaters, and other area users that the military will be operating in a specific area, allowing them to plan their activities accordingly. These temporary clearance procedures for safety purposes have been employed regularly over time without significant socioeconomic impacts on commercial shipping, commercial fishing, or tourist-related activities. Under the No-action Alternative, the local economy of Kauai will continue to benefit from PMRF/Main Base.

4.3.1.1.3.2 Alternative 1 (Socioeconomics—PMRF Offshore [BARSTUR, BSURE, SWTR, Kingfisher])

Increased Tempo and Frequency HRC Training—Alternative 1

Under Alternative 1, the Navy proposes to increase the tempo and frequency of training in the HRC (see Table 2.2.2.3-1). Under Alternative 1, there are no increases in offshore HRC training associated with PMRF/Main Base and FCLPs are not a part of offshore training. Under Alternative 1, the socioeconomic impact on the economy of Kauai would be the same as discussed under the No-action Alternative and Kauai would continue to benefit from PMRF.

Enhanced RDT&E Activities—Alternative 1

The Navy proposes to enhance RDT&E activities from current levels as necessary as shown in Table 2.2.3.3-1. Under Alternative 1, PMRF/Main Base would increase RDT&E activities offshore. Under Alternative 1, Anti-Air Warfare RDT&E would increase by 14 percent. EC/EW and High-Frequency Radio Signals would increase by 11 percent. PMRF/Main Base would also develop the capability to launch the SM-6 missile from a sea based platform. Unmanned Aerial Vehicle (UAV) testing would be conducted a few nautical miles off the PMRF/Main Base coast. The Navy would continue to issue NOTMARs for scheduled RDT&E activity times and locations, and precautions would be taken to ensure that no interactions between military RDT&E activities and civilian vessels occurred during RDT&E activities. No additional impacts on socioeconomics are anticipated.

Major Exercises—Alternative 1

The Navy proposes to continue RIMPAC and USWEX. Activities associated with Major Exercises would be chosen from the appropriate matrix of training events in Appendix D. There are no proposed increases in offshore Major Exercises supported by PMRF/Main Base. The socioeconomic impact on the economy of Kauai from these training would be the same as discussed under the No-action Alternative, and Kauai would continue to benefit from PMRF.

4.3.1.1.3.3 Alternative 2 (Socioeconomics—PMRF Offshore [BARSTUR, BSURE, SWTR, Kingfisher])

Increased Tempo and Frequency HRC Training—Alternative 2

Under Alternative 2, the Navy proposes to increase the tempo and frequency of training in the HRC. For example, instead of a training event lasting 5 days, the same training would be completed in 3 days. Under Alternative 2, Expeditionary Assault activities would increase by 9 percent and Swimmer Insertion/Extraction would increase by approximately 10 percent. Training would have the potential for occasional, temporary disruptions of commercial fishing and tourism within the HRC; however, such training would be infrequent and of very limited duration. Offshore training would not result in significant restrictions on commercial fishing or tourism-related activities due to the Navy's procedures for issuing NOTMARs and the ability of commercial vessels to plan accordingly when NOTMARs are issued. Additionally, the Navy would continue precautions to ensure that no interactions between military training and civilian vessels occur during training events. No additional impacts on socioeconomics are anticipated.

Enhanced and Future HRC RDT&E Activities—Alternative 2

Under Alternative 2, PMRF/Main Base would continue the increased RDT&E activities as well as Directed Energy and the Advanced Hypersonic Weapon for future RDT&E activities. Anti-Air Warfare RDT&E would increase by approximately 26 percent, EC/EW would increase by 23 percent, missile defense would increase by approximately 9 percent and High-Frequency Radio Signals would increase by 22 percent. Use of additional chemical simulants, launching the SM-6 from a Sea-based Platform (AEGIS), testing UAVs and Advanced Hypersonic Vehicles as discussed under Alternative 1 would continue. The Navy proposes to establish a long-term Maritime Directed Energy Center at PMRF. Up to four air targets would be used for testing. The Advanced Hypersonic Weapon would eventually involve launches of long range missiles from KTF, which is located on PMRF, and launches would average one per year. The Navy would continue to issue NOTMARs for scheduled RDT&E activity times and locations, and precautions would be taken to ensure that no interactions between military activities and civilian vessels occurred during training. Beneficial impacts on Kauai economics would continue as a result of the additional personnel and services that may be required.

Additional Major Exercises—Alternative 2

Up to three Strike Groups would conduct training simultaneously in the HRC. Proposed Major Exercises would be similar to current training for the RIMPAC and USWEX Exercises. The Strike Groups would not be homeported in Hawaii, but would stop in Hawaii en route to a final destination. Commercial shipping (route), commercial fishing, sport fishing, and tourist-related activities occur regularly within the HRC area. Proposed increases in training under Alternative 2 would result in increases in training offshore of PMRF/Main Base. However, the Navy would continue to issue NOTMARs for scheduled Major Exercise times and locations, and precautions would be taken to ensure that no interactions between military activities and civilian vessels occurred during training. Beneficial impacts on Kauai economics would continue as a result of the additional personnel and services that may be required.

4.3.1.1.3.4 Alternative 3 (Socioeconomics—PMRF Offshore [BARSTUR, BSURE, SWTR, Kingfisher])

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on socioeconomics under Alternative 3 would be the same as those described for Alternative 2.

4.3.1.1.4 Transportation—PMRF Offshore (BARSTUR, BSURE, SWTR, Kingfisher)

4.3.1.1.4.1 No-action Alternative (Transportation—PMRF Offshore [BARSTUR, BSURE, SWTR, Kingfisher])

The No-action Alternative stands as no change from current levels of training, and the Navy will continue its current activities at the HRC. Offshore PMRF is used by tourist boats and by barges delivering ordnance and fuel to PMRF/Main Base. A primary commercial shipping route exists approximately 50 mi north of Kauai; there is no commercial shipping to PMRF.

Barges carrying explosives are met at Nawiliwili Bay by trained ordnance personnel and special vehicles for transit to and delivery at PMRF. All ordnance is transported in accordance with U.S. Department of Transportation regulations. PMRF has established guidelines (PMRF Instruction [PMRFINST] 8023.G) that covers the handling and transportation of ammunition, explosives, and hazardous materials on the facility.

Liquid fuels are transported to KTF. These fuels are shipped to the site by truck, aircraft, or barge, which do not affect transportation routes offshore of the island of Kauai. Transportation of these materials is conducted in accordance with U.S. Department of Transportation regulations and specific safety procedures developed for the location.

The Navy has developed extensive protocols and procedures for the safe operation of its vessels and the safe execution of its training (e.g. NOTMARs). Any disruption of tour boats due to the Navy use of the waterway offshore of PMRF/Main Base is occasional and temporary.

4.3.1.1.4.2 Alternative 1 (Transportation—PMRF Offshore [BARSTUR, BSURE, SWTR, Kingfisher])

Increase Tempo and Frequency HRC Training—Alternative 1

Under Alternative 1, there are no increases in offshore HRC training associated with PMRF/Main Base. Offshore training events would remain as discussed under the No-action Alternative.

Enhanced RDT&E Activities—Alternative 1

Under Alternative 1, PMRF/Main Base would increase RDT&E activities offshore. Under Alternative 1, Anti-Air Warfare RDT&E would increase by 14 percent. EC/EW and High-Frequency Radio Signals would increase by 11 percent. PMRF/Main Base would also develop the capability to launch the SM-6 missile from a sea based platform. UAV testing would be conducted a few nautical miles off the PMRF/Main Base coast. Offshore waterway systems at PMRF/Main Base would be impacted occasionally and temporarily by increases and upgrades of RDT&E activities. The Navy would continue to issue NOTMARs for scheduled activity times and locations, and precautions would be taken to ensure that no interactions between military activities and civilian vessels occurred during offshore RDT&E activities.

Major Exercises—Alternative 1

Under Alternative 1, there are no increases in offshore Major Exercises supported by PMRF/Main Base and FCLPs are a part of offshore training at PMRF/Main Base. Under

Alternative 1, offshore Major Exercises would remain as discussed under the No-action Alternative.

4.3.1.1.4.3 Alternative 2 (Transportation —PMRF Offshore [BARSTUR, BSURE, SWTR, Kingfisher])

Increase Tempo and Frequency HRC Training—Alternative 2

Under Alternative 2, the Navy proposes to compress training and increase the frequency of training in the HRC. Under Alternative 2, Expeditionary Assault would increase by 9 percent, C2 would increase by 100 percent, and Swimmer Insertion/Extraction would increase by approximately 10 percent. Offshore waterway systems at PMRF/Main Base would be impacted occasionally and temporarily by increases in training.

Enhanced and Future RDT&E—Alternative 2

Under Alternative 2, PMRF/Main Base would continue the increased RDT&E activities and Directed Energy and Advanced Hypersonic Weapon for future RDT&E activities. Anti-Air Warfare RDT&E would increase by approximately 26 percent. EC/EW would increase by 23 percent, missile defense would increase by approximately 9 percent, and High-Frequency Radio Signals test and evaluation would increase by 22 percent. The upgrades in Additional chemical simulant, launches of SM-6 missiles from Sea-based Platform (AEGIS), and testing UAVs and Hypersonic Vehicles as discussed under Alternative 1 would continue. The Navy would continue to issue NOTMARs for scheduled activity times and locations, and precautions would be taken to ensure that no interactions between military activities and civilian vessels occurred during training activities.

Additional Major Exercises—Alternative 2

Up to three Strike Groups would conduct training simultaneously in the HRC. Proposed Major Exercises would be similar to current training events for the RIMPAC and USWEX Exercises. The Strike Groups would not be homeported in Hawaii, but would stop in Hawaii en route to a final destination. The Navy would continue to issue NOTMARs for scheduled activity times and locations, and precautions would be taken to ensure that no interactions between military activities and civilian vessels occurred during training. No additional impacts on waterways offshore of PMRF/Main Base are anticipated.

4.3.1.1.4.4 Alternative 3 (Transportation —PMRF Offshore [BARSTUR, BSURE, SWTR, Kingfisher])

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on transportation under Alternative 3 would be the same as those described for Alternative 2.

4.3.1.2 NIIHAU OFFSHORE

Table 4.3.1.2-1 lists ongoing training events and RDT&E activities for the No-action Alternative and proposed training and RDT&E activities for Alternatives 1, 2, and 3 offshore at Niihau. Alternative 3 is the preferred alternative.

Table 4.3.1.2-1. Training and RDT&E Activities at Niihau Offshore

Training	Research, Development, Test, and Evaluation (RDT&E) Activities
• Electronic Combat Operations • Special Warfare Operations (SPECWAROPS) • Mine Countermeasures Exercise • Flare Exercise	• Kingfisher Underwater Training Area (Alternative 1)

A review of the 13 resources against training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 was performed for Niihau. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, cultural resources, geology and soils, hazardous material and hazardous waste, health and safety land use, noise, socioeconomics, transportation, utilities, and water resources.

Air emissions from HRC training and RDT&E activities would not change the regional air quality surrounding Niihau. Use of the area offshore of Niihau could require control of the airspace; however, any issues associated with this airspace are included within the PMRF/Main Base discussion (Section 4.3.2.1.2). There are no HRC training and RDT&E activities that affect any offshore cultural resources, land-forms, land use, or geology. Training and RDT&E activities associated with this site would adhere to policies and regulations governing hazardous materials and hazardous waste, health and safety, and noise, as discussed in Appendix C. There would be no impact on Kauai's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. The transportation infrastructure on Niihau is not used during HRC training and RDT&E activities. There is no central utility system on the island. Training and RDT&E activities at the site would not generate any hazardous waste streams that could impact local water quality.

4.3.1.2.1 Biological Resources—Niihau Offshore

4.3.1.2.1.1 No-action Alternative (Biological Resources—Niihau Offshore)

HRC Training and Major Exercises—No-action Alternative

PMRF remotely operates a radar unit at Paniau (northeast corner of the island) and the Niihau Perch site electronic warfare system. In addition, PMRF flies AEGIS drone targets along the east coast of the island away from inhabited areas. These training events will continue intermittently under the No-action Alternative with the following minimal impacts on marine species. Effects on marine species from underwater sound levels produced by the use of MFA/HFA sonar are addressed in Section 4.1.2.

Vegetation

No threatened or endangered vegetation is located in the offshore area. SPECWAROPS training on Niihau will use existing openings, which will minimize the potential for impacts on the common plants found in Niihau's rocky and sandy beach intertidal habitats.

Wildlife

As described in Section 4.3.1.1.1.1, marine mammals and sea turtles are normally found below the surface of the water. Radiofrequency radiation does not penetrate the surface of water to any great degree. The power density level just below the surface of the ocean will not exceed the permissible human exposure level for uncontrolled environments. (U.S. Department of the Navy, 2002a) No adverse impacts should occur to whales, other marine mammals, or sea turtles at least 0.5 inch below the surface. It is also unlikely that an individual will be on or substantially above the surface of the water in the location of the main beam for a significant amount of time during the radar's operation. (U.S. Army Space and Missile Defense Command, 2003)

The microwave on Niihau is focused on PMRF only. A small signal (about 5 watts, similar to a cell phone) is transmitted from the Electro-magnetic Environmental System Simulator (EMESS) 1 site. Nesting seabirds on Lehua would not be affected.

Reefs offshore of Niihau are poorly developed, and SPECWAROPS on Niihau use existing openings, which will minimize the potential for impacts from Major Exercises. The black coral (*Antipathes sp.*) that occurs at 90 ft and deeper off the northern end of the island should not be affected by current training and Major Exercises. Noise and movement of personnel, vehicles, helicopters, and landing craft during training can temporarily displace sensitive species in the offshore area, such as the green turtle and Hawaiian monk seals that haul out on the island. However, all ocean vessel landing areas are first checked to ensure the sites are clear of monk seals. Training will avoid areas where green turtles are basking. Training activities will also avoid any beach area with sea turtle nests, as they occasionally nest on Niihau beaches.

4.3.1.2.1.2 Alternative 1 (Biological Resources—Niihau Offshore)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training events (See Table 2.2.2.3-1). This would amount to an average increase of approximately 76 percent for Electronic Combat Operations. The number of SPECWAROPS would remain the same.

Vegetation

No threatened or endangered vegetation is located in the offshore area. SPECWAROPS training on Niihau would continue to use existing openings, which would minimize the potential for impacts on the common plants found in Niihau's rocky and sandy beach intertidal habitats.

Wildlife

With the exception of impacts associated with MFA/HFA sonar use (Section 4.1.2), impacts on wildlife would be similar to those described previously for the No-action Alternative. It is unlikely that a listed marine species or other wildlife would be injured or killed as a result of increased training offshore of Niihau. The additional training would comply with relevant Navy policies and procedures, which would minimize the potential for effects on wildlife. This would include the briefing of all participants on current guidelines to avoid undue impacts on wildlife. No EMR impacts on wildlife on the ocean surface are anticipated, as described in Section 4.3.1.1.1.1. It is also very unlikely that a seabird would remain within the radar beam for any considerable length of time. (U.S. Army Space and Missile Defense Command, 2004)

HRC Enhancements—Alternative 1

Kingfisher Underwater Training Area

PMRF would establish a simulated underwater minefield used to exercise the Kingfisher mine detection system closer to Niihau (Figure 2.2.3.6.4-2). This underwater training area would be approximately 2 mi off the southeast coast of Niihau at a depth of between 300 and 1,200 ft in flat areas free of high-relief features such as cliffs where coral could be established. Reefs offshore of Niihau are poorly developed. The known black coral beds are located off the northern coast of the island and not in the area proposed for the training area.

Buoys deployed at Kingfisher Underwater Training Area could act as Fish Aggregating Devices which could attract pelagic species such as tuna, mahimahi, wahoo, and numerous shark species and thus also attract fishermen. This has not been an issue for the Kingfisher training area offshore of PMRF. The clump of chain anchoring each buoy to the ocean floor may eventually become buried, depending on currents and the softness of the ocean floor. There would be no electronics and no emitters on the buoys. Limited ocean floor disturbance would occur from buoy installation

Mobile marine species could leave the area temporarily to avoid the installation activities. They are expected to return once installation is complete. Some sessile organisms such as sponges, and anemones, may be lost due to anchoring the chain, but these species would be avoided to the maximum extent practicable.

4.3.1.2.1.3 Alternative 2 (Biological Resources—Niihau Offshore)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. With the exception of impacts associated with MFA sonar use (Section 4.1.2), impacts on wildlife would be similar to those described previously for the No-action Alternative since the additional training would be performed throughout the HRC and would not be confined to one particular area. This dispersion of training with identical mitigations should buffer any potential increase in likelihood or intensity of effect. It is unlikely that a listed species or other wildlife offshore of Niihau would be injured or killed as a result of increased training. Likewise, increases in the number of training events would continue to comply with relevant Navy policies and procedures, such as existing clearance procedures, which would minimize the potential for increased likelihood of effects on wildlife.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during current

Major Exercises, in various areas of the HRC, with impacts on biological resources being similar to those described above.

4.3.1.2.1.4 Alternative 3 (Biological Resources—Niihau Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.3.1.3 KAULA OFFSHORE

Table 4.3.1.3-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 offshore at Kaula. Alternative 3 is the preferred alternative.

Table 4.3.1.3-1. Training at Kaula Offshore

Training
• Air-to-Ground Gunnery Exercise (A-G GUNEX)

A review of the 13 resources against training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Kaula. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and waste, health and safety, noise, socioeconomics, transportation, utilities, and water resources.

Air emissions from HRC training would not change the regional air quality surrounding Kaula. Use of the island does require control of the airspace above this land area; however, any issues associated with airspace are included within the onshore discussion for Kaula (Section 4.3.2.10.1). Training associated with this site would adhere to policies and regulations governing hazardous materials and waste, and health and safety, as discussed in Appendix C. Because access to the island is restricted, no noise impacts on civilian or military personnel would occur. Potential noise impacts on wildlife are addressed under the biological resources section. There would be no impact on Kauai's socioeconomics, transportation, or utilities because access to the island is restricted. There are no facilities, transportation, or utility systems on the island. Training at the site would not generate any hazardous waste streams that could impact local water quality.

4.3.1.3.1 Biological Resources—Kaula Offshore

4.3.1.3.1.1 No-action Alternative (Biological Resources—Kaula Offshore)

The Navy uses the southeastern tip of Kaula for Air-to-Surface Gunnery Exercises (A-S GUNEX). Potential effects on biological resources are discussed below. Effects on marine species from underwater sound levels produced by the use of MFA/HFA sonar are addressed in Section 4.1.2.

Vegetation

No threatened or endangered vegetation is located in the offshore area.

Wildlife

Under the No-action Alternative, current GUNEX training will continue. Kaula is covered by a sparse grass landscape and earthen/rock outcrops, reportedly underlain by a relatively thin soil layer with highly weathered limestone bedrock. Soil erosion that could impact coral offshore is thus not an issue for the island.

Pursuant to a previous Section 7 Consultation and Biological Opinion (National Oceanic and Atmospheric Administration, 1979), the Navy agreed to mitigations that reduce or eliminate any potential impacts on humpback whales. No live fire is used. Mitigations agreed to include seasonal use during periods when humpback whales are not present, surveying the waters off Kaula to ensure that no whales are present, and limiting the impact area to the southern tip of the island. These mitigation measures are also used for other marine species including Hawaiian monk seals and sea turtles. Impacts on marine mammals are also discussed in the Open Ocean Section (4.1.2).During GUNEX at Kaula, the target is visually cleared by aircraft flying over Kaula and determining whether it is safe to complete the mission. Only if the target is clear does the mission continue. The potential for any harm to marine mammals from gunnery practice rounds is very remote. A gunnery practice round does not carry any explosives but does carry the equivalent of a shotgun shell which generates a puff of smoke upon impact for scoring. Aircrews are aware that they are not to harm or harass any marine mammals. As part of the required clearance before a GUNEX, participants must determine that the area to be gunned is clear, visually and with their sensors, whether at Kaula or far out to sea. The lack of an explosive charge, the required clearance, and conducting the majority of gunnery runs at either Kaula or the controlled ranges at PMRF keep the risk to marine mammals very remote.

Small numbers of Hawaiian monk seals now haul-out on a small limestone bench on Kaula. Major Exercises may cause monk seals to temporarily leave this haul-out site and enter the water temporarily. Based on the Navy's level of use of Kaula and the number of Hawaiian monk seals continually sighted at Kaula, it is likely that monk seals will return once the disturbance from the training had ended. Major Exercises affecting Kaula thus will have only an occasional, short-term effect on monk seals at this site. RIMPAC Exercises occur biennially and USWEX activities will occur only up to six times per year, for a maximum of 4 days per Major Exercise. Since these Major Exercises will affect less than 10 percent of the island over less than 10 percent of the year, its effects on marine species will be reduced to the extent practicable.

4.3.1.3.1.2 Alternative 1 (Biological Resources—Kaula Offshore)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training events (See Table 2.2.2.3-1). This would amount to an average increase of approximately 76 percent for Electronic Combat Operations. The number of SPECWAROPS would remain the same. Two additional GUNEXs per year could occur under Alternative 1. Only small caliber weapons are used. Practices described above would continue to minimize impacts on marine species.

While training events would increase in number, the likelihood of a similar increase in impacts on biological resources on or adjacent to Kaula would be minimal due to implementation of guidelines established for training as described above. As stated in Section 4.3.1.3.1.1, the intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. Effects on marine biological resources from underwater sound levels produced by the use of MFA/HFA sonar are addressed in Section 4.1.2.

4.3.1.3.1.3 Alternative 2 (Biological Resources—Kaula Offshore)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. Two additional GUNEXs per year could occur under Alternative 2. Only small caliber weapons are used. With the exception of impacts associated with MFA sonar use (Section 4.1.2), impacts on wildlife would be similar to those described previously for the No-action Alternative since the additional training would be performed throughout the HRC and would not be confined to one particular area. This dispersion of training with identical mitigations should buffer any potential increase in likelihood or intensity of effect. It is unlikely that a listed species or other wildlife offshore of Kaula would be injured or killed as a result of increased training. Likewise, increases in the number of training events would continue to comply with relevant Navy policies and procedures, such as existing clearance procedures, which would minimize the potential for increased likelihood of effects on wildlife.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during current Major Exercises, in various areas of the HRC, with impacts on biological resources being similar to those described above.

4.3.1.3.1.4 Alternative 3 (Biological Resources—Kaula Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.3.1.3.2 Cultural Resources—Kaula Offshore

4.3.1.3.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Cultural Resources—Kaula Offshore)

The underwater cultural resources region of influence for Kaula includes areas offshore of the southwestern tip of the island where there is an existing, heavily disturbed ordnance impact area. Kaula has previously been used for BOMBEX and GUNEX, and no impacts on cultural resources have been identified. There are no recorded underwater cultural resources surrounding Kaula (see Figures 3.1.3-1 and 3.3.1.1.2-1). No impacts on cultural resources would occur from either the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3.

4.3.2 KAUAI ONSHORE

4.3.2.1 PACIFIC MISSILE RANGE FACILITY/MAIN BASE

Table 4.3.2.1-1 lists ongoing training and RDT&E activities for the No-action Alternative and proposed training and RDT&E activities for Alternatives 1, 2, and 3 at PMRF/Main Base. Alternative 3 is the preferred alternative. Sections 4.3.2.1.1 to 4.3.2.1.13 address impacts on specific resources of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 at PMRF/Main Base.

Table 4.3.2.1-1. Training and RDT&E Activities at PMRF/Main Base

Training	Research, Development, Test, and Evaluation (RDT&E) Activities
• Expeditionary Assault • Swimmer Insertion/Extraction • Special Warfare Operations (SPECWAROPS) • Air Operations • Humanitarian Assistance/Non-Combatant Evacuation Operations (HAO/NEO) • Command and Control (C2) • Aircraft Support Operations • Personnel Support Operations • Field Carrier Landing Practice (Alternative 1)	• Anti-Air Warfare RDT&E • Electronic Combat/Electronic Warfare (EC/EW) • High-Frequency Radio Signals • Missile Defense (including THAAD radars) • Joint Task Force Wide Area Relay Network • Additional Chemical Simulant (Alternative 1) • Test Unmanned Aerial Vehicles (Alternative 1) • Test Hypersonic Vehicles (Alternative 1) • Large Area Tracking Range (LATR) Upgrade (Alternative 1) • Expanded Training Capability for Transient Air Wings (Alternative 1) • Enhanced Auto ID System and Force Protection Capability (Alternative 1) • Construct Range Operations Control Building (Alternative 1) • Improve Fiber Optics Infrastructure (Alternative 1) • Directed Energy (Alternative 2/3) • Advanced Hypersonic Weapon (Alternative 2/3)

4.3.2.1.1 Air Quality—PMRF/Main Base

4.3.2.1.1.1 No-action Alternative (Air Quality—PMRF/Main Base)

Air quality conditions under the No-action Alternative will not differ from the existing conditions as described in Chapter 3.0. Navy training and RDT&E activities with potential to affect air quality include emergency generators, Air Operations, missile launches, and personnel support (such as government vehicle miles traveled and private vehicle commuting).

Air emissions will occur from the use of facility electrical generators used for emergency back-up power at PMRF. The existing power generators will continue to be operated in accordance with limits set forth in the PMRF Title V Permit, and therefore will not have a significant impact on the air quality in the basin. Table 4.3.2.1.1.1-1 lists the predicted emissions from the five existing generators, based on the limits in the Title V Permit for PMRF/Main Base. The Title V permit controls the emissions generated by restricting the hours for use for each generator.

Table 4.3.2.1.1.1-1. Air Emissions from Emergency Generators, PMRF/Main Base

Pollutant	Averaging Time	Predicted Emissions ($\mu g/m^3$)	Hawaii Ambient Air Quality Standard ($\mu g/m^3$)	Percent of Standard
Sulfur Dioxide	3-hour	561	1,300	43
	24-hour	141	365	39
	Annual (2)	13	80	16
Nitrogen Dioxide	Annual (2,3)	65	70	93
Carbon Monoxide	1-Hour	1,364	10,000	14
	8-hour	683	5,000	14
PM-10	24-hour	64	150	43
	Annual (2)	7	50	14
Lead (1)	Calendar Quarter	-	1.5	0
Hydrogen Sulfide (1)	1-hour	-	35	0

(1) Lead and hydrogen sulfide are not expected at PMRF
(2) The annual concentrations are based on fuel limitations in Title V Permit of 208,000 gal/year for the combined usage of the 320-kilowatt (kW) generators and 217,800 gal/year for the combined usage of the 600-kW generators
(3) Nitrogen Dioxide concentrations were calculated using the ozone limiting method with a background ozone concentration of 34.6 $\mu g/m^3$
PM-10 = Particulate matter with a mean aerodynamic diameter greater than or equal to 10 microns

Additional personnel (whether active duty or training, both military and civilian) have the potential to impact air quality. The increase in personnel is proportional to the impact on air quality, to a large degree. Sources of air emissions to consider include: vehicle miles traveled (VMT) by on-base government-owned vehicles, VMT of new employees not living on base and commuting, and new construction and operation of office/residential pace for added employees working/living on base. The continuation of HRC training and RDT&E activities at PMRF is not expected to require additional employees or involve additional trainees.

HRC Training—No-action Alternative

PMRF/Main Base will continue to conduct current HRC training under the No-action Alternative. Onshore training that has potential to affect air quality includes Expeditionary Assault, Swimmer Insertion/Extraction, SPECWAROPS, Aircraft Support Operations, Air Operations, and

HAO/NEO. This training will produce mobile emissions from helicopters, fixed-wing Air Operations, and operations of diesel engines of landing craft and tracked vehicles.

Existing aircraft exercises and support will continue from the PMRF airfield under the No-action Alternative. Approximately 69 percent of Navy aircraft using the airfield are C-26 "Metroliner" aircraft and the UH-3H "S-61" helicopter. The estimated annual mobile source emission levels, including aerospace ground support activities and engine testing, are:

- 12.9 tons per year (TPY) for carbon monoxide
- 3.6 TPY for volatile organic compounds (VOC)
- 13.8 TPY for nitrogen dioxides
- 1.3 TPY for sulfur dioxide
- 0.8 TPY for particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM-10)

These emissions are calculated using an air emissions screening computer program developed by the Air Force to calculate air emissions for realignment of aircraft, personnel, and for facility construction (U.S. Air Force, 2005). Aircraft operating data are derived from 2004 operations at the airfield (U.S. Department of the Navy, Engineering Field Activity Chesapeake, 2006). Appendix C includes details of the applicability screening and supporting analysis. These emissions are not further evaluated because they are not restricted by the current Title V permit held by PMRF, and because the General Conformity Rule applicability analysis, though a useful tool, is not required for Navy actions in Hawaii.

Anti-Air Warfare training and other training that requires missile launches from PMRF/Main Base will continue to occur at current levels described in Chapter 2.0 (Table 2.2.2.3-1). Each launch is a discrete event, and the total number of launches for the No-action Alternative will not exceed that currently being performed annually at PMRF. Missile and rocket launches are characterized by intense combustive reactions over a short period, which result in exhaust streams of varying sizes, depending on the size of the launch vehicle. The tempo of launch events will be managed by range activities to stay within the limits of current guidelines established by governmental agencies or professional organizations.

Analysis of launch-related impacts is covered in the 1998 PMRF Enhanced Capability Final EIS. Analysis of typical launch vehicles at PMRF determined that exhaust emissions will not produce short-term exceedances of either the National Ambient Air Quality Standards (NAAQS) or health-based guidance levels in areas to which the general public would have access. The ground hazard area used to support the Strategic Target System launch program—10,000 ft—was used as a worst case. This area is evacuated of all personnel before any launch. Also, personnel remaining outdoors within the launch hazard area will wear appropriate safety equipment, such as respirator masks. Therefore, no air quality impacts in the lower troposphere (Earth's surface to 6.2 mi) are anticipated due to the continued use of the 10,000-ft ground hazard area at its current level (U.S. Department of the Navy, 1998a).

Table 4.3.2.1.1.1-2 lists major exhaust components from typical training-related and RDT&E missiles launched from PMRF. In the stratosphere (6.2 to 31 mi above the Earth's surface), missile launch emissions could potentially affect global warming (the greenhouse gas effect) and depletion of the stratospheric ozone layer. Of the chemical species that form during launches, the most environmentally significant are hydrochloric acid, aluminum oxide, nitrogen, and carbon dioxide.

Global Warming

Most propellant systems produce carbon dioxide, which is a greenhouse gas. Greenhouse gas emissions in the troposphere and stratosphere are of concern as they contribute to global warming by trapping re-radiated energy in the atmosphere (e.g., water vapor, carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrofluorocarbons, and perfluorinated carbons). Table 4.3.2.1.1.1-2 shows the total quantity of carbon dioxide emissions ranges from 0 to 0.5 ton per launch, depending on the missile. The worst case estimated total carbon dioxide emissions from launches into the troposphere for the No-action Alternative would be 36 TPY. Alternative 1 emissions of carbon dioxide from launches would be 52 TPY, and Alternative 2 emissions of carbon dioxide from launches would be 56 TPY (see Table 2.2.2.3-1 for number of launches per year). In comparison, the amount of total carbon dioxide emissions from all sources in the United States was 5,945 million tons in 2005 (U.S. Office of Energy Statistics, Energy Information Administration, 2007). Although it is not easy to know with precision how long it takes greenhouse gases to leave the atmosphere, missile exhaust emissions per launch would be rapidly dispersed and diluted over a large geographic area. Because the missiles are relatively small and launches are short-term, discrete events, the time between launches would allow the dispersion of greenhouse gases. Therefore, carbon dioxide from launches would have an insignificant effect on global warming. On June 30, 2007 the Governor of Hawaii signed House Bill 226 regarding greenhouse gas emissions. It establishes that Hawaii shall reduce its statewide greenhouse gas emissions to 1990 levels by 2020. It establishes a Task Force to prepare a work plan and regulatory scheme to determine how that will be done. Hawaii Department of Health must adopt rules by January 1, 2011. Per its provisions, the Act became effective July 1, 2007. Military operations are not exempted from the Act's scope, and how it will apply to the military may be determined by the Task Force.

Ozone Depletion

Emissions from missile launches are of concern because during ascent, the missile injects substances that can lead to ozone depletion (hydrochloric acid, aluminum oxide, nitrogen). Table 4.3.2.1.1.1-2 shows the total quantity of ozone-depleting gases range from 0 to 9.5 tons per launch. It was shown in the Department of Transportation (DOT) Programmatic EIS for Licensing Launches that although ozone loss occurs in the plume wakes of large solid propellant boosters (i.e., Titan IV and Space Shuttle), the amount and duration of the loss appears to be temporary and limited. Emissions from licensed launches analyzed in the Programmatic EIS do contribute to the creation of "holes" in the stratospheric ozone layer as the launch vehicle passes through, although these "holes" tend to "fill back in" rapidly following a launch (U.S. Department of Transportation, 2001). In comparison, the missiles used by Navy at PMRF are smaller than those analyzed in the Programmatic EIS. Therefore, ozone depletion from launch exhaust is limited spatially and temporally, and these reactions do not have a globally significant impact on ozone depletion.

Table 4.3.2.1.1.1-2: Estimated Emissions from a Typical Missile Launch at PMRF/Main Base (tons per launch)

Missile	Aluminum Oxide[4]	Carbon Monoxide	Carbon Dioxide[5]	Hydrogen	Water	Hydrochloric Acid[4]	Nitrogen[4]	Lead	Others
Castor IV	2.698	2.863	0.340	0.249	0.866	2.213	0.889	0.000	0.004
Strategic Target System (1)	5.628	4.185	0.431	0.318	0.959	1.943	1.855	0.000	0.027
STRYPI	1.435	1.509	0.181	0.114	0.344	0.816	0.499	0.000	0.000
Vandal(2)	0.000	0.509	0.503	0.024	0.150	0.000	0.185	0.024	0.000
PAC-3	0.045	0.029	0.003	0.003	0.009	0.026	0.011	0.000	0.000
MEADS	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
THAAD	0.157	0.106	0.009	0.011	0.028	0.092	0.035	0.000	0.000
Hera (3)	4.418	1.459	0.316	0.129	0.853	1.542	0.600	0.000	0.082
Lance	0.000	0.022	0.232	0.001	0.279	0.001	0.210	0.002	0.020

Source: U.S. Department of the Navy, 1998a
Notes:
(1) Exhaust products are total for all three stages
(2) Exhaust products are for boosters only
(3) Stage-1 only
(4) Ozone-depleting Substances
(5) Greenhouse Gas

A variety of off-road support vehicles are used at PMRF during training and pre-missile launch activities. There are many types of these vehicles, both gasoline and diesel fueled. Since specific numbers and types of vehicles for each training or missile launch are difficult to obtain, emissions from this category are assumed to be proportional to the number of personnel added, with an emission factor derived from aggregate emissions for a typical facility. Since the current number of personnel will remain the same under the No-action Alternative, off-road support vehicles will not have a measurable air quality impact.

HRC RDT&E Activities—No-action Alternative

Ongoing RDT&E activities that can affect air quality at PMRF/Main Base include missile defense ballistic missile target flights and THAAD interceptor launch activities. RDT&E activities include missile launches from existing launch facilities at PMRF and KTF. The rate of launches, which is up to 46 per year, will not increase at PMRF/Main Base due to the No-action Alternative. Potential air quality impacts from missile launches are described above for HRC training.

Other onshore RDT&E activities at PMRF include Anti-Air Warfare RDT&E, EC/EW, High-Frequency Radio Signals, Joint Task Force Wide Area Relay Network, and Shipboard Electronic Systems Evaluation Facility (SESEF) tests. These RDT&E activities have little or no impact on air quality and will continue at current levels under the No-action Alternative.

Major Exercises—No-action Alternative

Under the No-action Alternative, the type and number of Major Exercises on PMRF/Main Base will continue at current levels. There is one RIMPAC Exercise every 2 years, with each RIMPAC lasting 10 days. There are up to six USWEXs per year, each lasting 3 or 4 days. These Major Exercises include ongoing training and, in some cases RDT&E activities. Therefore, the potential impacts on PMRF air quality are included in those impacts described above for the training and RDT&E activities.

4.3.2.1.1.2 Alternative 1 (Air Quality—PMRF/Main Base)

Increased Tempo and Frequency of Training and New Training—Alternative 1

Increased training that has potential to impact air quality includes Navy's proposal to conduct FCLP. Except for the new FCLP, Alternative 1 has no increases in training and no change in training locations onshore at PMRF.

Under Alternative 1, the Navy proposes to use F/A-18 aircraft for FCLPs. PMRF/Main Base is one of the two sites proposed for this activity in Hawaii (the other is Marine Corps Base Hawaii [MCBH] on Oahu). Twelve FCLP periods are proposed, each consisting of a maximum of eight touch-and-go landings, for an annual increase of 96 touch-and-go landings. No aerospace ground equipment and no ground training are expected. Using the above mentioned screening tool, the estimated increase of annual mobile source emission levels for the F-18 aircraft, excluding aerospace ground support activities and engine testing, are:

- 0.04 TPY for carbon monoxide
- 0.01 TPY for VOCs
- 0.28 TPY for nitrogen oxides
- 0.02 TPY for sulfur dioxide
- 0.03 TPY for PM-10

Overall, under Alternative 1, the addition of FCLPs would not alter air quality on PMRF/Main Base. Further analysis is provided in Appendix C.

Enhanced and Future RDT&E Activities—Alternative 1

Increased and future RDT&E activities that have potential to impact air quality include incorporating new chemical simulants in target payloads launches, testing UAVs, and testing hypersonic vehicles.

Launch preparations involved in chemical simulants for target launches would be similar to those described in for the No-action Alternative. Flight testing of target launches with chemical simulants would result in aerial dispersal of TBP, which is a non-flammable, non-explosive, colorless, odorless liquid typically used as a solvent in commercial industry. The release of simulant would occur at a high altitude over the open ocean during a nominal flight test. The only potential impact on air quality at PMRF could occur in the case of a near pad/on-pad missile failure. The use and effects of TBP have been analyzed in the *Missile Defense Agency Vertical Gun Test Environmental Assessment* (U.S. Army Space Missile Defense Command, 2004). Tests were conducted using canisters containing 110 lb of thickened TBP that would be released at an altitude of 1,640 ft. This analysis showed that the concentration of TBP in the air following the test would be significantly lower than the Occupational Safety and Health Administration (OSHA) industrial standard for TBP exposure.

The impact on air quality from the launch of target missiles from existing launch facilities at PMRF/Main Base would be the uncontrolled emissions from the missile as discussed above. The proposed launch vehicles from PMRF/Main Base would produce similar emissions to those described in Table 4.3.2.1.1.1-2. This analysis showed that neither NAAQS nor health based standards applicable to the lower troposphere would be expected to be exceeded for distances greater than 10,000 ft from the launch site. In the stratosphere (6.2 to 31 mi above the Earth's surface), missile launch emissions could potentially affect global warming (the greenhouse gas effect) and depletion of the stratospheric ozone layer. The worst case estimated total carbon dioxide emissions from launches into the troposphere for Alternative 1 would be 52 TPY (see Table 2.2.2.3-1 for number of launches per year). However, because the missiles are relatively small and launches are short-term, discrete events, the time between launches would allow the dispersion of greenhouse gases and ozone-depleting substances.

HRC Enhancements—Alternative 1

A temporary increase in air emissions would be associated with construction of a new Range Operations Control Building and the dehumidified warehouse. The increase in operational air emissions would be negligible and therefore was not evaluated. Construction activities would include constructing the new facilities described in Chapter 2.0. The 90,000-square-foot (ft^2) Range Operations Control Building and the 4,200-ft^2 dehumidified warehouse would require 2 years to complete. Demolition of 13 buildings (some are trailers) with a combined floor area of over 55,000 ft^2 would start in 2008. Site grading was assumed to be 1.4 acres.

Construction emissions would include emissions generated from demolition of existing structures, grading of the site, and construction of new facilities. Emission sources include privately owned vehicles of construction workers (assumed approximately 50 trips per day to the site), grading equipment, grading activities, demolition activities, stationary and mobile equipment related to construction, and architectural coatings. Construction of new asphalt pavement was not significant and not included in the calculations of air emissions.

Table 4.3.2.1.1.2-1 shows the summary results of applying Air Conformity Applicability Model (ACAM) (U.S. Air Force, 2005) to the construction of a proposed Range Operations Control Building and the dehumidified warehouse at PMRF Main Base.

Table 4.3.2.1.1.2-1. Proposed Construction Air Emissions Summary (Tons per Year)

Year	Nitrogen Oxides (tons)	Sulfur Dioxide (tons)	Volatile Organic Compounds (tons)	PM-10 (tons)	Carbon Monoxide (tons)
2008	6.92	0.81	1.39	5.28	21.09
2009	18.46	2.18	3.66	1.43	57.53
2010	2.91	0.34	0.57	0.23	9.07
Conformity Threshold	>100.00	>100.00	>100.00	>100.00	>100.00

Note: PM-10 = Particulate Matter with an Aerodynamic Diameter Less Than or Equal to 10 Microns

While a conformity determination is not required in Hawaii, use of the screening model is a useful tool to assess the principal air quality concern during construction. The principal emissions would be PM-10 generated during grading or first year of construction, and nitrogen oxides and carbon monoxide from operating equipment and construction worker commutes during the second year of construction. These PM-10 emissions were calculated assuming implementation of standard dust suppression methods (frequent watering, covering truck loads, and hauling on paved roads). None of the emissions generated by the construction of the new facilities would exceed the highest *de minimis* or “conformity threshold” levels of 100 TPY of carbon monoxide, VOCs, nitrogen oxides, particulate matter with an aerodynamic diameter less than or equal to 2.5 microns (PM-2.5), and sulfur dioxide if regulatory conformity thresholds were to exist in Hawaii. See Appendix C for further analysis.

New Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training events (See Table 2.2.2.3-1). This would amount to an average increase of approximately 9 percent for onshore training. While training events would increase in number, the likelihood of a similar increase in impacts on air quality is small because (1) there would be no additional stationary sources added to PMRF because of the proposed new training, and (2) Hawaii is in attainment for all criteria air pollutants, and increased military activity is not likely to change this status due to the weather conditions.

4.3.2.1.1.3 Alternative 2 (Air Quality—PMRF/Main Base)

Increased Tempo and Frequency of Training—Alternative 2

While training events would increase in number, emissions would be similar to existing levels. Increases would occur in the following training: Expeditionary, Swimmer, C2, Air Operations, and FCLP. The types of Major Exercises that would occur at PMRF/Main Base would be similar to those described in Alternative 1.

Under Alternative 2, the Navy proposes to use F/A-18 aircraft for FCLPs. PMRF/Main Base is one of the two sites proposed for this activity in Hawaii (the other is MCBH on Oahu). Sixteen FCLP periods are proposed, each consisting of a maximum of 8 touch-and-go landings, for an annual increase of 128 touch-and-go landings. No aerospace ground equipment and no ground training are expected. Using the above-mentioned screening tool, the estimated increase of annual mobile source emission levels for the F-18 aircraft, excluding aerospace ground support training and engine testing, are:

- 0.05 TPY for carbon monoxide
- 0.01 TPY for VOC
- 0.37 TPY for nitrogen oxides
- 0.03 TPY for sulfur dioxide
- 0.04 TPY for PM-10

Overall, under Alternative 2, the addition of FCLPs would not alter air quality on PMRF/Main Base. See Appendix C for further analysis.

Future RDT&E Activities—Alternative 2

The proposed high-energy laser would require a 25,000-ft^2 building at PMRF/Main Base. Construction impacts would be similar to those described earlier—the principal emissions would be PM-10 generated during grading and nitrogen oxides and carbon monoxide from operating equipment and construction worker commutes during construction. Up to four air targets and up to four surface targets would be used for testing and operation of the high-energy laser. Air emissions from generators needed to generate up to 30 megawatts of power for testing and operation would require the current Title V permit for PMRF/Main Base to be modified or renewed. Additional environmental documentation would be required to analyze the specific location and operational requirements.

The testing of the Advanced Hypersonic Weapon would include two launches of a Strategic Target System booster from KTF and two launches of the new booster configuration from the same site. The Strategic Target System booster has been previously launched at KTF, and it is anticipated that the testing of the Advanced Hypersonic Weapon with the new booster configuration at the same site would have a similar air quality impact as described for the No-action Alternative. The Advanced Hypersonic Weapon tests would be similar to a ballistic missile test, and the potential impacts on air quality would be similar to that described for missile launches.

In the stratosphere (6.2 to 31 mi above the Earth's surface), missile launch emissions could potentially affect global warming (the greenhouse gas effect) and depletion of the stratospheric ozone layer. The worst case estimated total carbon dioxide emissions from launches into the troposphere for Alternative 2 would be 56 TPY (see Table 2.2.2.3-1 for number of launches per year). However, because the missiles are relatively small and launches are short-term, discrete events, the time between launches would allow the dispersion of greenhouse gases and ozone-depleting substances.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Under Alternative 2, up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. The proposed Major Exercises would be similar to those occurring during current Major Exercises, with impacts on air quality resources being similar to those described in the No-action Alternative and Alternative 1. The Multiple Strike Group training should not impact the continued good air quality of Hawaii.

Depending on the training being performed, PMRF/Main Base is a support facility and could provide support, although Sailors or Marines are not expected to come onshore to Kauai. The Navy would not need additional on-base or off-base employees to continue to support the Strike Groups. However, the potential for requiring FCLPs increases, as described above.

4.3.2.1.1.4 Alternative 3 (Air Quality—PMRF/Main Base)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on air quality under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.1.2 Airspace—PMRF/Main Base

The potential impacts on airspace in the PMRF/Main Base Area are discussed in terms of conflicts with the use of controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields. The airspace discussion includes the airspace above land and the offshore area out to 12 nm.

4.3.2.1.2.1 No-action Alternative (Airspace—PMRF/Main Base)

HRC Training—No-action Alternative

The ongoing training that can affect airspace includes mine laying, Flare Exercise, and Air Operations occurring above territorial waters.

Controlled and Uncontrolled Airspace

The Navy can accomplish the No-action Alternative without modifications or need for additional airspace to accommodate continuing mission training.

Special Use Airspace

Ongoing training identified above will continue to use the existing PMRF/Main Base special use airspace including Restricted Areas, Warning Areas, and Air Traffic Control Assigned Airspace (ATCAA) shown on Figure 3.3.2.1.2-1. Although the nature and intensity of utilization varies over time and by individual special use airspace area, the continuing training represent precisely the kinds of training for which the special use airspace was created to contain hazards to non-participating aircraft. Restricted Areas were designated to contain hazards to non-participating aircraft, and the Warning Areas are designed and set aside by the Federal Aviation Administration (FAA) to accommodate activities that present a hazard to other aircraft. As such, the continuing training does not represent an adverse impact on special use airspace and does not conflict with any airspace use plans, policies, and controls.

En Route Airways and Jet Routes

Two low altitude airways pass through the region of influence: V15 (through W-188), and V16 (through W-186). Use of these low altitude airways comes under the control of the Honolulu Air Route Traffic Control Center (ARTCC). In addition, the Navy surveys the airspace involved in each training event either by radar or patrol aircraft. Safety regulations dictate that hazardous activities will be suspended when it is known that any non-participating aircraft has entered any part of a training activity danger zone until the non-participating entrant has left the area or a thorough check of the suspected area has been performed. Aircraft using the V16 airway through the northern part of W-186 and over Niihau will not likely be re-routed by air traffic control if they are flying over 9,000 ft mean sea level, since W-186 extends up to but does not include 9,000 ft. Consequently, there are no airspace conflicts.

In terms of potential airspace use impacts on en route airways and jet routes, the continuing training will be in compliance with DoD Directive 4540.1, as directed by the Office of the Chief of Naval Operations Instruction (OPNAVINST) 3770.4A, which specifies procedures for conducting Air Operations and for missile/projectile firing. Namely "firing areas shall be selected so that trajectories are clear of established oceanic air routes or areas of known surface or air activity" (DoD Directive 4540.1, § E5). In addition, before conducting a training that is hazardous to non-participating aircraft, Notices to Airmen (NOTAMs) will be sent in accordance with the conditions of the directive specified in OPNAVINST 3721.20A.

As noted above, continuing training will use the existing special use airspace and will not require either: (1) a change to an existing or planned instrument flight rules (IFR) minimum flight altitude, a published or special instrument procedure, or an IFR departure procedure; or (2) a visual flight rules (VFR) operation to change from a regular flight course or altitude.

Airports and Airfields

Ongoing training will continue to use the existing special use airspace and will not restrict access to or affect the use of the existing airfields and airports at PMRF. Training at the PMRF airfield will continue unhindered.

Similarly, the existing airfield or airport arrival and departure traffic flows will not be affected by the No-action Alternative. Access to the PMRF airfield, Kekaha airstrip, and the heliports at Kokee and Makaha Ridge will not be curtailed. With all arriving and departing aircraft, and all participating military aircraft, under the control of the PMRF Radar Control Facility, there will be no airfield or airport conflicts in the area under the No-action Alternative.

HRC RDT&E Activities—No-action Alternative

The ongoing RDT&E activities that could affect airspace include missile defense ballistic missile target flights and THAAD interceptor activities. RDT&E activities are conducted in PMRF Restricted Airspace and Warning Areas as shown on Figure 3.3.2.1.2-1. Missile launches from PMRF and KTF will move into Open Ocean Areas soon after launch.

Controlled and Uncontrolled Airspace

No new airspace proposal or any modification to the existing controlled airspace was identified to accommodate continuing RDT&E activities. Interceptor missile launches from PMRF and target missiles launched from KTF will be well above flight level (FL) 600 (60,000 ft) and still be within the R-3101 Restricted Airspace, which covers the surface to unlimited altitude, within 1 minute of the rocket motor firing. As such, all other local flight activities will occur at sufficient distance and altitude that the target missile and interceptor missiles will have minimal effect. Activation of the proposed stationary altitude reservation (ALTRV) procedures, where the FAA provides separation between non-participating aircraft and the missile flight test activities in the TOA, are discussed under the Open Ocean Section 4.1.1.

Special Use Airspace

Ongoing RDT&E activities identified earlier will be conducted within the existing special use airspace in Restricted Area R-3101 and extend into the adjacent W-188 Warning Area controlled by PMRF, and will not represent a direct special use airspace impact. The missile launches represent precisely the kinds of activities for which special use airspace was created: namely, to accommodate national security and necessary military activities, and to confine or segregate activities considered to be hazardous to non-participating aircraft.

Due to the coordination and planning procedures that are in place, the RDT&E activities do not represent an adverse impact on special use airspace and do not conflict with any airspace use plans, policies, and controls.

En Route Airways and Jet Routes

Two IFR en route low altitude airways are used by commercial aircraft that pass through the PMRF Warning Areas. The two low altitude airways are V15 (through W-188), and V16 (through W-186). Use of these low altitude airways comes under the control of the Honolulu ARTCC. In addition, during an RDT&E activity, provision is made for surveillance of the affected airspace either by radar or patrol aircraft. Target and defensive missile launches will be conducted in compliance with DoD Directive 4540.1, as enclosed by OPNAVINST 3770.4A. DoD Directive 4540.1 specifies procedures for conducting missile and projectile firing, namely "firing areas shall be selected so that trajectories are clear of established oceanic air routes or areas of known surface or air activity" (DoD Directive 4540.1, § E5).

Before conducting a missile launch and/or intercept test, NOTAMs will be sent in accordance with the conditions of the directive specified in OPNAVINST 3721.20. In addition, to satisfy airspace safety requirements, the responsible commander will obtain approval from the Administrator, FAA, through the appropriate Navy airspace representative. Provision is made for surveillance of the affected airspace either by radar or patrol aircraft. In addition, safety regulations dictate that hazardous activities will be suspended when it is known that any non-participating aircraft have entered any part of the danger zone until the non-participating entrant has left the area or a thorough check of the suspected area has been performed.

The airways and jet routes in the region of influence are protected because of the required coordination with the FAA. There is a scheduling agency identified for each piece of special use airspace that will be utilized. The procedures for scheduling each piece of airspace are performed in accordance with letters of agreement with the controlling FAA facility, and the Honolulu and Oakland ARTCCs. Schedules are provided to the FAA facility as agreed between the agencies involved. Aircraft transiting the Open Ocean Area region of influence on one of the low-altitude airways and/or high-altitude jet routes that will be affected by flight test activities within the PMRF/Main Base region of influence will be notified of any necessary rerouting before departing their originating airport and will therefore be able to take on additional fuel before takeoff. Real-time airspace management involves the release of airspace to the FAA when the airspace is not in use or when extraordinary events occur that require drastic action, such as weather requiring additional airspace.

The FAA ARTCCs are responsible for air traffic flow control or management to transition air traffic. The ARTCCs provide separation services to aircraft operating on IFR flight plans and principally during the en route phases of the flight. They also provide traffic and weather advisories to airborne aircraft. By appropriately containing military activities within the Restricted Airspace and Warning Areas non-participating traffic is advised or separated accordingly.

As noted above, continuing RDT&E activities will use the existing special use airspace and will not require either: (1) a change to an existing or planned IFR minimum flight altitude, a published or special instrument procedure, or an IFR departure procedure; or (2) a VFR operation to change from a regular flight course or altitude.

Airports and Airfields

Impacts will be similar to those discussed for the HRC training, and there will be no airfield or airport conflicts in the region of influence for the No-action Alternative.

Major Exercises—No-action Alternative

Major Exercises, such as RIMPAC and USWEX, include ongoing training and, in some cases, RDT&E activities. Therefore, potential impacts from a Major Exercise on PMRF airspace will be similar to those described earlier for the training and RDT&E activities. RIMPAC planning conferences, which include coordination with the FAA, are conducted beginning in March of the year prior to each RIMPAC. Each of the USWEX training events, up to six per year, will include coordination with the FAA well in advance of each 3- or 4-day Major Exercise.

The advanced planning and coordination with the FAA regarding ALTRV requirements for missile tests, scheduling of special use airspace, and coordination of Navy training relative to en route airways and jet routes, results in minimal impacts on airspace from Major Exercises.

4.3.2.1.2.2 Alternative 1 (Airspace—PMRF/Main Base)

Increased Tempo and Frequency of Training and New Training—Alternative 1

Alternative 1 would include increases in the number of training events including mine laying, Flare Exercises, and Air Operations occurring above territorial waters. Training would occur in the same locations as for the No-action Alternative.

The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described above for the No-action Alternative. The total number of training events that affect airspace would increase by approximately 18 percent above the No-action Alternative. No new airspace proposal or any modification to the existing controlled airspace would be required. Training would continue to use the existing special use airspace including the PMRF Restricted Airspace, Warning Areas, and ATCAA shown on Figure 3.3.2.1.2-1. By appropriately containing military activities within the Restricted Airspace and Warning Areas or coordinating the use of the ATCAA area, non-participating traffic is advised or separated accordingly.

As noted above, training events will use the existing special use airspace and will not require either: (1) a change to an existing or planned IFR minimum flight altitude, a published or special instrument procedure, or an IFR departure procedure; or (2) a VFR operation to change from a regular flight course or altitude. The increase in training under Alternative 1 would require an increase in coordination and scheduling by the Navy and FAA. The increase in training events would be readily accommodated within the existing airspace. Consequently, there are no airspace conflicts.

Enhanced and Future RDT&E Activities—Alternative 1

The proposed RDT&E activities include SM-6 launches from a sea-based platform, and high speed and UAV testing. The number of RDT&E activities that may affect airspace would increase by approximately 6 percent above the No-action Alternative.

HRC Enhancements—Alternative 1

Range safety for high-energy lasers at PMRF could affect airspace. Depending on the intensity of the lasers, nomenclature would need to be added to aeronautical charts, and certain test events could require NOTAMs and NOTMARs.

The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described above for missile launches. The establishment of laser range operational procedures, including horizontal and vertical buffers, would minimize potential impacts on aircraft. All activities would be in accordance with American National Standards Institute Z136.1, *Safe Use of Lasers*, which has been adopted by DoD as the governing standard for laser safety. Additional information on range safety for high-energy lasers is in Section 4.1.5, Health and Safety–Open Ocean.

Major Exercises—Alternative 1

Major Exercises, such as RIMPAC and USWEX, include ongoing training and, in some cases, RDT&E activities. Therefore, potential impacts from a Major Exercise would be similar to those described above for the training and RDT&E activities.

An additional proposed training event associated with Major Exercises is FCLP. This activity involves pilots from an aircraft carrier air wing practicing landings at a land runway. As discussed in Chapter 2.0, the runway at PMRF could be used for FCLP. For each pilot, the FCLP would include six to eight touch-and-go landings at the PMRF runway during both daytime and at night. The carrier wing aircraft would be operating within the PMRF Class D and Class E airspace, primarily within Restricted Airspace R-3101, and within the adjacent Warning Areas W-186 and W-188. FCLP activities would be below the V15 and V16 airways.

RIMPAC planning conferences, which include coordination with the FAA, are conducted beginning in March of the year prior to each RIMPAC. Each of the USWEX training events, up to six per year, would include coordination with the FAA well in advance of the 3- or 4-day Major Exercise. FAA coordination would include discussions regarding the anticipated number of aircraft, including FCLP activities.

The advanced planning and coordination with the FAA regarding ALTRV requirements for missile tests, scheduling of special use airspace, and coordination of Navy training relative to en route airways and jet routes, results in minimal impacts on airspace from Major Exercises. The increase from 1 aircraft carrier to 2 during RIMPAC under Alternative 1 would require a minor increase in coordination and scheduling by the Navy and FAA. The increased training would be readily accommodated within the existing airspace.

4.3.2.1.2.3 Alternative 2 (Airspace—PMRF/Main Base)

Increased Tempo and Frequency of Training—Alternative 2

Alternative 2 would include increases in the number of training events including mine laying, Flare Exercise, and Air Operations Training would occur in the same locations as for the No-action Alternative.

The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described in Section 4.3.2.1.2.1 for the No-action Alternative. The total number of training events that affect airspace would increase by approximately 27 percent above the No-action Alternative. No new airspace proposal or any modification to the existing controlled airspace would be required. The training events would continue to use the existing PMRF special use airspace shown on Figure 3.3.2.1.2-1. By appropriately containing military activities within the Restricted Airspace, Warning Areas or coordinating the use of the ATCAA areas, non-participating traffic is advised or separated accordingly, thus avoiding potential adverse impacts on the low altitude airways and high-altitude jet routes in the region of influence.

Alternative 2 would include increases in the number of RDT&E activities including missile defense ballistic missile target flights, THAAD interceptor activities, A-S MISSILEX, A-A MISSILEX, and Surface-to-Air Missile Exercise (S-A MISSILEX). RDT&E activities would occur in the same locations as for the No-action Alternative.

The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described in Section 4.1.1.1 for the No-action Alternative. The total number of RDT&E activities that may affect airspace would increase by approximately 16 percent above the No-action Alternative. No new airspace proposal or any modification to the existing controlled airspace would be required. The RDT&E activities would continue to use the existing special use airspace including the PMRF Restricted Airspace, Warning Areas, and ATCAA shown on Figure 3.3.2.1.2-1. By appropriately containing military activities within these areas, non-participating traffic is advised or separated accordingly.

Enhanced and Future RDT&E Activities—Alternative 2

Planned RDT&E activities include a Maritime Directed Energy Test Center at PMRF and the Advanced Hypersonic Weapon test program at KTF.

The Directed Energy Test Center, which might include a High-Energy Laser Program, would have minimal impacts on airspace due to the required electromagnetic radiation/electromagnetic interference (EMR/EMI) coordination process. As discussed in Section 4.1.1.3, high-energy lasers at PMRF could affect airspace. Depending on the intensity of the lasers, nomenclature would need to be added to aeronautical charts, and certain test events could require NOTAMs and NOTMARs. The potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described previously for missile launches. The establishment of laser range operational procedures, including horizontal and vertical buffers, would minimize potential impacts on aircraft. All RDT&E activities would be in accordance with American National Standards Institute Z136.1, *Safe Use of Lasers*, which has been adopted by DoD as the governing standard for laser safety. Additional information on range safety for high-energy lasers is in Section 4.1.5, Health and Safety—Open Ocean.

The Advanced Hypersonic Weapon tests would be similar to a ballistic missile test, and the potential impacts on controlled and uncontrolled airspace, special use airspace, en route airways and jet routes, and airports and airfields would be similar to that described for missile launches.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

In addition to RIMPAC and USWEX, Alternative 2 includes a Multiple Strike Group Exercise consisting of training that involves Navy assets engaging in a schedule of events battle scenario, with U.S. forces (blue forces) pitted against a hypothetical opposition force (red force). Participants use and build upon previously gained training skill sets to maintain and improve the proficiency needed for a mission-capable, deployment-ready unit. The Major Exercise would occur over a 5- to 10-day period. The Multiple Strike Group training would involve many of the training events identified and evaluated under the No-action Alternative and Alternative 1 including Mine Laying Exercises, Flare Exercises, FCLP, and Air Operations.

Much of the Multiple Strike Group training would occur in the open ocean area. However, as part of this training, FCLP could occur at PMRF. Potential impacts would be similar to those described in Section 4.3.2.1.2.2.

A Multiple Strike Group Exercise planning conference would include coordination with the FAA well in advance of the Major Exercise. FAA coordination would include discussions regarding the anticipated number of aircraft including FCLP activities.

The advanced planning and coordination with the FAA regarding: scheduling of special use airspace, and coordination of Navy training relative to en route airways and jet routes, results in minimal impacts on airspace from Major Exercises. The use of three aircraft carriers during a Major Exercise would require an increase in coordination and scheduling by the Navy and FAA. The increased training would be readily accommodated within the existing airspace.

4.3.2.1.2.4 Alternative 3 (Airspace—PMRF/Main Base)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on airspace under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.1.3 Biological Resources—PMRF/Main Base

Potential impacts of construction, building modification, and missile launches on terrestrial biological resources within the PMRF region of influence have been addressed in detail in the Strategic Target System EIS, the Restrictive Easement EIS, the PMRF Enhanced Capability EIS, and the THAAD Pacific Flight Tests EA, (U.S. Army Strategic Defense Command, 1992; U.S. Army Space and Strategic Defense Command, 1993a; U.S. Department of the Navy, 1998a; U.S. Army Space and Missile Defense Command, 2002). Based on these prior analyses, and the effects of current and past missile launch activities, the potential impacts of training and RDT&E activities related to continuing RDT&E on terrestrial biological resources are expected to be minimal. The analytical approach for biological resources is discussed in Section 4.3.1.1.1.

4.3.2.1.3.1 No-action Alternative (Biological Resources—PMRF/Main Base)

HRC Training, HRC Support Events, and Major Exercises—No-action Alternative

Vegetation

Although ohai and lau`ehu have been observed north of PMRF/Main Base, there are no known listed plant species on PMRF. Amphibious landings have taken place at PMRF for many years. Damage to vegetation from movement of personnel, vehicles, and equipment across the beach and into upland areas during Expeditionary Assault and SPECWAROPS is not likely since the movement is restricted to existing routes. Damage to sensitive vegetation from other training events such as Swimmer Insertion/Extraction and HAO/NEO is also unlikely since troops are directed to avoid such areas. HAO/NEO use existing open areas and facilities, though some temporary structures including tents may be used in preselected locations. All participants follow current guidelines to avoid undue impacts on vegetation.

Compliance with relevant Navy policies and procedures during training limits the potential for introduction of invasive weed plant species. Amphibious vehicles are washed down after completion of activities to minimize the potential for introducing alien or invasive species. Military Customs Inspectors are responsible for implementing Federal customs statutes and agricultural regulations for transfers of military goods and personnel from overseas into U.S. jurisdiction. Military inspectors do not inspect goods and personnel transferred to Hawaii from the U.S. mainland, because inspections apply only to shipments entering Hawaii from foreign sources or those bound to the mainland from Hawaii. Military inspectors are trained to look for prohibited animals, soil, seeds, and other pests. Inbound flights carrying cargo from the mainland and landing at PMRF are advised to inspect and secure their cargo prior to shipment to ensure it is free of invasives. To prevent transport of invasive seeds from PMRF to Kokee, ground crews are tasked to blow/wash down vehicles and equipment prior to movement. (Burger, 2007c; Nature Conservancy and Natural Resources Defense Council, 1992)

Missile launches are performed at KTF facilities in the northern (KTF Launch Complex) and southern portions (Kokole Point Launch Complex) of PMRF. No listed plants have been identified adjacent to the Strategic Target System launch pad. The launch pad is kept clear, and the surrounding area contains landscaped vegetation. Analysis provided in the Strategic Target System EIS (U.S. Army Strategic Defense Command, 1992) concluded that although vegetation near the Strategic Target System launch pad can suffer some temporary distress from the heat generated at launch and from hydrogen chloride or aluminum oxide emissions, there is no evidence of any long-term adverse effect on vegetation from two decades of launches at PMRF. Similarly, it is expected that no vegetation impacts will occur at other launch sites on PMRF.

Measures were suggested in the PMRF Enhanced Capability EIS to further reduce possible environmental impacts. The installation of a portable blast deflector on the launch pad could protect the vegetation on the adjacent sand dunes. The potential for starting a fire would be further reduced by clearing dry vegetation from around the launch pad. Spraying the vegetation adjacent to the launch pad with water just before launch would reduce the risk of ignition. Emergency fire crews would be available during launches to quickly extinguish any fire and minimize its effects. An open (spray) nozzle will be used, when possible, rather than a directed stream when extinguishing fires, to avoid erosion damage to the sand dunes and to prevent possible destruction of cultural resources.

Wildlife

Potential impacts of past amphibious landings during Expeditionary Assault events have been monitored. The area of Majors Bay used for landing activities is located on part of the shoreline typically not used by sea turtles, monk seals, or wedge-tailed shearwaters. The landing areas are also not near Laysan albatross sites. In the event that nesting seabirds are discovered in the action area, the activities would be routed away from nests and the area would be marked until the birds depart. Within 1 hour prior to initiation of Expeditionary Assault landing activities, landing routes and beach areas are surveyed for the presence of sensitive wildlife. If any marine mammals or sea turtles are found to be present on the beach, the training is delayed as long as necessary until the animals voluntarily leave the area.

In accordance with the mitigation measures adopted for PMRF's Enhanced Capability EIS (U.S. Department of the Navy, 1998a), night lighting is shielded to the extent practical to minimize its potential effect on night-flying birds (Newell's shearwater and petrels) and Hawaiian hoary bats.

Launches of target missiles and drones from PMRF occur from existing ground-based target launch sites at the PMRF launch complex and KTF. Their potential effects are discussed below.

<u>Noise</u>

The effects of noise on wildlife vary from serious to no effect in different species and situations. Behavioral responses to noise also vary from startling to retreat from favorable habitat. Animals can also be very sensitive to sounds in some situations and very insensitive to the same sounds in other situations. (Larkin, 1996) Noise from launches and other events may startle nearby wildlife and cause flushing behavior in birds, but this startle reaction would be of short duration. The increased presence of personnel, vehicles, helicopters, and landing craft immediately before an event or launch would tend to cause birds and other mobile species of wildlife to temporarily leave the area that would be subject to the highest level of launch noise.

Noise from and movement of personnel, vehicles, helicopters, and landing craft during training events and Major Exercises may temporarily displace fish, birds, and other sensitive species. Foraging birds would be subjected to increased energy demands if flushed by the noise, but this should be a short-term, minimal effect. However, training events are short in duration and occur within regularly used range areas. Major Exercises incorporate avoidance procedures to avoid wildlife that are foraging, resting, or hauled out, such as green sea turtles or Hawaiian monk seals.

Figures 4.3.2.1.9.1-1 through 4.3.2.1.9.1-3 (see Section 4.3.2.1.9.1) show typical noise levels from missile launches at the northern and southern launch facilities at PMRF/Main Base. The brief noise peaks produced by missiles, such as THAAD, are comparable to levels produced by thunder at close range (120 decibel [dB] to 140 dB peak). Disturbance to wildlife from launches will be brief and is not likely to have long-term impacts. A rookery at Kennedy Space Center used by wood storks and other species of wading birds is located approximately 2,461 ft from a Shuttle launch pad. This rookery continues to be used successfully, even though it has received peak sound levels of up to approximately 138 dB (American Institute of Aeronautics and Astronautics, 1993). Monitoring of birds during the breeding season indicates that adults respond to Shuttle noise by flying away from the nest, but return within 2 to 4 minutes. Birds within 820 ft of Titan launch complexes at Cape Canaveral Air Station have shown no mortality or reduction in habitat use from the 170-dB sound levels from Titan IV launches. (U.S. Department of the Air Force, 1990) The launch area on PMRF is inspected following a launch, and no dead birds have been reported.

<u>Air Emissions</u>

Results of monitoring conducted following a Strategic Target System launch from KTF at PMRF indicated little effect on wildlife due to the low-level, short-term hydrogen chloride air (exhaust) emissions. The program included surveys of representative birds and mammals for both pre-launch and post-launch conditions. Birds flying through an exhaust plume may be exposed to concentrations of hydrogen chloride that could irritate eye and respiratory membranes (Federal Aviation Administration, 1996). However, most birds will not come into contact with the exhaust plume, because of their flight away from the initial launch noise. Deposition of aluminum oxide from missile exhaust onto skin, fur, or feathers of animals will not cause injury because it is inert and not absorbed into the skin. U.S. Environmental Protection Agency (USEPA) has determined that non-fibrous aluminum oxide found in solid rocket motor exhaust is nontoxic (U.S. Air Combat Command, 1997). Because aluminum oxide and hydrogen chloride do not bioaccumulate, no indirect effects on the food chain are anticipated from these exhaust emissions. (U.S. Department of the Navy, 1998a; U.S. Army Space and Missile Defense Command, 2004)

<u>Debris</u>

The probability for a launch mishap is very low. However, an early flight termination or mishap will cause missile debris to impact along the flight corridors. In most cases, the errant missile will be moving at such a high velocity that resulting missile debris will strike the water further downrange. If monk seals or sea turtles were observed in the launch safety zone, the launch will be delayed until the animals leave (U.S. Department of the Navy, 1998a; U.S. Army Strategic Defense Command, 1992).

In the unlikely event of an on-pad fire or early flight failure over land of a solid propellant missile, most or all of the fuel will likely burn up before being extinguished. Any remaining fuel will be collected and disposed of as hazardous waste. Soil contamination which could result from such an incident is expected to be localized, along with any impacts on vegetation or wildlife.

In the unlikely event of a launch mishap involving a liquid-propellant missile, if the fuel and/or oxidizer do not explode or burn, they will likely be deposited on the ground or water surface. For THAAD missiles, a maximum of 0.5 gal of hypergolic bi-propellants will be released from the Divert and Attitude Control System. For a Lance missile, up to several hundred pounds of

IRFNA and hydrazine can be released. The Liquid Fuel Target System has the potential to release up to several hundred gallons of IRFNA and coal tar distillate.

An on-pad spill or catastrophic missile failure of a liquid-fueled missile over land could result in the release of unsymmetrical dimethyl hydrazine fuel and/or IRFNA oxidizer. When released, the IRFNA will volatize into the atmosphere. Unsymmetrical dimethyl hydrazine is heavier than air, and if not oxidized when airborne will react and/or possibly ignite with the porous earth or will form dimethylamine and nitrogen oxides. Emergency crews will respond as soon as possible to extinguish any fires. All of these substances are soluble in water. On further oxidation of the dimethylamine, the amino substances serve as nutrients to plant life. Airborne nitrogen dioxide would return to earth as nitric acid rains in precipitation events and would react with the calcium carbonate soil to form the nitrates which are used in fertilizer for plant life (U.S. Army Space and Strategic Defense Command, 1995). Coal tar distillate fuel would not mix with the water, but would form a slick on the surface. Because of (1) the relatively small area that will be affected, and (2) the existing spill prevention, containment, and control measures in place at PMRF, minimal impacts on biological resources are expected.

Electromagnetic Radiation

Specific siting and orientation of the radar results in a cone shaped EMR zone being projected skyward yet within site boundaries. In terms of the potential for EMR impacts on wildlife, the main beam of the THAAD radar or other ground-based radar system during missile flight tests, will not be directed toward the ground and will have a lower limit of 4 to 5 degrees above horizontal, which precludes EMR impacts on terrestrial species on the beach at PMRF. The potential for main-beam (airborne) exposure thermal effects on birds exists. The potential for impacts on birds and other wildlife was addressed in the Ground-Based Radar Family of Radars EA (U.S. Army Space and Strategic Defense Command, 1993c). The analysis was based on the conservative assumption that the energy absorption rate of a bird's body was equal to its resting metabolic rate and that this could pose a potential for adverse effects. Birds in general typically expend energy at up to 20 times their resting metabolic rates during flight. Mitigating these concerns is the fact that radar beams are relatively narrow. To remain in the beam for any period requires that the bird flies directly along the beam axis, or that a hovering bird such as a raptor does so for a significant time. There is presently insufficient information to make a quantitative estimate of the joint probability of such an occurrence (beam stationary/bird flying directly on-axis or hovering for several minutes), but it is estimated to be insubstantial. Since birds are not likely to remain continuously within the radar beam, the likelihood of harmful exposure is not great. (U.S. Department of the Navy, 1998a)

Earlier analysis of ground-based radar's potential impacts on birds indicated that power densities of 243 to 390 milliwatts per square inch would be necessary to affect birds weighing up to 7.7 lbs. The power density of radars such as THAAD is not expected to exceed 32 milliwatts per square inch. (U.S. Army Space and Strategic Defense Command, 1993c)

Few field experiments have been performed to determine the potential effects of high-frequency EMR on wild animals. Aberdeen University researchers have over time observed that bat activity is reduced in the vicinity of the Civil Air Traffic Control radar station despite the proximity of habitat where bat activity would be expected. This observation raised the possibility that the radiofrequency radiation from the station might cause an aversive behavioral response in foraging bats. (Nicholls and Racey, 2007)

Nicholls and Racey (2007) predicted that if high-frequency EMR exerts an aversive response in foraging bats, the bat activity would be reduced at radar installations. The results of their study indicate that total bat activity was higher in control sites (0 volts/meter) when compared to sites with a high level (>2 volts/meter) of EMR. Nicholls and Racey (2007) proposed that thermal induction leading to an increased risk of overheating/hyperthermia and echolocation were the two likely mechanisms through which electromagnetic fields could induce an aversive response. To define the actual impact of radar on bats, field trials with a mobile radar that could be introduced into areas known to contain foraging would be required. (Nicholls and Racey, 2007)

Environmentally Sensitive Habitat

Training currently avoids the coastal dune systems. Conservation measures to minimize adverse effects on sensitive habitats developed as part of the 1998 PMRF Enhanced Capability EIS process included the following: (1) installation of a portable blast deflector on the launch pad could protect the vegetation the adjacent sand dunes; (2) potential for starting a fire would be further reduced by clearing dry vegetation from around the launch pad; (3) spraying the vegetation adjacent to the launch pad with water just before launch to reduce the risk of ignition; (4) emergency fire crews available during launches to quickly extinguish any fire and minimize its effects; and (5) the use of an open (spray) nozzle, when possible, rather than a directed stream when extinguishing fires, to avoid erosion damage to the sand dunes. Current training events do not occur in any of the wetland areas on base, including those associated with the Nohili Ditch and the Kawaiele Ditch.

HRC training and Major Exercises at PMRF do not occur in established critical habitat areas for lau`ehu that are located on or off base (Figure 3.3.2.1.3-1). Unexpected flight terminations or other launch mishaps have the potential to impact an area that has been designated as unoccupied critical habitat by fire, debris, and the resultant cleanup. However, the likelihood of a mishap occurring is small, and appropriate measures will be in place to minimize adverse effects.

HRC RDT&E Activities—No-action Alternative

PMRF's additional mission is supporting RDT&E projects. The at sea RDT&E activities are analyzed in the Open Ocean Section (4.1.2). Land sensor and missile defense effects will be the same or similar to those discussed above. Other RDT&E activities on PMRF include one-of-a-kind or short duration RDT&E activities conducted for both government and commercial customers. Examples include humpback whale detection, Maritime Synthetic Range, and numerous System Integration Checkout activities. Generally these types of activities have no or minimal effect on biological resources.

4.3.2.1.3.2 Alternative 1 (Biological Resources—PMRF/Main Base)

Increased Tempo and Frequency of Training, New Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training events (See Table 2.2.2.3-1). This would amount to an average increase of approximately 9 percent for onshore training. While training events would increase in number, the likelihood of a similar increase in impacts on biological resources is small, as described below.

Vegetation

Training would take place in current operating areas, with no expansion. Compliance with relevant Navy policies and procedures during these increased training events should continue to minimize the effects on vegetation, as well as limit the potential for introduction of invasive plant species. No threatened or endangered plants have been observed on PMRF.

Wildlife

Impacts on wildlife from an increase in frequency and tempo of training would be similar to those described for the No-action Alternative since the additional training events would be performed throughout the HRC and not confined to one particular area. It is unlikely that an individual listed species or other wildlife on PMRF would be repeatedly exposed to noise, debris, EMR, or emissions as a result of increased training. The additional training would comply with relevant Navy policies and procedures, which would minimize the potential for effects on wildlife.

Environmentally Sensitive Habitat

The continued use of regular training areas and transit routes would avoid the wetland acreage and other environmentally sensitive habitat on PMRF, thus no impacts are anticipated.

<u>New Training</u>

An additional proposed training event associated with Major Exercises is FCLP. This event involves pilots from an aircraft carrier air wing practicing landings at a land runway. As discussed in Chapter 2.0, the runway at PMRF could be used for FCLP. For each pilot, the FCLP would include 8 to 10 touch-and-go landings at the PMRF runway during both daytime and at night. Sound levels from these training events would be similar to sound levels currently occurring at the PMRF runway (65 to 85 dB). Other than startle effects, no substantial impacts on wildlife, including threatened and endangered species, are anticipated.

While PMRF does not currently participate in night time FCLPs, there are other take-offs and landings that do occur at night at the PMRF airfield. In addition, no substantial impacts on nocturnal species are anticipated since: (1) the number of hoary bats observed on PMRF is limited and none have been observed in the runway areas; (2) wedge-tail shearwaters are not located within the runway approach; and (3) as described in Chapter 3.0, the Laysan albatross is being discouraged from nesting at PMRF to prevent interaction between the species and aircraft using the runway. Albatross on the airfield are tagged and released on the north portion of the base or returnees are relocated to Kilauea National Wildlife Refuge in order to prevent bird/aircraft strikes. Viable PMRF albatross eggs are being relocated to Kilauea Point and other north shore nest sites to replace eggs that would never hatch. This surrogate parenting program continues through the 2006/2007 nesting season and is anticipated to continue as long as viable eggs are available at PMRF/Main Base (Burger, 2007a). Any required lighting would be shielded in accordance with existing PMRF policy to minimize the potential for adverse impacts on Newell's shearwaters and stormy petrels that may traverse the area on their way out to sea. The Navy would attempt to avoid FCLPs during breeding and fallout seasons, if practicable. If not practicable, any potential impacts to listed endangered bird species would be addressed through coordination/consultation with the USFWS.

A 750-ft runway clear zone measured from the centerline of the runway is regularly mowed and maintained. No structures or trees exceeding certain height limitations are allowed within this zone. These practices deter wildlife from nesting and foraging along the runway and minimize the potential for bird strikes.

Enhanced and Future RDT&E Activities—Alternative 1

Payloads on some target vehicle launches from PMRF would incorporate additional chemical simulants, which include larger quantities of TBP and various glycols. The families of chemicals were selected based on the criteria to minimize potential toxicity and maximize the potential to simulate the more dangerous chemical warfare agents. Up to approximately 120 gal of simulant could be used in target vehicles. The simulant would be transported from the Continental United States to PMRF with the target vehicle and loaded into the target payload as part of the vehicle processing activities.

The use and effects of simulants have been analyzed in other PMRF-related documents (U.S. Department of the Navy, 1998a; U.S. Army Space and Missile Defense Command, 2002; 2003) and are further discussed in Sections 4.2.1.1.1 and 4.2.1.1.1.2. The release of simulant would continue to occur at a high altitude over the open ocean during a nominal flight test. Because of (1) the relatively small area that would be affected and (2) the existing spill prevention, containment, and control measures in place at PMRF, minimal impacts on biological resources are expected in the event of a launch mishap. The potential ingestion of toxins, such as the small amount of propellant or simulant remaining in the spent boosters or on pieces of missile debris, by terrestrial species would be remote.

An additional proposed training activity associated with Major Exercises is FCLP (addressed above), which would involve pilots from an aircraft carrier air wing practicing landings at the PMRF land runway.

Launches from Wake Island, the Reagan Test Site at USAKA, and Vandenberg AFB toward the vicinity of PMRF are proposed. Launches from those sites would be from existing launch facilities and the intercept areas would be in the Open Ocean Area and TOA of the PMRF Range. Targets would also be launched from sea-based and air-based platforms. The effects of these missile tests would be similar to those described above for the No-action Alternative and in Section 4.1.2.

HRC Enhancements—Alternative 1

Where possible, existing towers would be used for the placement of new equipment to enhance the PMRF electronic warfare (EW) training capability. The construction of any new towers on Kauai or on other islands (e.g., Molokai, Lanai, Maui, and Hawaii), would occur at locations selected by personnel familiar with local environmental constraints, including the presence of threatened or endangered species. Additional environmental documentation would be required once specific sites are identified. The placement of new equipment to enhance electronic warfare training capability would be collocated on an existing communication tower or other structure. Any new towers would not be sited in or near wetlands, other known bird concentration areas (e.g., state or Federal refuges, staging areas, rookeries), in known migratory or daily movement flyways, or in habitat of threatened or endangered species. The towers proposed for use are not located in Newell's shearwater nesting areas. Any required lighting would be shielded in accordance with existing PMRF policy. PMRF works directly with Save our Shearwaters to minimize effects on the birds from its activities. If avoidance of activities during bird fallout season is not practicable, monitoring for downed birds near the new towers would be conducted as appropriate.

Enhanced Automatic Identification System and Force Protection Capability

As part of the enhanced Automatic Identification System (AIS) and Force Protection Capability, antennas would be added to an existing structure on PMRF/Main Base, resulting in temporary elevated noise levels. No vegetation clearing or ground disturbance would be required for this effort. Because construction-related noise would be localized and short-term, the potential for impacts on biological resources would be minimal. If avoidance of activities during bird fallout season is not practicable, monitoring for downed birds near the antennas would be conducted as appropriate.

Pacific Missile Range Facility Enhancements

Construct Range Operations Control Building

PMRF would construct a new, almost 90,000-ft^2 building to consolidate range operations currently conducted in 13 buildings. Its proposed location is shown on Figure 2.2.3.6.4-5. An environmental review of the proposed consolidated Range Operations Control Building construction was conducted that determined that the effects of the proposed construction on the environment would be minimal and a categorical exclusion (CATEX) for the proposed project was approved on 14 May 2004.

Vegetation. The proposed building site is within the previously disturbed administrative area. No unique habitat or indigenous or native vegetation would be disturbed. No threatened or endangered vegetation has been identified as occurring on PMRF.

Wildlife. At 50 ft from construction equipment, noise levels typically range from 70 to 98 A-weighted decibels (dBA). The combination of increased noise levels and human activity would likely displace some small mammals and birds (e.g., common field and urban birds, and small rodents) that forage, feed, or nest within and adjacent to the construction site. Impacts on listed birds (Hawaiian duck, Hawaiian moorhen, Hawaiian coot, and Hawaiian stilt) that could be in or transiting the construction area would be limited to startle or flying away reactions. Foraging birds would be subjected to increased energy demands if flushed by the construction noise, but this should be a short-term, minimal effect. Construction would not affect the wetlands that these birds use for resting, nesting, and foraging, which are approximately 0.5 mi northeast of the proposed new building location as shown in Figure 3.3.2.1.3-1. Bird migration patterns would not be altered.

Any outdoor lighting associated with construction activities and permanent structures would be properly shielded, following U.S. Fish and Wildlife Service (USFWS) guidelines to minimize reflection and impact on light-sensitive wildlife, such as the Newell's shearwater and petrels.

Improve Fiber Optics Infrastructure

To improve communications and data transmission, PMRF would install fiber optic cable between the Main Base and Kokee. The cable would be hung on existing KIUC poles between PMRF/Main Base and Kokee; however, it is possible that additional poles might need to be installed in some areas where exceptionally long spans are encountered. To minimize ground disturbance and impacts on vegetation, it is expected that all equipment and installation activities would occur along existing public and KIUC access roads in previously disturbed areas. Effects from the noise and presence of additional personnel during this activity would be similar to those discussed in Section 4.3.2.1.3.1, PMRF/Main Base. Newell's shearwaters and Hawaiian dark-rumped petrels often fly into utility wires and poles and fall to the ground. KIUC has implemented a number of conservation measures to benefit listed seabird species on Kauai. The cooperative has shielded all streetlights on utility poles along county and state highways to reduce light-attraction impacts. KIUC has also placed power line marker balls in areas of concentrated seabird flight paths. (Kauai Island Utility Cooperative, 2006b) These measures could also be used for the proposed installation of additional poles and cable between PMRF and Kokee. The Navy would consult with USFWS regarding the potential for threatened and endangered bird takes.

Environmentally Sensitive Habitat. New construction would follow standard methods to control erosion during construction. Construction would thus not likely directly or indirectly affect any wetlands on base including those associated with the Nohili Ditch and the Kawaiele Ditch.

4.3.2.1.3.3 Alternative 2 (Biological Resources—PMRF/Main Base)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training events would be increased and the frequency of events could also increase. Wildlife exhibits a wide variety of responses to noise. Some species are more sensitive to noise disturbances than others. Literature on the effects on wildlife from noise suggests that common responses to noise events include a startle or fright response, and ultimately, habituation (becoming accustomed to the noise). The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c).

Enhanced and Future RDT&E Activities—Alternative 2

The high-energy laser would require a 25,000-ft^2, permanent operations building on PMRF. If Naval Sea Systems Command (NAVSEA) decides to build and operate this Maritime Directed Energy Test Center, separate environmental documentation would be required to analyze the specific location, and test and operational requirements, including the requirement of 30 megawatts of power.

PMRF would also add the capability to test non-eye-safe lasers. If Airborne Laser system testing were conducted at PMRF, separate environmental documentation would be required to analyze the specific test requirements.

Advanced Hypersonic Weapon

Launches of the new booster configurations as part of the Advanced Hypersonic Weapon testing would be similar to launches of the Strategic Target System previously analyzed in the Strategic Target System EIS and the PMRF Enhanced Capability EIS (U.S. Army Strategic Defense Command, 1992; U.S. Department of the Navy, 1998a). No new facilities would be required. The launch azimuth and flight termination system would be the same as that of the existing Strategic Target System. Existing radars and the ground hazard area would also be the same. As a result, impacts on biological resources would be minimal.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

A Multiple Strike Group Exercise consists of training that involves Navy assets engaging in a schedule of events battle scenario, with U.S. forces against a hypothetical opposition force. Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. Participants use and build upon previously gained training skill sets to maintain and improve the proficiency needed for a mission-capable, deployment-ready unit. The Major Exercise would occur over a 5- to 10-day period. Activities would mainly be offshore and in the Open Ocean. The Multiple Strike Group training would involve many of the training events identified and evaluated under the No-action Alternative and Alternative 1 including mine training events, Missile Defense, and FCLP. Increased activities should not result in new lighting, fire potential, noise, and EMR/electromagnetic fields, or introduction of non-native species.

4.3.2.1.3.4 Alternative 3 (Biological Resources—PMRF/Main Base)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on vegetation and wildlife under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.1.4 Cultural Resources—PMRF/Main Base

4.3.2.1.4.1 No-action Alternative (Cultural Resources—PMRF/Main Base)

HRC Training—No-action Alternative

Training with the potential to affect cultural resources at PMRF Main Base includes Swimmer Insertion/Extraction, Expeditionary Assault, MCM, and HAO/NEO. All three of these training events exhibit similar activities that involve personnel and equipment (e.g., AAVs, SDVs, supply trucks) crossing beach areas or following existing roads from the shoreline and dispersing into designated areas for from 1 to 18 days of training.

At PMRF, the insertion point for training is at Majors Bay and within a landing zone that has been specifically designated for these types of training events. The Majors Bay landing site is heavily disturbed from long-term use by both the military and the public, and contains no recorded cultural resources in either the landing or staging areas. This location also has a low potential for the unanticipated discovery of cultural materials or human remains. There is one significant recorded cultural site in the over-night area inland of the beach (Site 05-1834) (International Archaeological Resources Institute, Inc., 2005) ; however, the site is fully marked in the field and easily recognized as a “keep-out” area (U.S. Department of the Navy, 2002a). With adherence to prohibitions against entry into this area, no impacts on cultural resources will occur from training at Majors Bay.

If unanticipated cultural resources are encountered (particularly human remains) for any activity, training plans direct that all training events will cease in the immediate vicinity of the find and procedures outlined in the PMRF ICRMP, SOP II.3.3, followed (International Archaeological Resources Institute, Inc., 2005).

HRC RDT&E Activities—No-action Alternative

Missile activities at PMRF encompass a wide array of missile types and are conducted from existing launch facilities. Under the No-action Alternative, any or all of the following potential impacts could occur to cultural resources from ongoing or future launches:

- New construction, ground-clearing, and off-road traffic activities
- Sound pressure damage to buildings and structures from launch activities
- Inadvertent ignition of vegetation and subsequent fire suppression activities
- Increased human presence in archaeologically sensitive areas as a result of training or maintenance activities
- Alteration, modification, renovation, or demolition of existing potentially significant facilities.

Mitigation measures to reduce and/or eliminate any potential adverse effects on known or unidentified historic properties from ongoing and future missile activities have been developed and are presented in the PMRF ICRMP (International Archaeological Resources Institute, Inc., 2005). These include:

- Avoiding activities and construction in areas where cultural resources are known to exist
- Monitoring all ground-disturbing activities and construction in medium and high sensitivity archaeological areas
- Briefing personnel working in culturally sensitive areas, including providing information on Federal laws protecting cultural resources
- Spraying water on vegetation within the immediate area of the launch vehicle prior to launch. In the event that vegetation ignites as a result of launches, fire suppression personnel are instructed to use an open spray nozzle whenever possible to minimize erosion damage (such as to sand dunes) and prevent destruction of cultural resources.
- If extensive burning of dune vegetation occurs, conducting post-burn archaeological surveys in consultation with the Hawaii State Historic Preservation Office (SHPO) and Navy archaeologist
- Implementing data recovery/research and documentation program if cultural resources are discovered as a result of normal training and base operations activities.

As part of the PMRF Enhanced Capability EIS process, a Memorandum of Agreement for the protection of cultural resources was signed in 1999 (Appendix H), which includes a monitoring plan for ground-disturbing activities and a burial treatment plan. These plans have been integrated into the SOPs of the PMRF ICRMP as well (International Archaeological Resources Institute, Inc., 2005).

Because extensive measures described above are in place for the protection of cultural resources during missile activities at PMRF, no adverse effects are expected. With missile activities and all other military activities at PMRF, the Navy will continue to provide Native Hawaiians with access to traditional religious and cultural properties, in accordance with the American Indian Religious Freedom Act and Executive Order 13007, on a case-by-case basis.

Major Exercises—No-action Alternative

Elements of Major Exercises with the potential to affect cultural resources (e.g., Swimmer Insertion/Extraction, Expeditionary Assault, MCM, HAO/NEO, missile launches) are included in the above discussions.

4.3.2.1.4.2 Alternative 1 (Cultural Resources—PMRF/Main Base)

Increased Tempo and Frequency of Training and New Training—Alternative 1

Increases in the numbers of training events required under Alternative 1 would have no effect on terrestrial cultural resources at PMRF. Baseline training (i.e., the No-action Alternative) analyzed above would have no adverse effect on known cultural resources at PMRF, and established guidance (e.g., the PMRF ICRMP and a Memorandum of Agreement) is in place for protection. Increased tempo and frequency of training under Alternative 1 would not be anticipated to produce adverse effects. (International Archaeological Resources Institute, Inc., 2005)

HRC Enhancements—Alternative 1

Enhanced Automatic Identification System and Force Protection

The AIS provides a ship-to-ship and ship-to-shore communications capability. To enhance the existing system, new antennas would be added to Building 282 at PMRF Main Base. Historic buildings surveys have been completed of PMRF/Main Base, and Building 282 has not been recommended as eligible for inclusion in the National Register of Historic Places (NRHP) either on individual merit or as an element of a historic district. As a result, installation of a new antenna on this building would have no effect on cultural resources (International Archaeological Resources Institute, Inc., 2005) (see Appendix H).

Pacific Missile Range Facility Enhancements

Training at PMRF/Main Base with the potential to affect terrestrial cultural resources includes construction of a new Range Operations Control Building and completion of a new fiber optic cable line between PMRF/Main Base and Kokee (see Figure 2.1-2).

<u>Range Operations Control Building</u>

There are no cultural resources sites identified within the direct region of influence for construction of the Range Operations Control Building. The areas have been surveyed for archaeological resources; however, subsurface features may still be present (International Archaeological Resources Institute, Inc., 2005). Construction of this facility would require coordination with the PMRF Environmental Engineer and would follow the guidance provided in the PMRF ICRMP, most specifically SOP II.3.1 (International Archaeological Resources

Institute, Inc., 2005). Mitigation measures would include, but not be limited to, archaeological monitoring during construction.

Fiber Optic Cable

Improving the fiber optics infrastructure between PMRF and Kokee would involve the installation of approximately 23 mi of fiber optic cable. The cable would be hung on existing Kauai Island Utility Cooperative (KIUC) poles.

Hanging the new fiber optic cable on existing KIUC utility poles between PMRF and Kokee would have no effect on cultural resources. However, any connections required between the existing cable terminal and the poles (i.e., trenching, installation of new ducts, or erection of new poles across PMRF to get to the KIUC intersection) could affect subsurface cultural materials. Mitigation measures would include, but may not be limited to, archaeological monitoring during construction.

Major Exercises—Alternative 1

Impacts associated with Major Exercises at PMRF/Main Base (e.g., Swimmer Insertion/Extraction, Expeditionary Assault, MCM, HAO/NEO, missile launches) would be similar to those discussed in Section 4.3.2.1.4.1.

4.3.2.1.4.3 Alternative 2 (Cultural Resources—PMRF/Main Base)

Increased Tempo and Frequency of Training—Alternative 2

Increases in the numbers of training events required under Alternative 2 would have no effect on terrestrial cultural resources at PMRF. Baseline training (i.e., the No-action Alternative) analyzed earlier would have no adverse effect on known cultural resources at PMRF, and established guidance (e.g., the PMRF ICRMP and a Memorandum of Agreement) is in place for protection. Increased tempo and frequency of training under Alternative 1 would not be anticipated to produce adverse effects.

Future RDT&E Activities—Alternative 2

Directed Energy

The Directed Energy program would require the construction of a new operations building at PMRF/Main Base(see Figure 2.2.4.5-1). The potential building is currently sited in locations where there are no known archaeological sites; however, the location has not been finalized. There is always the potential for subsurface archaeological remains to occur. Once the exact facility location has been determined, construction would require coordination with the PMRF Environmental Engineer, following guidance provided in the PMRF ICRMP (International Archaeological Resources Institute, Inc., 2005).

Advanced Hypersonic Weapon

The Advanced Hypersonic Weapon involves multiple launches of a long range missile. Launches would be from the KTF area of PMRF. No construction is required for this program and, as described above, measures are in place for the protection of terrestrial cultural resources within the ground hazard area. As a result, adverse effects are not expected.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Training associated with the Multiple Strike Group primarily involves sea and air activities; therefore, adverse effects on terrestrial cultural resources at PMRF/Main Base are not expected.

4.3.2.1.4.4 Alternative 3 (Cultural Resources—PMRF/Main Base)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on cultural resources under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.1.5 Geology and Soils—PMRF/Main Base

4.3.2.1.5.1 No-action Alternative (Geology and Soils—PMRF/Main Base)

Ongoing training at PMRF/Main Base, Expeditionary Assault, ground maneuvers, and HAO/NEO, will have minimal direct impact on the beach and inland areas, and soils will not be permanently affected.

4.3.2.1.5.2 Alternatives 1, 2, and 3 (Geology and Soils—PMRF/Main Base)

Construction activities that could affect geology and soils include installation of AIS and Force Protection equipment, construction of a new Range Operations Control Building and construction of the proposed High-Energy Laser facility. New construction would follow standard methods to control erosion during construction. No adverse impacts on soils are likely to occur as a result of new construction because the proposed sites are located in modern alluvial and dune sands unsuitable for agricultural development. Soil disturbance would be limited to the immediate vicinity of the construction area and would be of short duration. Soils at the proposed sites may be subject to minor erosion from the wind during the construction period. Base personnel would exercise best management practices to reduce soil erosion.

4.3.2.1.6 Hazardous Materials and Waste—PMRF/Main Base

4.3.2.1.6.1 No-action Alternative (Hazardous Materials and Waste—PMRF/Main Base)

HRC Training and Support Activities—No-action Alternative

Under the No-action Alternative existing training at PMRF/Main Base will continue and there will be no increase in hazardous materials used and hazardous waste produced. PMRF/Main Base has plans in place to manage hazardous materials and waste.

Under the No-action Alternative, existing HRC training at PMRF will continue to occur. Training at PMRF/Main Base that can affect hazardous material and waste includes GUNEX, Swimmer Insertion/Extraction, Expeditionary Assault, and Missile Exercises. Section 3.3.2.1.6 details existing levels of hazardous materials and hazardous wastes at PMRF/Main Base. The No-action Alternative will continue to generate similar levels. PMRF activities follow applicable State and Federal requirements for the management of hazardous materials and waste generated. All hazardous materials and hazardous waste will continue to be shipped in accordance with DOT regulations.

Hazardous materials and wastes associated with GUNEX, Swimmer Insertion/Extraction, and Expeditionary Assault will primarily include fuels needed for vehicles used in the activities. These vehicles will be fueled prior to the start of the training. Any spills that occur will be handled in accordance with existing SOPs at PMRF. In addition, training materials will be expended offshore at PMRF/Main Base during training. Items that will be expended in the water offshore and those not recognized as training material typically will not be recovered.

Missile Exercises at PMRF/Main Base
Both solid and liquid propellant missiles launch activities will continue to occur at PMRF/Main Base. Pre-launch activities associated with these launches include transportation and handling of launch vehicles. All elements of the launch vehicle will be transported, handled, and stored at PMRF in accordance with applicable Federal and State regulations and standard range SOPs to limit any adverse impact.

Potential soil contamination could occur from rocket emissions forming hazardous residues in concentrations which would dictate a hazard to human health, or, in the event of an early flight termination, burning fuel may reach the ground. This local contamination could require soil sampling and analysis to determine if any clean-up is required. During nominal launches of a solid propellant missile, the primary emission products will include hydrogen chloride, aluminum oxide, carbon dioxide, carbon monoxide, nitrogen, and water.

No adverse changes to soil chemistry are predicted to occur as a result of hydrogen chloride or aluminum oxide deposition from solid fueled target and interceptor launches. No solid propellant missile launches will occur during rainy conditions, and the launch system will not use a water deluge system for cooling and noise suppression (a deluge system could increase the potential for ground deposition). As detailed in Section 3.3.2.1.6, potential deposition of aluminum oxide per launch is expected to be small relative to the background levels of aluminum present in the soil. Previous studies performed by the Department of Energy to evaluate the impact of potentially launching Strategic Target Systems at KTF measured high background levels of aluminum in the soils of the Mana Plain. Soil deposition of measurable levels of aluminum oxide from a moving exhaust cloud is predicted to be negligible (U.S. Army Strategic Defense Command, 1992). Additionally, because the launch location is on the western side of the island, the launch trajectory is away from the island, and there are strong persistent wind conditions, it is expected that very little of these emissions will be deposited at PMRF.

In the unlikely event of an on-pad fire or early flight failure over land of a solid propellant missile, most or all of the fuel will likely burn up before being extinguished. Any remaining fuel will be collected and disposed of as hazardous waste. Potential soil contamination which could result from such an incident is expected to be localized. Such contamination could require soil sampling and analysis to determine if any clean-up is required. An on-pad spill or catastrophic missile failure of a liquid-fueled missile over land could result in the release of unsymmetrical dimethyl hydrazine fuel and/or IRFNA oxidizer. Unsymmetrical dimethyl hydrazine is heavier than air, and if not oxidized when airborne will react and/or possibly ignite with the porous earth or will form dimethylamine and nitrogen oxides. All of these substances are soluble in water.

On further oxidation of the dimethyl amine, the amino substances serve as nutrients to plant life. Airborne nitrogen dioxide would return to earth as nitric acid rains in precipitation events and would react with the calcium carbonate soil to form the nitrates which are used in fertilizer for plant life (U.S. Army Space and Strategic Defense Command, 1995).

Likewise, IRFNA that reached the ground will react with calcium carbonate soils to form calcium nitrates (U.S. Army Space and Strategic Defense Command, 1995). Calcium nitrate, a strong oxidizer, is a dangerous fire risk in contact with organic materials, and may explode if shocked or heated (U.S. Army Space and Strategic Defense Command, 1995). Therefore, depending on the amount of the propellant and/or oxidizer released, soils contaminated with these liquid propellants may require removal to prevent subsequent fires or explosions. Calcium nitrate is also water soluble, so it is anticipated that any residual material or unreacted fuel will be washed into the groundwater or directly out to sea.

Potentially hazardous materials (external to those preloaded into the launch vehicles) to be used will be fuel required for electrical power generators, coating, sealants, and solvents needed for launch and launch preparation. The types of hazardous materials used and hazardous waste generated will be managed in accordance with existing PMRF procedures, which conform to Federal and State of Hawaii requirements.

In addition, the PMRF Fire Department and Spill Response Team are trained in the appropriate procedures to handle the materials associated with launches if a mishap occurs. All personnel involved in this training will wear protective clothing and receive specialized training in spill containment and cleanup. During launches there is the potential for a mishap to occur resulting in potentially hazardous missile debris and propellants falling within the ground hazard area. The hazardous materials that result from a flight termination will be cleaned up and any contaminated areas remediated. All hazardous waste generated from such a mishap will be disposed of in accordance with appropriate State and Federal requirements. Specific restoration actions, if necessary, will be determined on a case-by-case basis in coordination with the procedures of the Facility Services Division of Hazardous Materials.

HRC RDT&E Activities—No-action Alternative

Ongoing RDT&E activities that can affect hazardous materials and waste levels at PMRF/Main Base include missile defense ballistic missile target flights and THAAD interceptor activities.

RDT&E activities include conducting missile launches from both northern and southern PMRF/Main Base launch sites. Impacts will be as described above for HRC training. The types of hazardous materials used and hazardous waste generated will be similar to current materials and will not result in any existing procedural changes to the hazardous materials and hazardous waste management plans currently in place. The rate of launches will not increase at PMRF/Main Base due to the No-action Alternative.

Major Exercises—No-action Alternative

Major Exercises include ongoing training, and in some cases RDT&E activities. C2 is achieved through a network of communication devices strategically located at selected DoD installations around the islands with no hazardous material or hazardous waste impacts foreseen.

Potential impacts on hazardous materials and wastes at PMRF/Main Base from a Major Exercise will be similar to those described for training and RDT&E activities. The types of hazardous materials used and hazardous waste generated will be similar to current materials and will not result in any existing procedural changes to the hazardous materials and hazardous waste management plans currently in place.

4.3.2.1.6.2 Alternative 1 (Hazardous Materials and Waste—PMRF/Main Base)

Increased Tempo and Frequency of Training and New Training—Alternative 1

The types of training that would occur at PMRF/Main Base would be similar to those described in Section 4.3.2.1.6.1. While training events would increase in number, hazardous materials used and hazardous waste generated would be similar to existing usage and generation, and would not result in any changes to management plans currently in place.

The new training proposed for PMRF/Main Base is FCLP. The Navy proposes to conduct an FCLP for half an air wing's pilots once a year in Hawaii. An FCLP is a series of touch-and-go landings that would be conducted during day or night periods, each consisting of six to eight touch-and-go landings per pilot. Hazardous materials and waste associated with the proposed FCLPs would be consistent with existing management plans in place at PMRF/Main Base. Training would continue to follow applicable State and Federal requirements for the management of hazardous materials and waste generated. All hazardous materials and hazardous waste would continue to be shipped in accordance with DOT regulations. Any spills that occur would also be handled in accordance with existing SOPs.

Enhanced and Future RDT&E Activities—Alternative 1

Increased and future RDT&E activities include target missiles launched from Wake Island, Kwajalein Atoll, or Vandenberg AFB into the TOA, additional chemical simulants, High Speed UAV and surface vehicle testing, and Hypersonic Vehicle testing.

Proposed launches associated with increased and future RDT&E activities would have a similar impact on hazardous material used and wastes generated as those described for the No-action Alternative. The proposed solid and liquid propellants would be similar to past launches from PMRF and would follow the same hazardous materials and hazardous waste handling procedures developed under existing plans. The types of hazardous materials used and hazardous waste generated would be similar to current materials and would not result in any changes to the hazardous materials and hazardous waste management plans currently in place.

Section 4.3.2.1.7.2, Health and Safety, addresses the amounts of liquid fuels required and the appropriate health and safety measures. All liquid propellant fuel spills would be remediated and hazardous waste generated would be disposed of in accordance with appropriate requirements.

During launches of either solid or liquid propellant missiles there is the potential for a mishap to occur resulting in potentially hazardous missile debris and propellants falling within the ground hazard area. As addressed for previous launch programs on PMRF, the hazardous materials that result from a flight termination would be cleaned-up and any contaminated areas remediated. All hazardous waste generated in such a mishap would be disposed of in accordance with appropriate State and Federal requirements

Target launches from PMRF would incorporate additional chemical simulants to include larger quantities of TBP and various glycols. Approximately 120 gal of simulant would be used in target vehicles launched from PMRF. The simulant would be transported from the Continental United States to PMRF with the target vehicle and would be loaded into the target vehicle payload as part of the payload processing activities.

TBP is a non-flammable, non-explosive, colorless, odorless liquid typically used as a solvent in commercial industry. The release of simulant would occur at a high altitude over the open ocean during a nominal flight test. TBP is not considered a hazardous substance or constituent by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and DOT. There are no reportable quantities or cleanup standards established for TBP. However, caution would be used when handling TBP, as recommended on Material Safety Data Sheets and in keeping with PMRF SOPs. Launch preparation activities, including loading and handling of the TBP payload, would have a minimal impact on hazardous materials and waste. Emergency response planning would be incorporated into RDT&E activities requirement to minimize any impact due to an unplanned release of TBP. Loading TBP would be similar to other project actions at PMRF and would not result in an increased hazard.

HRC Enhancements—Alternative 1

Proposed HRC enhancements at PMRF/Main Base include construction of a Range Operations Control Building, range safety for high-energy lasers, and improvement of fiber optics infrastructure.

Construction of new facilities at PMRF/Main Base, including a Range Operations Control Building and improvement of fiber optics infrastructure, would be conducted in accordance with the U.S. Army Corps of Engineers (USACE) Safety and Health Requirements Manual. Before any facility modifications, the areas to be modified would be surveyed for asbestos and lead-based paint. These materials would be removed in accordance with Federal and State requirements prior to building modifications. Construction activities associated with HRC enhancements would be centralized to the greatest extent possible at the selected project site and on specific construction laydown areas. Hazardous materials and waste management would be performed in accordance with ongoing PMRF procedures, as well as applicable Federal, State, and local requirements. All construction activities would follow the PMRF spill control plan.

Proposed construction activities are anticipated to use small quantities of hazardous materials, which would result in the generation of some hazardous and nonhazardous wastes. The hazardous materials that are anticipated to be used are common to construction activities and could include diesel fuel, anti-freeze, hydraulic fluid, lubricating oils, welding gases, and small amounts of paints, thinners, and adhesives. Hazardous materials management techniques would be used during the construction period to minimize (1) the amount of hazardous materials stored, (2) the threat of their accidental and unplanned release into the environment, and (3) the quantity of hazardous waste generated.

PMRF would develop and implement the necessary SOPs and range safety requirements necessary to provide safe activities associated with future high-energy laser tests.

Major Exercises—Alternative 1

The types of Major Exercises that would occur at PMRF/Main Base would be similar to those described in Section 4.3.2.1.6.1 and would be similar to training. While these activities would increase in number, hazardous materials used and hazardous waste generated would be similar to existing usage and generation, and would not result in any changes to management plans currently in place.

4.3.2.1.6.3 Alternative 2 (Hazardous Materials and Waste—PMRF/Main Base)

Increased Tempo and Frequency of Training—Alternative 2

Impacts on hazardous materials and waste at PMRF/Main Base from increased training would be similar to existing levels of hazardous materials used and waste generated. The total number of training events that affect hazardous material use and hazardous waste generation would increase by an average of approximately 31 percent above the No-action Alternative. While the number of training events would increase, the level of hazardous materials used and waste generated would continue to be managed by PMRF under appropriate State and Federal requirements.

Future RDT&E Activities—Alternative 2

The proposed high-energy laser would require a 25,000-ft^2 building at PMRF/Main Base. Construction impacts would be similar to those described earlier. However, separate environmental documentation would be required to analyze specific location and RDT&E activity requirements, including requirements associated with hazardous material use and hazardous waste generation.

The testing of the Advanced Hypersonic Weapon would include two launches of a Strategic Target System booster from KTF and two launches of the new booster configuration from the same site. The Strategic Target System booster has been previously launched at KTF, and hazardous materials and wastes would be the same for these launches. The testing of the Advanced Hypersonic Weapon with the new booster configuration would be anticipated to use similar hazardous materials and produce similar hazardous waste. While the number of launches would increase, hazardous material usage and waste generation would continue to be managed by PMRF under appropriate State and Federal requirements.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the HRC area for up to 10 days per Major Exercise. Training events that could occur at PMRF/Main Base would be similar to those described in Section 4.3.2.1.6.1 and would require similar levels of hazardous materials and produce similar levels of hazardous waste. While the number of training events would increase at PMRF/Main Base during Strike Group Training, the levels of hazardous materials and waste would continue to be managed by PMRF under the Navy's Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP) and PMRF's current status as a large-quantity hazardous waste generator by USEPA. The types of hazardous materials used and hazardous waste generated would be similar to current materials and would not result in any existing procedural changes to the hazardous materials and hazardous waste management plans currently in place.

4.3.2.1.6.4 Alternative 3 (Hazardous Materials and Waste—PMRF/Main Base)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on hazardous materials and waste under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.1.7 Health and Safety—PMRF/Main Base

4.3.2.1.7.1 No-action Alternative (Health and Safety—PMRF/Main Base)

Under the No-action Alternative, existing training and RDT&E activities at PMRF/Main Base will continue. PMRF takes every reasonable precaution during planning and execution of training and RDT&E activities to prevent injury to human life or property.

HRC Training and Support Activities—No-action Alternative

Under the No-action Alternative, existing HRC training at PMRF will continue to occur. The ongoing training associated with the No-action Alternative that can affect health and safety at PMRF/Main Base includes GUNEX, Swimmer Insertion/Extraction, Expeditionary Assault, and Missile Exercises.

Existing SOPs will be used during GUNEX, Swimmer Insertion/Extraction, and Expeditionary Assault training events. These procedures include the use of clearance zones, restricting landings to specific areas of the beach, publication of training overlays that identify the landing routes and any restricted areas, and designating a lookout to watch for other vessels. Every reasonable precaution is taken to prevent injury to human life or property.

Missile Exercises at PMRF/Main Base

Missile and aerial target launch activities can occur from the PMRF Launch Complex on the northern part of the base and from two Department of Energy KTF launch areas on the northern and southern ends of the base. The missile and aerial targets are launched from fixed or portable launchers using either solid or liquid propellants. Health and safety concerns stem from pre-launch, launch, and post-launch activities.

Missile launches by nature involve some degree of risk, and it is for this reason that DoD and PMRF have specific launch and range safety policies and procedures to ensure that any potential risk to the public and government assets (launch support facilities) is minimized. Potential issues related to health and safety include mishaps during the transportation of missile components, toxic and explosive risks during missile integration and assembly, mishaps during payload/warhead mating, mishaps during handling, and launch associated debris and emissions.

Hazards During Pre-flight Activities

Missiles and support equipment may arrive at Pearl Harbor before final shipment to PMRF. Equipment will be available at Pearl Harbor for the loading and unloading of missiles. Storage areas will be available for the temporary storage of any hazardous materials. Missiles and support equipment are routinely transported directly to PMRF by aircraft. Missiles and support equipment may also be transported by ship to Nawiliwili Harbor, then by DoD/DOT-approved over-the-road carrier truck to PMRF. Applicable State and Federal regulations and range safety plans and procedures are followed in transporting and handling potentially explosive ordnance and hazardous materials. Missile components, including any propellant, are transported in DOT and military designed and approved shipping containers.

The protection afforded by shipping containers is sufficient to protect solid rocket motors from the shock required to cause an explosion. In the unlikely event of a transportation accident, the solid propellants will likely burn rather than explode. The solid propellants would release combustion products, specifically hydrogen chloride, which would irritate the eyes and skin of persons nearby. Such an accident would not likely occur given the in-place safety procedures used by PMRF during transportation and handling of missile components. Explosive Safety Quantity-Distances (ESQDs) are established along transportation corridors.

On arrival at PMRF, support equipment is placed in secure storage until assembly and launch preparation. ESQDs are established around ordnance storage and Missile Assembly Buildings. Access to storage and support facilities is limited to trained and authorized PMRF/mission critical personnel.

A pre-launch accident would be characterized by either an explosion and/or detonation of the missile propellants, or a situation in which the missile propellants burn without detonation or explosion. An ESQD surrounding the launcher is calculated based on the equivalent explosive force of all propellant and pyrotechnic materials contained on the flight vehicle. All potentially hazardous debris resulting from an accident on the launcher will be contained entirely within the ESQD, which will already have been cleared of unprotected personnel. Figure 3.3.2.1.7-1 shows the ESQD arcs for the launch pads at PMRF/Main Base. Teams are available for fire suppression, hazardous materials emergency response, and emergency medical response during launch activities.

Hazards During Vehicle Launch/Flight

Many procedures are in place to mitigate the potential hazards of an accident during the flight of one of these missiles. The PMRF Flight Safety Office prepares a Range Safety Operational Procedure (RSOP) for each mission that involves missiles, supersonic targets, or rockets. The development of the RSOP also considers the hazards from debris of hit-to-kill intercept tests where an interceptor missile impacts a target missile. The Commanding Officer of PMRF approves each RSOP, which includes specific requirements and mission rules. The Flight Safety Office has extensive experience in analyzing the risks posed by such activities. In spite of the developmental nature of missile activities (which leads to a significant probability of mission failure), the United States has an unblemished record of public safety during missile and rocket launches. Appendix K describes the general approach to protect the public and involved personnel from launch accident hazards. A brief overview of missile flight procedures is presented here, with specific examples for some of the proposed programs. The procedures in place are designed such that there is a very low probability of any adverse health or safety consequences of missile or rocket activities.

To protect people from injury from either nominal launches or accidents, two primary mitigation measures are in place: flight termination and clearance of specified regions. Clearance areas include the ground hazard area for land areas, Ship Exclusion Zones for ocean areas, and Restricted Airspace and Altitude Reservations for airspace. In addition, launch times and trajectories are cleared with United States Space Command to prevent impacts on satellites (both manned and unmanned); this process is called Collision Avoidance. For some missions, no flight termination system is needed. This occurs when the vehicle properties are such that all potential debris from accidents is contained within the hazard area.

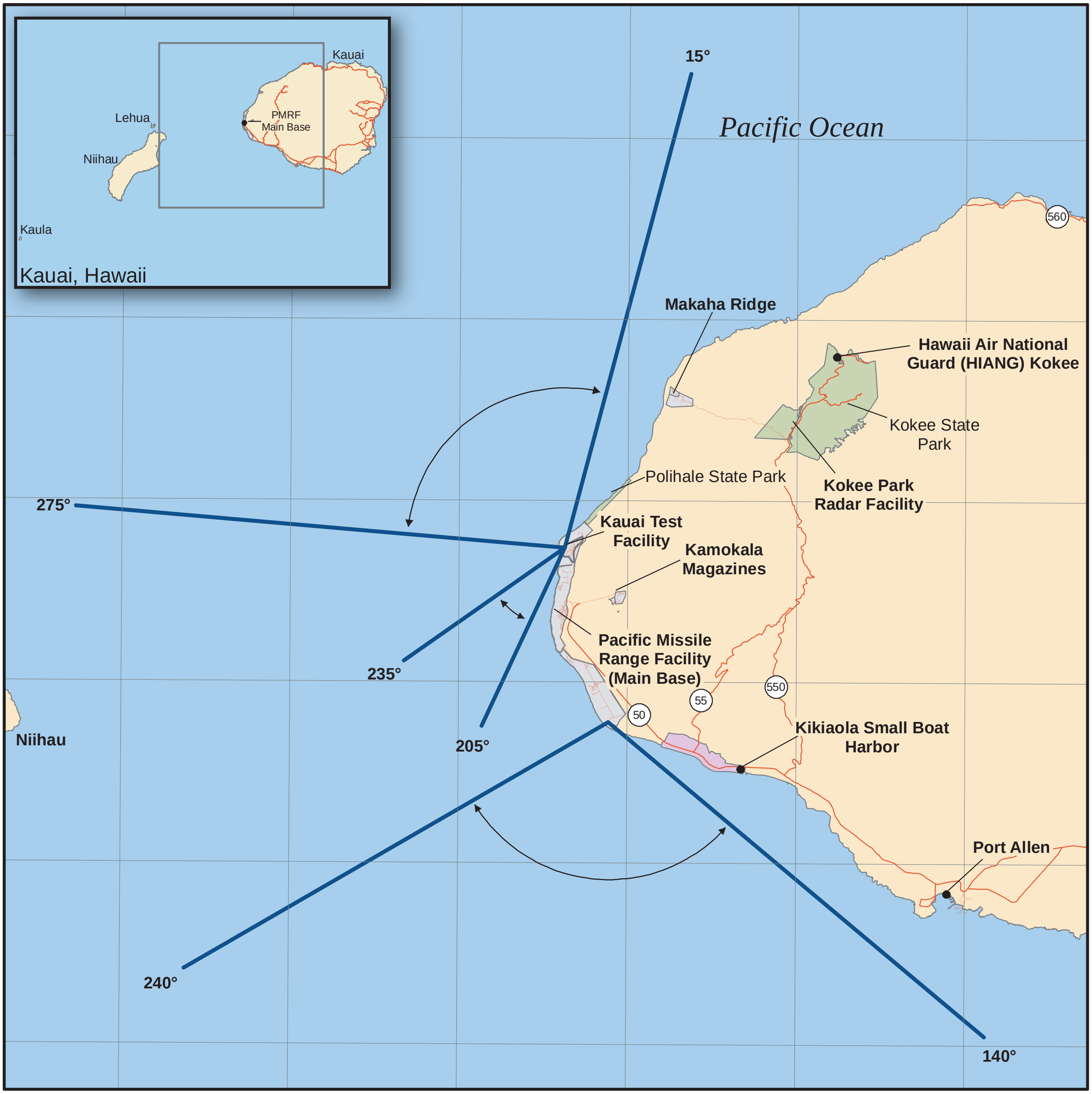
Flight termination is performed by the Missile Flight Safety Officer if a missile malfunctions and leaves a predefined region or violates other predefined mission rules. The acceptable flight region is bounded by Destruct Limits, which are defined to make impact of potentially hazardous debris on populated areas highly unlikely. The Missile Flight Safety Officer terminates flight if the Instantaneous Impact Point of a vehicle crosses a Destruct Limit. The range safety system includes highly-reliable in-flight tracking and command destruction systems. The Missile Flight Safety Officer monitors in real-time missile performance and evaluates flight termination criteria. The flight termination system provides a mechanism to protect the public with very high reliability, even in the unlikely case of a missile malfunction.

The sizes and locations of clearance regions, as well as the duration of closure, are determined for each particular launch through analysis and simulation.

The ground hazard area includes the area that may be at risk from a vehicle failure very early in flight. It is a region in the vicinity of the launch location, typically extending 1,000 to 20,000 ft from the launch point, depending on the vehicle and mission. Clearance of this region ensures that the public is excluded from any area that will be at risk from an errant missile in the time immediately after launch before Missile Flight Safety Officer could react to the malfunction (i.e., several seconds). For launches from the northern portion of PMRF Main Base (such as some Missile Defense, THAAD, Flexible Target Family), PMRF may activate the easement on State of Hawaii lands, and close roads on the Mana Plain (see Section 4.3.2.1.8).

The Ship and Aircraft Exclusion Areas ensure that vehicles are not in areas of unacceptable risk. These areas include the places where planned debris may impact (such as dropped stages of multi-stage vehicles or debris from hit-to-kill intercept engagements) and also the regions at risk if there is a failure (such as under the planned flight path). Aircraft regions are designed in a similar fashion. The specific definition of each of these regions is determined by a probabilistic risk analysis that incorporates modeling of the vehicle response to malfunctions, mission rules (such as Destruct Limits), and the vulnerability of vehicles to debris. NOTMARs and NOTAMs are issued for the entire region that may be at risk, encompassing both exclusion areas and warning areas (areas with very remote probability of hazard). Surveillance by aircraft and satellite is used to ensure that there are no ships or aircraft in cleared areas, and also that the collective risk meets acceptable risk criteria for the mission.

Figure 4.3.2.1.7.1-1 shows flight corridor azimuth limits, and Figure 3.3.2.1.7-1 shows typical ground hazard areas. A given mission would have different regions, but in all cases the same process to ensure mission personnel and public safety will be followed.



EXPLANATION

50 State Highway

Road

Flight Corridor Azimuth Limit

State Park

Installation Area

City of Kekaha

Land

Note: Azimuths between 235° and 275° from Kauai Test Facility are avoided to protect Niihau.

NORTH

0 3 6 12 Miles

Pacific Missile Range Facility Flight Corridor Azimuth Limits

Kauai, Hawaii

Figure 4.3.2.1.7.1-1

Sensor instrumentation activities will also occur during launches from PMRF/Main Base. EMR health and safety issues described below address hazards of EMR to people, fuel, and ordnance (HERP, HERF, and HERO, respectively).

HERP hazards are the result of tissue heating by radio frequency energy. Hazard levels are a result of radio frequency energy averaged over any 6-minute period. The hazard of EMR to fuel is the ignition of fuel vapors by arcing or ignition of fuel in contact with the radiofrequency (RF) heated metal in intense radio frequency fields. The hazard of EMR on ordnance is the potential to cause the ordnance to explode in intense RF fields.

Prior to installing any new radar or modifications to existing radar, the PMRF conducts an EMR hazard review that considers hazards of EMR on personnel, fuel, and ordnance. The review provides recommendations for sector blanking (areas off-limits to EMR) and safety systems.

Regular radiation hazard surveys occur of the radar and other EMR generating equipment used on PMRF. None of the EMR generated affects the public using the beaches on PMRF or the areas adjacent to the facility. EMR hazards to personnel on PMRF are minimized by conducting hazard surveys of existing systems to ensure appropriate safety precautions are implemented. In addition, each radar unit contains warning lights that operate to inform personnel when the system is emitting EMR. Overall, with the implementation of the existing safety procedures, EMR represents a minimal health and safety risk to personnel working on PMRF or the public.

Prior to each mission, the PMRF Flight Safety Office performs a comprehensive analysis of the proposed mission, including flight plans, planned impact areas, vehicle response to malfunctions, and effects of flight termination action. A probabilistic analysis is performed with sufficient conservative assumptions incorporated to ensure that the risks from the mission are acceptable. PMRF follows the guidance of the Range Commanders' Council (RCC) for acceptable risk (in RCC-321). These acceptable risk criteria are designed to ensure that the risk to the public from range operations is lower than the average background risk for other third-party activities (for example, the risk of a person on the ground being injured from an airplane crash).

Post-launch Hazards

Debris from a launch may impact the ground or open ocean (either from stage jettison or from a flight termination action). Debris can consist of metals, solid propellant, and batteries. Potentially hazardous debris will be recovered from the ground or ocean (if it floats or impacts in shallow water) and disposed of in accordance with applicable State, Federal, and range hazardous waste requirements and operating procedures.

HRC RDT&E Activities—No-action Alternative

PMRF's additional mission is supporting RDT&E projects. The at sea RDT&E activities are analyzed in the Open Ocean Section (4.1.5). Land sensor and missile defense were discussed previously. Every reasonable precaution will be taken during planning and execution of RDT&E activities to prevent injury to human life or property.

Major Exercises—No-action Alternative

Major Exercises such as RIMPAC and USWEX include ongoing training and, in some cases, RDT&E activities. Potential impacts on health and safety at PMRF/Main Base from a Major Exercise will be similar to those described for training and RDT&E activities and current SOPs will be used during Major Exercises. These procedures include using clearance zones, restricting landings to specific areas of the beach, publishing training overlays that identify the landing routes and any restricted areas, and designating a lookout to watch for other vessels. Every reasonable precaution will be taken to prevent injury to human life or property.

4.3.2.1.7.2 Alternative 1 (Health and Safety—PMRF/Main Base)

Increased Tempo and Frequency of Training and New Training—Alternative 1

While the tempo and frequency of training would increase in number under Alternative 1 and FCLPs are proposed as new training at PMRF/Main Base, current SOPs would continue to be used during training. These procedures include using clearance zones, restricting landings to specific areas of the beach, publishing training overlays that identify the landing routes and any restricted areas, and designating a lookout to watch for other vessels. Every reasonable precaution would continue to be taken to prevent injury to human life or property. The types of training that would occur at PMRF/Main Base would be similar to those described in Section 4.3.2.1.7.1.

Enhanced and Future RDT&E Activities—Alternative 1

Enhanced and future RDT&E activities include incorporation of additional non-lethal chemical simulants in target launches, interceptor targets launched from Wake Island, Kwajalein Atoll, or Vandenberg AFB into the TOA, High Speed UAV and surface vehicle testing, and Hypersonic Vehicle testing.

Proposed launches associated with enhanced and future RDT&E activities would have a similar impact on health and safety as those described for the No-action Alternative. The proposed solid and liquid propellants would be similar to past launches from PMRF/Main Base and would follow the same health and safety procedures developed under existing plans described in Section 3.3.2.1.7.1.

Target launches would incorporate additional chemical simulants and include larger quantities of currently used simulants. The top three preferred simulants would be TBP, glyceryl tributyrate, and propylene glycol. None of proposed simulants are considered hazardous substances or constituents; however, caution would be used when they are handled. The launch preparation activities would include loading and handling of the simulant payload. All simulant related RDT&E activities would be performed in accordance with OSHA standards and SOPs developed, reviewed, and approved by PMRF. Adherence to these procedures would minimize the potential for health and safety impacts on both workers and the public.

TBP is an odorless liquid, colorless to pale yellow in appearance, with applications in industrial and nuclear chemistry. High levels of TBP have been shown to have an irritant effect on the skin, eyes, and mucous membranes in humans. Glyceryl tributyrate is a colorless, clear, oily liquid used in food products as a flavoring agent. Glyceryl tributyrate may be harmful if swallowed, or act as a skin or eye irritant at high levels. Propylene glycol is a tasteless, odorless, and colorless oily liquid, which is approved for uses in food, cosmetics, and medicines by the U.S. Food and Drug Administration. High levels of propylene glycol can cause redness and pain to eyes. Personnel directly involved in the loading of the simulant would wear appropriate personal protection equipment. In addition, aerial dispersion of TBP during proposed target launches would not be at levels to cause a health and safety concern to the public. Previous analysis of using TBP as a chemical stimulant determined that the amount of TBP that could be ingested by humans would be magnitudes below the amount needed to reach the probable oral lethal dose (U.S. Army Space and Missile Defense Command, 2004). In addition, any dispersion of the proposed chemical stimulant would occur over the open ocean; therefore, deposition of TBP would not pose an ingestion hazard to the public.

HRC Enhancements—Alternative 1

Proposed HRC enhancements at PMRF/Main Base include construction of a Range Operations Control Building, range safety for high-energy lasers, and improvement of fiber optics infrastructure. The Range Operations Control Building would be constructed in accordance with the USACE Safety and Health Requirements Manual. New facilities are routinely constructed for both military and civilian activities and present only potential occupational-related effects on safety and health for workers involved in the performance of the construction activity. The siting of the building would be in accordance with DoD standards.

PMRF would develop and implement the necessary SOPs and range safety requirements necessary to provide safe activities associated with future high-energy laser tests. The improvement of the fiber optics infrastructure at PMRF/Main Base would include hanging fiber optic cable on existing KIUC poles. In the event that exceptionally long spans are encountered, additional poles could be installed. Prior to installation, PMRF would coordinate with KIUC and the local DOT to ensure that every reasonable precaution would be taken to prevent injury to human life or property.

Major Exercises—Alternative 1

The types of Major Exercises that would occur at PMRF/Main Base would be similar to those described in Section 4.3.2.1.7.1 and would be similar to training. While these activities would increase in number, current SOPs, including the use of use of clearance zones, restricting landings to specific areas of the beach, publication of training overlays that identify the landing routes and any restricted areas, and designating a lookout to watch for other vessels would continue to be used. Every reasonable precaution would continue to be taken to prevent injury to human life or property.

4.3.2.1.7.3 Alternative 2 (Health and Safety—PMRF/Main Base)

Increased Tempo and Frequency of Training—Alternative 2

While training events would increase in number, current SOPs would continue to be used during training. These procedures include using clearance zones, restricting landings to specific areas of the beach, publishing training overlays that identify the landing routes and any restricted areas, and designating a lookout to watch for other vessels. Every reasonable precaution would be taken to prevent injury to human life or property.

Future RDT&E Activities—Alternative 2

The proposed high-energy laser would require a 25,000-ft^2 building at PMRF/Main Base. Construction impacts would be similar to those described earlier; however, separate environmental documentation would be required to analyze the specific location and operational requirements. Range safety is responsible for ensuring the safe usage of laser systems on the PMRF range. Range safety would require the proposed high-energy laser program to provide specific information about the proposed usage so that a safety analysis of all types of hazards could be completed and appropriate remedial procedures would be taken before initiation of potentially hazardous laser activities.

The high-energy laser program office would be responsible for providing all necessary documentation to PMRF prior to issuance of the Range Safety Approval (RSA) or RSOP. These include:

- Letter of Approval or a Letter of No Concern from the FAA for the use of the laser within Honolulu FAA airspace,
- Letter of Approval or a Letter of No Concern for the use of their laser if it will or has the potential of lasing above the horizon from United States Space Command (USSPACECOM) as well as clearance from USSPACECOM for each intended laser firing,
- Letter of Approval from the Laser Safety Review Board (LSRB) at Dahlgren for the use for their laser on Navy Ranges (this letter entails a survey and certification of the laser by the LSRB), and
- Range Safety Laser Data Package.

The Range Safety Laser Data Package is intended to provide the Range Safety Office with sufficient information to perform an evaluation of the safety of the laser and the proposed lasing activity and to approve the laser and its operation, and any risk mitigations required.

The Range Safety Office would analyze the submittal to ensure that it is in compliance with PMRF safety criteria, which is based on Range Commanders Council document RCC-316, OPNAVINST 5100.27A, and 2004 Laser Safety Survey Report for the Pacific Missile Range Facility Open Ocean Range. PMRF would be responsible for publishing an RSA or an RSOP specifying hazard areas and safety guidelines for the operation of the laser. The RSA/RSOP process would include an onsite safety inspection of the system by a PMRF Laser Safety Specialist to ensure that it complies with the Navy guidelines for lasers. As appropriate, the Range Safety Office would review the proposed laser systems for other non-optical hazard mechanisms, such as toxic releases.

Safety assurance would include defining exclusion areas, ensuring that the NOTAM and NOTMAR requests are submitted to the responsible agencies (FAA and Coast Guard respectively), ensuring that the laser operation falls within the approved operational areas, surveillance/clearance of the operational area and scheduling of the appropriate airspace and surface space. A Medical Surveillance Program would be required for any PMRF personnel or contractors whose duties lie within the hazard area of a laser program that is a permanent tenant or one whose tenancy is for an extended duration, and may require additional time to implement beyond the time normally required to generate an RSA or RSOP.

For general training scenarios of the proposed high-energy laser, the Range Safety Office would build on the *2004 Laser Safety Survey Report* performed by the Corona Division of the Naval Surface Warfare Center (Solis, 2004). This document defines the boundaries of the two laser target areas at PMRF: the outer W-186 Area and the outer W-188 Area are multipurpose bombing and laser target ranges used for aerial lasing. Only airborne laser designators may be used on the laser target areas. Procedures and restrictions for use of these areas are defined in this survey.

The testing of the Advanced Hypersonic Weapon would include two launches of a Strategic Target System booster from KTF and two launches of the new booster configuration from the same site. The Strategic Target System booster has been previously launched at KTF. The testing of the Advanced Hypersonic Weapon with the new booster configuration at the same site would have a similar potential health and safety impact as described for the No-action Alternative. The proposed solid and liquid propellants would be similar to past launches and would follow the same health and safety procedures developed under existing plans.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the HRC area for up to 10 days per Major Exercise. Training events and potential impacts on health and safety associated with this training that could occur at PMRF/Main Base would be similar to those described in Section 4.3.2.1.7.1. Current SOPs would continue to be used during Major Exercises, including the use of use of clearance zones, restricting landings to specific areas of the beach, publication of training overlays that identify the landing routes and any restricted areas, and designating a lookout to watch for other vessels.

4.3.2.1.7.4 Alternative 3 (Health and Safety—PMRF/Main Base)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on health and safety under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.1.8 Land Use—PMRF/Main Base

Land use was evaluated by analyzing the training and RDT&E activities associated with each alternative presented in Chapter 2.0 of this Draft EIS/Overseas EIS (OEIS). If any activity indicates a potential environmental consequence it has been discussed in the appropriate section below. Land use associated with KTF has been evaluated within PMRF/Main Base.

4.3.2.1.8.1 No-action Alternative (Land Use—PMRF/Main Base)

Under the No-action Alternative, training, RDT&E activities, and Major Exercises were reviewed for current land use associated with PMRF/Main Base HRC.

HRC Training—No-action Alternative

The No-action Alternative stands as no change from current levels of training usage. PMRF/Main Base will continue to conduct current HRC training under the No-action Alternative. Land HRC training events include Expeditionary Assault, Swimmer Insertion/Extraction, SPECWAROPS, C2, Aircraft Support Operations, Air Operations, and HAO/NEO. These training events take place at Majors Bay, the airfield, and other facilities on PMRF Main/Base. The current baseline occurrence for each of these training events is listed on Table 2.2.2.3-1, a full description is found in Appendix D, and a description of current weapon systems is found in Appendix E. Under the No-action Alternative, these training events currently have little or no impact on land use (including recreation) and will continue at current baseline level.

On-base Land Use

PMRF/Main Base will continue to conduct the ongoing training events listed above within the designed conservation district/military lands at current capacity. All established safety measures will continue to be followed (ESQD Arcs, Ground Hazard Areas, Accident Potential Zones and Rocket Launchers). The continuation of training at PMRF/Main Base under the No-action Alternative will be consistent to the maximum extent practicable with the Hawaii Coastal Zone Management Program.

On-base Recreation

Recreational services available to military and civilian personnel at PMRF/Main Base will remain at current status during non-hazardous training. The installation's approximately 200-ft by 2-mi beach in the southern zone of PMRF will remain accessible to Kauai residents possessing an approved beach access pass. The beaches on PMRF only represent a small portion of the available beaches on Kauai. The requirement for 10 safety zones around PMRF has served to protect and preserve scenic areas.

Off-based Land Use

PMRF operates adjacent to County and State designated agricultural areas (Figure 3.3.2.1.8-2). There are no inhabited buildings within these areas. The current State and County designations limit any development of a conflicting use between these governmental agencies and the Navy. The Navy currently leases 215 acres within the Agricultural Preservation Initiative (API—See Chapter 3.0) area which contain the pumping system for the Mana Plain. The ongoing training events under the No-action Alternative are not conducted within these areas. Activities performed within missile ground hazard areas that extend off-base into these agricultural areas, which are only used during launch events, will continue to adhere to established safety measures (Section 3.3.2.1.7, Health and Safety-PMRF/Main Base).

To protect all persons, private property, and vehicles during training events at PMRF/Main Base, a 2,110-acre restricted easement has been established (Figure 3.3.2.1.7-1). Approximately 70 acres of the southern extent of Polihale State Park contain missile ground hazard areas which are within the restricted easement boundary for PMRF/Main Base. Ongoing training events for launches are not conducted in the Park, and the missile ground hazard areas are only used during launch events. In 2002 there were fewer than 4 launches, in 2006 there were fewer than 9 launches, and a total of 11 launches are anticipated for 2007 (Burger, 2007d). A review of Table 2.2.2.3-1 indicates that if PMRF provides support for training, under the No-action Alternative (remain at current status), Alternative 1, Alternative 2, and Alternative 3, the easement has the potential to be used during 7 to 28 possible missile launches. The safety restrictions are further ensured by restricting access to the land within a designated ground hazard area, prior to, during, and shortly after a launch. (U.S. Department of the Navy, 2005a, 1998a)

HRC RDT&E Activities—No-action Alternative

PMRF/Main Base will continue to conduct current HRC RDT&E activities. Table 2.2.2.5-1 lists the baseline number for the occurrence of each RDT&E activity. Land-RDT&E activities include Anti-Air Warfare RDT&E, EC/EW, High-Frequency Radio Signals, Missile Defense, and Joint Task Force Wide Area Relay Network. These RDT&E activities take place at shore sites and launch facilities on PMRF/Main Base. Under the No-action Alternative, these RDT&E activities currently have little or no impact on land use (including recreation) and will continue at current baseline level.

Major Exercises—No-action Alternative

Types of Major Exercises that occur within the HRC are the RIMPAC Exercise and USWEX. Major Exercises associated with PMRF/Main Base are C2, Air Operations, HAO/NEO, SPECWAROPS, and Expeditionary Assault. These training events are listed on Table 2.2.2.6-1 and Figure 2.2.2.6-1 shows the areas used by these Major Exercises. These Major Exercises have historically been conducted on PMRF Main Base since the 1960s. PMRF/Main Base provides land-based support for Major Exercises by launching ground-based targets from the PMRF launch complex, onshore training at Majors Bay, airfield support, and C2 support from a land facility on PMRF/Main Base. All land support locations are within the installation's boundary. Public accessibility to the Majors Bay beach is not allowed during training events. Additionally, missile ground hazard areas are in use during launching activities which affect off-base land use (launch complex in northern area of PMRF adjacent to Polihale State Park) by restricting access to the land. Potential land use impacts typically stem from encroachment of one land use or activity on another or an incompatibility between adjacent land uses that lead to encroachment. The support provided by PMRF/Main Base for these Major Exercises is compatible with the land use of the installation and with adjacent land uses. Under the No-action Alternative, the type and number of training events on PMRF/Main Base associated with Major Exercises will continue at current baseline level.

4.3.2.1.8.2 Alternative 1 (Land Use—PMRF/Main Base)

Increased Tempo and Frequency of Training and New Training—Alternative 1

Under Alternative 1, PMRF would continue those ongoing training events described under the No-action Alternative with a potential increase in the number of these training events performed per year.

Alternative 1 includes all ongoing training events associated with the No-action Alternative and proposes an increased tempo and frequency of such events. HRC training associated with land-based use for PMRF/Main Base under Alternative 1 includes Expeditionary Assault, Swimmer Insertion/Extraction, SPECWAROPS, C2, Aircraft Support Operations, Air Operations, HAO/NEO and the proposed addition of FCLP. Table 2.2.2.3-1 list the number of training events proposed under Alternative 1. The number of training events would not change from the baseline training events listed under the No-action Alternative; therefore, the land support provided by PMRF/Main Base for these training events would not change.

Under Alternative 1, the Navy is proposing to conduct 12 FCLPs for a small number of pilots each year at the PMRF/Main Base airfield. The FCLP is a series of touch-and-go landings conducted to train and field qualify pilots for aircraft carrier landings. The aircraft would be operating within the PMRF airspace and Warning Areas. The airfield currently provides support for Air Operations during HRC training and Major Exercises, and there are no conflicts with on-base use or adjacent land use. FCLP activities would not involve land acquisition or new construction. Overall, under Alternative 1, the addition of FCLPs would not alter on-base or off-base land use patterns on PMRF/Main Base nor adjacent properties.

Enhanced and Future RDT&E Activities—Alternative 1

The Navy proposes to enhance RDT&E activities from current levels as necessary as shown in Table 2.2.2.3-1. Under Alternative 1, PMRF/Main Base would continue current ongoing RDT&E activities under the No-action Alternative and proposes the use of additional chemical simulant, testing UAV Vehicles and Hypersonic Vehicles, construction of a Range Operations Control Building, and improvement of fiber optics infrastructure. These activities do not involve land acquisition, new construction, or conflict with adjacent land-use.

Under Alternative 1 the number of Anti-Air Warfare RDT&E activities would increase by approximately 14 percent, EC/EW operations would increase by approximately 11 percent, High-Frequency Radio Signals would increase by approximately 11 percent, and Joint Task Force Wide Area Relay Network activities would increase by 50 percent. These increases do not involve land acquisition, new construction, or conflict with adjacent land-use.

Under Alternative 1 additional simulant would be used in target vehicles launched from PMRF. This addition is considered as an upgrade process, and the Navy would not require additional land or new construction to perform this RDT&E activity. Additionally, there is no conflict with adjacent land use. UAVs, remotely piloted or self-pilot aircraft, would be tested at PMRF/Main Base and storage and ground-support would be provided at PMRF/Main Base. No new facilities are planned for this RDT&E activity, and it would not conflict with adjacent land use. Proposed Hypersonic Vehicles would be attached under aircraft at PMRF/Main Base. In support of training, no new facilities would be needed.

Construction (consolidation) of the proposed new 90,000 ft^2 Range Operations Control Building also includes demolition and conversions of current buildings to consolidate activities currently being performed on PMRF/Main Base. The construction would occur in an area previously disturbed, does not involve land acquisition, and would not affect adjacent properties off-base.

The installation of approximately 23 mi of fiber optic cable would be hung on existing KIUC poles between PMRF/Main Base and Kokee. This upgrade would not affect the on-base land use or adjacent property. Overall, under Alternative 1, RDT&E activities would not alter on-base or off-base land use patterns on PMRF/Main Base.

Major Exercises—Alternative 1

The Navy proposes to continue RIMPAC and USWEX Exercises described in the No-action Alternative. Under Alternative 1, RIMPAC would include two Strike Groups and FCLPs would occur in association with transiting Strike Groups participating in Major Exercises. Appendix D shows the matrix of training events generally used during a USWEX by location. The training associated with the Major Exercises would be chosen from the list of training events in Appendix D. The increases in land (onshore) training events under Alternative 1 (see Table 2.2.2.6-1) are within the installation's boundary. Public accessibility to the Majors Bay beach area would not be allowed during training and all missile ground hazard areas used during launching activities, which affect off-base land use, would restrict access to the land, before, during and after launches. These increases do not involve land acquisition, new construction, or expansion of military presence on Kauai. Land use would continue to be compatible with the land use on the installation, and, compatible with adjacent land uses. Overall, under Alternative 1, Major Exercise activities associated with RIMPAC and USWEX would not alter on-base or off-base land use patterns on PMRF/Main Base.

4.3.2.1.8.3 Alternative 2 (Land Use—PMRF/Main Base)

Alternative 2 includes all the events of Alternative 1 plus an increase in training and RDT&E activities, as well as new RDT&E activities, and additional Major Exercises. Tables 2.2.2.3-1 and 2.2.2.5-1 show the number of training and RDT&E activities proposed for Alternative 2, compared to the baseline and the number of activities proposed for Alternative 1. A description of training events found in Appendix D, with current weapon systems discussed in Appendix E.

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the Navy also proposes to increase the tempo and frequency of training (above Alternative 1 levels) and compress the tempo of training events in the HRC (Table 2.2.2.3-1). Events usually lasting 5 days would be completed in 3 days. Under Alternative 2, training for Expeditionary Assault would increase by 9 percent, Swimmer Insertion/Extraction would increase by approximately 10 percent, C2 would increase by 100 percent, and Aircraft Support would increase by 100 percent. Under Alternative 2, 16 FCLPs would be an increase of approximately 33 percent (from 12 to 16 training events) from the proposed FCLPs under Alternative 1. FCLPs are not conducted under the No-action Alternative.

The Navy would not need to acquire additional land or require any new construction to support these increases. These training events are currently provided by PMRF/Main Base, and the training events are compatible with on-base land and adjacent land use.

Sixteen FCLPs are proposed to be conducted at the airfield at PMRF/Main Base. The aircraft would operate within PMRF airspace and Warning Areas. The airfield currently provides support for Air Operations and Aircraft Support Operations during HRC training and Major Exercises, and there are no conflicts with on-base use or adjacent land use. The increase in training does not involve land acquisition, new construction, or expansion of military presence in Kauai. Overall, under Alternative 2, increase in training would not alter on-base or off-base land use patterns on PMRF/Main Base.

Enhanced and Future RDT&E Activities—Alternative 2

The Navy proposes to enhance RDT&E activities from Alternative 1 levels as shown in Table 2.2.2.5-1. PMRF would develop the capability to support the Directed Energy and Advanced Hypersonic Weapon programs.

Under Alternative 2, Anti-Air Warfare RDT&E would increase by approximately 26 percent, EC/EW operations would increase by 23 percent, High-Frequency Radio Signals would increase by 22 percent, Missile Defense would increase by approximately 9 percent, and Joint Task Force Wide Area Relay Network would increase by 100 percent. These increases would not involve land acquisition, new construction, or conflict with on-base or adjacent land-use off-base.

Additional chemical simulant, testing UAVs and Hypersonic Vehicles, construction of a Range Operations Control Building, and improvement of fiber optics infrastructure are proposed for Alternative 2. The details of these proposed RDT&E activities are discussed under Alternative 1. The upgrades associated with these RDT&E activities would not involve land acquisition, and are not in conflict with adjacent properties.

For future RDT&E, under Alternative 2, PMRF proposes to develop the capability to support Directed Energy and Advanced Hypersonic Weapons. In support of the Directed Energy Test Center a permanent 25,000 ft^2 operations building would be constructed on PMRF and up to 100 personnel would support this program. The construction of the Center would require separate/additional environmental documentation. The one Advanced Hypersonic Weapon would be launched from KTF on PMRF/Main Base. The increases in RDT&E activities do not involve land acquisition and are not in conflict with adjacent properties. Construction and operation of the Center and the Advanced Hypersonic Weapon would be compatible with current on-base land use. Overall, under Alternative 2, land use at PMRF/Main Base would not be impacted due to future RDT&E activities. Overall, under Alternative 2, increases in RDT&E activities would not alter on-base or off-base land use patterns on PMRF/Main Base.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Under Alternative 2, up to three Strike Groups would be allowed to conduct training simultaneously in the HRC (Figure 1.2-3). Appendix D lists the proposed Multiple Strike Group Matrix training events. The Strike Groups would not be homeported in Hawaii, but would be in Hawaii for up to 10 days per Major Exercise. Multiple Carrier Strike Group activities receiving support from PMRF/Main Base include C2, Air Operations, HAO/NEO, SPECWAROPS, and Expeditionary Assault. PMRF/Main Base is a support facility and could provide support for training, as described in Section 4.3.2.1.8.1. The Navy would not acquire additional land on-base or off-base to continue to support the Strike Groups. Additionally, the potential for requiring FCLPs increases. These FCLPs would be conducted at the airfield on PMRF/Main Base, which could bring transient personnel to the airfield, but would not involve land acquisition on-base or off-base to conduct the FCLP training. Overall, under Alternative 2, additional Major Exercise activities would not alter on-base or off-base land use patterns on PMRF/Main Base.

4.3.2.1.8.4 Alternative 3 (Land Use—PMRF/Main Base)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on land use under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.1.9 Noise—PMRF/Main Base

Noise impacts on human receptors are evaluated based on whether a noise event will exceed DoD or OSHA guidelines. Sensitive receptors at PMRF/Main Base consist of on-base housing, which is located approximately 5 mi south of the northern KTF and PMRF launch areas and 1 mi from the southern launch site. The nearest off-base residential area is Kekaha, which is approximately 8 mi south of the northern launch areas and 3 mi from the southern launch site. Noise effects on wildlife are discussed in Section 4.3.2.1.3, Biological Resources.

4.3.2.1.9.1 No-action Alternative (Noise—PMRF/Main Base)

HRC Training and Support—No-action Alternative

Under the No-action Alternative, existing training at PMRF/Main Base will continue and there will be no increase to existing noise levels. Existing training events include airfield and range activities, missile, rocket and drone launches, and ambient noise. Airfield activities include take-offs and landings of high performance and cargo/passenger aircraft and helicopter activities. Range activities include training support. Ambient noise stems from natural sources such as wind, surf, and wildlife. PMRF maintains a hearing protection program that includes monitoring the hearing of personnel exposed to high noise levels and identifying and posting notification of noise hazard areas. Personnel who work in noise-hazard areas are required to use appropriate hearing protection to bring noise levels within established safety levels.

Under the No-action Alternative, existing HRC training at PMRF will continue to occur. Training events at PMRF/Main Base that can affect the noise environment include GUNEX, Swimmer Insertion/Extraction, Expeditionary Assault, and Missile Exercises. There will be no increase in existing noise levels during the continuing training events listed above. The noise levels will be a combination of ambient noise and noise by training under during the No-action Alternative. Ambient noise sources may include wind, surf, highway traffic, Air Operations, and other local noise-generating land uses.

Mine laying occurs as either an airborne or underwater activity. Underwater mine laying produces no airborne noise. Mine laying training comprises two major types of activities: MINEXs and Mine Readiness Certification Inspections. MINEXs generally involve a single aircraft sortie (FA-18 or P-3), whereas Mine Readiness Certification Inspections are aircrew pre-deployment evaluations of entire units (i.e., supply, personnel, loading, aircrew weapon delivery, and recovery). Both training events are conducted in the PMRF range. In the single aircraft MINEX, the aircraft may make multiple passes in the same flight pattern, dropping one or more shapes each time. MINEX activities typically last approximately 1 hour.

The Mine Readiness Certification Inspections are similar to the MINEX except that multiple aircraft are used. Several aircraft usually take off from an aircraft carrier (or a shore station in the case of a P-3 wing), obtain clearance from Range Control, and verify visually that the range is clear of small boats. After flying over the Initial Point, they drop their shape in a predetermined pattern and return to the carrier (or shore base). Typical range time for this mission is approximately 1 hour. As with the MINEX activities, localized noise areas surrounding the activities site are expected. Due to the flight paths of the aircraft over water, the inert character of the mine shapes, and the remoteness of the sites with respect to sensitive receptors, potential noise impacts are minimal.

During GUNEX, small arms fire (using blank ammunition during the beach assault) will produce minor, short-term increases in ambient noise levels, and cannot be avoided. The landing beach at Major's Bay varies from 1,000 to 3,000 ft in distance from military housing, but previous GUNEX activities with small arms have occurred at least 3,000 ft from housing. Another type of GUNEX, part of the RIMPAC Exercises, involves a beach landing and overland transport of up to six 155 howitzers to the northern area of Barking Sands, and will produce short-term noise impacts associated with the simultaneous firing of the six. Exposure to impulsive or impact noise will not exceed 140 unweighted peak decibels (dBP) at any time. The radius of exposure to 140 dBP (threshold for permanent damage to unprotected human ears) during the simultaneous firing of all six was calculated at 4,331 ft from the center of the gun emplacement. The emplacement is several miles from base housing.

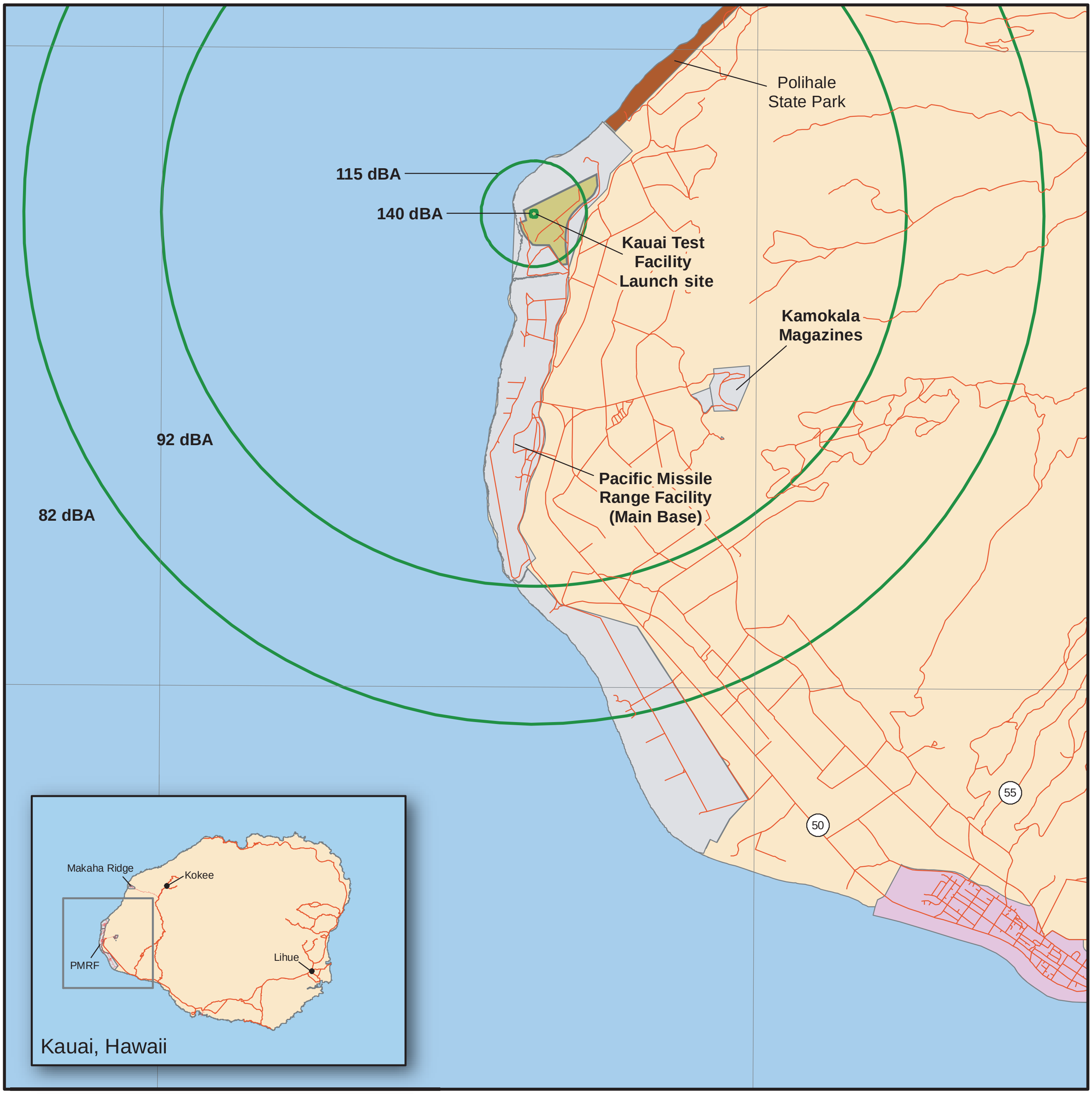
During Swimmer Insertion/Extraction and Expeditionary Assault training events, the noise sources can include helicopters, fixed-wing aircraft and airship activities, and activities of diesel engines of landing craft and tracked vehicles. Airfield operations are analyzed in the current Air Installation Compatible Use Zone (AICUZ) study, *Final Noise and Accident Potential Zone Study for the Pacific Missile Range Facility Barking Sands* (U.S. Department of the Navy, Engineering Field Activity Chesapeake, 2006). The majority of high noise levels associated with Air Operations are contained within the PMRF/Main Base boundary. Some Day-Night Average Sound Level (L_{dn}) contours of 65 dB do extend to the adjacent sugar cane fields, which are considered a compatible land use in accordance with Navy AICUZ recommendations. PMRF/Main Base Air Operations do not affect off-base residential areas or other sensitive receptors (Figure 3.3.2.1.9-1). On-base facilities have appropriate noise abatement to limit impacts from airfield operations.

In addition, Swimmer Insertion and Extraction activities that occur beneath the water have no airborne noise sources. Other insertion techniques involve helicopter insertion. The expected noise level for this activity is 90 dBA at 50 ft. These activities take place near the coast on military training areas away from population centers.

Missile Exercises at PMRF/Main Base

Noises produced during pre-launch activities include noise from mechanical equipment (see Table 3.3.2.1.9-1 for typical noise levels), as well as an increase in traffic noise levels due to the increase in support personnel. This increase is considered temporary, and does not permanently impact the surrounding area.

Noise produced during launches stems from the interaction of the exhaust jet with the atmosphere and the combustion of the fuel. The sound pressure from a missile is related to the engine’s thrust level and other design features. Figures 4.3.2.1.9.1-1 through 4.3.2.1.9.1-3 show typical noise levels from launches at PMRF and KTF launch facilities. Limits have been set by DoD and OSHA to prevent damage to human hearing. Except at the launch pad/rail launcher, noise levels above 140 dBA will not be exceeded at any time. A time-weighted limit for 15 minutes (or less) exposure is 115 dBA. In onbase areas where these noise levels will be exceeded, personnel are required to wear hearing protection. None of the noise levels outside the ground hazard areas, where non-essential personnel and the public are excluded, will exceed either DoD or OSHA safety requirements.



EXPLANATION

- 50 State Highway
- Road
- Calculated Noise Level
- Polihale State Park
- Installation Area
- City of Kekaha
- Kauai Test Facility
- Land

Note: Noise levels calculated from modeling data and not based on the terrain or climate of the facility or surrounding area.

dBA = A-weighted decibels

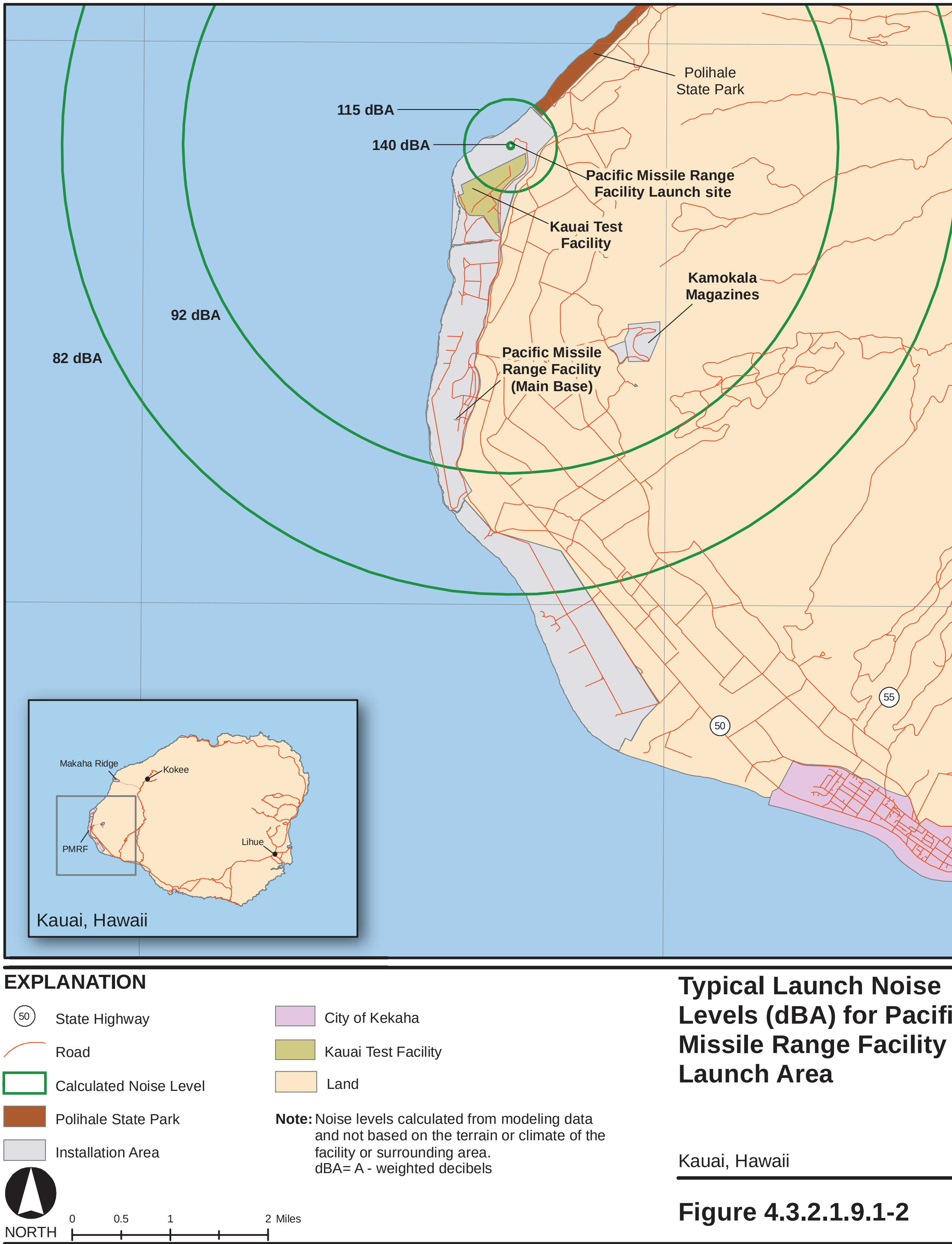
NORTH

0 0.5 1 2 Miles

Typical Launch Noise Levels (dBA) for Kauai Test Facility Launch Area

Kauai, Hawaii

Figure 4.3.2.1.9.1-1

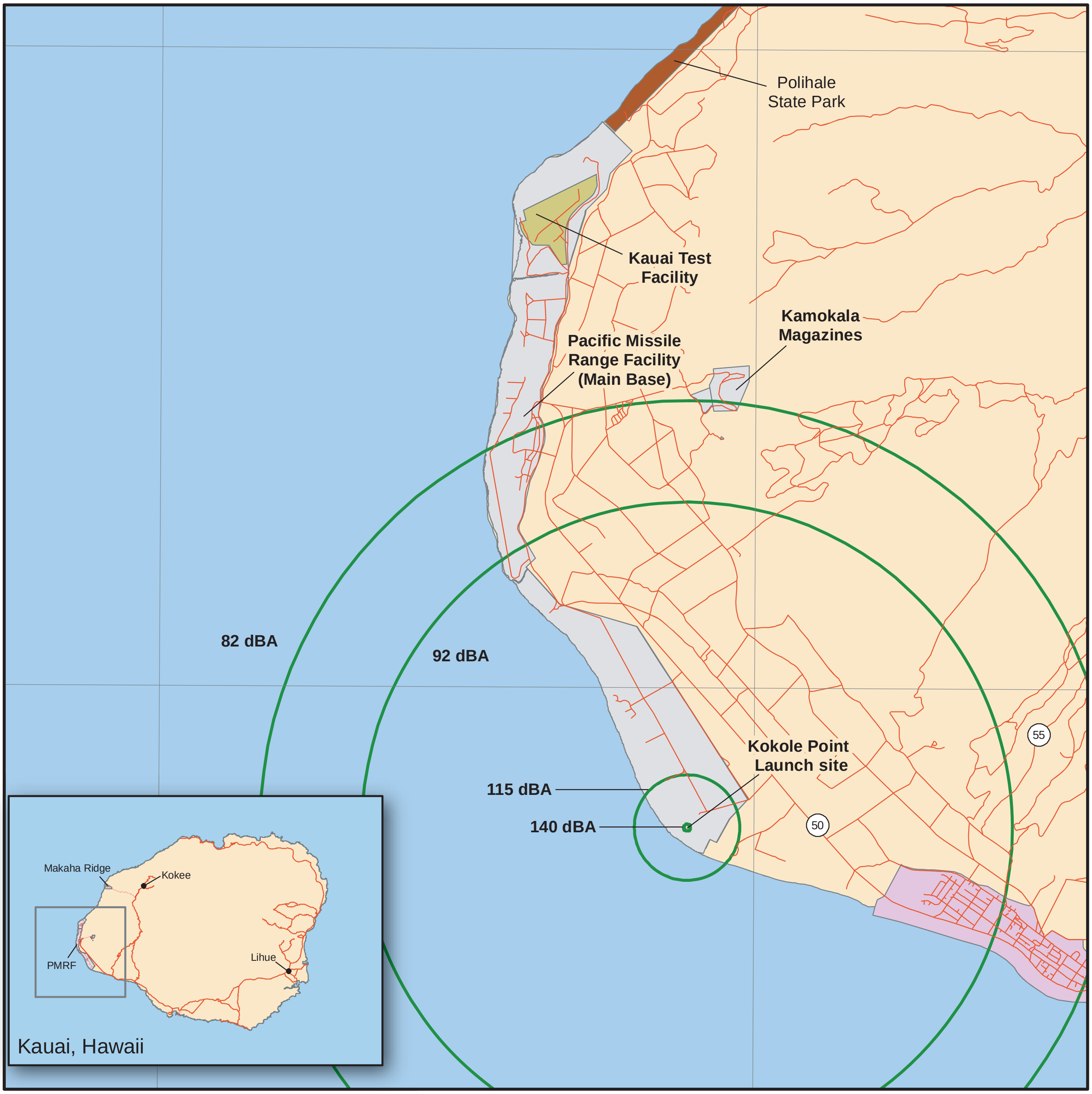


Note: Noise levels calculated from modeling data and not based on the terrain or climate of the facility or surrounding area.
dBA= A - weighted decibels

Typical Launch Noise Levels (dBA) for Pacific Missile Range Facility Launch Area

Kauai, Hawaii

Figure 4.3.2.1.9.1-2



EXPLANATION

- 50 State Highway
- Road
- Calculated Noise Level
- Polihale State Park
- Installation Area
- City of Kekaha
- Kauai Test Facility
- Land

Note: Noise levels calculated from modeling data and not based on the terrain or climate of the facility or surrounding area.
dBA= A - weighted decibels

NORTH

0 0.5 1 2 Miles

Typical Launch Noise Levels (dBA) for Kokole Point Launch Area

Kauai, Hawaii

Figure 4.3.2.1.9.1-3

In addition to the noise of the rocket engine, sonic booms are possible. Sonic booms from PMRF/Main Base launches do not occur over land. Offshore vessels impacted by sonic booms will be expected to experience sound resembling mild thunder. Sonic booms generated during launch activities will occur over the Pacific Ocean, and will not affect the public on Kauai or Niihau because the proposed missile trajectory will not include overflight of populated areas.

Noise levels from a flight termination or explosion of the missile system will be greater than that of a normal launch; however, the potential for such a mishap is low, as detailed in Section 4.3.2.1.7. All public, civilian, and nonessential personnel are required to be outside of ground hazard areas (see Figure 3.3.2.1.7-1) where expected noise levels will be below the 115 dBA limit for short-term exposure. Noise generated during the removal of all mobile equipment and assets during post-launch activities have minimal impacts on the noise environment on or off of PMRF/Main Base.

To limit noise impacts on nonessential personnel and the public, beach access to the areas of each of the Missile Exercises is restricted for the duration of the training. PMRF implements safety procedures for personnel in the PMRF-controlled areas, which can include evacuation of non-essential personnel for the duration of the training. PMRF also coordinates appropriate safety measures with adjacent private land users. The noise exposure areas of concern are not anticipated to impact people because of these safety measures.

HRC RDT&E Activities—No-action Alternative

Ongoing RDT&E activities that can affect noise levels at PMRF/Main Base include missile defense ballistic missile target flights and THAAD interceptor launch activities. HRC RDT&E activities includes conducting missile launches from PMRF and KTF launch sites. Potential impacts will be as described for HRC training. The rate of launches will not increase at PMRF/Main Base due to the No-action Alternative.

Additional sources of noise at PMRF/Main Base include heavy machinery and generators. Each of these noise sources can generate localized high noise levels. The heavy equipment, such as heavy trucks and construction equipment, is a mobile source of noise and typically causes short-term elevated noise levels. Generators are generally stationary. The emergency generators on PMRF/Main Base typically run only 3 to 4 hours per month to maintain readiness. Table 3.3.2.1.9-1 list noise levels associated with these noise sources. Noise associated with these RDT&E activities does not affect off-base areas. On-base personnel are required to wear hearing protection in noise hazard areas.

Major Exercises—No-action Alternative

Major Exercises include ongoing training, and in some cases RDT&E activities. In addition to routine training at PMRF/Main Base, C2, Aircraft Support Operations, HAO/NEO, missile launches, SPECWAROPS, and underwater demolition are conducted during Major Exercises.

C2 is achieved through a network of communication devices strategically located at selected DoD installations around the islands with no impacts on the noise environment. Potential impacts on the noise environment from Aircraft Support Operations, HAO/NEO, Missile Launches, and SPECWAROPS will be similar to those described for the training and RDT&E activities.

Underwater demolition will generate noise from the detonation of relatively small charges (less than 20 lb) of explosive. Clearance zones will also be used to limit noise levels. To limit noise impacts, beach access to the areas of the training will be restricted for the duration of the training. PMRF implements safety procedures for personnel in the PMRF-controlled areas, which can include evacuation of non-essential personnel for the duration of the training. PMRF also coordinates appropriate safety measures with adjacent private land users to limit noise impacts.

4.3.2.1.9.2 Alternative 1 (Noise—PMRF/Main Base)

Increased Tempo and Frequency of Training and New Training—Alternative 1

While training events and Major Exercises would increase in number, noise levels would be similar to existing noise levels. The types of training events that would occur at PMRF/Main Base would be similar to those described in Section 4.3.2.1.9.1 and would not occur simultaneously.

Field Carrier Landing Practice
The Navy proposes to conduct an FCLP for half an air wing's pilots once a year in Hawaii. An FCLP is a series of touch-and-go landings that would be conducted during day or night periods, each consisting of six to eight touch-and-go landings per pilot. PMRF/Main Base is one of the sites proposed for this activity in Hawaii.

The *2006 Noise and Accident Potential Zone Study for PMRF Barking Sands* (U.S. Department of the Navy, Engineering Field Activity Chesapeake, 2006) considered the possibility of 25,486 flight activities in 2009, of which the proposed use of F/A-18 aircraft for FCLPs accounted for 34 percent of those activities. This proposed level of activity in the Noise and Accident Potential Study is an increase of approximately 90 percent over current flight activities at PMRF/Main Base. Figure 4.3.2.1.9.2-1 depicts the modeled noise levels for the 2009 condition. The figure shows that the 65 to 75 dB noise contours would extend off the PMRF/Main Base boundary to the north, south, and east. It is anticipated that 727 acres of land off-base would be affected by the noise levels. Based on U.S. Census Bureau data, the off-base land in the 65 to 75 dB contour contains no housing units or population. The 65 dB contours cuts through at least one Military Family Housing unit on PMRF/Main Base as well as beach cottages used by transient personnel. There would be 168 acres of land off-base within the 75 dB contour. As shown in Figure 4.3.2.1.9.2-1, most noise contours are over water. (U.S. Department of the Navy, Engineering Field Activity Chesapeake, 2006)

While the proposed FCLPs in the study would account for only 34 percent of the 2009 modeled activities, the Noise and Accident Potential Zone Study determined that the FCLPs would account for the majority of the modeled noise levels. No noise-sensitive land uses would be affected by noise levels. (U.S. Department of the Navy, Engineering Field Activity Chesapeake, 2006)

Under Alternative 1, 12 FCLP periods are proposed. It is anticipated that the noise levels for the proposed activities would not exceed the levels described in the *2006 Noise and Accident Potential Zone Study for PMRF Barking Sands* (U.S. Department of the Navy, 2006a). Twelve FCLP periods would account for approximately 1 percent of the modeled flight activities.

EXPLANATION

- Noise Contour
- Road
- City of Kekaha
- Runway
- Kauai Test Facility
- Installation Area
- Polihale State Park
- Land

Note: dB = Decibels
Noise contours shown are Day-Night Average Sound Levels

NORTH

0 0.5 1 2 Miles

Pacific Missile Range Facility Noise Contours for 2009 Prospective Flight Operations

Kauai, Hawaii

Figure 4.3.2.1.9.2-1

Enhanced and Future RDT&E Activities—Alternative 1

Increased and future RDT&E activities would include Interceptor targets launched from Wake Island, Kwajalein Atoll, or Vandenberg AFB into the TOA, High Speed UAV and Surface Vehicle testing, and Advanced Hypersonic Weapon testing.

Interceptors would be launched from existing launch facilities at PMRF and KTF, and the intercept areas would be in the Open Ocean Area and TOA of the HRC. It is anticipated that the proposed launch vehicles would produce similar noise levels to previously analyzed launch vehicles at PMRF. Figures 4.3.2.1.9.1-1 through 4.3.2.1.9.1-3 show noise levels produced during launches the PMRF and KTF launch facilities. Launch events would be audible for only short periods of time.

All public, civilian, and nonessential personnel would be required to be outside the ground hazard area where the expected noise levels would be below the 115 dBA limit for short-term exposure. The launches would be infrequent and of short duration and similar to previous launches.

HRC Enhancements—Alternative 1

Proposed HRC enhancements at PMRF/Main Base would include a newly constructed Range Operations Control Building, enhanced range safety for high-energy lasers, and improvement of fiber optics infrastructure.

Construction noise levels associated with Alternative 1 activities would result in intermittent, short-term noise effects that would be temporary, lasting for the duration of the noise generating construction activities. Noise-generating construction activities would include excavation and grading, utility construction and paving, and frame building.

The specific types of equipment that would be used during construction of the Range Operations Control Building and improvement of fiber optics infrastructure are not known at this time. Excavation and grading would normally involve the use of bulldozers, scrapers, backhoes, and trucks. The construction of buildings would likely involve the use of pile drivers, concrete mixers, pumps, saws, hammers, cranes, and forklifts. Typical sound levels from construction equipment are listed in Table 3.3.2.1.9-1.

Due to the exclusion of the public from the immediate vicinity of construction, the public would not be exposed to hazardous noise levels that could cause hearing damage. To minimize noise level impacts, personnel or contractors involved in the proposed construction activities would be required to wear hearing protection in areas where noise levels would exceed limits set by OSHA.

The use of the Range Operations Control Building would not result in an increase in noise levels. The proposed facility would replace existing buildings on PMRF/Main Base used for similar activities.

Major Exercises—Alternative 1

Major Exercises such as RIMPAC and USWEX include ongoing training events and, in some cases, RDT&E activities. PMRF maintains a hearing protection program that includes monitoring the hearing of personnel exposed to high noise levels and identifying and posting notification of noise hazard areas. Personnel who work in noise-hazard areas would be required to use appropriate hearing protection to bring noise levels within established safety levels. In addition, noise impacts on nonessential personnel and the public would be limited through existing safety procedures. Procedures would include restricting beach access to the areas of each of the training for the duration of the Major Exercise. PMRF would also implement safety procedures for personnel in the PMRF-controlled areas, which can include evacuation of non-essential personnel for the duration of the Major Exercise. PMRF would also coordinate appropriate safety measures with adjacent private land users. The noise exposure areas of concern are not anticipated to impact people because of these safety measures.

4.3.2.1.9.3 Alternative 2 (Noise—PMRF/Main Base)

Increased Tempo and Frequency of Training and Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Activities associated with the increased tempo and frequency of training that could occur at PMRF/Main Base would be similar to those described in Section 4.3.2.1.9.1 and would produce similar noise levels.

Under Alternative 2, 16 FCLP periods are proposed. It is anticipated that the noise levels for the proposed activities would not exceed the levels described in the *2006 Noise and Accident Potential Zone Study for PMRF Barking Sands* (U.S. Department of the Navy, 2006a). Sixteen FCLP periods would account for approximately 1 percent of the modeled flight activities.

Future RDT&E Activities—Alternative 2

The proposed high-energy laser would require a 25,000-ft^2 building at PMRF/Main Base. Construction impacts would be similar to those described in Section 4.3.2.1.9.2; however, separate environmental documentation would be required to analyze the specific location and operational requirements.

The testing of the Advanced Hypersonic Weapon would include two launches of a Strategic Target System booster from KTF, and two launches of the new booster configuration from the same site. The Strategic Target System booster has been previously launched at KTF, and noise levels would be the same as previous launches. Testing the Advanced Hypersonic Weapon with the new booster configuration would produce similar noise levels to launches at KTF (see Figure 4.3.2.1.9.1-1).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the HRC area for up to 10 days per Major Exercise. Training events and potential impacts on noise levels associated with this training that could occur at PMRF/Main Base would be similar to those described in Section 4.3.2.1.9.1 and would produce similar noise levels.

4.3.2.1.9.4 Alternative 3 (Noise—PMRF/Main Base)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on noise under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.1.10 Socioeconomics—PMRF/Main Base

Socioeconomic characteristics are evaluated by analyzing action alternatives presented in Chapter 2.0 of this EIS/OEIS. If any activity associated with an alternative indicates a potential environmental consequence, it is discussed in the appropriate section below.

4.3.2.1.10.1 No-action Alternative (Socioeconomics—PMRF/Main Base)

Under the No-action Alternative, HRC training, RDT&E activities, and Major Exercises associated with PMRF/Main Base were reviewed. The No-action Alternative stands as no change from current levels of training usage, and the Navy will continue its current activities at the HRC. PMRF/Main Base is a major contributor to the economy of Kauai County, particularly on the western side of the island. PMRF/Main Base employs nearly 1,000 military, civilian, and contract personnel and has a $130M impact annually on the local economy. In fiscal year (FY) 2005 expenditures for PMRF and other defense initiates on Kauai totaled about $113M. Additionally, in FY 2005-06, $5.5 million was provided to improve infrastructure for Hawaii's public schools with high enrollments of military children.

Current HRC training associated with PMRF/Main Base are Expeditionary Assault, Swimmer Insertion/Extraction, SPECWAROPS, C2, Aircraft Support Operations, Air Operations, and HAO/NEO. Training events are listed in Table 2.2.3.1-1, and a full description is found in Appendix D. A description of current weapon systems is found in Appendix E. HRC RDT&E activities at PMRF/Main Base include Anti-Air Warfare RDT&E, EC/EW, High-Frequency Radio Signals, Missile Defense and the Joint Task Force Wide Area Relay Network. Table 2.2.2.5-1 lists the baseline number for the occurrence of each RDT&E activity. Types of Major Exercises that occur within the HRC are the RIMPAC and USWEX. Major Exercises associated with PMRF/Main Base are C2, Air Operations, HAO/NEO, SPECWAROPS, and Expeditionary Assault. These training events and RDT&E activities are listed on Table 2.2.2.6-1, and Figure 2.2.2.6-1 shows the areas used. The support provided to HRC training, RDT&E activities, and Major Exercises from PMRF/Main Base will continue. The level of employment and defense initiatives on Kauai will continue to benefit the local economy of Kauai.

4.3.2.1.10.2 Alternative 1 (Socioeconomics—PMRF/Main Base)

Under Alternative 1, PMRF would continue training and RDT&E activities described under the No-action Alternative; the number of training events and RDT&E activities performed per year would increase. Additionally, Alternative 1 includes FCLPs.

Increased Tempo and Frequency of Training and New Training—Alternative 1

Under Alternative 1, the Navy proposes to increase the tempo and frequency of training events in the HRC (see Table 2.2.2.3-1). Under Alternative 1, PMRF/Main Base would continue current HRC training and proposes the addition of FCLPs. Under Alternative 1, there is no increase in the current HRC training. The socioeconomic impact on the economy of Kauai from these training events would be the same as discussed under the No-action Alternative.

The airfield located on PMRF/Main Base is a proposed site for the FCLP. The proposed FCLPs would affect a small number of pilots each year in Hawaii. Under Alternative 1 there are 12 proposed FCLPs per year. Normally, four FCLP periods would be required per pilot (two day and two night practice landings). The pilots would be carrier based and would not bring transient or permanent personnel to PMRF/Main Base.

Enhanced and Future RDT&E Activities—Alternative 1

The Navy proposes to enhance RDT&E activities from current levels as necessary as shown on Table 2.2.2.5-1. Under Alternative 1, PMRF/Main Base would continue ongoing RDT&E activities listed for the No-action Alternative and proposes additional chemical simulant, testing UAV and Hypersonic Vehicles, construction of a Range Operations Control Building, and improvement of fiber optics infrastructure. Under Alternative 1 the number of Anti-Air Warfare RDT&E would increase by approximately 14 percent, EC/EW activities would increase by approximately 11 percent, High-Frequency Radio Signals test and evaluation would increase by approximately 11 percent, and Joint Task Force Wide Area Relay Network activities would increase by 50 percent. The Navy does not require new construction or an increase in personnel to support the increase in these RDT&E activities.

The additional chemical simulant would be used in target vehicles launched from PMRF. UAVs, which are remotely piloted or self-pilot aircraft, would be tested at PMRF/Main Base and storage and ground-support would be provided at PMRF/Main Base. Hypersonic Vehicles would be attached under aircraft at PMRF/Main Base. In support of these RDT&E activities, the Navy would not require new construction or an increase in personnel.

The proposed location for a new Range Operations Control Building is on PMRF/Main Base. The facility would be approximately 90,000 ft^2, and constructing the new facility includes demolishing and conversions of current buildings. The facility would consolidate activities currently being performed on PMRF/Main Base. Range users, who require support in terms of space equipment and technical services, would vary from small teams working for 3 to 6 months to as many as 300 individuals visiting for 1 to 2 days to witness and participate in a specific mission. The construction (consolidation) of a Range Operations Control Building would bring transient personnel to PMRF Main Base. The construction (consolidation) of the new Range Operations Control Building could positively affect the local economy on Kauai through the employment of some sectors of the local construction community. The potential of as many as 300 individuals visiting for 1 to 2 days to witness and participate in a specific mission at the Range Operations Control building could also positively affect the local economy of Kauai through tourism-related-services and the use of lodging facilities. Additionally, the total number of civilian and contractor personnel assigned to the range operations is anticipated to grow by 34 percent (from 120 to 161). This increase in personnel (41 additional military personnel) would have a positive impact on the local real estate market (renter-occupied homes or single-family homes).

The proposed upgrade of approximately 23 mi of fiber optic cable would be hung on existing KIUC poles between PMRF/Main Base and Kokee. This improvement would not bring transient or permanent personnel to PMRF/Main Base. However, the installation of the fiber optic cable could have a positive effect on the local economy on Kauai through the employment of some sectors of the local construction community.

Major Exercises—Alternative 1

The Navy proposes to continue RIMPAC and USWEX Exercises as described in the No-action Alternative. Appendix D shows the matrix of training events generally used during a USWEX by location. The training associated with Major Exercises would be chosen from the list of training events in Appendix D. USWEX and RIMPAC training under Alternative 1 would not bring permanent personnel to PMRF/ Main Base, or, require new construction to complete the training.

The FCLPs would be conducted during a Major Exercise and a small number of pilots would train at the airfield located on PMRF/Main Base. The pilots would be carrier based, and the training events would not bring transient or permanent personnel to PMRF/Main Base.

4.3.2.1.10.3 Alternative 2 (Socioeconomics—PMRF/Main Base)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the Navy proposes to increase the tempo and frequency of training events (above Alternative 1 levels) and compress the tempo of training events in the HRC. The Expeditionary Assault would increase by 9 percent, Swimmer Insertion/Extraction would increase by approximately 10 percent, C2 would increase by 100 percent, and Aircraft Support would increase by 100 percent. The Navy would not require new construction or additional personnel to support the increases in these training events.

Sixteen FCLPs are proposed to be conducted at the airfield at PMRF/Main Base. Sixteen FCLPs would be an increase of approximately 33 percent (from 12 to 16 FCLPs per year) from the proposed number under Alternative 1. The Navy would not require any new construction to support the FCLPs at the airfield. The FCLP pilots would be carrier based and would not bring permanent personnel to PMRF/Main Base.

Future RDT&E Activities—Alternative 2

The Navy proposes to enhance RDT&E activities from Alternative 1 levels as shown in Table 2.2.2.5-1. Under Alternative 2, PMRF/Main Base would continue RDT&E activities and would develop the capability to support the Directed Energy and Advanced Hypersonic Weapon program.

Under Alternative 2, Anti-Air Warfare RDT&E would increase by approximately 26 percent, EC/EW operations would increase by 23 percent, High-Frequency Radio Signals would increase by 22 percent, Missile Defense activities would increase by approximately 9 percent, and Joint Task Force Wide Area Relay Network activities would increase by 100 percent. These increases would not bring permanent or transient personnel to Kauai and no new construction is required.

Additional chemical simulant, testing UAV and Hypersonic Vehicles, construction of a Range Operations Control Building, and improvement of fiber optics infrastructure are proposed for Alternative 2. The details/analysis for these proposed RDT&E activities are discussed under Alternative 1.

In support of the Directed Energy Test Center a permanent 25,000 ft^2 operations building would be constructed on PMRF and up to 100 personnel would support this program. The construction of the building could positively affect the local economy on Kauai through the employment of some sectors of the local construction community. If the 100 personnel required to support the Directed Energy Test Center are permanent additional personnel, this RDT&E activity could have a positive impact on the local real estate market (renter-occupied homes or single-family owned homes). Construction of this test center would require separate/additional environmental documentation. The Advanced Hypersonic Weapon is a U.S. Army Space and Missile Defense Command RDT&E program that would eventually involve launches from the KTF launch site at PMRF/Main Base. Launches would average one per year. This activity would not require new construction or additional personnel.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Under Alternative 2, up to three Strike Groups would be allowed to conduct training simultaneously in the HRC (Figure 1.2-3). The Strike Groups would not be homeported in Hawaii, but would be in Hawaii for up to 10 days per Major Exercise. Depending on the Major Exercise being performed, PMRF/Main Base could provide support for training events. There are no piers available to support the docking of Strike Groups at PMRF/Main Base; therefore, sailors or marines are not expected to come ashore.

The potential for requiring FCLPs increases. These FCLPs would be conducted on PMRF/Main Base. The pilots would be carrier based, and the training would not bring transient or permanent personnel to PMRF/Main Base.

4.3.2.1.10.4 Alternative 3 (Socioeconomics—PMRF/Main Base)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on socioeconomics under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.1.11 Transportation—PMRF/Main Base

Transportation impacts are evaluated by analyzing training and RDT&E activities associated with each alternative presented in Chapter 2.0 of this EIS/OEIS. If any proposed activity indicates a potential environmental impact, it has been discussed in the appropriate section below. Transportation for KTF has been evaluated within PMRF/Main Base.

4.3.2.1.11.1 No-action Alternative (Transportation—PMRF/Main Base)

HRC Training—No-action Alternative

The No-action Alternative stands as no change from current levels of training usage, and the Navy will continue activities at the HRC. Under the No-action Alternative, HRC training includes Expeditionary Assault, Swimmer Insertion/Extraction, SPECWAROPS, C2, Aircraft Support Operations, Air Operations, and HAO/NEO. RDT&E activities under the No-action Alternative include Anti-Air Warfare RDT&E, EC/EW, High-Frequency Radio Signals, Missile Defense, and Joint Task Force Wide Area Relay Network. PMRF takes every reasonable precaution during planning and execution of training events. PMRF transports ordnance by truck from Nawiliwili Bay to PMRF along Highway 50 (see Figure 2.1-2). All ordnance is transported in accordance with U.S. DOT regulations. PMRF has established PMRFINST 8023.G, which covers the handling and transportation of ammunition, explosives, and hazardous materials on the facility. In addition, liquid fuels are transported to KTF. These fuels can be shipped to the site by truck. This transport does not affect transportation routes on the island of Kauai and there are no road closures during transport. Transportation of these materials is conducted in accordance with U.S. DOT regulations and specific safety procedures developed for the location. Under the No-action Alternative, no negative impacts have been identified that affect transportation systems on PMRF/Main Base or adjacent properties.

4.3.2.1.11.2 Alternative 1 (Transportation—PMRF/Main Base)

Increased Tempo and Frequency of Training and New Training—Alternative 1

Under Alternative 1, the Navy proposes to increase the tempo and frequency of training in the HRC (see Table 2.2.2.3-1). Under Alternative 1, the Navy is also proposing to conduct FCLP. Under Alternative 1 there is no increase in training events. With no increases in these training events, transportation systems on-base and those off-based associated with PMRF/Main Base (Highway 50) would not change from the No-action Alternative, where no negative impacts have been identified that affect transportation systems on PMRF/Main Base or adjacent properties.

The Navy is proposing to conduct 12 FCLPs for a small number of pilots each year at the airfield on PMRF/Main Base. Additional personnel are not required for PMRF/Main Base to support the FCLP training. The pilots would be operating the aircraft within the PMRF airspace and Warning Areas. The airfield currently provides support for Air Operations during HRC training and Major Exercises and is compatible with on-base transportation regulations and specific safety systems. The FCLPs would bring only transient personnel to the airfield.

HRC Enhancements—Alternative 1

The Navy proposes to enhance RDT&E activities from current levels as necessary as shown in Table 2.2.2.5-1. Under Alternative 1, PMRF/Main Base would continue RDT&E activities as listed for the No-action Alternative and proposes additional chemical simulant, test of UAV and Hypersonic Vehicles, Construction of a Range Operations Control Building, and improvement to fiber optics infrastructure.

Under Alternative 1 the number of Anti-Air Warfare RDT&E would increase by approximately 14 percent, EC/EW activities would increase by approximately 11 percent, High-Frequency Radio Signals would increase by approximately 11 percent, and Joint Task Force Wide Area Relay Network would increase by 50 percent. The Navy would not require new construction, or, an increase in personnel to support the increase in these activities.

The additional chemical simulant would be used in target vehicles launched from PMRF. UAVs, which are remotely piloted or self-pilot aircraft, would be tested at PMRF/Main Base and the storage and ground-support would occur at PMRF/Main Base. The proposed Hypersonic Vehicles would be attached under aircraft at PMRF/Main Base. In support of these RDT&E activities, the Navy would not require new construction or an increase in personnel to perform these RDT&E activities.

The amount of traffic on Highway 50 and roadways on-base may be affected by the temporary increase in construction traffic due to the installation of the optic fibers and due to construction traffic for the Range Operations Control Building. The improvements of the fiber optics Infrastructure between PMRF and Kokee would not bring permanent personnel to PMRF/Main Base. During operational periods of the completed new Range Operations Control Building, the potential for range users would vary from small teams working for 3 to 6 months to as many as 300 individuals visiting for 1 to 2 days to witness and participate in a specific mission. The amount of traffic on PMRF/Main Base and Highway 50 and potentially other local roadways could be temporarily affected during these RDT&E activities. As part of the construction of the new Range Operations Control Building, roadways on-base would be realigned to provide access to the new Range Operations Control Building. The number of permanent personnel needed for the operation of the proposed Range Operations Control building is anticipated to increase by 34 percent (from 120 to 161) or 41 additional personnel. This could increase the daily number of vehicles traveling to and from PMRF/Main Base by 41. The installation employs nearly 1,000 military, civilian, and contract personnel, and 41 additional personnel entering the main gate (Highway 50) of PMRF/Main Base would increase by 4.1 percent. Overall, the effect on roadways due to construction would be temporary. The effect on roadways from operation of the Range Operations Control Building would increase the daily amount of traffic traveling to PMRF/Main Base.

Major Exercises—Alternative 1

The Navy proposes to continue RIMPAC and USWEX Exercises as described in the No-action Alternative. Alternative 1 would include up to six USWEXs per year; RIMPAC would include two Strike Groups; and FCLPs would occur in association with transiting Strike Groups participating in Major Exercises. Appendix D shows the matrix of training events generally used during a USWEX by location. The training associated with the Major Exercises would be chosen from the list of training events in Appendix D. The increase in USWEX activities would not bring permanent personnel to PMRF/Main Base or require new construction.

FCLPs would be conducted during a Major Exercise, and a small number of pilots would train at the airfield located on PMRF/Main Base. Nominally, four FCLP periods would be required per pilot (two day and two night training sessions). The pilots would be carrier based and would not bring permanent personnel to PMRF/Main Base.

4.3.2.1.11.3 Alternative 2 (Transportation—PMRF/Main Base)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the Navy proposes to increase the tempo and frequency of training (above Alternative 1 levels) in the HRC. The Expeditionary Assault would increase by 9 percent, Swimmer Insertion/Extraction would increase by approximately 10 percent, C2 would increase by 100 percent, and Aircraft Support Operations would increase by 100 percent. The Navy would not require new construction or additional personnel to support the increase in these training events. The transportation systems on-base or off-base (Highway 50) associated with PMRF/Main Base would remain at the status as addressed under the No-action Alternative.

Sixteen FCLPs are proposed to be conducted at the airfield at PMRF/Main Base. Under Alternative 2, 16 FCLPs would be an increase of approximately 33 percent (from 12 to 16 FCLP) from Alternative 1. FCLPs are not conducted under the No-action Alterative. The airfield currently provides support for Air Operations and Aircraft Support Operations during HRC training and Major Exercises. The Navy would not require any construction to support the FCLP. The FCLPs would bring transient personnel to the airfield, but they would only be on PMRF/Main Base for a short amount of time.

Future RDT&E Activities—Alternative 2

The Navy proposes to enhance RDT&E activities from Alternative 1 levels as shown on Table 2.2.2.5-1. PMRF would also develop the capability to support the Directed Energy and Advanced Hypersonic Weapon programs.

Under Alternative 2, Anti-Air Warfare RDT&E would increase by approximately 26 percent, EC/EW activities would increase by 23 percent, High-Frequency Radio Signals would increase by 22 percent, Missile Defense activities would increase by approximately 9 percent, and Joint Task Force Wide Area Relay Network activities would increase by 100 percent. These increases would not bring permanent or transient personnel to Kauai.

The Navy would not require new construction or an increase in personnel for the additional chemical simulant, testing the UAVs, and Hypersonic Vehicles. The effects on roadway traffic for the construction of the new Range Operations Control Building and the installation of the fiber optics are discussed under Alternative 1.

In support of the proposed Directed Energy Test Center, a permanent 25,000 ft^2 operations building would be constructed on PMRF and up to 100 personnel would support this program. The amount of traffic on Highway 50 and roadways on-base may be affected by the temporary increase in construction traffic during the construction of the test center. If the 100 personnel needed to support the Directed Energy Test Center are permanent, this RDT&E activity would increase the amount of traffic on-base and off-base (Highway 50) of PMRF/Main Base. A Basic Facility Requirements report has not been completed for this proposed center. Construction of this test center would require separate/additional environmental documentation.

The Advanced Hypersonic Weapon is a U.S. Army Space and Missile Defense Command RDT&E program that would eventually involve launches from the KTF Strategic Target System at PMRF/Main Base. Launches would average one per year. This RDT&E activity would not require new construction or additional personnel. This proposed RDT&E activities would not affect roadway traffic on PMRF/Main Base or off-base (Highway 50).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Under Alternative 2, up to three Strike Groups would be allowed to conduct training simultaneously in the HRC (Figure 1.2-3). The Strike Groups would not be homeported in Hawaii, but would be in Hawaii for up to 10 days per Major Exercise. Depending on the Major Exercise being performed PMRF/Main Base could provided support. There are no piers available at PMRF/Main Base to support the docking of Strike Groups; therefore, sailors or marines are not expected to come ashore on Kauai during Multiple Strike Group Training

The potential for requiring FCLPs increases during additional Major Exercises. These FCLPs would be conducted on PMRF/Main Base and would require a small number of pilots to be trained each year. The pilots would be carrier based and would not bring permanent personnel to PMRF/Main Base.

4.3.2.1.11.4 Alternative 3 (Transportation—PMRF/Main Base)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on transportation under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.1.12 Utilities—PMRF/Main Base

Impacts on utilities were evaluated by analyzing training and RDT&E activities associated with each alternative presented in Chapter 2.0 of this EIS/OEIS. Utilities associated with KTF Utilities have been evaluated within PMRF/Main Base.

4.3.2.1.12.1 No-action Alternative (Utilities—PMRF/Main Base)

The No-action Alternative stands as no change from the current level of training, and the Navy will continue its current activities at the HRC. Under the No-action Alternative, HRC training events are Expeditionary Assault, Swimmer Insertion/Extraction, SPECWAROPS, Aircraft Support Operations, Air Operations, and HAO/NEO. RDT&E activities under the No-action Alternative include Anti-Air Warfare RDT&E, EC/EW, High-Frequency Radio Signals, Missile Defense, and Joint Task Force Wide Area Relay Network. Training events associated with Major Exercises at PMRF/Main Base are C2, Aircraft Operation, HAO/NEO, SPECWAROPS, and Expeditionary Assault.

The No-action Alternative will not require a change to ongoing utilities demands to continue current baseline for HRC training events (Table 2.2.2.3-1), RDT&E activities (Table 2.2.2.5-1), or Major Exercises (Table 2.2.2.6-1) at PMRF/Main Base. Water will continue to be supplied by the Mana Well and the Kauai County Water Department. Electrical power will continue to be purchased from the KIUC, and wastewater and solid waste will continue to be processed by current procedures (see Section 3.3.2.1.12).

4.3.2.1.12.2 Alternative 1 (Utilities—PMRF/Main Base)

Increased Tempo and Frequency of Training and New Training—Alternative 1

Under Alternative 1, the Navy proposes to increase the tempo and frequency of training events in the HRC (see Table 2.2.2.3-1). Under Alternative 1, PMRF/Main Base would continue HRC training events listed for the No-action Alternative and the proposed addition of FCLP.

Under Alternative 1 there is no increase in current HRC training events at PMRF/Main Base. The utilities demand would remain the same as discussed under the No-action Alternative.

Under Alternative 1, the Navy is proposing to conduct 12 FCLPs for a small number of pilots each year at the airfield on PMRF/Main Base. This training event would not require new construction or additional personnel. Nominally, four FCLP periods would be required per pilots (two day and two night training session). Under Alternative 1, this increase in training would be short-term and intermittent and would not be expected to have a significant effect on current utilities demand on PMRF/Main Base.

HRC Enhancements—Alternative 1

The Navy proposes to enhance RDT&E activities from current levels as necessary as shown in Table 2.2.2.5-1. Under Alternative 1, PMRF/Main Base would continue RDT&E activities as listed for the No-action Alternative and proposes the use of additional chemical simulant, test of UAVs and Hypersonic Vehicles, construction of a Range Operations Control Building, and improvements to fiber optics infrastructure.

Under Alternative 1 the number of Anti-Air Warfare RDT&E would increase by approximately 14 percent, EC/EW activities would increase by approximately 11 percent, High-Frequency Radio Signals would increase by approximately 11 percent, and Joint Task Force Wide Area Relay Network activities would increase by 50 percent. This increase would not bring permanent or transient personnel to PMRF Main Base, and the Navy would not require new construction for the increase in these RDT&E activities. The increase on utilities demand for these increases would occur during the RDT&E activity periods, which are discrete and intermittent.

The additional chemical simulant would be used in target vehicles launched from PMRF. UAVs, which are remotely piloted or self-pilot aircraft, would be tested at PMRF/Main Base, and the storage and ground-support would also occur at PMRF/Main Base. Proposed Hypersonic Vehicles would be attached under aircraft at PMRF/Main Base. In support of these RDT&E activities, the Navy would not require new construction or an increase in personnel to perform these activities. There is no indication that there would be any additional demands on utility systems to complete these RDT&E activities.

The utility upgrade of installing 23 mi of fiber optic cable from PMRF/Main Base to Kokee does not require construction or an increase in personnel. All equipment and installation activities would be expected to occur along existing public and KIUC access roads. The installation of the fiber optic cable would not affect the utilities demand on PMRF Main Base.

PMRF would construct a new 90,000 ft^2 building to consolidate range operations. Range users, who require support in terms of space equipment, and technical services, would vary from small teams working for 3 to 6 months to as many as 300 individuals visiting for 1 to 2 days to witness and participate in a specific mission. Range operations currently occur in 13 buildings (Figure 2.2.3.6.4-5). The 13 buildings have a combined space of 55,000 ft^2 and would be demolished. The construction of a new building would add approximately 35,000 ft^2 of additional space that would require utilities (electrical, water, wastewater, solid waste disposal). The demand factor for electrical service for the proposed Range Operations Control Building would be 1,727 kW/hour, whereas the current demand for the range operation buildings is 700 to 800 kW/hour. Also as part of the project for the new Range Operations Control Building is a 4,200 ft^2

dehumidified warehouse that would replace Building 106. Building 106 currently measures 4,000 ft^2; therefore, 200 additional square feet would require utilities. The KIUC service to PMRF/Main Base comprises 12.47 kV of electricity (overhead), originating from the KIUC Mana Substation. An emergency generator would not be provided since the power plant is deemed to be reliable power during mission activities. The 12.47-kV power supply would remain sufficient for the additional 35,200 ft^2 associated with the proposed Range Operations Control Building and the dehumidified warehouse. Additionally, there are three 320-kW generators and two 600-kW generators on PMRF/Main Base that could be used for backup power. The current power supply from KIUC is sufficient to support the new Range Operations Control Building and associated building conversions or relocations. Domestic waterlines would be added to accommodate increases in demand and the wastewater treatment system would be constructed and connected to the current system. (Naval Facilities Engineering Command, 2004)

The total number of civilian and contractor personnel assigned to the range operations is anticipated to grow by 34 percent (from 120 to 161). This increase in personnel would have an effect on the utilities demand for water and wastewater treatment. An existing 2-inch waterline is available to provide both potable and fire protection water service for the new Range Operations Control Building. A new 2-inch waterline would be installed to provide domestic water service to the Range Operations Control Building. The current capacity of the water systems on PMRF/Main Base is sufficient for the increase. Sanitary sewer system does not exist in the central portion of PMRF where the new Range Operations Control Building and the new (replacement) dehumidified warehouse would be located. Sanitary sewer service would be provided by a gravity sewer line connection to an existing sewer line that is located north of the proposed project side. A new gravity sewer for the new dehumidified warehouse would be provided. (Naval Facilities Engineering Command, 2004)

The proposed Range Operations Control Building would block the line of sight for the current Q1 radar; therefore, a new site target for the Q-1 radar would be constructed. Also, the Building 105 annex would be converted into an electrical and electronic system laboratory. There is no indication that additional utilities would be required to support the replaced Q1 radar tower site or the conversion for Building 105. (Naval Facilities Engineering Command, 2004)

Major Exercises—Alternative 1

The Navy proposes to continue RIMPAC and USWEX Exercises as described in the No-action Alternative. The training associated with the Major Exercises would be chosen from the list of training events in Appendix D. The RIMPAC and USWEX training under Alternative 1 would not bring permanent personnel to PMRF/Main Base.

FCLPs would be conducted during a Major Exercise, and a small number of pilots would train at the airfield located on PMRF/Main Base. These pilots would be transient, and nominally four FCLP periods would be required per pilot (two day and two night training sessions). Under Alternative 1, this increase in training would be short-term and intermittent and would not be expected to have a significant effect on current utilities demand on PMRF/Main Base.

4.3.2.1.12.3 Alternative 2 (Utilities—PMRF/Main Base)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the Navy proposes to increase the tempo and frequency of training events (above Alternative 1 Levels). Table 2.2.2.3-1 lists the number of training events proposed under Alternative 1. Under Alternative 1, PMRF/Main Base would continue HRC training events listed for the No-action Alternative and the proposed addition of FCLPs.

Under Alternative 2 Expeditionary Assault training events would increase by 9 percent, Swimmer Insertion/Extraction would increase by approximately 10 percent, and Aircraft Support Operations would increase by 100 percent. The Navy would not require new construction or additional personnel to support the increase in training.

Sixteen FCLPs are proposed to be conducted at the airfield at PMRF/Main Base. Under Alternative 2, 16 FCLPs would be an increase of approximately 33 percent (from 12 to 16) from Alternative 1. The airfield currently provides support for Air Operations and Aircraft Support Operations during HRC training and Major Exercises. The Navy would not require any construction or additional personnel to support FCLPs at the airfield. In addition, the pilots would be carrier based and would not bring permanent personnel to PMRF/Main Base. Under Alternative 2, this increase would be short-term and intermittent and would not be expected to have a significant effect on current utilities demand on PMRF/Main Base.

Future RDT&E Activities—Alternative 2

The Navy proposes to enhance RDT&E activities from Alternative 1 levels as shown on Table 2.2.2.5-1. PMRF would develop the capability to support the Directed Energy and Advanced Hypersonic Weapon programs.

Under Alternative 2, Anti-Air Warfare RDT&E would increase by approximately 26 percent, EC/EW activities would increase by 23 percent, High-Frequency Radio Signals would increase by 22 percent, Missile Defense would increase by approximately 9 percent, and Joint Task Force Wide Area Relay Network activities would increase by 100 percent. These increases would not bring permanent or transient personnel to PMRF/Main Base.

The Navy would not require new construction, nor any increase in personnel for use of the additional chemical simulant, test of the UAVs, and the Hypersonic Vehicles. The details and analysis for the proposed Range Operations Control building are discussed under Alternative 1. There is no indication that there would be any additional demands on utility systems to complete these RDT&E activities.

In support of the proposed Directed Energy Test Center, a permanent 25,000 ft^2 operations building requiring 30 megawatts of power would be constructed on PMRF/Main Base. Up to 100 personnel would be needed to support this center. A Basic Facility Requirements report has not been completed for this proposed center. Construction of this test center would require separate/additional environmental documentation. The effect of this center on the utilities demand on PMRF/Main Base would be determined during a separate documentation process.

The Advanced Hypersonic Weapon is a U.S. Army Space and Missile Defense Command RDT&E program that would eventually involve launches from the KTF launch site at PMRF/Main

Base. Launches would average one per year. This RDT&E activity would not require new construction or additional personnel. This proposed RDT&E activity is not expected to have a significant effect on current utilities demand on PMRF/Main Base.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Under Alternative 2, up to three Strike Groups would be allowed to conduct training simultaneously in the HRC (Figure 1.2-3). The Strike Groups would not be homeported in Hawaii, but would be in Hawaii for up to 10 days per Major Exercise. There are no piers available at PMRF/Main Base to support the docking of Strike Groups; therefore, sailors or marines are not expected to come ashore on Kauai. However, the potential for requiring FCLPs increases. FCLPs would be conducted during a Major Exercise, and a small number of pilots would train at the airfield located on PMRF/Main Base. These pilots would be transient, and nominally four FCLP periods would be required per pilot (two day and two night training sessions). Under Alternative 2, this increase in training would be short-term and intermittent and would not be expected to have a significant effect on current utilities demand on PMRF/Main Base.

4.3.2.1.12.4 Alternative 3 (Utilities—PMRF/Main Base)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on utilities under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.1.13 Water Resources—PMRF/Main Base

4.3.2.1.13.1 No-action Alternative (Water Resources—PMRF/Main Base)

Under the No-action Alternative, training and RDT&E activities that can affect water resources include expeditionary assault and ground maneuvers, areas that are used for handling materials in support of training, and HAO/NEO training events.

HRC Training—No-action Alternative

Expeditionary assault and ground maneuvers, areas that are used for handling materials in support of training, and HAO/NEO have minimal direct impact on the beach and inland areas. Surface drainage is not affected because there are no surface water features that exist in the areas that are used for training. In addition, training events are generally restricted to existing roads and/or previously disturbed areas. Therefore, there are no impacts on water resources.

HRC RDT&E Activities—No-action Alternative

Analysis of launch-related impacts is covered in the Strategic Target System EIS (U.S. Army Strategic Defense Command, 1992). The EIS evaluated the potential impacts of launch emissions, spills of toxic materials, and early flight termination. The analysis concluded that hydrogen chloride emissions would not significantly affect the chemical composition of surface or groundwater; that there would be no significant increase in aluminum oxide in surface waters due to launches; that sampling of surface waters in the vicinity of the launch site showed that hydrogen chloride, potentially deposited during past launches, has not affected surface water quality on PMRF or adjacent areas; and that contamination from spills of toxic materials would be highly unlikely.

Subsequent sampling and analysis, prior to and following a 26 February 1993 Strategic Target System target launch, showed little or no evidence that the launch produced any adverse impact on water, soil, or vegetation (U.S. Army Space and Strategic Defense Command, 1993a). Based on the *Calendar Year 2005 Annual Site Environmental Report for Tonopah Test Range and Kauai Test Facility* (Sandia National Laboratories, 2006), there were no reportable releases at the Kauai Test Facility under EPCRA or CERCLA in 2005. In addition, there were no compliance issues with respect to any state or federal water pollution regulations in 2005. As reported in the Annual Site Environmental Report, a National Pollutant Discharge Elimination System (NPDES) permit is not required due to the lack of significant storm water runoff discharging into “Waters of the U.S.,” as defined in 40 CFR 122.

The results of soil sampling conducted in 1999, 2002, and 2007 are presented in the KTF Report (Sandia National Laboratories, 2008). The results show that most reported values are below the EPA residential screening levels. Iron and thallium exceed the residential screening level however; they are below the industrial screening level. Arsenic exceeds the EPA industrial screening level however; the State of Hawaii has identified action levels based on bioavailable arsenic. As presented in the Hawaii Department of Health Technical Report (Hawaii Department of Health, 2006) background concentrations of arsenic in soil in Hawaii may range up to 20 milligrams per kilogram (mg/kg) or higher (up to 50 mg/kg in some cases). In addition, much of the arsenic in pesticide-contaminated soil appears to be tightly bound to soil particles and not *available* for uptake in the human body. This portion of the arsenic is essentially nontoxic. These two factors led to a need for further guidance, particularly with respect to the use of *bioaccessible* arsenic data in human health risk assessments and in the development of risk-based, soil action levels.

The highest level found in the KTF report was 56 mg/kg. This would fall into the Hawaii Department of Health *Category 2 Soils (C-2): Bioaccessible Arsenic >19 mg/kg and <95 mg/kg.* Long-term exposure to Category 2 (C-2) soils is not considered to pose a significant risk to workers provided that lawns and landscaping are maintained to minimize exposure and control fugitive dust.

Impacts on water resources have not been identified from these constituents at the levels found on PMRF. As described in Chapter 3.0, sampling for perchlorate was conducted at PMRF in October and November 2006, and the results indicated perchlorate levels were within guidelines.
Based on this previous analysis and sampling, HRC RDT&E activities do not adversely affect water resources.

Major Exercises—No-action Alternative

Major Exercises under the No-action Alternative, such as RIMPAC and USWEX, include combinations of ongoing training events. Therefore, potential impacts from Major Exercises will be the same to those described above for HRC training.

4.3.2.1.13.2 Alternative 1 (Water Resources—PMRF/Main Base)

Increased Tempo and Frequency of Training and New Training—Alternative 1

Under Alternative 1, training associated with expeditionary assault and ground maneuvers, areas that are used for handling materials in support of training, and HAO/NEO would increase. Proposed increases in training tempo and frequency would have minimal direct impact on the beach and inland areas. Surface drainage is not affected because there are no surface water features that exist in the areas that are used for training. In addition, training events are generally restricted to existing roads and/or previously disturbed areas.

Enhanced and Future RDT&E Activities—Alternative 1

Under Alternative 1, RDT&E activities that could affect water resources include high speed UAV and surface vehicle testing and hypersonic vehicle testing. These launches would produce some additional exhaust emissions; however, the level of impacts on water resources would not be expected to increase above those identified for the No-action Alternative. Based on previous analysis and sampling programs, the emissions from enhanced and future RDT&E activities would be similar to existing RDT&E activities and would not adversely affect water resources.

HRC Enhancements—Alternative 1

Under Alternative 1, activities that could affect water resources include installation of Automatic Identification System and Force Protection equipment, and construction of a new Range Operations Control Building. If construction of a facility results in a total area disturbed greater than 1 acre, a Stormwater Pollution Prevention Plan would be prepared and submitted prior to construction. The plan would specify all of the measures to be used during construction to minimize and avoid adverse water quality impacts. The dry climate, level topography, and high permeability of the soils results in limited runoff and erosion during construction projects, reducing the potential for impacts on water resources from construction activities.

In addition, all construction activities would follow Spill Prevention, Control, and Countermeasures Plans and transportation safety measures; therefore, potential effects on surface and groundwater resulting from accidental spills of hazardous materials would be minimized.

Major Exercises—Alternative 1

Major Exercises include combinations of ongoing training events. Under Alternative 1, the intensity and number of these Major Exercises would be increased; however, since no new areas are proposed for training, impacts would be the same to those described under the No-action Alternative.

4.3.2.1.13.3 Alternative 2 (Water Resources—PMRF/Main Base)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, training associated with Expeditionary Assault and ground maneuvers, areas that are used for handling materials in support of training, and HAO/NEO would increase. Proposed increases in training tempo and frequency would have minimal direct impact on the beach and inland areas. Surface drainage is not affected because there are no surface water features in the areas that are used for training. In addition, training events are generally restricted to existing roads and/or previously disturbed areas.

Enhanced and Future RDT&E Activities—Alternative 2

Under Alternative 2, RDT&E activities that could affect water resources include those described under Alternative 1 and the development of a Maritime Directed Energy Test Center at PMRF/Main Base and launches of an Advanced Hypersonic Weapon from the KTF launch site.

Under Alternative 2, if development of a facility results in a total area disturbed greater than 1 acre, a Stormwater Pollution Prevention Plan would be prepared and submitted prior to construction. The plan would specify all of the measures to be used during construction to minimize and avoid adverse water quality impacts. The dry climate, level topography, and high permeability of the soils result in limited runoff and erosion during construction projects, reducing the potential for impacts on water resources from construction activities.

HRC Enhancements—Alternative 2

Under Alternative 2, all HRC enhancements would be the same as those described under Alternative 1; therefore, impacts would be the same.

Major Exercises—Alternative 2

Major Exercises include combinations of ongoing training events. Under Alternative 2, the intensity and number of these Major Exercises would be increased; however, since no new areas are proposed for training, impacts would be the same as those described under the No-action Alternative.

4.3.2.1.13.4 Alternative 3 (Water Resources—PMRF/Main Base)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on water resources under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.2 MAKAHA RIDGE

Table 4.3.2.2-1 lists ongoing training and RDT&E activities for the No-action Alternative and proposed training and RDT&E activities for Alternatives 1, 2, and 3 at Makaha Ridge. Alternative 3 is the preferred alternative.

Table 4.3.2.2-1. Training and RDT&E Activities at Makaha Ridge

Training	Research, Development, Test, and Evaluation (RDT&E) Activities
• Special Warfare Operations (SPECWAROPS)	• FORCEnet Antenna (Alternative 1) • Enhanced Auto Identification System and Force Protection Capability (Alternative 1)

A review of the 13 resources against training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Makaha Ridge. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on airspace, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources.

Any impacts on airspace that are associated with Makaha Ridge are included within the PMRF/Main Base discussion. Use of this site would not require control of the airspace. Planned construction or alterations at either Makaha Ridge or Kokee would not affect land forms, geology, and associated soils. Training and RDT&E activities associated with this site would adhere to policies and regulations governing noise, as discussed in Appendix C. There would be no impact on Kauai's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training and RDT&E activities at the site would not generate any hazardous waste streams that could impact local water quality.

4.3.2.2.1 Air Quality—Makaha Ridge

4.3.2.2.1.1 No-action Alternative (Air Quality—Makaha Ridge)

HRC Training and Major Exercises—No-action Alternative

Existing training events will continue at Makaha Ridge, and there will be no increase in air emissions. Existing sensor activities includes the minimal use of diesel power generators, which are operated under a "Non-Covered" Source Air Permit issued by the state.

SPECWAROPS at PMRF includes reconnaissance and survey inserts at Makaha Ridge. These training events cause a short-term elevation in mobile source emissions from off-road vehicles; however, these air emissions are intermittent and will increase proportionally to the additional number of trainees.

C2 is achieved through a network of communication devices strategically located at Makaha Ridge and other locations around Kauai with no impacts on the regional air quality. Increased training will have no impact.

4.3.2.2.1.2 Alternative 1 (Air Quality—Makaha Ridge)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Training events and Major Exercises would increase in number, as described in Chapter 2.0; however, mobile emissions would be similar to existing emission levels.

HRC Enhancements—Alternative 1

Proposed HRC enhancements at either Makaha Ridge or Kokee include:

- The Proposed FORCEnet integration laboratory, which would use an existing building or portable trailer.
- An antenna would be added to Building 720 as part of the Enhanced AIS and Force Protection Capability.

Construction emissions would include emissions generated from privately owned vehicles of construction workers, and stationary and mobile equipment related to construction. The principal air emissions would be nitrogen oxides and carbon monoxide from operating equipment and commuting during construction. None of the emissions generated by the enhancements to facilities would exceed Clean Air Act de minimis or "conformity threshold" levels, which do not apply to Hawaii but are a useful comparison to assess the principal air quality concerns during construction.

4.3.2.2.1.3 Alternative 2 (Air Quality—Makaha Ridge)

Increased Tempo and Frequency of Training and Additional Major Exercises—Multiple Strike Group Training—Alternative 2

While training events would increase in number, emissions would be similar to existing levels. The types of training events that would occur at Makaha Ridge were described in the No-action Alternative. Air emissions would continue to be within the existing limits of the "non-covered" source Air Permit.

4.3.2.2.1.4 Alternative 3 (Air Quality—Makaha Ridge)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on air quality under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.2.2 Biological Resources—Makaha Ridge

4.3.2.2.2.1 No-action Alternative (Biological Resources—Makaha Ridge)

HRC Training and Major Exercises—No-action Alternative

Existing sensors at Makaha Ridge will continue to be used for HRC training and Major Exercises. The potential for impacts on birds, including threatened and endangered species, on

Makaha Ridge will be minor and similar to those discussed in Section 4.3.2.1.3. The protection provided by the restricted access and grassy habitat within Makaha Ridge will continue to have a positive effect on the small population of nene (Hawaiian goose) (Pacific Missile Range Facility, 2000).

SPECWAROPS are performed by Navy SEALs and Marines and include special reconnaissance, reconnaissance and surveillance, combat search and rescue, and direct action. These activities occur within regularly used areas at Makaha Ridge with little potential for long-term impacts on listed species such as those listed in Table 3.3.2.2.2-1. Existing cleared areas, trails, and roads are used. All participants will be briefed on current guidelines to avoid undue impacts on vegetation and wildlife, including sensitive biological resource areas. Makaha Ridge will also continue to provide sensor support for MISSILEX and Air Operations Support. In terms of the potential for EMR impacts on wildlife, the main beam of the radars during missile flight tests will not be directed toward the ground and will have a lower limit of at least 4 to 5 degrees above horizontal, which precludes EMR impacts on terrestrial species. As discussed in Section 4.3.2.1.3, it is also unlikely that a bird, such as a nene, will remain within the radar beam for any considerable length of time. (U.S. Army Space and Missile Defense Command, 2004) Effects of EMR are further discussed in Sections 4.3.1.1.1.1 and 4.3.2.1.3.

4.3.2.2.2.2 Alternative 1 (Biological Resources—Makaha Ridge)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Under Alternative 1, training events would increase as shown in Table 2.2.2.3-1. Major Exercises would continue to be supported at Makaha Ridge. While training events would increase in number, the likelihood of a similar increase in impacts on biological resources on or adjacent to Makaha Ridge would be minimal due to implementation of guidelines established for the training as described below.

Vegetation

Training and Major Exercises would continue to take place at current locations; no expansion of the area would occur. All participants would continue to be briefed on current guidelines to avoid undue impacts on vegetation. SPECWAROPS troops would avoid sensitive biological resources, such as the dwarf iliau, since regular existing routes are used. Training would comply with relevant Navy policies and procedures (e.g., blow/wash down of vehicles and equipment between locations), which should limit the potential for introduction of invasive plant species.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. It is unlikely that a listed species or other wildlife would be injured or killed as a result of increased training at Makaha Ridge. The additional training would comply with relevant Navy policies and procedures, which would minimize the potential for effects on wildlife. This would include the briefing of all participants on current guidelines to avoid undue impacts on wildlife. Radars would not radiate lower than 5 degrees above horizontal, which precludes EMR impacts on wildlife on the ground as discussed in Sections 4.3.1.1.1.1 and 4.3.2.1.3. It is also very unlikely that a bird would remain within the radar beam for any considerable length of time. (U.S. Army Space and Missile Defense Command, 2004)

HRC Enhancements—Alternative 1

Enhanced Cooperative Engagement Capability

A site would be chosen at Makaha Ridge (Figure 2.2.3.6.4-3) or Kokee (Figure 2.2.3.6.4-4) to be the location of a FORCEnet integration laboratory. The laboratory would be sited in an existing building or in a portable trailer located in a previously disturbed area. Effects on wildlife from the noise and presence of additional personnel during this activity would be minimal. No effects are anticipated during use of the facility.

Enhanced Automatic Identification System and Force Protection Capability

As part of the enhanced AIS and Force Protection Capability, antennas would be added to Building 720 on Makaha Ridge, resulting in temporary elevated noise levels. No vegetation clearing or ground disturbance would be required for this effort. Because construction-related noise would be localized, intermittent, and occur over a relatively short-term, the potential for impacts on biological resources would be minimal. The installation of the antennas would not require additional lighting or changes to the physical size of the structure. Telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the THAAD radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005). If avoidance of activities during bird fallout season is not practicable, monitoring for downed birds near the antennas would be conducted as appropriate.

4.3.2.2.2.3 Alternative 2 (Biological Resources—Makaha Ridge)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. Impacts on wildlife from an increase in frequency and tempo of training would be similar to those described for the No-action Alternative since the additional training would be performed throughout the HRC and not confined to one particular area. It is therefore unlikely that an individual listed species or other wildlife offshore would be repeatedly exposed to noise, debris, EMR, or emissions as a result of increased training. As stated in Section 4.3.2.1.3.3, the intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

The Major Exercises proposed could require additional support from the sensors at Makaha Ridge. However, effects on birds and other wildlife would be minor and similar to those occurring during current Major Exercises, as described above. No new lighting, fire potential, noise, electromagnetic radiation/electromagnetic fields from increased training, or introduction of non-native species would occur.

4.3.2.2.2.4 Alternative 3 (Biological Resources—Makaha Ridge)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on vegetation and wildlife under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.2.3 Cultural Resources—Makaha Ridge

4.3.2.2.3.1 No-action Alternative (Cultural Resources—Makaha Ridge)

HRC Training and Major Exercises—No-action Alternative

Makaha Ridge has been surveyed for archaeological, historical, and Native Hawaiian resources, and none have been identified. As a result, No-action Alternative training will not affect cultural resources.

4.3.2.2.3.2 Alternative 1 (Cultural Resources—Makaha Ridge)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Makaha Ridge has been surveyed for archaeological, historical, and Native Hawaiian resources, and none have been identified. As a result, an increase in tempo and frequency of training would not affect cultural resources.

HRC Enhancements—Alternative 1

Enhanced Cooperative Engagement Capability

A new integration laboratory for FORCEnet would be established at Makaha Ridge. The proposed location for the new facility is shown on Figure 2.2.3.6.4-3. The laboratory would use an existing facility or may be a portable trailer. Because Makaha Ridge has been surveyed for cultural resources and there are none present, no effects are expected. If archaeological or Native Hawaiian resources are unexpectedly encountered as the new facility is established (i.e., if ground disturbance occurs), then the Hawaii SHPO would be notified in accordance with the Programmatic Agreement described in Appendix H.

Enhanced Automatic Identification System and Force Protection

The AIS provides a ship-to-ship and ship-to-shore communications capability. To enhance the existing system, new antennas would be added to Building 720 on Makaha Ridge (see Figure 2.2.3.6.4-3). Building 720 has not been recommended as eligible for inclusion in the NRHP either on individual merit or as an element of a historic district; therefore, installation of a new antenna on this building would not affect cultural resources (International Archaeological Resources Institute, Inc., 2005).

4.3.2.2.3.3 Alternative 2 (Cultural Resources—Makaha Ridge)

Increased Tempo and Frequency of Training—Alternative 2

Makaha Ridge has been surveyed for archaeological, historical, and Native Hawaiian resources and none have been identified. As a result, an increase in tempo and frequency of training would not affect cultural resources.

4.3.2.2.3.4 Alternative 3 (Cultural Resources—Makaha Ridge)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on cultural resources under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.2.4 Hazardous Materials and Waste—Makaha Ridge

4.3.2.2.4.1 No-action Alternative (Hazardous Materials and Waste—Makaha Ridge)

HRC Training and Major Exercises—No-action Alternative

Existing training at Makaha Ridge will continue. No increase in hazardous material used or generated will occur. PMRF has appropriate plans in place to manage hazardous materials and waste at Makaha Ridge.

Existing sensor activities will continue to use small amounts of hazardous materials. Reconnaissance and survey inserts associated with SPECWAROPS will continue to have a minimal impact on the hazardous materials used at Makaha Ridge. These materials are handled in accordance with PMRF hazardous materials and hazardous waste plans described in Chapter 3.0. Past handling of these materials at Makaha Ridge has not resulted in any impacts on the environment around the facilities.

4.3.2.2.4.2 Alternative 1 (Hazardous Materials and Waste—Makaha Ridge)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

While the number of training events and Major Exercises would increase, the types of hazardous materials consumed would be similar to existing types and levels currently at Makaha Ridge. The types of hazardous materials used would not result in any changes to the existing hazardous materials management plans currently in place.

HRC Enhancements—Alternative 1

Proposed HRC enhancements at Makaha Ridge include a FORCEnet integration laboratory and an antenna for AIS and Force Protection Capability. The proposed FORCEnet integration laboratory would use an existing building or portable trailer. An antenna would be added to building 720 as part of the Enhanced AIS and Force Protection Capability. Any construction activities would occur under existing PMRF spill plans, and all hazardous materials and waste would be handled in accordance with State and Federal regulations. No impact from hazardous materials and waste would be anticipated. Due to the exclusion of the public from the immediate vicinity of construction, the public would not be exposed to any hazardous materials or waste.

4.3.2.2.4.3 Alternative 2 (Hazardous Materials and Waste—Makaha Ridge)

Increased Tempo and Frequency of Training and Additional Major Exercises—Multiple Strike Group Training—Alternative 2

While the number of training events and Major Exercises would increase, it is anticipated that the level of hazardous materials used would continue to be managed by PMRF under appropriate State and Federal requirements.

4.3.2.2.4.4 Alternative 3 (Hazardous Materials and Waste—Makaha Ridge)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on hazardous materials and waste under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.2.5 Health and Safety—Makaha Ridge

4.3.2.2.5.1 No-action Alternative (Health and Safety—Makaha Ridge)

HRC Training and Major Exercises—No-action Alternative

Existing training at Makaha Ridge, including use of tracking radars and the primary PMRF telemetry station, will continue and PMRF will take every reasonable precaution during planning and execution of training events to prevent injury to human life or property.

Hazards to health and safety stemming from existing sensor operations that can potentially occur include generation of EMR at Makaha Ridge. Hazards of EMR to personnel and fuel (called HERP and HERF, respectively) are the primary concerns at Makaha Ridge. To ensure conditions are safe, the site is regularly surveyed for hazardous radiation, and all systems have warning lights to inform personnel when the radar units are operating and to remain outside of the personnel exclusion area. SPECWAROPS at PMRF will include reconnaissance and survey inserts at Makaha Ridge. In addition, Makaha Ridge is located at the end of a ridge and away from the public; therefore, there are no adverse public health and safety issues. All hazardous materials used and hazardous waste generated at the site will be handled according to Federal and State requirements.

4.3.2.2.5.2 Alternative 1 (Health and Safety—Makaha Ridge)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

The number of training events would increase. However, health and safety concerns would be similar to existing concerns. Established SOPs and procedures would be used.

HRC Enhancements

Proposed HRC enhancements at Makaha Ridge include a FORCEnet integration laboratory and an antenna for AIS and Force Protection Capability.

The proposed FORCEnet integration laboratory would use an existing building or portable trailer. An antenna would be added to Building 720 as part of the Enhanced AIS and Force Protection Capability. Construction would be conducted in accordance with the USACE Safety and Health Requirements Manual. Construction is routinely accomplished for both military and civilian activities, and presents safety and health concerns for workers involved in the performance of the construction activity. The siting of facilities would be in accordance with DoD standards, taking into account HERO, HERP, HERF, ESQD, and other facility compatibility issues.

4.3.2.2.5.3 Alternative 2 (Health and Safety—Makaha Ridge)

Increased Tempo and Frequency of Training and Additional Major Exercises—Multiple Strike Group Training—Alternative 2

While the number of training events occurring at Makaha Ridge would increase, current health and safety procedures would continue to be used to ensure that every reasonable precaution is taken to prevent injury to human life or property.

4.3.2.2.5.4 Alternative 3 (Health and Safety—Makaha Ridge)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on health and safety under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.3 KOKEE

Table 4.3.2.3-1 lists ongoing RDT&E activities for the No-action Alternative and proposed RDT&E activities for Alternatives 1, 2, and 3 at Kokee. Alternative 3 is the preferred alternative.

Table 4.3.2.3-1. RDT&E Activities at Kokee

Research, Development, Test, and Evaluation (RDT&E) Activities	
• FORCEnet Antenna (Alternative 1)	• Improve Fiber Optics Infrastructure (Alternative 1)

A review of the 13 resources against RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Kokee. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on airspace, cultural resources, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources.

Any impacts on airspace that are associated with Kokee are included within the PMRF/Main Base discussion. Use of this site would not require control of the airspace. Kokee has no prehistoric and historic artifacts, archaeological sites (including underwater sites), historic buildings or structures, or traditional resources that would be affected by HRC RDT&E activities. Planned construction or alterations at either Makaha Ridge or Kokee would not affect land forms, geology, and associated soils. RDT&E activities associated with this site would adhere to policies and regulations governing noise, as discussed in Appendix C. There would be no impact on Kauai's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. RDT&E activities at the site would not generate any hazardous waste streams that could impact local water quality.

4.3.2.3.1 Air Quality—Kokee

4.3.2.3.1.1 No-action Alternative (Air Quality—Kokee)

HRC Training and Major Exercises—No-action Alternative

Existing training will continue at Kokee, and there will be no increase to existing emissions. Kokee will also continue to provide support for MISSILEX and Aircraft Support Operations through use of sensors. Existing sensor activities will continue to include the intermittent use of diesel power generators, which are operated under a "Non-Covered" Source Air Permit issued by the state. Since their operating time is usually minimal, these emergency generators will have minimal impact on the air quality of Kokee.

C2 is achieved through a network of communication devices strategically located at Kokee and other sites around Kauai with no impacts on the regional air quality. Increased training will have no impact.

4.3.2.3.1.2 Alternative 1 (Air Quality—Kokee)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Emissions anticipated from the proposed additional training events would stem from the use of existing sensors at Kokee. Emissions from the generators used to power the sensors are covered under the current non-covered source permit.

HRC Enhancements—Alternative 1

Proposed HRC enhancements to be sited at either Kokee or Makaha Ridge include:

- Proposed FORCEnet integration laboratory, which would use an existing building or portable trailer.
- An antenna would be added to Building 720 as part of the Enhanced AIS and Force Protection Capability.
- Improved fiber optics infrastructure would require the cable to be hung on existing KIUC poles between PMRF/Main Base and Kokee.

Construction emissions would include emissions generated from privately owned vehicles of construction workers, and stationary and mobile equipment related to construction. The principal air emissions would be nitrogen oxides and carbon monoxide from operating equipment and commuting during construction. None of the emissions generated by the enhancements to facilities would exceed Clean Air Act *de minimis* or "conformity threshold" levels, which do not apply to Hawaii but are a useful comparison to assess the principal air quality concerns during construction.

4.3.2.3.1.3 Alternative 2 (Air Quality—Kokee)

Increased Tempo and Frequency of Training and Additional Major Exercises—Multiple Strike Group Training—Alternative 2

The increased tempo and frequency of training and additional Major Exercises proposed would be similar to those described in the No-action Alternative for Kokee. While training would increase, emissions would be similar to existing levels. Emissions would continue to be within the limits of the existing "Non-Covered" Source Air Permit.

4.3.2.3.1.4 Alternative 3 (Air Quality—Kokee)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on air quality under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.3.2 Biological Resources—Kokee

4.3.2.3.2.1 No-action Alternative (Biological Resources—Kokee)

HRC Training and Major Exercises—No-action Alternative

Existing sensors at Kokee will continue to be used for HRC training and Major Exercises. The potential for impacts on birds, including threatened and endangered species, at Kokee will be minor and similar to those discussed in Section 4.3.2.1.3. Existing radars will not radiate lower than at least 4 to 5 degrees above horizontal, which precludes EMR impacts on wildlife on the ground. It is also very unlikely that a bird will remain within the radar beam for any considerable length of time. (U.S. Army Space and Missile Defense Command, 2004) Effects of EMR are further discussed above in Sections 4.3.1.1.1.1 and 4.3.2.1.3. Kokee will continue to provide sensor support for MISSILEX, Aircraft Support Operations, and RDT&E programs. This support is generally non-intrusive in nature.

4.3.2.3.2.2 Alternative 1 (Biological Resources—Kokee)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Under Alternative 1, training events would increase as shown in Table 2.2.2.3-1. Major Exercises would continue to be supported at Kokee. While training events would increase in number, the likelihood of a similar increase in impacts on biological resources on or adjacent to Kokee would be minimal due to implementation of guidelines established for the training as described below.

Vegetation

Training and Major Exercises would continue to take place at current locations; no expansion of the area would occur. All participants would continue to be briefed on current guidelines to avoid undue impacts on vegetation. Training events would comply with relevant Navy policies and procedures (e.g., blow/wash down of vehicles and equipment between locations), which should limit the potential for introduction of invasive plant species.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. It is unlikely that a listed species or other wildlife would be injured or killed as a result of increased training at Kokee. The additional training would comply with relevant Navy policies and procedures, which would minimize the potential for effects on wildlife. This would include the briefing of all participants on current guidelines to avoid undue impacts on wildlife. Radars would not radiate lower than 5 degrees above horizontal, which precludes EMR impacts on wildlife on the ground. It is also very unlikely that a bird would remain within the radar beam for any considerable length of time. Effects of EMR are further discussed in Sections 4.3.1.1.1.1 and 4.3.2.1.3. (U.S. Army Space and Missile Defense Command, 2004)

HRC Enhancements—Alternative 1

Enhanced Cooperative Engagement Capability

A site would be chosen at Makaha Ridge (Figure 2.2.3.6.4-3) or Kokee (Figure 2.2.3.6.4-4) to be the location of a FORCEnet integration laboratory. The laboratory would be sited in an existing building or in a portable trailer located in a previously disturbed area. Effects on wildlife from the noise and presence of additional personnel during this activity would be minimal. The installation of the antennas would not require additional lighting or changes to the physical size of the structure. Telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the THAAD radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005). If avoidance of activities during bird fallout season is not practicable, monitoring for downed birds near the antennas would be conducted as appropriate.

Improve Fiber Optics Infrastructure

To improve communications and data transmission, PMRF would install fiber optic cable between the Main Base and Kokee. The cable would be hung on existing KIUC poles between PMRF/Main Base and Kokee; however, it is possible that additional poles might need to be installed in some areas where exceptionally long spans are encountered. To minimize ground disturbance and impacts on vegetation, it is expected that all equipment and installation activities would occur along existing public and KIUC access roads in previously disturbed areas. Effects from the noise and presence of additional personnel during this activity would be similar to those discussed in Section 4.3.2.2.2, PMRF/Main Base. Newell's shearwaters and Hawaiian dark-rumped petrels often fly into utility wires and poles and fall to the ground. KIUC has implemented a number of conservation measures to benefit listed seabird species on Kauai. The cooperative has shielded all streetlights on utility poles along county and state highways to reduce light-attraction impacts. KIUC has also placed power line marker balls in areas of concentrated seabird flight paths. (Kauai Island Utility Cooperative, 2006b) These measures could also be used for the proposed installation of additional poles and cable between PMRF and Kokee. The Navy would consult with USFWS regarding the potential for threatened and endangered bird takes.

4.3.2.3.2.3 Alternative 2 (Biological Resources—Kokee)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training events would be increased and the frequency of training events would also increase. Impacts on wildlife from an increase in frequency and tempo of training would be similar to those described for the No-action Alternative since the additional training would be performed throughout the HRC and not confined to one particular area. It is therefore unlikely that an individual listed species or other wildlife offshore would be repeatedly exposed to noise, debris, EMR, or emissions as a result of increased training. As stated in Section 4.3.2.2.2.3, the tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c).

Additional Major Exercises–Multiple Strike Group Training—Alternative 2

The Major Exercises proposed might require additional support from the sensors at Kokee. However, effects on birds and other wildlife would be minor and similar to those occurring during current Major Exercises, as described earlier.

4.3.2.3.2.4 Alternative 3 (Biological Resources—Kokee)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on vegetation and wildlife under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.3.3 Hazardous Materials and Waste—Kokee

4.3.2.3.3.1 No-action Alternative (Hazardous Materials and Waste—Kokee)

HRC Training and Major Exercises—No-action Alternative

Existing training at Kokee will continue and there will be no increase in hazardous materials used or any hazardous waste generated. PMRF has appropriate plans in place to manage hazardous materials and waste at Kokee. Existing sensors at Kokee will continue to use small amounts of hazardous materials. Kokee will also continue to provide support for MISSILEX and Aircraft Support Operations through use of sensors. These materials will continue to be handled in accordance with PMRF hazardous materials and hazardous waste plans.

4.3.2.3.3.2 Alternative 1 (Hazardous Materials and Waste—Kokee)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

While the tempo and frequency of training and the number of Major Exercises would increase, the types of hazardous materials consumed would be similar to existing types and levels at Kokee. The types of hazardous materials used would not result in any existing changes to the hazardous materials management plans currently in place.

HRC Enhancements—Alternative 1

Proposed HRC enhancements at Kokee include a FORCEnet integration laboratory and improvement of fiber optics infrastructure.

The proposed FORCEnet integration laboratory would use an existing building or portable trailer. Fiber optic cable would be installed on existing KIUC poles between PMRF/Main Base and Kokee; however, it is possible that additional poles might need to be installed in areas with long spans. Construction activities would be handled under existing PMRF spill plans, and all hazardous materials would be handled in accordance with State and Federal regulations. In addition, use of the proposed FORCEnet laboratory would not use new types of hazardous materials, and appropriate plans are in place to handle these materials.

4.3.2.3.3.3 Alternative 2 (Hazardous Materials and Waste—Kokee)

Increased Tempo and Frequency of Training and Additional Major Exercises—Multiple Strike Group Training—Alternative 2

The increase in tempo and frequency of training and additional Major Exercises proposed would use hazardous materials similar to those described for the No-action Alternative. While the number of training events and Major Exercises would increase, it is anticipated that the level of hazardous materials used would continue to be managed by PMRF under appropriate State and Federal requirements.

4.3.2.3.3.4 Alternative 3 (Hazardous Materials and Waste—Kokee)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on hazardous materials and waste under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.3.4 Health and Safety—Kokee

4.3.2.3.4.1 No-action Alternative (Health and Safety—Kokee)

HRC Training and Major Exercises—No-action Alternative

PMRF will continue to take every reasonable precaution during planning and execution of training events to prevent injury to human life or property at Kokee.

Hazards to health and safety can potentially occur as a result of EMR generated at the site during HRC training. The main concerns at Kokee are HERP and HERF. The only fuel stored at the site (diesel fuel for the electrical generators) is located outside of any EMR generating areas, so there are no HERF issues at the site. Appropriate sector blanking, filtering, and the elevation of the radar units above the ground have eliminated any potential HERP issues at Kokee. In addition, radiation hazards are contained within the boundaries of the sites. To ensure conditions are safe, the site is regularly surveyed for radiation hazards, and all systems have warning lights to inform personnel when the radar units are operating. The public is not exposed to any unsafe EMR levels. All hazardous materials used at the site are handled according to Federal and State regulations. Kokee will also continue to provide support for MISSILEX and Aircraft Support Operations through use of sensors.

4.3.2.3.4.2 Alternative 1 (Health and Safety—Kokee)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

The number of Major Exercises and the tempo and frequency of training would increase, however, the health and safety concerns would be would be similar to existing concerns. Existing SOPs and procedures would be used to prevent injury to human life or property.

HRC Enhancements—Alternative 1

Proposed HRC enhancements at Kokee include a FORCEnet integration laboratory and improvement of fiber optics infrastructure.

The proposed FORCEnet integration laboratory would use an existing building or portable trailer. Any construction would be conducted in accordance with Corps of Engineers Safety and Health Requirements Manual. The siting of facilities would be in accordance with DoD standards, taking into account HERO, HERP, HERF, ESQD, and other facility compatibility issues. All hazardous materials used and hazardous waste generated during construction would be handled according to Federal and State requirements.

4.3.2.3.4.3 Alternative 2 (Health and Safety—Kokee)

Increased Tempo and Frequency of Training and Additional Major Exercises—Multiple Strike Group Training—Alternative 2

The increased tempo and frequency of training and additional Major Exercises proposed would be similar to those described for the No-action Alternative for Kokee, and health and safety procedures would be similar. Current health and safety procedures would be used to ensure that every reasonable precaution is taken to prevent injury to human life or property.

4.3.2.3.4.4 Alternative 3 (Health and Safety—Kokee)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on health and safety under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.4 HAWAII AIR NATIONAL GUARD KOKEE

Hawaii Air National Guard Kokee provides operation and maintenance of the Hawaii Digital Microwave System and a radar site. Microwave systems at PMRF provide voice and data communications between PMRF/Main Base and support facilities, including Hawaii Air National Guard Kokee. The Hawaii Digital Microwave System also links the Hawaii Air National Guard facility at Kokee to the Hawaii Regional Operations Center at Wheeler Army Airfield, Oahu. The Hawaii Air National Guard Wing's 150th Aircraft Control and Warning Flight operate the radar site. The radar site is linked to the Hawaii Region Air Operations Center at Wheeler Army Airfield, Oahu, where 24-hour air surveillance of the Hawaiian Islands chain is provided. Training at the Hawaii Air National Guard Kokee radar site follows all applicable regulations and procedures established by the Air Force and the Navy to protect human health and the environment. These facilities would continue to be used during ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3. Alternative 3 is the preferred alternative.

A review of the 13 resources against training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the Hawaii Air National Guard Kokee. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

There are no air emission sources introduced by the alternatives proposed at the Hawaii Air National Guard Kokee. Any impacts on airspace that are associated with Hawaii Air National Guard Kokee are included within the PMRF/Main Base discussion. Use of this site would not require control of the airspace. Hawaii Air National Guard Kokee has no prehistoric and historic artifacts, archaeological sites (including underwater sites), historic buildings or structures, or traditional resources that would be affected by HRC training. There is no planned construction or alterations that would affect land forms, geology, and associated soils. Training associated with this site would adhere to policies and regulations governing noise and health and safety, as discussed in Appendix C. There would be no impact on Kauai's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training at the site would not generate any hazardous waste streams that could impact local water quality

4.3.2.4.1 Biological Resources—Hawaii Air National Guard Kokee

4.3.2.4.1.1 No-action Alternative (Biological Resources—Hawaii Air National Guard Kokee)

HRC Training and Major Exercises—No-action Alternative

Existing sensors at Hawaii Air National Guard Kokee will continue to be used for HRC training. Navy training at the site would be performed in accordance with all applicable biological opinions and existing Air National Guard regulations. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Hawaii Air National Guard regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed. There have been no reports of birds being affected by EMR from the existing sensors located in the Hawaii

Air National Guard Kokee complex. Impacts on threatened and endangered birds (nene, Hawaiian dark-rumped petrel, and Newell's Townsend's shearwater) and the Hawaiian hoary bat that may be in the area will be minor and similar to those discussed in Section 4.3.2.1.3.

Support for MISSILEX provided by the sensors will continue as part of Major Exercises. Due to the non-intrusive continuing nature of these training events, no additional impacts on biological resources are anticipated.

4.3.2.4.1.2 Alternative 1 (Biological Resources—Hawaii Air National Guard Kokee)

Increased Tempo and Frequency of Training—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training events (See Table 2.2.2.3-1), an overall increase of approximately 9 percent. While sensor usage would increase, the likelihood of a similar increase in impacts on biological resources is minimal. Training would take place at existing locations; no expansion of the sensor operating area would occur.

4.3.2.4.1.3 Alternative 2 (Biological Resources—Hawaii Air National Guard Kokee)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training events would be increased and the frequency of events could also increase. Thus, the frequency of sensor operation is expected to increase as well. However, effects on birds and other wildlife would be minor and similar to those occurring during current Major Exercises, as described earlier.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

The Major Exercises proposed may require additional support from the sensors at Hawaii Air National Guard Kokee. However, effects on birds and other wildlife would be minor and similar to those occurring during current Major Exercises, as described above.

4.3.2.4.1.4 Alternative 3 (Biological Resources—Hawaii Air National Guard Kokee)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on vegetation and wildlife under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.5 KAMOKALA MAGAZINES

The Kamokala Magazines provide secure storage of ordnance material. The magazines are in continuous use by PMRF, the Hawaii Air National Guard, and the Department of Energy. Other commands conducting training events and needing storage are also accommodated at the facility intermittently. These facilities would continue to be used during ongoing training and RDT&E activities for the No-action Alternative and proposed training and RDT&E activities for Alternatives 1, 2, and 3. Alternative 3 is the preferred alternative.

A review of the 13 resources against training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the Kamokala Magazines. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, biological resources, cultural resources, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources. Use of the Kamokala storage magazine does not require control of the airspace above this land area. Any air quality, biological, cultural resources, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water issues are included within the PMRF/Main Base discussion.

4.3.2.5.1 Hazardous Materials and Waste—Kamokala Magazines

4.3.2.5.1.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Hazardous Materials and Waste—Kamokala Magazines)

Under the No-action Alternative existing training and RDT&E activities at Kamokala Magazines will continue. New hazardous materials will not be used, and new hazardous waste will not be generated. Training and RDT&E activities proposed for Alternative 1, Alternative 2, and Alternative 3 would not result in the need for additional hazardous materials to be used and no hazardous waste to be generated at Kamokala Magazines. Storage and transportation of ordnance would be conducted in accordance with established DOT, DoD, and Navy safety procedures. PMRF has appropriate plans in place to manage existing and future hazardous materials and waste levels at Kamokala Magazines.

4.3.2.5.2 Health and Safety—Kamokala Magazines

4.3.2.5.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Health and Safety—Kamokala Magazines)

Under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, there would be no change in the type of ordnance stored at the Kamokala Magazines and no increased safety risks. Storage and transportation of ordnance are conducted in accordance with established DOT, DoD, and Navy safety procedures. The storage magazines have appropriate ESQD arcs for the amount and type of ordnance stored (Figure 3.3.2.1.7-1). The existing uses around the magazine and within the ESQD arcs are considered compatible. If a mishap should occur, the hazard associated with the explosion would be contained within the ESQD arcs.

4.3.2.6 PORT ALLEN

Port Allen is a small, fully developed industrial seaport that supports PMRF's Range Support Boats and maintenance facilities. Port Allen also provides pier space, protected anchorage, and small boat launch facilities. Lights would be shielded to the extent practicable to minimize the potential for impacts to nocturnal species. In addition, PMRF leases warehouse space at the facility.

A review of the 13 resources against program training determined there were no impacts from training events under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 at Port Allen. There are no reports of emission from Navy training affecting the air quality for Port Allen. Use of Port Allen does not require control of the airspace above this land area.

Ports and harbors can be initial invasion sites for non-native species transported via ships. Activities would follow existing procedures used to prevent the introduction of non-native species. Various instructions, as well as training event-specific operations orders such as the RIMPAC Operations Order, advise commanding officers of requirements regarding the protection of Hawaii from additional alien or invasive species. Introduction of any plant or animal into Hawaii without permission of the State of Hawaii Department of Agriculture is prohibited. All ship commanding officers and aircraft are required by the Defense Transportation Regulation, DoD 4500.9-R, to conduct inspections of equipment, cargo, supplies and waste prior to entering their first port of entry into the OPNAVINST 6210.2, Quarantine Regulations of the Navy, is intended to prevent the introduction and dissemination, domestically or internationally originated, of diseases affecting humans, plants, and animals; prohibited or illegally taken wildlife; arthropod vectors; and pests of health and agricultural importance.

According to OPNAVINST 5090.1B, Chapter 19, and the RIMPAC Operations Order, surface ships shall routinely wash down anchors, chains, and appendages with seawater when retrieving them to prevent on board collection of sediment, mud and silt. When possible, following anchor retrieval, surface ships shall wash down chain lockers outside 12 nm from land to flush out sediment, mud, or silt.

All equipment and unmanned vehicles to be placed in the ocean are to be clean and free of residual materials from prior use to avoid introduction of new species. For ships arriving from foreign ports, hulls of ships' small boats are to be cleaned of any marine growth (algae, barnacles, crustaceans, etc.) before placing them into ocean or harbor waters.

Amphibious vessels launching and recovering amphibious vehicles shall ensure those vehicles, including their treads, are washed down after completion of training. Ships shall dispose of wash water before entering 12 nm of the next operating area.

State of Hawaii Department of Agriculture inspectors may be invited by the commanding officer to board U.S. flag vessels to assist with inspection of food stores, plants, and animals to ensure compliance with State animal quarantine laws.

No snakes are known to inhabit Hawaii. Commanding officers of all vessels and aircraft shall, prior to arrival in Hawaii, ensure that all stores originating from Australia and Guam are inspected for the brown tree snake. This inspection may be accomplished during on-loading of such stores or while underway. If any snake is sighted aboard a ship or aircraft entering Hawaii, the snake is to be restrained, contained, or killed and the snake retained until entry into Hawaii.

Naval Station Pearl Harbor Security (911) is to be contacted and advised and will take control of the snake for appropriate reporting to State Agriculture authorities.

Because no ground disturbance or building modifications would occur, there would be no impact on cultural resources or geology and soils. Additionally, there are no known significant archaeological sites at Port Allen.

Training at this site would require small amounts of hazardous materials for maintenance and would generate small amounts of hazardous waste. All hazardous materials used and hazardous waste generated would continue to be managed in accordance with PMRF's hazardous materials management plans as described under PMRFINST 5100.2c and all other applicable regulations. No noise-sensitive land receptors are affected by existing noise levels at the site. All training events at Port Allen are conducted in accordance with OSHA and OPNAVINST 5100.23D, Navy Occupational Safety and Health Program Manual; there are no public health and safety issues.

Port Allen is compatible with existing surrounding land uses, and land use does not conflict with recreational activities occurring in or adjacent to the harbor. Any transportation and utility issues associated with Port Allen are included within the PMRF/Main Base discussion. There is no socioeconomic impact from training at the site. Training at the site would not generate any waste streams that could impact local water quality.

4.3.2.7 KIKIAOLA SMALL BOAT HARBOR

Kikiaola Small Boat Harbor hosts PMRF Range Support Boats and small-boat launch facilities. PMRF's Seaborne Powered Targets are launched from Kikiaola.

A review of the 13 resources against program training determined there were no impacts from training events under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 at the Kikiaola Small Boat Harbor. Any emissions from training associated with the use of range support boats and small-boat-launch facilities would not affect the air quality of the area. The Navy would not require control of the airspace above this land area. Additionally, all training would adhere to Navy policy, statutory and regulatory requirements for hazardous materials and hazardous waste, range safety guidelines, and noise, as discussed in Appendix C.

Activities would follow existing procedures used to prevent the introduction of non-native species as discussed in Section 4.3.2.6. There would be no ground-disturbing activities or building modifications that could affect biological and geology and soils resources at Kikiaola Small Boat Harbor. Additionally, there are no training events that could affect the land-based use, including recreation and tourism-related-activities. The work force assigned to the site would not affect local transportation levels of service or utilities. There is no socioeconomic impact from HRC training.

4.3.2.8 MT. KAHILI

Training at Mt. Kahili consists of existing telemetry towers and communications. A review of the 13 environmental resources against program training determined there would be no impacts from training events under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 at Mount Kahili. Alternative 3 is the preferred alternative.

No air emissions would be generated from training at Mt. Kahili unless use of diesel generators would be required for backup power for Command and Control activities at this site. The site does not affect the existing airspace structure in the region. Telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the THAAD radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005). There is no lighting at the facility. No impacts are expected to the endangered Newell's shearwater, Hawaiian petrel, or Hawaiian hoary bat that may traverse the area. If avoidance of activities during bird fallout season is not practicable, monitoring for downed birds near the antennas would be conducted as appropriate. Because no ground disturbance or building modifications would occur, there would be no impact on cultural resources, or geology and soils. Training at this site would require small amounts of hazardous materials for maintenance and would generate small amounts of hazardous waste. All hazardous materials used and hazardous waste generated would continue to be managed in accordance with applicable regulations. There is no electromagnetic radiation generated at the site; therefore, there are no public health and safety issues.

Mt. Kahili is compatible with existing surrounding land uses. No noise is generated by activities at the site. The site, which is only manned during activities, employs two to four persons. Such a small work force would not affect local transportation levels of service or utilities. There is no socioeconomic impact from use of the site. Training at the site would not generate any waste streams that could impact local water quality.

4.3.2.9 NIIHAU

Table 4.3.2.9-1 lists ongoing training and RDT&E activities for the No-action Alternative and proposed training and RDT&E activities for Alternatives 1, 2, and 3 at Niihau. Alternative 3 is the preferred alternative.

Table 4.3.2.9-1. Training and RDT&E Activities at Niihau

Training	Research, Development, Test, and Evaluation (RDT&E) Activities
• Special Warfare Operations (SPECWAROPS) • Humanitarian Assistance/Non-combatant Evacuation Operations (HAO/NEO)	• Electronic Combat/Electronic Warfare (EC/EW) • Enhanced Electronic Warfare Training (Alternative 1)

A review of the 13 resources against onshore training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Niihau. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, cultural resources, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources.

Air emissions from HRC training and RDT&E activities would not change the regional air quality surrounding Niihau. Any impacts on airspace that are associated with Niihau are included within the PMRF/Main Base discussion. Use of this site would not require control of the airspace. Niihau has no prehistoric and historic artifacts, archaeological sites (including underwater sites), historic buildings or structures, or traditional resources that would be affected by HRC training and RDT&E activities. Planned construction or alterations would not affect land forms, geology, and associated soils. Training and RDT&E activities associated with this site would adhere to policies and regulations governing noise, as discussed in Appendix C. There would be no impact on Kauai's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. The transportation infrastructure on Niihau is rudimentary and is not used during HRC training and RDT&E activities. There is no central utility system on the island. Training and RDT&E activities at the site would not generate any hazardous waste streams that could impact local water quality.

4.3.2.9.1 Biological Resources—Niihau

4.3.2.9.1.1 No-action Alternative (Biological Resources—Niihau)

HRC Training and Major Exercises—No-action Alternative

PMRF remotely operates a radar unit at Paniau (northeast corner of the island) and the Niihau Perch site electronic warfare system. These training events will continue intermittently under the No-action Alternative with minimal impacts on biological resources. In terms of the potential for EMR impacts on wildlife, the main beam of the Paniau radar during missile flight tests is not directed toward the ground and has a lower limit of at least 4 to 5 degrees above horizontal, which precludes EMR impacts on terrestrial species on the beach. The potential for main-beam (airborne) exposure thermal effects on birds or bats exists. Helping to alleviate this concern is the fact that radar beams are relatively narrow and operate non-continuously; that is, radars generate EMR in a rapid pulse as opposed to other EMR sources that radiate continuously (e.g., microwave antennas). The beam will also normally be in motion. To remain in the beam for any period requires that birds fly directly along the beam axis or hover within the beam for a significant time. Thus, the probability for the Paniau radar to harm birds or bats with any frequency is judged to be low. (U.S. Department of the Navy, 1998a) Effects of EMR are further discussed above in Sections 4.3.1.1.1.1 and 4.3.2.1.3.

Vegetation

Vegetation on Niihau is dominated by non-native plant species and plant communities. SPECWAROPS training on Niihau uses existing openings, trails, and roads and thus avoids areas that contain threatened or endangered plants. Helicopter landings are in areas designated as suitable and absent of listed biological resources. HAO/NEO activities at Niihau will be similar to SPECWAROPS training. HRC training comply with relevant Navy and USFWS policies and procedures (e.g., blow/wash down of vehicles and equipment) during these training events and Major Exercises, which should limit the potential for introduction of invasive plant species.

Target drones are flown along the east coast of the island away from inhabited areas. There is the potential for a drone to crash and start a brush fire on the island. However, during activities that present the potential for fires, a ground fire-fighting crew and helicopters with water buckets are airborne to minimize any fire hazard.

Wildlife

Wildlife on Niihau is dominated by non-native species such as feral pigs, sheep, cattle, and horses. Noise and movement of personnel, vehicles, helicopters, and landing craft during these training events can temporarily displace sensitive species, such as the green turtle and Hawaiian monk seal if they are basking on the island. However, all ocean vessel landings are first checked to ensure the sites are clear of monk seals. Also, training will avoid any beach area with green turtle nests, as they occasionally nest on Niihau beaches.

Environmentally Sensitive Habitat

An area of 357 acres on the northern portion of Niihau has been designated as critical habitat for the endangered alula (U.S. Fish and Wildlife Service, 2003a). Training events will not affect this area, and current transmitter sites are not located within the critical habitat.

4.3.2.9.1.2 Alternative 1 (Biological Resources—Niihau)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training events (See Table 2.2.2.3-1). While training would increase in number, the likelihood of a similar increase in impacts on biological resources is small as discussed below.

Vegetation

Training at Niihau would take place at existing locations; no expansion of the area would occur. All participants would continue to be briefed on current guidelines to avoid undue impacts on vegetation. Training would comply with relevant Navy policies and procedures (e.g., blow/wash down of vehicles and equipment between locations), which should limit the potential for introduction of invasive plant species.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. It is unlikely that a listed species or other wildlife would be injured or killed as a result of increased training on Niihau since the additional training would still comply with relevant Navy policies and procedures, which would minimize the potential for effects on wildlife. This would include the briefing of all participants on current guidelines to avoid undue impacts on wildlife. EMR impacts on birds or wildlife on the ground would be minimal as described in Section 4.3.2.1.3.1. (U. S. Army Space and Missile Defense Command, 2004)

4.3.2.9.1.3 Alternative 2 (Biological Resources—Niihau)

Increased Tempo and Frequency of Training—Alternative 2

Impacts on wildlife would be similar to those described previously for the No-action Alternative since the additional training would be performed throughout the HRC and not confined to one particular area. While Electronic Combat activities would double, the activities would not necessarily increase on Niihau. It is unlikely that a listed species or other wildlife on Niihau would be injured or killed as a result of increased training since the additional training events would continue to comply with relevant Navy policies and procedures.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. The training events proposed would be similar to those occurring during current Major Exercises, in various areas of the HRC, with impacts on biological resources being similar to those described above.

4.3.2.9.1.4 Alternative 3 (Biological Resources—Niihau)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on vegetation and wildlife under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.9.2 Hazardous Materials and Waste—Niihau

4.3.2.9.2.1 No-action Alternative (Hazardous Materials and Waste—Niihau)

HRC Training—No-action Alternative

Under the No-action Alternative, PMRF will continue ongoing HRC training at Niihau. The hazardous material/used oil issues associated with these training events are the fueling and maintenance of diesel generators which are operated intermittently to power remotely operated radar and the electronic warfare facility. These materials will continue to be handled by Niihau

Ranch. Past handling of these materials at Niihau has not resulted in any impacts on the environment around the facilities. PMRF only brings hazardous materials onto the island when required for maintenance. Diesel fuel required for fueling is stored in a portable fuel trailer.

Target drones are currently flown along the east coast of the island away from inhabited areas. The drones do not fly over occupied areas; however, there is the potential for a drone to crash and deposit hazardous waste onto the island. The PMRF Hazardous Material Spill Response Team will be dispatched to the crash site of any mishap to ensure proper removal of all hazardous material/hazardous waste.

Major Exercises—No-action Alternative

Major Exercises at Niihau include HAO/NEO training events. These training events will use helicopters, trucks, Landing Craft, Air Cushioned (LCAC), Landing Craft, Utility (LCU) and/or Combat Rubber Raiding Craft (CRRC) to shuttle supplies. Any diesel fuel required for fueling vehicles will be provided by Niihau Ranch.

4.3.2.9.2.2 Alternative 1, Alternative 2, and Alternative 3 (Hazardous Materials and Waste—Niihau)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1, Alternative 2, and Alternative 3

While the tempo and frequency of training and the number of Major Exercises would increase, the types of hazardous materials consumed would be similar to existing types and levels at Niihau. The types of training events that would occur at Niihau would be similar to those described in Section 4.3.2.9.2.1. The types of hazardous materials used would not result in any procedural changes to the hazardous materials management plans currently in place.

HRC Enhancements—Alternative 1, Alternative 2, and Alternative 3

Proposed HRC enhancements at Niihau include the installation and use of an antenna for AIS and Force Protection Capability. Potential construction impacts for this antenna would be minimal. Construction would be conducted in accordance with the USACE Safety and Health Requirements Manual. Hazardous materials used during construction could include engine oil, oil filters, paint, paint thinners, and solvents generated during maintenance of equipment. Construction activities would be handled under existing PMRF spill plans, and all hazardous materials and hazardous waste would be handled in accordance with State and Federal requirements.

Use of the AIS and Force Protection antenna would require minimal use of hazardous materials. However, materials would continue to be handled in accordance with PMRF hazardous materials and hazardous waste plans. Past handling of hazardous materials and hazardous waste at Niihau has not resulted in any impacts on the environment.

4.3.2.9.3 Health and Safety—Niihau

4.3.2.9.3.1 No-action Alternative (Health and Safety—Niihau)

Under the No-action Alternative existing activities at Niihau will continue and there will be no adverse impacts on health and safety. PMRF takes every reasonable precaution during planning and execution of training and RDT&E activities to prevent injury to human life or property at Niihau.

HRC Training—No-action Alternative

Under the No-action Alternative, HRC training will continue on Niihau. The primary health and safety issues associated with these training events are the generation of EMR emissions from radar and Electronic Warfare Operations. The covert penetration activities only involve military personnel trying to avoid detection by ground observers and do not involve any hazardous activities to the public.

EMR emissions do not represent a health and safety risk to the island residents because the radar and Perch site electronic warfare sites are located away from the island village. The radar unit is located on top of a facility and presents no HERP hazards at ground level where any island residents could be affected. During use of the Perch site, appropriate warning lights and signs are placed around the facility.

Target drones are flown along the east coast of the island away from inhabited areas. Because the drones do not fly over occupied areas, there is no direct health and safety risk; however, there is the potential for a drone to crash and start a brush fire on the island. During activities that present the potential for fires, a ground fire-fighting crew and helicopters with water buckets are airborne to minimize any fire hazard.

Major Exercises—No-action Alternative

Training events at Niihau that are a part of Major Exercises include HAO/NEO training events. These training events will use helicopters, trucks, LCAC, LCU and/or CRRC to shuttle supplies. Every reasonable precaution is taken during Major Exercises to prevent injury to human life or property at Niihau; therefore no adverse impacts will occur during ongoing Major Exercises.

4.3.2.9.3.2 Alternative 1, Alternative 2, and Alternative 3 (Health and Safety—Niihau)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1, Alternative 2, and Alternative 3

The number of training events would increase in tempo and frequency and the number of Major Exercises would increase, however, the health and safety concerns would be similar to existing concerns and existing SOPs and procedures would be used. The types of training events that would occur at Niihau would be similar to those described in Section 4.3.2.9.3.1 and would not occur simultaneously.

HRC Enhancements—Alternative 1, Alternative 2, and Alternative 3

Proposed HRC enhancements at Niihau includes the installation and use of an antenna for AIS and Force Protection Capability. Construction would be conducted in accordance with the Corps of Engineers Safety and Health Requirements Manual. It is the policy on Niihau to minimize the contact between island residents and workers brought to the island. This policy would continue under the proposed construction activities, which would minimize the potential for an island resident to contract any illnesses that personnel may have. Transportation of hazardous materials on Niihau would be conducted under DOT regulations, and any generation of hazardous waste would be in accordance with Federal and State requirements.

Operation of the AIS and Force Protection antenna would result in no adverse impacts on health and safety risk to the island residents; it would be located away from the island village.

4.3.2.10 KAULA

Table 4.3.2.10-1 lists ongoing training events for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at Kaula. Alternative 3 is the preferred alternative.

Table 4.3.2.10-1. Training at Kaula

Training
• Bombing Exercises
• Air-to-Ground Gunnery Exercise (GUNEX)

A review of the 13 resources against onshore program training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Kaula. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, hazardous material and waste, noise, socioeconomics, transportation, utilities, and water resources.

Air emissions from HRC training would not change the regional air quality surrounding Kaula. Training associated with this site would adhere to policies and regulations, including the Military Munitions Rule, governing hazardous materials and waste, as discussed in Appendix C. Because access to the island is restricted, no noise impacts on civilian or military personnel would occur. Potential noise impacts on wildlife are addressed under the biological resources section. There would be no impact on Kauai's socioeconomics, transportation, or utilities because access to the island is restricted. There are no facilities, transportation, or utility systems on the island. Training at the site would not generate any hazardous waste streams that could impact local water quality.

4.3.2.10.1 Airspace—Kaula

4.3.2.10.1.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Airspace—Kaula)

HRC Training and Major Exercises—No-action Alternative, Alternative 1, Alternative 2, Alternative 3

The ongoing, continuing BOMBEX and GUNEX at Kaula will have no impact on controlled and uncontrolled airspace or special use airspace. Restricted Area R-3107 and the surrounding Warning Area W-187 were specifically designed to accommodate these kinds of hazards to non-participants' activities.

En route airways and jet routes will not be affected. The closest airway, V16, is located 18 nm north of Kaula. There are no airports or airfields in the area. The use of the airspace at Kaula will be coordinated with the FAA and PMRF prior to use for BOMBEX, GUNEX, and Major Exercises such as RIMPAC and USWEX.

The increased training under Alternative 1 (31 percent increase above the No-action Alternative) and Alternatives 2 and 3 (52 percent increase above No action) would still not impact the controlled and uncontrolled airspace or special use airspace at Kaula. The advance planning and coordination with the FAA and FACSFACPH prior to the use of Kaula for BOMBEX, GUNEX, and Major Exercises such as RIMPAC, USWEX and the Multiple Strike Group Exercise results in minimal impacts on airspace.

4.3.2.10.2 Biological Resources—Kaula

4.3.2.10.2.1 No-action Alternative (Biological Resources—Kaula)

HRC Training and Major Exercises—No-action Alternative

The Navy uses the southeastern tip of Kaula for aircraft gunnery, inert ordnance target practice, Strike Warfare Exercises (STW), and Close Air Support Exercise (CASEX). Potential effects on biological resources are discussed below.

Vegetation

Vegetation on Kaula is very sparse, and there are no known threatened or endangered plant species. Because of the sparse vegetation, brush fires occurring from gunnery and inert ordnance practice are unlikely to occur, and no fires have ever been reported from prior training. Thus, any vegetative impacts on the southeastern tip of the island should continue to be minimal.

Wildlife

Under the No-action Alternative, current GUNEX and STW training will continue. Some individual migratory seabirds may be lost to GUNEX training in the designated impact area. Gunnery rounds that may occasionally miss the designated impact area may also result in the loss of some individuals elsewhere on the island. However, current migratory seabird populations appear to be healthy and reproducing normally.

RIMPAC Exercises use non-explosive rounds on Kaula. However, impacting and ricocheting projectiles likely will startle nesting birds, and can result in the loss of a few individuals. Spotting charges from practice bombs will also likely startle birds nesting near the targets. Birds frightened off their nests may abandon the nest and not breed again that season. Nest abandonment is highly species dependent. If the nest is abandoned, the bird may re-nest during the breeding season or not, depending in large part on the species and the point in the breeding season at which the nest is abandoned. RIMPAC Exercises occur biennially and USWEX will occur only up to six times per year, for a maximum of 4 days per Major Exercise. Since these Major Exercises will affect less than 10 percent of the island over less than 10 percent of the year, the effects on seabirds such as the sooty tern, brown noddy, and red-footed or masked booby will be reduced to the extent practicable.

Small numbers of Hawaiian monk seals now haul-out on a small limestone bench on Kaula. USWEX/RIMPAC may cause monk seals to leave this haul-out site and enter the water temporarily. Based on the Navy's level of use of Kaula and the number of Hawaiian monk seals continually sighted at Kaula, it is likely that monk seals will return once the disturbance from USWEX/RIMPAC Exercises has ended. Major Exercises thus will have only an occasional, short-term effect on monk seals at this site.

Environmentally Sensitive Habitat

Critical habitat that has been designated for sea turtles and other listed species is outside the region of influence and will not be affected by current training and Major Exercises (National Oceanic and Atmospheric Administration, 1979).

4.3.2.10.2.2 Alternative 1 (Biological Resources—Kaula)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Under Alternative 1, training events would increase as shown in Table 2.2.2.3-1. Major Exercises, such as STW and GUNEX, would continue to be supported at Kaula. While training events would increase in number, the likelihood of a similar increase in impacts on biological resources on or adjacent to Kaula would be minimal due to implementation of guidelines established for training as described below.

Vegetation

No rare, threatened, or endangered plant species are known to occur on Kaula. Training would continue to take place at current locations; no expansion of the area would occur. All participants would continue to be briefed on current guidelines to avoid undue impacts on vegetation. Training would comply with relevant Navy, NMFS, and USFWS policies and procedures during these increased training events.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. The additional training would comply with relevant Navy, NMFS, and USFWS policies and procedures, which would minimize the potential for effects on wildlife. All participants would continue to be briefed on current guidelines to avoid undue impacts on wildlife.

4.3.2.10.2.3 Alternative 2 (Biological Resources—Kaula)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training events would be increased and the frequency of training events could also increase. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c). An increased tempo and frequency of GUNEX and inert ordnance target practice would possibly result in an increased loss of individual birds. However, no potential impacts are foreseen to migratory seabird populations, which appear to be healthy and reproducing normally.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

The Major Exercises proposed might require an additional number of training events at Kaula. However, effects on birds and other wildlife would be minor and similar to those occurring during current Major Exercises, as described above.

4.3.2.10.2.4 Alternative 3 (Biological Resources—Kaula)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in

Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on vegetation and wildlife under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.10.3 Cultural Resources—Kaula

4.3.2.10.3.1 No-action Alternative (Cultural Resources—Kaula)

HRC Training—No-action Alternative

BOMBEX and GUNEX

The southwestern tip of Kaula (a 10-acre ordnance impact zone) is used for BOMBEX and GUNEX activities. The impact zone has only been partially surveyed for cultural resources because of the presence of unexploded ordnance; however, there are no known sites within that area. The remainder of the islet displays no evidence of long-term human habitation; however, six archaeological sites recorded in the northern portion indicate some level of visitation. None of the identified sites have been recommended as eligible for inclusion in the NRHP. As a result, training events on Kaula will have no impacts on cultural resources.

Major Exercises—No-action Alternative

BOMBEX and GUNEX are elements of Major Exercises (e.g., RIMPAC) and have been analyzed in the above discussion on HRC training. These training events are restricted to the southwestern tip of Kaula and will have had no impacts on cultural resources.

4.3.2.10.3.2 Alternative 1 (Cultural Resources—Kaula)

Increased Tempo and Frequency of Training—Alternative 1

Increased tempo and frequency of training would not affect Kaula. Training events are confined to the impact zone at the southwestern tip of the island where there are no known cultural resources. Ongoing training events have not been found to have any effect on cultural resources, and an increased frequency or tempo would also have no effects.

4.3.2.10.3.3 Alternative 2 (Cultural Resources—Kaula)

Increased Tempo and Frequency of Training—Alternative 2

Increased frequency or tempo of training would not have new or additional effects at Kaula. Ongoing training events have not been found to have any effect on cultural resources, and an increased frequency or tempo would also have no effects.

4.3.2.10.3.4 Alternative 3 (Cultural Resources—Kaula)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on cultural resources under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.10.4 Geology and Soils—Kaula

4.3.2.10.4.1 No-action Alternative (Geology and Soils—Kaula)

HRC Training—No-action Alternative

Training will include the continued use of the southeast end of Kaula for bombing and Air-to-Ground GUNEX training. Permanent adverse soil and geologic effects have been noted by the Navy resulting from shattering of rocks in explosions and the possibility of inert ordnance (duds), which may remain in the target area (U.S. Department of the Navy, 1980). The Navy minimizes the impact by managing the targeting to the southeast tip of the island, approximately 8 percent of the island land area (U.S. Department of the Navy, 1980).

Major Exercises—No-action Alternative

Major Exercises will include the continued use of the southeast end of Kaula for bombing and Air-to-Ground GUNEX training. Impacts will be the same as described above for training.

4.3.2.10.4.2 Alternative 1 (Geology and Soils—Kaula)

Increased Tempo and Frequency of Training—Alternative 1

Increased tempo and frequency of training would have similar impacts on those described under the No-action Alternative.

Major Exercises—Alternative 1

Major Exercises such as RIMPAC and USWEX would include the continued use of the southeast end of Kaula for bombing and Air-to-Ground GUNEX training. Impacts would be the same as described for the No-action Alternative.

4.3.2.10.4.3 Alternative 2 (Geology and Soils—Kaula)

Increased Tempo and Frequency of Training—Alternative 1

Increased tempo and frequency of training would have similar impacts on those described under the No-action Alternative.

Additional Major Exercises—Multiple Strike Group Training—Alternative 1

Major Exercises would include Multiple Strike Group training that could include the continued use of the southeast end of Kaula for bombing and Air-to-Ground GUNEX training. Impacts would be the same as described for the No-action Alternative.

4.3.2.10.4.4 Alternative 3 (Geology and Soils—Kaula)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of

Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on geology and soils under Alternative 3 would be the same as those described for Alternative 2.

4.3.2.10.5 Health and Safety—Kaula

4.3.2.10.5.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Health and Safety—Kaula)

Under the No-action Alternative, Kaula will continue to be used for aircraft gunnery and inert ordnance target practice. To minimize health and safety risks, a Surface Danger Zone has been established around the island, and the island and surrounding tidal zone are closed to unauthorized personnel. In addition, prior to any gunnery activities, an aircraft flies over the island and determines if it is safe to conduct the mission. While Alternatives 1, 2, and 3 would result in the total number of Major Exercises and training events increasing, the health and safety concerns would be similar to existing concerns, and existing SOPs and procedures would be used.

4.3.2.10.6 Land Use—Kaula

4.3.2.10.6.1 No-action Alternative (Land Use—Kaula)

HRC Training—No-action Alternative

The No-action Alternative stands as no change from current levels of training usage, and the Navy will continue its current activities in the HRC. Approximately 10 acres of the 108-acre island of Kaula will continue to be used for Bombing Exercises and Air-to-Ground GUNEX (Table 2.2.2.3-1). The State has included the island within the conservation protective subzone use designation, which will limit any development on the island. The open undeveloped conservation use and designation of the island is compatible with the Navy's gunnery practice activities. According to the Hawaii Department of Land and Natural Resources, the Hawaii State Seabird Sanctuary consists of and includes 40 State-owned or controlled islands, islets, and rocks (Hawaii Department of Land and Natural Resources, 1981). Kaula was listed erroneously by the State as one of these islands; it remains Federally owned and controlled. Training at Kaula will continue to be consistent to the maximum extent practicable with the Hawaii Coastal Zone Management Program. Under the No-action Alternative, the land-based use of Kaula will not change.

4.3.2.10.6.2 Alternative 1 (Land Use—Kaula)

Increased Tempo and Frequency of Training—Alternative 1

Under Alternative 1, the number of training events for bombing and Air-to-Ground GUNEX associated with STW would increase. STW includes the bombing activities, which would increase by approximately 31 percent and the Air-to-Ground GUNEX, which would increase by approximately 13 percent on Kaula. Overall, the increase in activities would not change or alter land use on Kaula.

Major Exercises—Alternative 1

STWs and CASEX are activities included in Major Exercises that would continue to be supported at Kaula. The land-base use of Kaula would not change under Major Exercises.

4.3.2.10.6.3 Alternative 2 (Land Use—Kaula)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the number of BOMBEX (land) would increase by approximately 52 percent and Air-to-Ground GUNEX would increase by 13 percent. Under Alternative 2 the increase in training would not change or alter land-base use on Kaula.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would conduct training simultaneously in the HRC (Figure 1.2-3) The Strike Groups would not be homeported in Hawaii, but would stop in Hawaii en route to a final destination. The Strike Group would be in Hawaii for up to 10 days per year. Under Alternative 2, BOMBEX (land) would increase by approximately 52 percent and Air-to-Ground GUNEX would increase by 13 percent. These increases in training events would not change or alter land-based use on Kaula.

4.3.2.10.6.4 Alternative 3 (Land Use—Kaula)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on land use under Alternative 3 would be the same as those described for Alternative 2.

4.4 OAHU

4.4.1 OAHU OFFSHORE

4.4.1.1 PUULOA UNDERWATER RANGE—OFFSHORE

Table 4.4.1.1-1 lists ongoing training and research, development, test and evaluation (RDT&E) activities for the No-action Alternative and proposed training and RDT&E activities for Alternatives 1, 2 and 3 at the Puuloa Underwater Range. Alternative 3 is the preferred alternative.

Table 4.4.1.1-1. Training and RDT&E Activities at Puuloa Underwater Range—Offshore

Training	Research, Development, Test, and Evaluation (RDT&E) Activities
• Mine Neutralization • Special Warfare Operations (SPECWAROPS) • Salvage Operations	• Mobile Diving and Salvage Unit Training Area

A review of the 13 resources against offshore training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the Puuloa Underwater Range. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would be no air emission sources associated with Puuloa Underwater Range. Use of the Puuloa Underwater Range would not require control of the airspace offshore. Training and RDT&E activities associated with this site would adhere to policies and regulations governing noise, as discussed in Appendix C.

There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population at the Puuloa Underwater Range is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training and RDT&E activities at the site would not generate any hazardous waste streams that could impact local water quality. Additionally, there is no planned construction or alteration that would affect land forms, geology, and associated soils.

4.4.1.1.1 Biological Resources—Puuloa Underwater Range—Offshore

4.4.1.1.1.1 No-action Alternative (Biological Resources—Puuloa Underwater Range—Offshore)

HRC Training and Major Exercises—No-action Alternative

Under the No-action Alternative, up to 62 Mine Neutralization training activities per year will continue to occur at locations such as Puuloa Underwater Range, or about 5 to 6 per month. Mine Neutralization activities involve the detection, identification, evaluation, rendering safe, and disposal of mines and unexploded ordnance (UXO) that constitutes a threat to ships or personnel. Mine Neutralization training involves a diver placing a specific amount of explosives which, when detonated underwater at a specific distance from a mine, results in neutralization of the mine. Floating, or moored, mines involve the diver placing a specific amount of explosives directly on the mine. Floating mines encountered by fleet ships in open-ocean areas are detonated at the surface. In support of a military Expeditionary Assault, the Navy deploys in very shallow water depths (10 to 40 feet [ft]) to locate mines and obstructions. Training uses explosives charges of no more than 20 pounds (lb) net explosive weight. High-order detonations result in almost complete conversion of explosives (99.997 percent or more [U.S. Army Corps of Engineers, 2003]) into such inorganic compounds as water, carbon dioxide, carbon monoxide, and nitrogen. This is further discussed in Section 4.4.1.1.3.1. Training will follow the relevant Navy policies and procedures to minimize impacts on biological resources.

Prior to actual detonation, the area is determined to be clear of marine mammals and sea turtles. When the divers enter the water, they have an opportunity to detect marine mammals and humpback whales visually or audibly (if the whales are vocalizing). The training does not proceed if marine mammals are in the vicinity. The delay between initiating the fuse and the detonation of the explosives is only 30 minutes, minimizing the opportunity for marine mammals to enter the area. Given the relatively small size of the charge, the area within which marine mammals would be at risk from the explosive is quite limited. Standard procedures require tethered mines to be suspended at least 10 ft below the surface of the water. Impacts on marine mammals and sea turtles from underwater explosions are discussed in Section 4.1.2. Only sandy areas that avoid/minimize potential impacts on coral are used for explosive charges on the shallow water floor (less than 40 ft of water).

Salvage Operations take place in any of the shoal waters, harbors, ports, and in-land waterways throughout the Hawaii Range Complex (HRC). The Navy's Mobile Diving and Salvage Unit One (MDSU-1) and divers from other countries practice ship and barge salvage, towing, battle damage repair, deep ocean recovery, harbor clearance, removal of objects from navigable waters, and underwater ship repair capabilities. Staging for these activities is from the MDSU-1 Facility located on the southwestern side of Hickam Air Force Base (AFB). Small cutting charges may be used during Salvage Operations training. There can be minor and localized loss of some fish and benthic community populations from the explosions. All waters around Naval Station Pearl Harbor have been designated as Essential Fish Habitat (EFH) for eggs and larvae of a number of species. The harbor has not been designated as a Habitat Area of Particular Concern. (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001) After training involving underwater detonations is complete, the area will be searched for injured animals.

Because of the diluting affects of ocean currents and the distance from the range, demolition activities are not expected to impact the aquaculture farm located 0.5 nautical mile (nm) outside the range boundary. Any effects from noise, shock, or residual chemicals will be localized and temporary.

Special Warfare Operations (SPECWAROPS) are performed by Navy Sea, Air and Land (SEALs) and U.S. Marines. Activities include special reconnaissance, reconnaissance and surveillance, combat search and rescue, and direct action. Reconnaissance inserts and beach surveys are often conducted before large-scale amphibious landings and can involve several units gaining covert access using a boat. The training events involve fewer than 20 troops and have minimal interaction with the environment, since one of the purposes of the training event is to operate undetected. During amphibious inserts the crews follow established procedures, such as having designated lookouts watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The troops review training overlays that identify the insertion points and any nearby restricted areas. Sensitive biological and cultural resource areas are avoided by the SPECWAROPS troops (Training Guidelines for Resource Protection—All Oahu Training Areas). (U.S. Department of the Navy, 2002a)

Potential effects on marine biological resources from mid-frequency active/high-frequency active (MFA/HFA) sonar usage are discussed in the applicable Open Ocean No-action Alternative sections.

4.4.1.1.1.2 Alternative 1 (Biological Resources—Puuloa Underwater Range—Offshore)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six Undersea Warfare Exercises (USWEXs) per year, the biennial Rim of the Pacific (RIMPAC) exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training events (See Table 2.2.2.3-1). No increase in the training events performed in the Puuloa Underwater Range is anticipated. Impacts on biological resources would be similar to those described previously for the No-action Alternative. Impacts on marine mammals, sea turtles, and fish from underwater sound levels produced by the use of MFA/HFA sonar and from underwater explosions are discussed in Section 4.1.2.

HRC Enhancements—Alternative 1

The Navy would establish an underwater training area in which MDSU-1 can conduct military diving and salvage training, including submerging a 100-ft by 50-ft vessel. Prior to the sinking of any vessels or deployment of steel frames for Naval Special Warfare exercises, environmental documents would be developed and reviewed as appropriate. The Navy would begin early coordination with regulatory agencies as applicable to reduce environmental impacts and to assist with the development of any required mitigative measures. Figure 2.2.3.6.2-2 shows three proposed locations (Sites A, B, and C) with Site B (in the Naval Defensive Sea Area) being the preferred location. Site C is located within the Puuloa Range. The vessel would be placed within a 328- by 328-ft area. The type of training to be conducted would consist of various underwater projects designed to develop mission critical skills, such as hot tapping, welding, cutting, patching, plugging, drilling, tapping, and grinding. Sensitive biological resource areas and species would be avoided during the establishment of this training area. Impacts would be similar to those from Salvage Operations.

The Navy proposes to develop targets and support target maintenance for exposed beach obstacles and fortified beach or offshore defenses, at least some of which must be cleared for live Naval Special Warfare (NSW) weapons and explosives. NSW targets are steel frames and shapes that can be lowered into the water to simulate hulls of ships, or amphibious obstacles. Explosive Ordnance Disposal (EOD) targets would be inert mine and bomb shapes. Some targets would be removed following the training. Others, including NSW obstacles and EOD targets, would be destroyed in place and are not recoverable. Impacts would be similar to those from Mine Neutralization and Salvage Operations.

4.4.1.1.1.3 Alternative 2 (Biological Resources—Puuloa Underwater Range—Offshore)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training events would be increased and the frequency of training events could also increase, including an additional six Mine Neutralization training events. Since Mine Neutralization training events occur in other areas of the HRC, not all of the additional six per year would necessarily take place in the Puuloa Underwater Range. Prior to actual detonation, the area would be determined as clear of marine mammals. Explosive charges, in less than 40 ft of water, would be placed/neutralized only in sandy areas to avoid/minimize potential impacts on coral. Impacts on marine mammals, sea turtles, and fish from underwater explosions are discussed in Section 4.1.2. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 2 are discussed in the applicable Open Ocean sections.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.1.1.1.4 Alternative 3 (Biological Resources—Puuloa Underwater Range—Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.4.1.1.2 Cultural Resources—Puuloa Underwater Training Range—Offshore

4.4.1.1.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Cultural Resources—Puuloa Underwater Training Range—Offshore)

No known cultural resources exist in the Puuloa Underwater Range. The area has been used for underwater demolition training for many years, and no impacts on cultural resources have been identified. No impacts on cultural resources will occur from either the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3.

4.4.1.1.3 Hazardous Materials and Waste—Puuloa Underwater Range—Offshore

4.4.1.1.3.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Hazardous Materials and Waste—Puuloa Underwater Range—Offshore)

HRC Training—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Under the No-action Alternative and Alternative 1, approximately 62 Mine Neutralization training events per year will occur at Puuloa Underwater Range, or about 5 to 6 per month. Under Alternatives 2 and 3, approximately 68 Mine Neutralization training events per year could occur. In addition, one salvage training event per year can be held on this range under the No-action Alternative or Alternative 1, Alternative 2, or Alternative 3. Training will use explosives charges of no more than 20 lb each, net explosive weight.

The major explosive byproducts of organic nitrated compounds such as trinitrotoluene (TNT), cyclotrimethylenetrinitramine, and Royal Demolition Explosive (RDX) include water, carbon dioxide, carbon monoxide, and nitrogen (Department of Health and Human Services, Agency for Toxic Substance and Disease Registry, 2003; Renner and Short, 1980; Cook and Spillman, 2000). High-order detonations result in almost complete conversion of explosives (99.997% or more [U.S. Army Corps of Engineers, 2003]) into such inorganic compounds. Table 4.4.1.1.3-1 lists the calculated chemical byproducts of high-order underwater detonation of TNT, RDX, and related materials.

Table 4.4.1.1.3-1: Chemical Byproducts of Underwater Detonations

Byproduct	Percent by Weight, by Explosive Compound			
	TNT	RDX	Composition B	PBX
Nitrogen	18.2	37.0	29.3	33.2
Carbon dioxide	27.0	24.9	34.3	32.0
Water	5.0	16.4	8.4	13.2
Carbon monoxide	31.3	18.4	17.5	7.1
Carbon (elemental)	10.6	-	2.3	3.2
Ethane	5.2	1.6	5.4	7.1
Hydrogen	0.2	0.3	0.1	0.1
Propane	1.6	0.2	1.8	2.8
Ammonia	0.3	0.9	0.6	1
Methane	0.2	0.2	0.2	0.1
Hydrogen cyanide	<0.0	<0.0	<0.0	<0.0
Methyl alcohol	<0.0	<0.0	-	-
Formaldehyde	<0.0	<0.0	<0.0	<0.0
Other compounds	<0.0	<0.0	<0.0	<0.0

Source: Renner and Short, 1980

Explosives use will total about 1,240 lb per year under the No-action Alternative and Alternative 1, and about 1,360 lb per year under Alternative 2 and Alternative 3. The transport, handling, and use of such modest quantities of hazardous materials by trained Navy personnel on an infrequent basis, primarily within Navy-controlled areas, will have no effect on ongoing hazardous materials management activities. No hazardous wastes would be generated by these training events.

Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Major Exercises under all Alternatives, such as RIMPAC and USWEX, include training and, in some cases, RDT&E activities. Under Alternative 2 and Alternative 3, Multiple Strike Groups would conduct limited, short-term Demolition and SPECWAROPS at Puuloa Range. The potential impacts of Major Exercises will be similar to those described above for training and RDT&E activities.

4.4.1.1.4 Health and Safety—Puuloa Underwater Range—Offshore

4.4.1.1.4.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Health and Safety—Puuloa Underwater Range—Offshore)

HRC Training—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Underwater Demolition activities at Puuloa Underwater Range under the No-action Alternative and Alternative 1 will consist of up to 62 training events per year, using no more than 20 lb net explosive weight of ordnance. Under Alternative 2 and Alternative 3, up to 68 Mine Neutralization events per year could occur. In addition, one salvage training event per year can be held on this range under the No-action Alternative or Alternative 1, Alternative 2, or Alternative 3.

The public will not be exposed to the energetic effects of the detonations because the range will be cleared, and these effects will be completely contained within the range. Existing Navy safety protocols for the use of explosives will ensure that no non-participants will be in the area during training. The Coast Guard is notified of each planned detonation.

Demolition activities will be conducted in accordance with Commander, Naval Surface Force, U.S. Pacific Fleet (COMNAVSURFPAC) Instruction 3120.8F (U.S. Department of the Navy, 1993). COMNAVSURFPAC Instruction 3120.8F specifies detonation procedures for underwater ordnance to avoid endangering the public or impacting other non-military activities, such as shipping, recreational boaters, divers, and commercial or recreational fishermen.

Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Major Exercises under all Alternatives, such as RIMPAC and USWEX, include training and, in some cases, RDT&E activities. Under Alternative 2 and Alternative 3, Multiple Strike Groups would conduct limited, short-term Demolition and SPECWAROPS at Puuloa Range. The potential impacts of Major Exercises will be similar to those described above for training and RDT&E activities.

4.4.1.2 NAVAL DEFENSIVE SEA AREA—OFFSHORE

Table 4.4.1.2-1 lists ongoing training and RDT&E activities for the No-action Alternative and proposed training and RDT&E activities for Alternatives 1, 2 and 3 offshore at the Naval Defensive Sea Area. Alternative 3 is the preferred alternative.

Table 4.4.1.2-1. Training and RDT&E Activities at Naval Defensive Sea Area—Offshore

Training	Research, Development, Test, and Evaluation (RDT&E) Activities
• Salvage Operations	• Mobile Diving and Salvage Unit Training Area (Alternative 1)

A review of the 13 resources against offshore training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the Naval Defensive Sea Area. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and waste, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would be no air emission sources associated with the Naval Defensive Sea Area. Use of this site would not require control of the airspace offshore. Training and RDT&E activities associated with this site would adhere to policies and regulations governing noise and hazardous materials and waste, as discussed in Appendix C.

There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population at the Naval Defensive Sea Area is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training and RDT&E activities at the site would not generate any hazardous waste streams that could impact local water quality. Additionally, there is no planned construction or alteration that would affect land forms, geology, and associated soils.

4.4.1.2.1 Biological Resources—Naval Defensive Sea Area—Offshore

4.4.1.2.1.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Biological Resources—Naval Defensive Sea Area—Offshore)

Potential effects on marine biological resources from MFA/HFA sonar usage determined for the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 are discussed in the applicable Open Ocean sections.

HRC Training and Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Current Salvage Operations have not resulted in any significant impacts on the four endangered waterbirds that have been identified in the region of influence. The green turtle has rarely been seen in the harbor and no nesting has been reported. The Hawaiian monk seal has been seen in the channel, but never reported in the harbor, and only one unusual humpback whale sighting has occurred in the region of influence.

All waters around Naval Station Pearl Harbor have been designated as Essential Fish Habitat (EFH) for eggs and larvae of a number of species. None of the current Salvage Operations have the potential to affect EFH. Acoustic effects on fish are discussed in Section 4.1.2 under Open Ocean Biological Resources. RIMPAC Exercises have procedures and practices in place to prevent the introduction of invasive species, consistent with Executive Order (EO) 13112 and Navy guidelines. The Navy requests that multinational participants purge bilge/ballasts tanks in their ships prior to entering U.S. territorial waters. The movement and berthing of ships and small training events in the harbor area are part of ongoing training at Naval Station Pearl Harbor. Marine mammal collision avoidance and encounter reporting procedures are already in place and implemented.

HRC Enhancements—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

The Navy would establish an underwater training area in which MDSU-1 can conduct military diving and salvage training, including submerging a 100-ft by 50-ft vessel. Prior to the sinking of any vessels or deployment of steel frames for Naval Special Warfare Exercises, environmental documents would be developed and reviewed as appropriate. The Navy would begin early coordination regulatory agencies as applicable to reduce environmental impacts and to assist with the development of any required mitigative measures. Figure 2.2.3.6.2-2 shows three proposed locations (Sites A, B, and C) with Site B (in the Naval Defensive Sea Area) being the preferred location. The vessel would be placed within a 328- by 328-ft area. The type of training to be conducted would consist of various underwater projects designed to develop mission critical skills, such as hot tapping, welding, cutting, patching, plugging, drilling, tapping, and grinding. Sensitive biological resource areas and species would be avoided during the establishment of this training area. Impacts would be similar to those from Salvage Operations.

4.4.1.2.2 Cultural Resources—Naval Defensive Sea Area—Offshore

4.4.1.2.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Cultural Resources—Naval Defensive Sea Area—Offshore)

No known cultural resources exist in the Naval Defensive Sea Area. The area has been used for underwater training for many years, and no impacts on cultural resources have been identified. No impacts on cultural resources will occur from either the No-action Alternative or Alternative 1, Alternative 2, or Alternative 3.

4.4.1.2.3 Health and Safety—Naval Defensive Sea Area—Offshore

4.4.1.2.3.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Health and Safety—Naval Defensive Sea Area—Offshore)

HRC Training and Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Salvage training can be held on this range under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. The public will not be exposed to training occurring in the Naval Defensive Sea Area because the area will be cleared, and the training will be completely contained. Existing Navy safety protocols will ensure that no non-participants will be in the area during training. The Coast Guard is notified of each planned training event.

HRC Enhancements—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

In a proposed underwater training area, MDSU-1 would conduct military diving and salvage training, including submerging a 100-ft by 50-ft barge. Figure 2.2.3.6.2-2 shows the alternative sites in the Naval Defensive Sea Area. The type of training to be conducted would consist of various underwater projects designed to develop mission critical skills, such as hot tapping, welding, cutting, patching, plugging, drilling, tapping, and grinding. Because the Navy has jurisdiction over the Naval Defensive Sea Area, the proposed training would be restricted to vessels owned and operated by military and Department of Defense (DoD) personnel. The restricted access in this area would minimize the potential for public safety issues.

4.4.1.3 MARINE CORPS BASE HAWAII (MCBH)—OFFSHORE

Table 4.4.1.3-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 offshore at Marine Corps Base Hawaii (MCBH). Alternative 3 is the preferred alternative.

Table 4.4.1.3-1. Training at MCBH—Offshore

Training	
• Special Warfare Operations (SPECWAROPS)	• Mine Neutralization • Expeditionary Assault

A review of the 13 resources against offshore training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for MCBH. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would be no air emissions generated at MCBH from offshore training other than that from an occasional aircraft event. The aircraft events would not change regional air quality. The proposed alternatives would not affect the existing airspace structure in the region. Training associated with this site would adhere to policies and regulations governing noise and hazardous materials and waste, as discussed in Appendix C. Airspace would be affected within existing Takeoff Safety Zones and Approach-Departure Clearance Surfaces that are delineated over the runways and do not extend off-base.

Geology and soils impacts at MCBH would be limited to short-term minor disturbance of beach sand and near-shore ocean floor along existing Expeditionary Assault access routes. Movement from the beach would also result in minor, short-term disturbance to soils along pre-defined access routes. There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training at the site would not generate any hazardous waste streams that could impact local water quality.

4.4.1.3.1 Biological Resources—MCBH—Offshore

4.4.1.3.1.1 No-action Alternative (Biological Resources—MCBH—Offshore)

HRC Training and Major Exercises—No-action Alternative

Under the No-action Alternative, up to 62 Mine Neutralization training events per year will continue to occur at MCBH, or up to about 5 to 6 per month. Mine Neutralization activities involve the detection, identification, evaluation, rendering safe, and disposal of mines and UXO that constitutes a threat to ships or personnel. Mine neutralization training involves a diver placing a specific amount of explosives which, when detonated underwater at a specific distance from a mine, results in neutralization of the mine. Floating, or moored, mines involve the diver placing a specific amount of explosives directly on the mine. Floating mines encountered by fleet ships in open-ocean areas are detonated at the surface. In support of a military Expeditionary Assault, the Navy deploys in very shallow water depths (10 to 40 ft) to locate mines and obstructions. Training uses explosives charges of no more than 20 lb net explosive weight. Training will follow the relevant Biological Opinions and Navy/Marine Corps policies and procedures to minimize impacts on biological resources. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Marine Corps regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

Prior to actual detonation, the area is determined to be clear of marine mammals. When the divers enter the water, they have an opportunity to detect marine mammals and humpback whales visually or audibly (if the whales are vocalizing). The training does not proceed if marine mammals are in the vicinity. The delay between initiating the fuse and the detonation of the explosives is approximately 30 minutes, minimizing the opportunity for marine mammals to enter the area. Given the relatively small size of the charge, the area within which marine mammals would be at risk from the explosive is quite limited. Standard procedures require tethered mines to be suspended at least 10 ft below the surface of the water. Impacts on marine mammals and sea turtles from underwater explosions are discussed in Section 4.1.2. Only sandy areas that avoid/minimize potential impacts on coral are used for explosive charges on the shallow water floor (less than 40 feet of water).

Landing sites are selected to minimize potential impacts on exposed reefs and coral colonies, and associated benthic communities. Assault amphibious vehicles and Landing Craft, Air Cushion with drafts exceeding 6 ft could inadvertently damage live coral present in shallow offshore waters at the Hale Koa/West Field and Fort Hase beach areas. However, the Landing Craft, Air Cushion (LCAC) and Combat Rubber Reconnaissance Craft (CRRC) used have drafts less than 3 ft and are unlikely to have such impacts.

LCAC landings are allowed at Hale Koa/West Field Beach, but they are restricted from Pyramid Rock and Fort Hase beaches. The physical boundaries of the landing sites are marked to avoid impacts on live coral and unique habitats. Landing Craft, Utility (LCU) landings are restricted to Pyramid Rock Beach or the LCU ramp at the base Fuel Pier.

The purpose of most SPECWAROPS is to operate undetected. The training events generally involve fewer than 20 troops and have minimal interaction with the environment. During amphibious inserts the crews follow established procedures, such as having designated lookouts watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The troops review training overlays that identify the insertion points and any nearby restricted areas. Sensitive biological and cultural resource areas are avoided by the SPECWAROPS troops (Training Guidelines for Resource Protection—All Oahu Training Areas). (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997)

Expeditionary Assault activities are restricted to specific areas of designated beaches. The activities are conducted in compliance with EO 13089, *Coral Reef Protection*. Before each Expeditionary Assault is conducted, a hydrographic survey is performed to map out the precise transit routes through sandy bottom areas. Within 1 hour of initiation of the landing activities, the landing routes and beach areas are determined to be clear of marine mammals and sea turtles. If any are seen, the training event is delayed until the animals leave the area. During the landing the crews follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. Other measures include publication of training overlays that identify the landing routes and any restricted areas. Where necessary, surveys for turtles are conducted prior to the training event so their feeding and nesting areas can be avoided. (U.S. Department of the Navy, 2002a)

Potential effects on marine biological resources from MFA/HFA sonar usage are discussed in the applicable Open Ocean No-action Alternative sections.

4.4.1.3.1.2 Alternative 1 (Biological Resources—MCBH—Offshore)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). While training events would not increase in number, their tempo may increase, but the likelihood of a similar increase in adverse impacts on biological resources is small, as discussed below.

Vegetation

Training would continue to take place at existing locations; no expansion of the area would be involved. Compliance with relevant Marine Corps and Navy policies and procedures during training would minimize the potential for effects on seagrass as well as limit the potential for introduction of invasive plant species. No threatened or endangered plant species are known to occur on MCBH.

Wildlife

The increased training events would comply with relevant Marine Corps and Navy policies and procedures, which would further reduce the potential for effects on wildlife. The beach and offshore waters would continue to be monitored for the presence of marine mammals and sea turtles 1 hour before and during training. If any are seen, then the training event would be delayed until the animals leave the area. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 1 are discussed in the applicable Open Ocean sections.

4.4.1.3.1.3 Alternative 2 (Biological Resources—MCBH—Offshore)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training events would be increased and the frequency of training events could also increase, including an additional six Mine Neutralization training events. Since Mine Neutralization events occur in other areas of the HRC, not all of the additional six per year would necessarily take place in the MCBH. Prior to actual detonation, the area would be determined to be clear of marine mammals. Explosive charges, in less than 40 ft of water, would be placed/neutralized only in sandy areas to avoid/minimize potential impacts on coral. Impacts on marine mammals, sea turtles, and fish from underwater explosions are discussed in Section 4.1.2. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 2 are discussed in the applicable Open Ocean sections.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.1.3.1.4 Alternative 3 (Biological Resources—MCBH—Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.1.3.2 Cultural Resources—MCBH—Offshore

4.4.1.3.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Cultural Resources—MCBH—Offshore)

According to the National Oceanic and Atmospheric Administration's (NOAA's) location maps there are several shipwrecks and Native Hawaiian fishponds in the vicinity of MCBH (see Figures 3.1.3-2 and 3.4.1.3.2-1); however, none are located within the direct offshore region of influence for HRC training. In the event unanticipated cultural remains are identified, all training will cease in the immediate vicinity and the Hawaii State Historic Preservation Officer (SHPO) immediately notified in accordance with the Programmatic Agreement (see Appendix H). No impacts on cultural resources would occur as a result of the additional training events and frequency of conducting those training events under Alternative 1, Alternative 2, and Alternative 3.

4.4.1.4 MARINE CORPS TRAINING AREA/BELLOWS (MCTAB)—OFFSHORE

Table 4.4.1.4-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 offshore at Marine Corps Training Area/Bellows (MCTAB). Alternative 3 is the preferred alternative.

Table 4.4.1.4-1. Training Offshore of MCTAB—Offshore

Training	
• Expeditionary Assault	• Swimmer Insertion/Extraction
• Mine Neutralization	• Special Warfare Operations (SPECWAROPS)

A review of the 13 resources against offshore training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for MCTAB. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would be no air emissions generated at MCTAB from training other than that from an occasional Aircraft Operation. The Aircraft Operations would not change regional air quality. Airspace use at MCTAB is limited to rotary wing aircraft. The proposed alternatives would not affect the existing airspace structure in the region.

Training associated with this site would adhere to policies and regulations governing noise and hazardous materials and waste, as discussed in Appendix C. Geology and soils impacts at MCTAB–Offshore would be limited to short-term minor disturbance of beach sand and offshore ocean floor along existing Expeditionary Assault access routes. There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training at the site would not generate any hazardous waste streams that could impact local water quality.

4.4.1.4.1 Biological Resources—MCTAB—Offshore

4.4.1.4.1.1 No-action Alternative (Biological Resources—MCTAB—Offshore)

HRC Training and Major Exercises—No-action Alternative

Under the No-action Alternative, up to 62 Mine Neutralization training events per year will continue to occur at MCTAB, or up to about 5 to 6 per month. Mine Neutralization activities are described in Section 4.4.1.2.1.1. Training will follow the relevant Biological Opinions and Navy/Marine Corps policies and procedures to minimize impacts on biological resources. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Marine Corps regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

Prior to actual detonation, the area is determined to be clear of marine mammals. When the divers enter the water, they have an opportunity to detect marine mammals and humpback whales visually or audibly (if the whales are vocalizing). The training event does not proceed if marine mammals are in the vicinity. The delay between initiating the fuse and the detonation of the explosives is only 30 minutes, minimizing the opportunity for marine mammals to enter the area. Given the relatively small size of the charge, the area within which marine mammals would be at risk from the explosive is quite limited. Standard procedures require tethered mines to be suspended at least 10 ft below the surface of the water. Impacts on marine mammals and sea turtles from underwater explosions are discussed in Section 4.1.2. Only sandy areas that avoid/minimize potential impacts on coral are used for explosive charges on the shallow water floor (less than 40 ft of water).

Landing sites are selected to minimize potential impacts on exposed reefs and coral colonies, and associated benthic communities. The physical boundaries of the landing sites are marked to avoid impacts on live coral and unique habitats. There are no live coral colonies along the coastal areas because of shifting sand and scouring caused by wave action. Impacts on live coral further seaward from tracked vehicles are minimized by use of regular transit routes through sandy bottom areas.

Green turtles occur frequently in the offshore water, and hawksbill turtles occasionally feed in these waters. Hawaiian monk seals have also been sighted in the area. An occasional humpback whale could use Waimanalo Bay. Well-trained crews follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals, or sea turtles. The landing routes and beach areas will continue to be determined clear of marine mammals and sea turtles within 1 hour of the landing activities. If any are seen, the training event will be delayed until the animals leave the area.

The purpose of most SPECWAROPS is to operate undetected. The training event generally involves fewer than 20 troops and has minimal interaction with the environment. During amphibious inserts the crews follow established procedures, such as having designated lookouts watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The troops review training overlays that identify the insertion points and any nearby restricted areas. Sensitive biological and cultural resource areas are avoided by the SPECWAROPS troops (Training Guidelines for Resource Protection—All Oahu Training Areas). (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997)

Expeditionary Assault activities are restricted to specific areas of designated beaches. The activities are conducted in compliance with EO 13089, *Coral Reef Protection*. Before each Expeditionary Assault is conducted, a hydrographic survey is performed to map out the precise transit routes through sandy bottom areas. Within 1 hour of initiation of the landing activities, the landing routes and beach areas are determined to be clear of marine mammals and sea turtles. If any are seen, the training event is delayed until the animals leave the area. During the landing the crews follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. Other measures include publication of training overlays that identify the landing routes and any restricted areas. Where necessary, surveys for turtles are conducted prior to the training event so their feeding and nesting areas can be avoided. (U.S. Department of the Navy, 2002a)

Naval Special Warfare personnel conduct underwater swimmer insertion and extraction training in the Hawaii Offshore Areas using either the Sea, Air, Land (SEAL) Delivery Vehicle (SDV), or the Advanced SEAL Delivery System (ASDS). Both submersibles are designed to deliver Special Operations forces for clandestine activities.

Underwater Swimmer Insertion and Extraction training focuses on undersea use of the SDV or ASDS, and does not typically involve SEAL personnel landing ashore or conducting shore training. Although undersea range areas are usually reserved for a 24-hour period, the insertion/extraction training event itself lasts approximately 8 hours. Swimmer insertion and extraction training can also include the use of helicopters to insert or extract personnel using a variety of techniques.

To further minimize potential impacts on biological resources, instructions to Service elements engaged in Swimmer Insertion/Extraction, Expeditionary Assault, and Mine Neutralization activities will include:

- Conducting surveys prior to use of amphibious launch vehicles to ensure that humpback whales are not disturbed.
- Establishing buffer zones in locations where green sea turtles are known to feed so that Amphibious Landing training events do not disturb these areas.
- Marking and monitoring green turtle nests discovered on beaches so they are not affected by training.

Potential effects on marine biological resources from MFA/HFA sonar usage are discussed in the applicable Open Ocean No-action Alternative sections.

4.4.1.4.1.2 Alternative 1 (Biological Resources—MCTAB—Offshore)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). While training events would not increase in number, their tempo may, but the likelihood of a similar increase in adverse impacts on biological resources is small, as discussed below.

Vegetation

Training would take place at existing locations; no expansion of the area would be involved. Compliance with relevant Marine Corps and Navy policies and procedures during training would minimize the potential for effects on seagrass as well as limit the potential for introduction of invasive plant species. No threatened or endangered plant species are known to occur on MCTAB.

Wildlife

The increased training events would comply with relevant Marine Corps and Navy policies and procedures, which would further reduce the potential for effects on wildlife. The beach and offshore waters would continue to be monitored for the presence of marine mammals and sea turtles 1 hour before and during training. If any are seen, then the training event would be delayed until the animals leave the area. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 1 are discussed in the applicable Open Ocean sections.

4.4.1.4.1.3 Alternative 2 (Biological Resources—MCTAB—Offshore)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and an additional six Mine Neutralization events would occur. Since Mine Neutralization events occur in other areas of the HRC, not all of the additional six per year would necessarily take place in the MCTAB. Prior to actual detonation, the area would be determined as clear of marine mammals. Explosive charges, in less than 40 ft of water, would be placed/neutralized only in sandy areas to avoid/minimize potential impacts on coral. Impacts on marine mammals, sea turtles, and fish from underwater explosions are discussed in Section 4.1.2. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 2 are discussed in the applicable Open Ocean sections.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.1.4.1.4 Alternative 3 (Biological Resources—MCTAB—Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.1.4.2 Cultural Resources—MCTAB—Offshore

4.4.1.4.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Cultural Resources—MCTAB—Offshore)

According to NOAA's location maps there are several shipwrecks and Native Hawaiian fishponds in the vicinity of MCTAB (see Figure 3.1.3-2 and 3.4.1.3.2-1); however, none are located within the direct offshore region of influence for HRC training. In the event unanticipated cultural remains are identified, all training will cease in the immediate vicinity and the Hawaii SHPO will be immediately notified. The nearest cultural resources include scattered shipwrecks in nearby waters (see Figure 3.1.3-2). With the implementation of established procedures, no impacts on cultural resources would occur during HRC training.

4.4.1.5 MAKUA MILITARY RESERVATION—OFFSHORE

Table 4.4.1.5-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 offshore at Makua Military Reservation. Alternative 3 is the preferred alternative.

Table 4.4.1.5-1. Training at Makua Military Reservation—Offshore

Training
• Special Warfare Operations (SPECWAROPS)

A review of the 13 resources against offshore training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the Makua Military Reservation. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and hazardous waste, land use, noise, socioeconomics, transportation, utilities, and water resources.

There are no air emission issues from HRC training associated with Makua Military Reservation. There would be no airspace use. Geology and soils impacts would be limited to short-term minor disturbance of beach sand and near-shore ocean floor along existing SPECWAROPS access routes. Movement from the beach would also result in minor, short-term disturbance to soils along pre-defined access routes.

Water resources at Makua Military Reservation would not be affected by the short-term temporary foot traffic during the SPECWAROPS. Training associated with this site adhere to policies and regulations governing hazardous materials and waste, health and safety, and noise as discussed in Appendix C. There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative.

4.4.1.5.1 Biological Resources—Makua Military Reserve—Offshore

4.4.1.5.1.1 No-action Alternative (Biological Resources—Makua Military Reservation—Offshore)

HRC Training and Major Exercises—No-action Alternative

The National Centers for Coastal Ocean Science/NOAA benthic habitat maps show no coral reefs along the western side of Oahu from the Naval Reservation to the Makua Military Reservation. The only non-listed marine mammals potentially present in the region of influence are the bottlenose dolphin and rough-toothed dolphin (U.S. Department of the Navy, 2005b).

The only threatened and endangered marine mammals potentially present in the region of influence are the Hawaiian monk seal and the humpback whale (U.S. Department of the Navy, 2005b). Of the five species of sea turtles that occur in Hawaiian waters, only the green turtle and rarely the leatherback turtle are likely to be in the region of influence (U.S. Department of the Army, 2005).

The purpose of most SPECWAROPS is to operate undetected. The training event generally involves fewer than 20 troops and has minimal interaction with the environment. During amphibious inserts the crews follow established procedures, such as having designated lookouts watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The troops review training overlays that identify the insertion points and any nearby restricted areas. Training will follow the relevant Biological Opinions and Army policies and procedures to minimize impacts on biological resources. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed. Sensitive biological and cultural resource areas are avoided by the SPECWAROPS troops (Training Guidelines for Resource Protection—All Oahu Training Areas). (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1997)

Potential effects on marine biological resources from MFA/HFA sonar usage are discussed in the applicable Open Ocean No-action Alternative sections.

4.4.1.5.1.2 Alternative 1 (Biological Resources—Makua Military Reservation—Offshore)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). While training events at Makua would not increase in number, their tempo may increase, but the likelihood of a similar increase in adverse impacts on biological resources is small, as described below.

Vegetation

Training would take place at existing locations; no expansion of the area would be involved. Compliance with relevant Navy guidelines, and other applicable Army procedures, during training would minimize the potential for effects on vegetation, as well as limit the potential for introduction of invasive algal species.

Wildlife

The beach and offshore waters would continue to be monitored for the presence of marine mammals and sea turtles 1 hour before and during training. If any are seen, then the training event would be delayed until the animals leave the area. Impacts are similar to those in Section 4.4.1.1.1.1. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 1 are discussed in the applicable Open Ocean sections.

4.4.1.5.1.3 Alternative 2 (Biological Resources—Makua Military Reservation—Offshore)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased but the frequency of training events would not change. Training would continue to take place at existing locations; no expansion of the area would be involved. With the exception of impacts associated with MFA sonar use (Section 4.1.2), impacts on biological resources would be the same as those discussed in Section 4.4.1.5.1.1. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 2 are discussed in the applicable Open Ocean sections.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.1.5.1.4 Alternative 3 (Biological Resources—Makua Military Reservation—Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.4.1.5.2 Cultural Resources—Makua Military Reservation—Offshore

4.4.1.5.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Cultural Resources—Makua Military Reservation—Offshore)

According to NOAA's location map there are several shipwrecks in the vicinity of Makua Military Reservation (see Figure 3.1.3-2); however, none are located within the direct offshore region of influence for HRC training. However, in the event unanticipated cultural remains are identified, all training will cease in the immediate vicinity and the Hawaii SHPO will be immediately notified. With the implementation of established procedures no impacts on underwater cultural resources would occur during HRC training.

4.4.1.6 DILLINGHAM MILITARY RESERVATION—OFFSHORE

Table 4.4.1.6-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 offshore at Dillingham Military Reservation. Alternative 3 is the preferred alternative.

Table 4.4.1.6-1. Training at Dillingham Military Reservation—Offshore

Training
• Special Warfare Operations (SPECWAROPS)

A review of the 13 resources against offshore training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Dillingham Military Reservation. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and hazardous waste, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would be no air emissions generated at Dillingham Military Reservation from offshore training other than that from an occasional Aircraft Operation. The Aircraft Operations would not change regional air quality. There would be only localized use of rotary wing aircraft within pre-defined areas. Most training would be conducted at night when the airfield is not in use. Geology and soils impacts would be limited to short-term minor disturbance of beach sand and offshore ocean floor along existing SPECWAROPS access routes.

Water resources at Dillingham Military Reservation would not be affected by the short-term temporary foot traffic during the SPECWAROPS. Training associated with this site adhere to policies and regulations governing hazardous materials and waste, health and safety, and noise as discussed in Appendix C. There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative.

4.4.1.6.1 Biological Resources—Dillingham Military Reservation—Offshore

4.4.1.6.1.1 No-action Alternative (Biological Resources—Dillingham Military Reservation—Offshore)

HRC Training and Major Exercises—No-action Alternative

Vegetation

SPECWAROPS activities at the range include a reconnaissance and survey mission, and a tactical aircrew recovery event. All participants in training are to adhere to the Navy's guidelines as well as the relevant Biological Opinions and Army policies and procedures to minimize potential impacts on the endangered vegetation, as well as limit the potential for introduction of invasive plant species. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

Wildlife

SPECWAROPS activities generally include reconnaissance activities and a helicopter raid. Short helicopter hovering periods could result in noise levels at ground level of 88 decibels (dB). Although these noise levels can cause flushing of individual birds, such as the endangered `alae ke`oke`o (Hawaiian coot), `alae`ula (Hawaiian moorhen), koloa maoli (Hawaiian duck), and nene (Hawaiian goose), the effects are temporary.

Because Dillingham Military Reservation is adjacent to a small segment of beachfront, a portion of the region of influence extends to the offshore waters. Humpback whales and several dolphin species are often present in the region of influence. Hawaiian monk seals and green turtles also have the potential to occur. All training participants are briefed on resource protection guidelines for training on Oahu, which minimizes the potential for harm to endangered species. The beach and offshore waters are monitored for the presence of marine mammals and sea turtles 1 hour before and during Major Exercises. If any are seen, the training event is delayed until the animals leave the area. Potential effects on marine biological resources from MFA/HFA sonar usage are discussed in the applicable Open Ocean No-action Alternative sections.

4.4.1.6.1.2 Alternative 1 (Biological Resources—Dillingham Military Reservation—Offshore)

Increased Tempo Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). SPECWAROPS training would remain at 30 per year for all of the HRC. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 1 are discussed in the applicable Open Ocean sections.

Vegetation

Impacts on vegetation would be similar to those described previously for the No-action Alternative.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. The increased training would comply with relevant Army and Navy policies and procedures, which would further reduce the potential for effects on wildlife. The beach and offshore waters would continue to be monitored for the presence of marine mammals and sea turtles 1 hour before and during an increase in Major Exercises. If any are seen, the training event would be delayed until the animals leave the area.

4.4.1.6.1.3 Alternative 2 (Biological Resources—Dillingham Military Reservation—Offshore)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased, but the frequency of training events would remain at 30 per year for all of the HRC. With the exception of impacts associated with MFA sonar use (Section 4.1.2), impacts on vegetation and wildlife would be similar to those described previously for the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 2 are discussed in the applicable Open Ocean sections.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area for up to 10 days per Major Exercise. The exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.1.6.1.4 Alternative 3 (Biological Resources—Dillingham Military Reservation—Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.4.1.6.2 Cultural Resources—Dillingham Military Reservation—Offshore

4.4.1.6.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Cultural Resources—Dillingham Military Reservation—Offshore)

Underwater cultural resources within the offshore Dillingham region of influence include scattered shipwrecks (Figure 3.1.3-2); none of which are known to have been evaluated for eligibility in the National Register of Historic Places (NRHP). In the event cultural materials are unexpectedly encountered during SPECWAROPS (particularly human remains), training in the vicinity of the find will cease and the appropriate military branch protocols would be followed. If the find is made by Marine Corps or Navy personnel, the Hawaii SHPO will be immediately notified in accordance with the Programmatic Agreement (see Appendix H). If the find is unexpectedly encountered during Army activities, the Schofield Barracks Cultural Resources Manager will be immediately notified.

4.4.1.7 EWA TRAINING MINEFIELD—OFFSHORE

Table 4.4.1.7-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 offshore at Ewa Training Minefield. Alternative 3 is the preferred alternative.

Table 4.4.1.7-1. Training at Ewa Training Minefield—Offshore

Training	
• Mine Neutralization	• Special Warfare Operations (SPECWAROPS)

A review of the 13 resources against offshore training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the Ewa Training Minefield. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, cultural resources, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would not be any air emission sources from HRC training associated with the Ewa Training Minefield. Use of this site would not require control of the airspace above this area. Training associated with Ewa Training Minefield adheres to policies and regulations governing noise, as discussed in Appendix C. There are no prehistoric, historic, or archaeological sites associated with Ewa Training Minefield. Additionally, there is no planned construction or alteration associated with the Navy that would affect the land use, land forms, geology, and associated soils development.

There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training at the Ewa Training Minefield would not generate any waste streams that could impact local water quality.

4.4.1.7.1 Biological Resources—Ewa Training Minefield—Offshore

4.4.1.7.1.1 No-action Alternative (Biological Resources—Ewa Training Minefield—Offshore)

HRC Training and Major Exercises—No-action Alternative

No Mine Neutralization is planned for the Ewa Training Minefield. However, if performed, no more than 20 lb net explosive weight of ordnance will be used. Training will follow Navy procedures to minimize impacts on biological resources. There can be minor and localized loss of some fish and benthic populations from the explosions. After training involving underwater detonations, the area is searched for injured animals. Impacts will be similar to those discussed in Section 4.4.1.1.1.1. Impacts on marine mammals and sea turtles from MFA/HFA sonar usage and from underwater explosions are discussed in Section 4.1.2. Only sandy areas that avoid/minimize potential impacts on coral are used for explosive charges on the shallow water floor (less than 40 ft of water).

4.4.1.7.1.2 Alternative 1 (Biological Resources—Ewa Training Minefield—Offshore)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). While training events in general would increase in number, the likelihood of a similar increase in the potential for impacts on biological resources at the Ewa Training Minefield is small, as described above for the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 1 are discussed in the applicable Open Ocean sections.

4.4.1.7.1.3 Alternative 2 (Biological Resources—Ewa Training Minefield—Offshore)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. While training events in general would increase in number, the likelihood of a similar increase in the potential for impacts on biological resources at the Ewa Training Minefield is small, as described above for the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 2 are discussed in the applicable Open Ocean sections.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above for the No-action Alternative.

4.4.1.7.1.4 Alternative 3 (Biological Resources—Ewa Training Minefield—Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.4.1.7.2 Hazardous Materials and Waste—Ewa Training Minefield—Offshore

4.4.1.7.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Hazardous Materials and Waste—Ewa Training Minefield—Offshore)

HRC Training—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3, underwater demolition training, if held, will use explosives charges of no more than 20 lb each, net explosive weight. The transport, handling, and use of such quantities of hazardous materials on an infrequent basis will have no effect on ongoing hazardous materials management activities. No hazardous wastes will be generated by these training events.

Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Major Exercises under all Alternatives, such as RIMPAC and USWEX, include training and, in some cases, RDT&E activities. Under Alternative 2 and Alternative 3, Multiple Carrier Strike Groups will conduct no Demolition and SPECWAROPS at Ewa. The potential impacts of Major Exercises will be similar to those described above for training.

4.4.1.7.3 Health and Safety—Ewa Training Minefield—Offshore

4.4.1.7.3.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Health and Safety—Ewa Training Minefield—Offshore)

HRC Training—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Underwater Demolition activities at Ewa Training Minefield are not anticipated under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. If conducted, however, they will use no more than 20 lb net explosive weight of ordnance. The public will not be exposed to the energetic effects of the detonations because the range will be cleared, and these effects will be completely contained within the range. Existing Navy safety protocols for the use of explosives will ensure that non-participants would not be in the area during training.

Demolition activities will be conducted in accordance with COMNAVSURFPAC Instruction 3120.8F (U.S. Department of the Navy, 1998a). COMNAVSURFPAC Instruction 3120.8F specifies detonation procedures for underwater ordnance to avoid endangering the public or impacting other non-military activities, such as shipping, recreational boaters, divers, and commercial or recreational fishermen.

Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Major Exercises under all Alternatives, such as RIMPAC and USWEX, include training and, in some cases, RDT&E activities. Multiple Strike Groups will conduct no Demolition and SPECWAROPS at Ewa. The potential impacts of Major Exercises will be similar to those described above for training.

4.4.1.8 BARBERS POINT UNDERWATER RANGE—OFFSHORE

Table 4.4.1.8-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 offshore at Barbers Point Underwater Range. Alternative 3 is the preferred alternative.

Table 4.4.1.8-1. Training at Barbers Point Underwater Range—Offshore

Training	
• Mine Neutralization	• Special Warfare Operations (SPECWAROPS)

A review of the 13 resources against offshore training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the Barbers Point Underwater Range. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, cultural resources, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would not be any air emission sources from HRC training associated with the Barbers Point Underwater Range. Use of this site would not require control of the airspace above this area. Training associated with Barbers Point Underwater Range adhere to policies and regulations governing noise, as discussed in Appendix C. There are no prehistoric, historic, or archaeological sites associated with Barbers Point Underwater Range. Additionally, there is no planned construction or alteration associated with the Navy that would affect the land use, land forms, geology, and associated soils development.

There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training at Barbers Point Underwater Range would not generate any waste streams that could impact local water quality.

4.4.1.8.1 Biological Resources—Barbers Point Underwater Range—Offshore

4.4.1.8.1.1 No-action Alternative (Biological Resources—Barbers Point Underwater Range—Offshore)

HRC Training and Major Exercises—No-action Alternative

If conducted, Mine Neutralization (underwater Demolition) will use no more than 20 lb net explosive weight of ordnance. Training will follow Navy procedures to minimize impacts on biological resources as discussed in Section 4.4.1.1.1.1.

Mine Neutralization and SPECWAROPS activities in the offshore environment include destruction of inert mines by detonation of no more than 20 lb of explosive per inert mine. Prior to actual detonation, the area is determined to be clear of marine mammals and sea turtles. Explosive charges are placed in sandy bottom areas away from exposed reefs and coral. There can be minor and localized loss of some fish and benthic populations from the explosions. All waters around Naval Station Pearl Harbor have been designated as EFH for eggs and larvae of a number of species. The harbor has not been designated as a Habitat Area of Particular Concern. (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a) After training involving underwater detonations, the area is searched for injured animals.

Potential effects on marine biological resources from MFA/HFA sonar usage are discussed in the applicable Open Ocean No-action Alternative sections.

4.4.1.8.1.2 Alternative 1 (Biological Resources—Barbers Point Underwater Range—Offshore)

Increased Tempo and Frequency of Training—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). While training events would slightly increase in number in some locations, impacts would be similar to those described above for similar actions. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 1 are discussed in the applicable Open Ocean sections.

4.4.1.8.1.3 Alternative 2 (Biological Resources—Barbers Point Underwater Range—Offshore)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training could also increase. Impacts would be similar to those described above for similar actions. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 2 are discussed in the applicable Open Ocean sections.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.1.8.1.4 Alternative 3 (Biological Resources—Barbers Point Underwater Range—Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.4.1.8.2 Hazardous Materials and Waste—Barbers Point Underwater Range—Offshore

4.4.1.8.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Hazardous Materials and Waste—Barbers Point Underwater Range—Offshore)

HRC Training—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3, no training will occur at Barbers Point Underwater Range. The transport, handling, and use of hazardous materials will occur on an infrequent basis in accordance with existing hazardous materials management regulations and Standard Operating Procedures (SOPs). No hazardous wastes will be generated.

Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Major Exercises under all Alternatives, such as RIMPAC and USWEX, include training and, in some cases, RDT&E activities. Potential impacts from Major Exercises will be similar to those described above for training. Under Alternative 2 and Alternative 3, Multiple Strike Groups would conduct Demolition and SPECWAROPS at Barbers Point. This very limited, short-term use of the range would use minor amounts of hazardous materials and generate minor to no hazardous wastes.

4.4.1.8.3 Health and Safety—Barbers Point Underwater Range—Offshore

4.4.1.8.3.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Health and Safety—Barbers Point Underwater Range—Offshore)

HRC Training—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

No underwater Demolition activities are planned at Barbers Point Underwater Range under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. If held, however, they will use no more than 20 lb net explosive weight of ordnance. The public will not be exposed to the energetic effects of the detonations because the range will be cleared, and these effects will be completely contained within the range. Existing Navy safety protocols for the use of explosives will ensure that non-participants will not be in the area during training. Accordingly, Navy activities at Barbers Point Underwater Range under the No-action Alternative will have no effect on public safety.

Demolition activities will be conducted in accordance with COMNAVSURFPAC Instruction 3120.8F (U.S. Department of the Navy, 1993). COMNAVSURFPAC Instruction 3120.8F specifies detonation procedures for underwater ordnance to avoid endangering the public or impacting other non-military activities, such as shipping, recreational boaters, divers, and commercial or recreational fishermen.

Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Major Exercises under all Alternatives, such as RIMPAC and USWEX, include training and, in some cases, RDT&E activities. Potential impacts of Major Exercises will be similar to those described above for training. Under Alternative 2 and Alternative 3, Multiple Strike Groups would conduct Demolition and SPECWAROPS at Barbers Point. These training events would involve limited, short-term use of the range away from public use areas.

4.4.1.9 NAVAL UNDERSEA WARFARE CENTER (NUWC) SHIPBOARD ELECTRONIC SYSTEMS EVALUATION FACILITY (SESEF)—OFFSHORE

Table 4.4.1.9-1 lists ongoing RDT&E activities for the No-action Alternative and proposed RDT&E activities for Alternatives 1, 2, and 3 offshore at the Naval Undersea Warfare Center (NUWC) Shipboard Electronic Systems Evaluation Facility (SESEF). Alternative 3 is the preferred alternative.

Table 4.4.1.9-1. RDT&E Activities at SESEF—Offshore

Research, Development, Test, and Evaluation (RDT&E) Activities	
• Shipboard Electronic Systems Evaluation Facility (SESEF) Quick Look Tests	• SESEF System Performance Tests

A review of the 13 resources against offshore RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the SESEF. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, cultural resources, geology and soils, hazardous materials and hazardous waste, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would be no air emission sources from HRC RDT&E activities associated with the SESEF range. Use of this site would not require control of the airspace above this area. RDT&E activities associated with the SESEF adhere to policies and regulations governing noise, and hazardous materials and hazardous waste as discussed in Appendix C. There would be no prehistoric, historic, or archaeological sites associated with the SESEF. Additionally, there is no planned construction or alteration associated with the RDT&E activities that would affect the land use, land forms, geology, and associated soils development.

There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Water resources would not be affected by the ships and submarines within the SESEF during electromagnetic transmitting and receiving equipment testing.

4.4.1.9.1 Biological Resources—SESEF—Offshore

4.4.1.9.1.1 No-action Alternative (Biological Resources—SESEF—Offshore)

HRC RDT&E Activities—No-action Alternative

NUWC provides underwater target services and range pinger installation services. Under the No-action Alternative, the SESEF range will be in nearly continuous use, with an average of about 10 to 15 concurrent tests per day, and an average duration of about 2 hours per test. During SESEF tests, Navy vessels will generate different levels of electromagnetic radiation (EMR) emissions. The intensities of the EMR fields generated by these RDT&E activities will decrease rapidly with increasing distance from the source.

Specific siting and orientation of the radar results in a cone-shaped EMR zone being projected skyward, yet within site boundaries. In terms of the potential for EMR impacts on wildlife, the main beam of the radar during missile flight tests, will not be directed toward the ground, and will have a lower limit of 4 to 5 degrees above horizontal.

Marine mammals and sea turtles are normally found below the surface of the water. Radiofrequency radiation does not penetrate the surface of water to any great degree. The power density level just below the surface of the ocean will not exceed the permissible human exposure level for uncontrolled environments. (U.S. Department of the Navy, 2002a) No adverse impacts should occur to whales, other marine mammals, or sea turtles at least 0.5 inch below the surface. It is also unlikely that an individual would be on or substantially above the surface of the water in the location of the main beam for a significant amount of time during the radar's use. (U.S. Army Space and Missile Defense Command, 2003)

Potential effects on marine biological resources from MFA/HFA sonar usage are discussed in the applicable Open Ocean No-action Alternative sections.

4.4.1.9.1.2 Alternative 1 (Biological Resources—SESEF—Offshore)

Increased RDT&E Activities—Alternative 1

Under Alternative 1, the SESEF range would be in continuous use, with an average of about 12 to 16 concurrent tests per day and an average duration of about 2 hours per test. With the exception of impacts associated with MFA/HFA sonar use (Section 4.1.2), impacts would be similar to those discussed above for the No-action Alternative.

4.4.1.9.1.3 Alternative 2 (Biological Resources—SESEF—Offshore)

Increased RDT&E Activities—Alternative 2

Under Alternative 2, the SESEF range would be in continuous use, with an average of about 12 to 16 concurrent tests per day and an average duration of about 2 hours per test. With the exception of impacts associated with MFA/HFA sonar use, impacts would be similar to those discussed above for the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 2 are discussed in the applicable Open Ocean sections.

4.4.1.9.1.4 Alternative 3 (Biological Resources—SESEF—Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.4.1.9.2 Health and Safety—SESEF—Offshore

4.4.1.9.2.1 No-action Alternative (Health and Safety—SESEF—Offshore)

HRC Training—No-action Alternative

No training will occur on the SESEF range.

HRC RDT&E Activities—No-action Alternative

Under the No-action Alternative, the SESEF range will be in nearly continuous use, with an average of about 10 to 15 tests per day, and an average duration of about 2 hours per test. During SESEF tests, Navy vessels will generate different kinds of EMR emissions (e.g., radar). The intensities of the EMR fields generated by these RDT&E activities will decrease rapidly with increasing distance from the source. However, Navy personnel aboard ship and the recreational or commercial public in the vicinity of the SESEF range potentially will be exposed to low intensity levels of EMR. Any exposures will be very brief because the position of the Navy vessel relative to the receptor will constantly be changing.

With regard to public safety, the Navy does not have exclusive use of the SESEF area, and collisions with commercial and recreational vessels are possible. However, both the personnel at the SESEF facility and the Navy personnel aboard ship constantly monitor the proximity of non-participants and adjust their activities accordingly, thus minimizing the potential for a vessel undergoing a SESEF test to be involved in a collision.

4.4.1.9.2.2 Alternative 1, Alternative 2, and Alternative 3 (Health and Safety—SESEF—Offshore)

Increased RDT&E Activities—Alternative 1, Alternative 2, and Alternative 3

Under Alternatives 1, 2, and 3, the SESEF range would be in continuous use, with an average of about 12 to 16 tests per day and an average duration of about 2 hours per test. During SESEF tests, Navy vessels would generate different kinds of EMR emissions. The intensities of the EMR fields generated by these RDT&E activities would decrease rapidly with increasing distance from the source. However, neither Navy personnel aboard ship nor the recreational or commercial public in the vicinity of the SESEF range would be exposed to harmful levels of EMR. Any low-intensity exposures would be very brief because the position of the Navy vessel relative to the receptor would constantly be changing.

With regard to public safety, the Navy does not have exclusive use of the SESEF area, and collisions with commercial and recreational vessels are possible. However, both the personnel at the SESEF facility and the Navy personnel aboard ship constantly monitor the proximity of non-participants and adjust their activities accordingly, thus minimizing the potential for a vessel undergoing a SESEF test to be involved in a collision.

4.4.1.10 NAVAL UNDERSEA WARFARE CENTER (NUWC) FLEET OPERATIONAL READINESS ACCURACY CHECK SITE (FORACS)—OFFSHORE

Table 4.4.1.10-1 lists ongoing RDT&E activities for the No-action Alternative and proposed RDT&E activities for Alternatives 1, 2, and 3 offshore at the NUWC Fleet Operational Readiness Accuracy Check Site (FORACS). Alternative 3 is the preferred alternative.

Table 4.4.1.10-1. RDT&E Activities at FORACS—Offshore

Research, Development, Testing, and Evaluation (RDT&E) Activities
• Fleet Operational Readiness Accuracy Check Site (FORACS) Tests

A review of the 13 resources against offshore RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the FORACS. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, cultural resources, geology and soils, hazardous materials and hazardous waste, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would be no air emission sources from HRC RDT&E activities associated with the FORACS. Use of this site would not require control of the airspace above this area. RDT&E activities associated with the FORACS adhere to policies and regulations governing noise, and hazardous materials and hazardous waste as discussed in Appendix C. There would be no prehistoric, historic, or archaeological sites associated with the FORACS. Additionally, there is no planned construction or alteration associated with the Navy that would affect the land use, land forms, geology, and associated soils development.

There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Water resources would not be affected by the ships and submarines operating within the FORACS during electromagnetic transmitting and receiving equipment testing.

4.4.1.10.1 Biological Resources—FORACS—Offshore

4.4.1.10.1.1 No-action Alternative (Biological Resources—FORACS—Offshore)

HRC Training—No-action Alternative

No training will occur on the FORACS range.

HRC RDT&E Activities—No-action Alternative

NUWC provides underwater target services and range pinger installation services. Inshore areas at depths of 40 to 70 ft have a modestly diverse coral community. Fish are generally rare, except where a coral colony or ocean debris provides habitat. Green turtles are abundant in the area. The purpose of the FORACS tests are to provide accuracy checks of ship and submarine sonar, both in active and passive modes, and to evaluate the accuracy of a ship's radar. The ship will conduct a series of "runs" on the range, each taking approximately 1.5 hours. Both active and passive sonar can be checked on a single run. Impacts from ships' radars would be similar to those discussed in Section 4.4.1.9.1.1.

Potential effects on marine biological resources from MFA/HFA sonar usage are discussed in the applicable Open Ocean No-action Alternative sections.

4.4.1.10.1.2 Alternative 1 (Biological Resources—FORACS—Offshore)

Increased RDT&E Activities—Alternative 1

FORACS tests proposed under Alternative 1 would have all the components of the No-action Alternative, but at an increased rate (i.e., from two to five FORACs tests per year). With the exception of impacts associated with MFA/HFA sonar use, impacts would be similar to those discussed above for the No-action Alternative.

4.4.1.10.1.3 Alternative 2 (Biological Resources—FORACS—Offshore)

Increased RDT&E Activities—Alternative 2

FORACS tests would increase from five to six. With the exception of impacts associated with MFA/HFA sonar use, impacts would be similar to those discussed above for the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 2 are discussed in the applicable Open Ocean sections.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Multiple Strike Groups would not conduct testing on the FORACS range.

4.4.1.10.1.4 Alternative 3 (Biological Resources—FORACS—Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.4.1.10.2 Health and Safety—FORACS—Offshore

4.4.1.10.2.1 No-action Alternative (Health and Safety—FORACS—Offshore)

HRC Training—No-action Alternative

No training will occur on the FORACS range.

HRC RDT&E Activities—No-action Alternative

Communications and electronic devices such as radar, electronic jammers, and other radio transmitters produce EMR. Equipment that produces an electromagnetic field could generate hazardous levels of EMR. Although the sea space where FORACS tests are conducted is unrestricted and is not controlled by NUWC or the Navy, the Navy notifies the public of hazardous activities through the use of Notices to Mariners. In addition, the NUWC Range Control Officer conducts a visual lookout and radar search of the FORACS range to identify any transient units. The NUWC Range Control Officer determines if range RDT&E activities can continue. The general public is typically not exposed in areas that can contain EMR hazards from Navy equipment; therefore, the public will not be inadvertently exposed to EMR.

4.4.1.10.2.2 Alternative 1 (Health and Safety—FORACS—Offshore)

Increased RDT&E Activities—Alternative 1

FORACS tests proposed under Alternative 1 would have all the components of the No-action Alternative, and would occur at the same rate (i.e., five FORACs tests per year). The same safety procedures described under the No-action Alternative would be implemented. The use of safety procedures and access clearance would minimize potential safety issues during these RDT&E activities.

4.4.1.10.2.3 Alternative 2 (Health and Safety—FORACS—Offshore)

Increase RDT&E Activities—Alternative 2

FORACS tests proposed under Alternative 2 would have all the components of Alternative 1, but at an increased rate (i.e., six FORACS tests per year). The same safety procedures described under the No-action Alternative would be implemented. The use of safety procedures and access clearance would minimize potential safety issues during these RDT&E activities.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Multiple Strike Groups would not conduct training on the FORACS range.

4.4.1.10.2.4 Alternative 3 (Health and Safety—FORACS—Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on health and safety under Alternative 3 would be the same as those described for Alternative 2.

4.4.2 OAHU ONSHORE

4.4.2.1 NAVAL STATION PEARL HARBOR

Table 4.4.2.1-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at Naval Station Pearl Harbor. Alternative 3 is the preferred alternative.

Table 4.4.2.1-1. Training at Naval Station Pearl Harbor

Training	
• Command and Control (C2)	• Personnel Support Operations
• In-Port Support Operations	• Special Warfare Operations (SPECWAROPS)
	• Salvage Operations

A review of the 13 resources against training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the Naval Station Pearl Harbor. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, transportation, utilities, and water resources.

There would be no air emissions generated other than that from an occasional Aircraft Operation at Naval Station Pearl Harbor. The Aircraft Operations would not change regional air quality. Airspace is not affected by the types of ongoing and proposed training at Naval Station Pearl Harbor. All training adheres to policies and regulations governing hazardous materials and waste, health and safety, and noise, as discussed in Appendix C.

There are no current or proposed training that could affect land use, land forms, geology, and associated soils development on Naval Station Pearl Harbor. There would be no impact on Oahu’s transportation, utilities, or land use because all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training at the site would not generate any waste streams that could impact local water quality.

4.4.2.1.1 Biological Resources—Naval Station Pearl Harbor

Command and Control (C2) is achieved through a network of communication devices strategically located at selected Department of Defense (DoD) installations around the islands with no impacts on biological resources. The purpose of Personnel Support Operations is to meet the housing and facilities needs of the personnel that support range training. This includes in-port briefings and debriefings and in-port training activities, with no impacts on biological resources. As part of the Visit, Board, Search, and Seizure event, helicopter and boat crews train to transport teams to board vessels and inspect the ship’s cargo and personnel. Typical In-Port Support Operations include the maintenance and supply of foreign and U.S. warships and submarines berthed at Naval Station Pearl Harbor. These training events do not affect vegetation and wildlife in the area.

4.4.2.1.1.1 No-action Alternative (Biological Resources—Naval Station Pearl Harbor)

HRC Training and Major Exercises—No-action Alternative

Vegetation

Exotic imported grasses and trees make up the majority of the vegetative community at Naval Station Pearl Harbor. The alien red mangrove dominates vegetation along the shoreline. No threatened and endangered plant species have been identified at Naval Station Pearl Harbor. Procedures and practices are in place to minimize impacts on vegetation and to prevent the introduction of invasive plant species (Table 4.4.2.1.1.1-1).

Table 4.4.2.1.1.1-1: Training Guidelines for Resource Protection—All Oahu Training Areas

APPLIES TO	
The following list of actions and limitations applies to all Oahu training areas. Additional limitations are imposed in the Sensitive Ecological and Cultural Resource Areas.	
AUTHORITY	
Enforcement of the following rules is under the authority of the Directorate of Plans, Training, Mobilization and Security, Range and Training Support Division.	
REQUIRED ACTIONS	
Access	Before entering a training area, troops must clean all vehicles, equipment, personal gear, shoes, and clothing.
Fire	All fires must be reported immediately.
	In case of fire, troops will stop training and begin fighting the fire.
	Troops will continue to fight the fire until released by the Fire Department.
Water	All aviation or other training area fuels or chemicals and other potentially toxic and polluting substances must be handled and stored to avoid spills and fires.
LIMITATIONS FOR SENSITIVE ECOLOGICAL AND CULTURAL RESOURCE AREAS	
Access	No troops may go beyond signs or fences marking the presence of rare or endangered plants and animals or archaeological sites.
Bivouacking	No bivouacking within 3,280 feet of posted signs marking the presence of rare or endangered native plants and animals or restoration projects.
	No training units larger than platoon size (more than 30 troops) may bivouac outside of reusable bivouac sites provided with portable or fixed latrines.
	No open fires.
	No burying or leaving trash.
	No food preparation.
	No refueling.
	No cutting, clearing, or disturbing of vegetation. This includes mosses, grasses, shrubs, bushes, and trees.
Maneuvers	No vehicle traffic off existing roads.
	No use of rocks from rock piles or walls for training purposes.
	No establishment or new vehicle tracks.
	No digging, including entrenchment and foxholes, except in areas specifically designated by Range Control.
	Dillingham Military Reservation and Kahuku Training Area: No pyrotechnic or incendiary training devices except during the wet season (October to April) OR outside areas designed to control fire.
	No new placement of barbed wire or concertina wire near signs marking the presence of sensitive ecological areas or fences.
	Dillingham Military Reservation and Kahuku Training Area: No use of live fire or tracer ammunition.
	No road, trail, or firebreak clearing without permission form Range Control.
	No grading or construction of buildings or other permanent structures without permission from Range Control.

Source: U.S. Department of the Navy, 2002a

SPECWAROPS activities include special reconnaissance, reconnaissance and surveillance, combat search and rescue, and direct action. Reconnaissance inserts and beach surveys are often conducted before large-scale amphibious landings and can involve several units gaining covert access using a boat. The training event involves fewer than 20 troops and has minimal interaction with the environment, since one of the purposes of the training event is to operate undetected. During amphibious inserts, the troops review training overlays that identify the insertion points and any nearby restricted areas. Sensitive biological resource areas are avoided by the SPECWAROPS troops (Training Guidelines for Resource Protection—All Oahu Training Areas). (U.S. Department of the Navy, 2002a)

Wildlife

Current In-Port Support Exercises and Salvage Operations have not resulted in any significant impacts on the four endangered waterbirds that have been identified in the harbor area. Military readiness activities are exempt from the take prohibitions of the Migratory Bird Treaty Act (MBTA) provided they do not result in a significant adverse effect on the population of a migratory bird species. While individual birds may be startled, the training (C2, In-port and Personnel Support Operations, SPECWAROPS, and Salvage Operations) being currently performed are not likely to significantly impact a population of any of the 46 migratory species that occur in the Naval Station Pearl Harbor area and thus would be exempt from the MBTA take prohibitions.

The green turtle has rarely been seen in the harbor, and no nesting has been reported. The Hawaiian monk seal has been seen in the channel, but never reported in the harbor, and only one unusual humpback whale sighting has occurred in the region of influence.

Salvage training takes place in any of the shoal waters, harbors, ports, and in-land waterways throughout the HRC. The Navy's MDSU-1 and divers from other countries practice ship and barge salvage, towing, battle damage repair, deep ocean recovery, harbor clearance, removal of objects from navigable waters, and underwater ship repair capabilities. Staging for these activities is from the MDSU-1 Facility located on the southwestern side of Hickam AFB. Small cutting charges may be used during Salvage Operations training. There can be minor and localized loss of some fish and benthic community populations from the explosions. After training involving underwater detonations are complete, the area will be searched for injured animals.

SPECWAROPS activities include special reconnaissance, reconnaissance and surveillance, combat search and rescue, and direct action. Reconnaissance inserts and beach surveys are often conducted before large-scale amphibious landings and can involve several units gaining covert access using a boat. The training event involves fewer than 20 troops and has minimal interaction with the environment, since one of the purposes of the training event is to operate undetected. During amphibious inserts the crews follow established procedures, such as having designated lookouts watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The troops review training overlays that identify the insertion points and any nearby restricted areas. Sensitive biological resource areas are avoided by the SPECWAROPS troops (Training Guidelines for Resource Protection—All Oahu Training Areas). (U.S. Department of the Navy, 2002a)

All waters around Naval Station Pearl Harbor have been designated as EFH for eggs and larvae of a number of species. None of the current training has the potential to affect EFH. Acoustic effects on fish are discussed in Section 4.1.2 under Open Ocean Biological Resources. RIMPAC Exercises have procedures and practices in place to prevent the introduction of invasive species, consistent with EO 13112 and Navy guidelines (Table 4.4.2.1.1.1-1). The Navy requests that multinational participants purge bilge/ballasts tanks in their ships prior to entering U.S. territorial waters. The movement and berthing of ships and small training in the harbor area are part of ongoing training at Naval Station Pearl Harbor. Marine mammal collision avoidance and encounter reporting procedures are already in place and implemented.

Environmentally Sensitive Habitat

Current training and Major Exercises do not occur in the Naval Station Pearl Harbor National Wildlife Refuge or within wetland areas on the installation.

4.4.2.1.1.2 Alternative 1 (Biological Resources—Naval Station Pearl Harbor)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, biennial RIMPAC Exercises, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). Training event numbers would not increase, but the tempo may. The likelihood of a similar increase in adverse impacts on biological resources would be small, as described below.

Vegetation

Training events and Major Exercises would continue to take place at existing locations; no expansion of the area would be involved. Compliance with relevant Naval Station Pearl Harbor and Navy policies and procedures (Table 4.4.2.1.1.1-1) during training would minimize the potential for effects on vegetation, as well as limit the potential for introduction of invasive plant species. No rare, threatened, or endangered plant species are known to occur at Naval Station Pearl Harbor.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. It is unlikely that a migratory bird, listed bird species, or other wildlife at Naval Station Pearl Harbor would be harmed as a result of increased training. The additional training would comply with relevant Navy policies and procedures (Table 4.4.2.1.1.1-1), which would minimize the potential for effects on wildlife.

Prior to the sinking of any vessels for MDSU-1 training, environmental documentation would be developed and reviewed as appropriate. The Navy would begin early coordination with regulatory agencies as applicable to reduce environmental impacts and to assist with the development of any required mitigative measures.

Environmentally Sensitive Habitat

Just as for the No-action Alternative, increased training events and Major Exercises would not occur in the Pearl Harbor National Wildlife Refuge or within wetland areas on the installation.

4.4.2.1.1.3 Alternative 2 (Biological Resources—Naval Station Pearl Harbor)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c). Impacts on wildlife would be similar to those described previously for the No-action Alternative since the additional training would be performed throughout the HRC and not confined to one particular area. The additional training would continue to comply with relevant Navy policies and procedures, such as existing clearance procedures, which would minimize the potential for effects on wildlife.

Additional Major Exercises—Multiple Carrier Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would visit the area for up to 10 days per Major Exercise. Participants use and build upon previously gained training skill sets to maintain and improve the proficiency needed for a mission-capable, deployment-ready unit. The Major Exercises would occur over a 5- to 10-day period. Activities would mainly be offshore and in the open ocean. The Multiple Strike Group training would involve many of the training events identified and evaluated under the No-action Alternative and Alternative 1. The Major Exercises proposed would be similar to those occurring during current RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.2.1.1.4 Alternative 3 (Biological Resources—Naval Station Pearl Harbor)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.1.2 Cultural Resources—Naval Station Pearl Harbor

4.4.2.1.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Cultural Resources—Naval Station Pearl Harbor)

HRC Training and Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Salvage Operations

Salvage Operations provide a realistic training environment for fire at sea, de-beaching of ships, and harbor clearance training by Navy diving and salvage units. Activities include battle damage repair, ship and barge salvage, towing, deep ocean recovery, removal of objects from navigable waters, and underwater ship inspection and repair (use of welding and other power equipment). Salvage Operations will occur primarily at the Puuloa Underwater Range, within Naval Station Pearl Harbor, and in the Keehi Lagoon; however, they may also take place in any of the shoal waters, harbors, ports, and inland waterways throughout the HRC.

Naval Station Pearl Harbor contains the wrecks of World War II-era warships and warship remnant fields, Japanese aircraft, and Japanese midget submarines. There are also several Native Hawaiian fishponds within the harbor. Of these submerged cultural resources, several are listed on the NRHP and designated National Historic Landmarks (e.g., *USS Arizona* and *USS Utah*). In addition, the entirety of Naval Station Pearl Harbor is within the Pearl Harbor National Historic Landmark boundary (International Archaeological Resources Institute, Inc., 2005). Because of the number and significance of the identified features, cultural resources within Naval Station Pearl Harbor are comprehensively and effectively managed through various in-place agency documents. Among these are policies, guidelines, and SOPs that are outlined in the *Integrated Cultural Resources Management Plan (ICRMP), Pearl Harbor Naval Complex.* The ICRMP, which has been in place since 2002, was developed in consultation with the Advisory Council on Historic Preservation, the Hawaii State Historic Preservation Officer, the National Trust for Historic Preservation, the Historic Hawaii Foundation, the National Park Service, the Oahu Council of Hawaiian Affairs, and The Outdoor Circle. Salvage Operations will be conducted in accordance with this guidance and coordinated with the Navy Region Hawaii's Historic Preservation Coordinator, as well as any other agreement documents (e.g., Memoranda of Agreement or Programmatic Agreements) promulgated since completion of the ICRMP (U.S. Department of the Navy, Commander Navy Region Hawaii, 2002). As a result, there will be no adverse effects on cultural resources from Salvage Operations.

4.4.2.1.3 Socioeconomics—Naval Station Pearl Harbor

4.4.2.1.3.1 No-action Alternative (Socioeconomics—Naval Station Pearl Harbor)

The No-action Alternative stands as no change from current levels of training, and the Navy will continue its current activities at the HRC. Under the No-action Alternative, HRC Training, RDT&E Activities, and Major Exercises associated with Naval Station Pearl Harbor were reviewed. Current HRC training associated with Naval Station Pearl Harbor are listed in Table 2.2.2.3-1 and a full description is found in Appendix D. A description of current weapon systems is found in Appendix E. There are no RDT&E activities associated with Naval Station Pearl Harbor, and Table 2.2.2.6-1 lists current Major Exercise events.

Naval Station Pearl Harbor is a major contributor to the economy of Oahu, and Pearl Harbor Naval Shipyard is the largest industrial employer in Hawaii. The DoD is the second major source of revenue to the State of Hawaii. In 2001, the U.S. military employed 64,074 people in the State of Hawaii, and the amount employed by the Navy and Marine Corps was 24,654. Major locations for active duty military and civilian personnel on Oahu in 2001 were Schofield Barracks (12.699 jobs), Naval Station Pearl Harbor (12,407 jobs), Kaneohe (6,847 jobs), Hickam AFB (5,374 jobs), Tripler Army Medical Center (2,856 jobs), Fort Shafter (2,337 jobs), Honolulu (1,879 jobs), Wheeler AFB (1,816 jobs), Kunia (1,495 jobs) and Camp H.M. Smith (1,045 jobs). In fiscal year (FY) 2005-2006, $5.5 million was provided to improve infrastructure for Hawaii's public schools with high enrollments of military children.

These training events include C2, which can provide continuous command and control support from a land location on Naval Station Pearl Harbor, and In Port Support Operations, which provide major support for Navy ships and submarines which are berthed at Naval Station Pearl Harbor. Additional training includes In Port Support Exercises, C2, SPECWAROPS, Demolition Exercises, which are provided support by a 2.75 acre facility at Naval Magazine Pearl Harbor West Loch, and Salvage Operations where staging for these activities occur on Bishop Point, an annex of Naval Station Pearl Harbor. Under the No-action Alternative, the support provided to

HRC training events from Naval Station Pearl Harbor will continue. The level of employment and defense initiatives on Oahu will continue to benefit the local economy of Oahu.

4.4.2.1.3.2 Alternative 1 (Socioeconomics—Naval Station Pearl Harbor)

Increased Tempo and Frequency of Training—Alternative 1

Under Alternative 1, there are no increases in the occurrence of onshore training events on Naval Station Pearl Harbor.

Increased RDT&E Activities—Alternative 1

There are no onshore RDT&E activities associated with Naval Station Pearl Harbor.

Major Exercises—Alternative 1

Under Alternative 1, USWEX frequency would increase by 50 percent (from 4 to 6 times per year). Appendix D shows the matrix of training events generally used during a USWEX by location. A review of Table 2.2.2.3-1 indicates that under Alternative 1 there are no increases in the training events on Naval Station Pearl Harbor that are associated with USWEX. The USWEX events under Alternative 1 would not affect Naval Station Pearl Harbor. The level of employment and defense initiatives associated with the No-action Alternative on Oahu would continue to benefit the local economy of Oahu.

4.4.2.1.3.3 Alternative 2 (Socioeconomics—Naval Station Pearl Harbor)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, HRC training associated with Naval Station Pearl Harbor that would increase is C2. Under Alternative 2 each of these training events would increase by 100 percent (from 1 to 2 events/year). Support would continue to be provided from facilities on Naval Station Pearl Harbor. The Navy would not require new construction or an increase in personnel in order to provide the support for these increases. Support would not change from the requirements under the No-action Alternative.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Under Alternative 2, up to three Strike Groups would be allowed to conduct training simultaneously in the HRC (Figure 1.2-3). Depending on the Major Exercise being performed, Naval Station Pearl Harbor would provide support for training. The Strike Groups would not be homeported in Hawaii, but would be in Hawaii for up to 10 days per Major Exercise. During this time, sailors and marines could visit Oahu while transiting. An increase in the income generated on Oahu could be expected for tourism-related services, which would affect the personal income of some Oahu residents during the 10-day training period. No increase in population size, renter-occupied homes, or single-family owned homes would be expected.

4.4.2.1.3.4 Alternative 3 (Socioeconomics—Naval Station Pearl Harbor)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of

Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on socioeconomics under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.2 FORD ISLAND

Table 4.4.2.2-1 lists ongoing RDT&E activities for the No-action Alternative and proposed RDT&E activities for Alternatives 1, 2, and 3 at Ford Island. Alternative 3 is the preferred alternative.

Table 4.4.2.2-1. RDT&E Activities at Ford Island

Research, Development, Testing, and Evaluation (RDT&E) Activities
• MK-84/MK-72 Pinger Acoustic Training Area (Alternative 1)

A review of the 13 resources against RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Ford Island. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, and utilities.

There would be no air emissions generated at Ford Island other than that from an occasional Aircraft Operations and the temporary impacts from construction of the proposed Acoustic Test Facility (ATF). Any minimal Air Support Operations at Ford Island would be limited to the types and number of aircraft that currently operate there. Neither Aircraft Operations nor construction would change regional air quality. Airspace is not affected by the types of ongoing and proposed RDT&E activities.

RDT&E activities associated with Ford Island adhere to policies and regulations governing hazardous materials and hazardous waste, health and safety, and noise, as discussed in Appendix C. There are no current or proposed RDT&E activities that could affect land use, land forms, geology, and associated soils development on the site. There would be no impact on Oahu's transportation, utilities, or land use because all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative.

4.4.2.2.1 Biological Resources—Ford Island

4.4.2.2.1.1 No-action Alternative (Biological Resources—Ford Island)

HRC Training and Major Exercises—No-action Alternative

Under the No-action Alternative, no HRC training or Major Exercises are occurring at Ford Island.

4.4.2.2.1.2 Alternative 1 (Biological Resources—Ford Island)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Under Alternative 1, no HRC training would occur at Ford Island; therefore, biological resources would not be affected.

HRC Enhancements—Alternative 1

The Navy proposes to develop a new open-water ATF capability near NUWC's Ford Island facility in Naval Station Pearl Harbor, shown in Figure 2.2.3.6.2-1. Testing would take place in the water to the west of Ford Island, between Middle Loch and East Loch. The pinger (noise source) could be located at one of several sites. Possible locations include Pier S291 on Ford Island, Beckoning Point piers, or a mobile test site that could operate within the test area. Pinger training typically runs for an 8-hour period once a week. Development of the ATF would require minor modification to the pier to provide electrical cabling and pinger attach points, with no impacts on vegetation. Vegetation on Ford Island consists primarily of non-native grasses, shrubs, and trees. No threatened or endangered plant species have been reported. No marine mammals occur in the area, and most fish do not respond to pingers (Stiles, 2004). Acoustic effects on fish are discussed in Section 4.1.2.

4.4.2.2.1.3 Alternative 2 (Biological Resources—Ford Island)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, no additional HRC training or Major Exercises would occur at Ford Island; therefore, biological resources would not be affected.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would not be performed on Ford Island.

4.4.2.2.1.4 Alternative 3 (Biological Resources—Ford Island)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.2.2 Cultural Resources—Ford Island

4.4.2.2.2.1 No-action Alternative (Cultural Resources—Ford Island)

There are no training events or Major Exercises with the potential to affect cultural resources at Ford Island.

4.4.2.2.2.2 Alternative 1 (Cultural Resources—Ford Island)

Increased Tempo and Frequency of Training—Alternative 1

There are no training events with the potential to affect cultural resources at Ford Island.

HRC Enhancements—Alternative 1

MK-84/MK-72 Pinger Acoustic Test Facility

The entirety of Ford Island falls within the Pearl Harbor Naval Complex National Historic Landmark. Ford Island also is a designated Historic Management Zone (see Section 3.4.2.1.2). Installation of equipment to support the new ATF has the potential to affect historic properties. To avoid adverse effects, guidance in the Pearl Harbor ICRMP will be followed and coordination with the Navy Region Hawaii's designated cultural resources coordinator would be required (U.S. Department of the Navy, Commander Navy Region Hawaii, 2002).

4.4.2.2.2.3 Alternative 2 (Cultural Resources—Ford Island)

There are no Major Exercises or training with the potential to affect cultural resources at Ford Island.

4.4.2.2.2.4 Alternative 3 (Cultural Resources—Ford Island)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on cultural resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.2.3 Water Resources—Ford Island

4.4.2.2.3.1 No-action Alternative (Water Resources—Ford Island)

Under the No-action Alternative, no HRC training or Major Exercises are occurring at Ford Island; therefore, water resources are not affected.

4.4.2.2.3.2 Alternative 1 (Water Resources—Ford Island)

Under Alternative 1, no HRC training would occur at Ford Island; therefore, water resources would not be affected.

HRC Enhancements—Alternative 1

Under Alternative 1, HRC enhancements would include the development of a new open-water ATF near the NUWC Ford Island Facility. The pinger (noise source) could be located at one of several sites. Possible locations include Pier S291 on Ford Island, Beckoning Point piers, or a mobile test site that could operate within the test area. Development of the ATF would require minor modification to the pier to provide electrical cabling and pinger attach points and would not require the preparation of a Stormwater Pollution Prevention Plan.

4.4.2.2.3.3 Alternative 2 (Water Resources—Ford Island)

Under Alternative 2, no HRC training or Major Exercises would occur at Ford Island; therefore, water resources would not be affected.

4.4.2.2.3.4 Alternative 3 (Water Resources—Ford Island)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on water resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.3 NAVAL INACTIVE SHIP MAINTENANCE FACILITY, PEARL HARBOR

Table 4.4.2.3-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at Ford Island. Alternative 3 is the preferred alternative.

Table 4.4.2.3-1. Training at Naval Inactive Ship Maintenance Facility, Pearl Harbor

Training	
• Special Warfare Operations (SPECWAROPS)	• Mine Neutralization

A review of the 13 resources against training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the Naval Inactive Ship Maintenance Facility, Pearl Harbor. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, cultural resources, geology and soils, health and safety, land use, noise, socioeconomics, transportation, and utilities.

There would not be any air emission sources associated with the Naval Inactive Ship Maintenance Facility, Pearl Harbor. Use of this site would not require control of the airspace above this land area. Additionally, there is no planned construction or alteration associated with the Navy that would affect cultural resources in the area. Training associated with this site adhere to policies and regulations governing health and safety and noise, as discussed in Appendix C.

There is no current or proposed training that could affect land forms, geology, and associated soils development. There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative.

4.4.2.3.1 Biological Resources—Naval Inactive Ship Maintenance Facility, Pearl Harbor

The Naval Inactive Ship Maintenance Facility is located in the Middle Loch.

4.4.2.3.1.1 No-action Alternative (Biological Resources—Naval Inactive Ship Maintenance Facility, Pearl Harbor)

HRC Training and Major Exercises—No-action Alternative

Under the No-action Alternative, up to 62 Mine Neutralization training events per year will continue to occur at locations such as the Inactive Ship Maintenance Facility, or about 5 to 6 per month. Mine Neutralization activities involve the detection, identification, evaluation, rendering safe, and disposal of mines and UXO that constitutes a threat to ships or personnel. Mine neutralization training involves a diver placing a specific amount of explosives which, when detonated underwater at a specific distance from a mine, results in neutralization of the mine. Individual training events use explosives charges no greater than 20 lb net explosive weight.

Training will follow the relevant Pearl Harbor and Navy policies and procedures to minimize impacts on biological resources.

Prior to actual detonation, the area is determined to be clear of marine mammals. When the divers enter the water, they also have an opportunity to detect marine mammals and humpback whales visually or audibly (if the whales are vocalizing). The training event does not proceed if marine mammals are in the vicinity. The delay between initiating the fuse and the detonation of the explosives is only 30 minutes, minimizing the opportunity for marine mammals to enter the area. Given the relatively small size of the charge, the area within which marine mammals would be at risk from the explosive is quite limited. Standard procedures require tethered mines to be suspended at least 10 ft below the surface of the water. Impacts on marine mammals and sea turtles from underwater explosions are discussed in Section 4.1.2. Only sandy areas that avoid/minimize potential impacts on coral are used for explosive charges on the shallow water floor (less than 40 ft of water). After training involving underwater detonations, the area is searched for injured animals. Applicable procedures are implemented during charge placement and the detonations occur infrequently. The Waiawa Unit of the Pearl Harbor National Wildlife Refuge, which supports breeding populations of endangered waterbirds, is across the Loch from the Naval Inactive Ship Maintenance Facility, Pearl Harbor. Mine Neutralization activities could startle these birds, but suspension of the mines at least 10 ft underwater should dampen the potential for airborne noise effects.

SPECWAROPS include special reconnaissance, reconnaissance and surveillance, combat search and rescue, and direct action. Reconnaissance inserts and beach surveys are often conducted before large-scale amphibious landings and can involve several units gaining covert access using a boat. The training event involves fewer than 20 troops and has minimal interaction with the environment, since one of the purposes of the exercise is to operate undetected. During amphibious inserts the crews follow established procedures, such as having designated lookouts watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The troops review training overlays that identify the insertion points and any nearby restricted areas. Sensitive biological and cultural resource areas are avoided by the SPECWAROPS troops (Training Guidelines for Resource Protection—All Oahu Training Areas). (U.S. Department of the Navy, 2002a)

4.4.2.3.1.2 Alternative 1 (Biological Resources—Naval Inactive Ship Maintenance Facility, Pearl Harbor)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). No increases in the number of training events performed in the Inactive Ship Maintenance Facility are anticipated. Impacts on biological resources would be similar to those described previously for the No-action Alternative. Impacts on marine mammals, sea turtles, and fish from underwater explosions are discussed in Section 4.1.2.

4.4.2.3.1.3 Alternative 2 (Biological Resources—Naval Inactive Ship Maintenance Facility, Pearl Harbor)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and an additional six Mine Neutralization activities would occur. Since Mine Neutralization activities occur in other areas of the HRC, not all of the additional six per year would necessarily take place in the Naval Inactive Ship Maintenance Facility. Prior to actual detonation, the area would be determined as clear of marine mammals. Explosive charges, in less than 40 ft of water, would be placed/neutralized only in sandy areas to avoid/minimize potential impacts on coral. Impacts on marine mammals, sea turtles, and fish from underwater explosions are discussed in Section 4.1.2.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above in Section 4.4.2.3.1.1.

4.4.2.3.1.4 Alternative 3 (Biological Resources—Naval Inactive Ship Maintenance Facility, Pearl Harbor)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.3.2 Hazardous Materials and Waste—Naval Inactive Ship Maintenance Facility, Pearl Harbor

4.4.2.3.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Hazardous Materials and Waste—Naval Inactive Ship Maintenance Facility, Pearl Harbor)

HRC Training and Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Training at the Naval Inactive Ship Maintenance Facility, Pearl Harbor would use explosives charges of no more than 20 lb net explosive weight each for a total of about 580 lb per year of explosives. Demolition activities in the offshore environment include destruction of inert mines by detonation of less than 20 lb of explosive per inert mine. The transport, handling, and use of hazardous materials on an infrequent basis would have no effect on ongoing hazardous materials management activities. No Resource Conservation and Recovery act (RCRA) hazardous wastes would be generated by this training.

4.4.2.3.3 Water Resources—Naval Inactive Ship Maintenance Facility, Pearl Harbor

4.4.2.3.3.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Water Resources—Naval Inactive Ship Maintenance Facility, Pearl Harbor)

HRC Training and Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

The detonation of explosives releases fragments and residues of explosives, as well as of associated ordnance constituents (e.g., primers, wires, casings). For underwater detonations, these materials are absorbed into the water column and, excluding those fragments large enough to settle to the bottom, disperse from the detonation site according to the local water circulation pattern. Underwater detonations also may, depending upon their size and placement relative to the bottom, create a crater and disperse the displaced bottom sediments into the water column. The size of explosives charge used in training at the Naval Inactive Ship Maintenance Facility, Pearl Harbor, will not result in substantial craters in the bottom sediments.

4.4.2.4 EXPLOSIVE ORDNANCE DISPOSAL (EOD) LAND RANGE–NAVAL MAGAZINE (NAVMAG) PEARL HARBOR WEST LOCH

Table 4.4.2.4-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at the EOD Land Range–Naval Magazine (NAVMAG) Pearl Harbor West Loch. Alternative 3 is the preferred alternative.

Table 4.4.2.4-1. Training at EOD Land Range-NAVMAG Pearl Harbor West Loch

Training
• Land Demolitions

A review of the 13 resources against training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the EOD Land Range–NAVMAG Pearl Harbor West Loch. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, hazardous materials and hazardous waste, land use, noise, socioeconomics, transportation, and utilities.

This level of in-place detonation of ordnance at the EOD Land Range is not expected to affect regional air quality. Use of the EOD Land Range would not require control of the airspace. The small increase in training would result only in minor changes to the noise environment.

Training at the EOD Land Range would adhere to policies and regulations governing noise, and hazardous materials and hazardous waste (including ordnance) as discussed in Appendix C. There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative.

4.4.2.4.1 Biological Resources—EOD Land Range–NAVMAG Pearl Harbor West Loch

4.4.2.4.1.1 No-action Alternative (Biological Resources—EOD Land Range–NAVMAG Pearl Harbor West Loch)

HRC Training—No-action Alternative

EOD training at West Loch involves the detonation of explosives with a net explosive weight of up to 2.5 lb. Although training at this facility can take place at any time, training most often occurs during daylight hours. Under the No-action Alternative, up to 85 such training events can occur per year.

Training at the EOD pit is not expected to have any adverse impacts on vegetation at the site. No direct effects on wildlife are anticipated. No threatened or endangered species have been observed at West Loch. Intrusive noise from the site, however, could startle noise-sensitive wildlife in the vicinity, most notably at the Pearl Harbor National Wildlife Refuge. Assuming that a detonation at the EOD pit generated a noise level of about 160 dB sound exposure level

(SEL) at 50 ft,[1] noise levels at 500 ft will be reduced to about 130 dB SEL.[2] Because this is predominately low-frequency noise, the dB value is not comparable to A-weighted noise levels. There is no significance cut-off for noise impacts on wildlife, including birds. While individual foraging or transient birds in the vicinity of the EOD pit may be startled, the event is unlikely to significantly impact a population of one of the 46 migratory species that occur in Pearl Harbor vicinity. At 4,000 ft from the EOD pit, the noise levels would be reduced to approximately 94 dB. The EOD Land Range is approximately 3 mi from the Honouiliuli Unit of the refuge, which would result in even lower noise levels at that site.

4.4.2.4.1.2 Alternative 1 (Biological Resources—EOD Land Range–NAVMAG Pearl Harbor West Loch)

Increased Tempo and Frequency of Training—Alternative 1

Under Alternative 1, EOD training intensity at West Loch would not increase. Impacts would be the same as those discussed above for the No-action Alternative.

4.4.2.4.1.3 Alternative 2 (Biological Resources—EOD Land Range–NAVMAG Pearl Harbor West Loch)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, EOD training intensity at the EOD Land Range would increase from 85 to 93 training events per year, an approximately 9 percent increase. The small increase in training would result only in minor changes to the noise environment.

4.4.2.4.1.4 Alternative 3 (Biological Resources—EOD Land Range–NAVMAG Pearl Harbor West Loch)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.4.2 Cultural Resources—EOD Land Range–NAVMAG Pearl Harbor West Loch)

4.4.2.4.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Cultural Resources—EOD Land Range–NAVMAG Pearl Harbor West Loch)

There are no ongoing land-based training events at the EOD Land Range with the potential to affect cultural resources.

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[1] Based on equations in Blasters Handbook (DuPont, 1980), and assuming 10-12 dB reduction in noise level from berm/barrier around EOD pit).

[2] Based on an assumed attenuation rate of 9 dB per doubling of distance from the source, and barrier attenuation as described in the previous footnote.

Land Demolitions take place at the West Loch EOD Training Facility, and are designed to train forces in the use of explosives. West Loch has been surveyed for archaeological and traditional Hawaiian resources, and a number or archaeological sites were identified; however, none were identified within the EOD Land Range (International Archaeological Resources Institute, Inc., 2005; Jensen, et al., 1997).

The EOD Land Range facilities used for Land Demolitions have also been surveyed for their historic significance. These facilities include two concrete blast chambers and one concrete safety bunker. None of these buildings have been recommended as eligible for inclusion in the NRHP.

Proposed increases in training under Alternative 1, Alternative 2, and Alternative 3 would result in increases in training; however, no cultural resources would be affected because there are none present in the area.

4.4.2.4.3 Geology and Soils—EOD Land Range–NAVMAG Pearl Harbor West Loch)

4.4.2.4.3.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Geology and Soils—EOD Land Range–NAVMAG Pearl Harbor West Loch)

HRC Training—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Navy EOD Training

Navy EOD training is not expected to affect the geology of the EOD Land Range, inasmuch as no construction or excavation is planned. The nature of the training, however, is such that contamination of surface soils is a concern.

The in-place detonation of ordnance typically generates fragments and residues of explosives and other ordnance constituents (e.g., inorganic compounds such as perchlorates and metals such as lead, mercury, chromium, copper, and nickel from primers, wires, and casings). Based on analysis of military blow-in-place activities, ordnance expended material, remnants, and residues deposited on and near an EOD pit may account for up to 40 percent[3] of the weight of small ordnance items (the remaining 60 percent being dispersed in the atmosphere as gases or particulates) (Kelleher, 2002). Larger fragments are periodically cleared from the site during EOD sweeps, whereas fine fragments and residues typically remain in place. This practice is consistent with the Military Munitions Rule, which allows expended munitions and constituents to remain on the range as long as the range remains open. Fine particulate residues may settle up to 197 ft from the point of detonation.

Some explosives residues will degrade over time, while others persist. Royal Demolition Explosive (RDX), for example, resists degradation while trinitrotoluene typically degrades to dinitrotoluene over time. Inorganic salts and metals may react with their surroundings to form insoluble compounds, or may migrate into surface soils and ground water dissolved in rain water. Sheet flows of precipitation during periods of heavy rainfall can disperse surface contaminants laterally. In summary, some ordnance constituents will accumulate in on-site soils while other constituents migrate from the site.

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[3] 85 (93) events / year x 2.5 lb / event x 0.4 = 85 (93) lb.

The rate at which ordnance residues accumulate in on-site soils will depend upon the relative rates of generation, degradation, and offsite migration. The degree to which accumulating residues contribute to soil contamination will depend upon the nature of the residue constituents. Under the No-action Alternative and Alternative 1, up to about 85 lb per year of ordnance fragments and residues will be deposited on the site.[4] Under Alternative 2 and Alternative 3, no more than 93 lb per year of ordnance fragments and residues would be deposited.[5] At this intensity of use, such residues will constitute a very small fraction of the surface materials in the vicinity of the EOD pit.[6] This level of use is not expected to affect soil chemistry at the EOD range.

EOD Land Range Use by Others

In addition to Navy EOD training, the EOD Land Range will continue to be used by law enforcement agencies and private companies. The frequency of use by these agencies and the types and amounts of ordnance to be used in their activities are not known. However, the restriction on the maximum net explosive weight of ordnance detonated at the Land Range, 2.5 lb, will apply to all users of the Land Range.

Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

EOD training for Major Exercises would be the same as described above for HRC Training. Major Exercises would not be new training events, but would be an aggregate of existing training events. Under Alternative 2 and Alternative 3, Multiple Strike Group Training would result in an unspecified number of additional training events at the EOD Land Range. These additional events would be substantially fewer than the number of training events estimated for HRC Training, and thus are unlikely to have substantial adverse effects on geology and soils.

4.4.2.4.4 Health and Safety—EOD Land Range–NAVMAG Pearl Harbor West Loch

4.4.2.4.4.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Health and Safety—EOD Land Range–NAVMAG Pearl Harbor West Loch)

HRC Training—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Navy EOD Training

EOD Land Range training under the No-action Alternative and Alternative 1 will consist of up to 85 training events per year, using no more than 2.5 lb net explosive weight of ordnance. Under Alternative 2 and Alternative 3, up to 93 training events per year would be held. The public will not be exposed to the energetic effects (overpressure and fragments) of the detonations because the ESQD arc for these training munitions lies completely within the West Loch lands and adjacent waters controlled by the Navy and from which the public is excluded. Accordingly, Navy training events at the EOD Land Range will have no effect on public safety.

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[4] For these alternatives, 85 exercises / year x 2.5 lb (maximum) per exercise x 40% residue = 85 lb (38.6 kg)
[5] For this alternative, 93 exercises / year x 2.5 lb (maximum) per exercise x 40% residue = 93 lb (42.3 kg)
[6] Assuming deposition within 100 ft of the detonation, area would be about 31,400 ft^2. 85 - 93 lb/year would be about 0.003 lb/ft^2 (15 grams/square meter) per year.

EOD Land Range Use by Law-Enforcement Agencies

In addition to Navy EOD training, the EOD Land Range will continue to be used by law enforcement agencies and private companies. The frequency of use by these agencies and the types and amounts of ordnance to be used in their activities are not known. However, the restriction on the maximum net explosive weight of ordnance detonated at the Land Range, 2.5 lb, would apply to all users of the Land Range. Thus, law enforcement and private activities at the EOD Land Range will have no effect on public safety.

Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Major Exercises under all Alternatives, such as RIMPAC and USWEX, include training and in some cases RDT&E activities. Under Alternative 2 and Alternative 3, Multiple Strike Group Training would result in an unspecified number of additional training events at the EOD Land Range. Potential impacts from Major Exercises would be similar to those described above for training and RDT&E activities. These additional training events are unlikely to have substantial adverse health and safety effects.

4.4.2.4.5 Water Resources—EOD Land Range–NAVMAG Pearl Harbor West Loch

4.4.2.4.5.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Water Resources—EOD Land Range–NAVMAG Pearl Harbor West Loch)

HRC Training—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Under the No-action Alternative and Alternative 1, up to 85 training events per year can be held at the EOD Land Range, each training event involving the demolition of up to 2.5 lb net explosive weight of ordnance. Under Alternative 2 and Alternative 3, up to 93 training events per year could be held. Based on published accounts, up to 40 percent[7] of the initial weight of the ordnance item, for small ordnance, will be deposited on the ground as fragments or residues (Kelleher, 2002). Thus, about 85 to 93 lb per year of solid munitions expended material will be deposited on the site.

These solids will include both soluble and insoluble materials, consisting mostly of inorganic metals (e.g., aluminum, steel, iron) and metallic compounds of low to negligible toxicity. Plastics, soft metals, and explosive compounds will disperse during detonation, and thus will be substantially under-represented in the solids deposited on the site. A small, but unknown percentage of the solids on the site will consist of heavy metals (e.g., chromium, cadmium, lead, nickel) and organic residues (e.g., explosives and their breakdown products, polycyclic aromatic hydrocarbons, dioxins).

Assuming, solely for purposes of analysis, that the entire weight of these residual materials is soluble in the rain water falling on the site (about 7.3 acre-ft, as described in Chapter 3.0), then their concentration will be about 36 parts per million (ppm) to 40 ppm. A portion of the rain water will percolate into the soils on the site, but the relatively impermeable capstone underlying the site will prevent downward movement, and shallow groundwater will eventually migrate horizontally into the adjacent waters of Pearl Harbor. Rain water that does not infiltrate the ground—or evaporate—will flow directly overland into Pearl Harbor.

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[7] 85 (93) events / year x 2.5 lb / event x 0.4 = 85 (93) lb.

Based on the estimated total concentrations of munitions constituents dissolved in rainwater migrating from the EOD Land Range, their contribution to concentrations of water pollutants in Pearl Harbor will be negligible. These inputs would be periodic, and tidal flushing would further substantially disperse and dilute them. Thus, these intermittent, short-term discharges of very small amounts of munitions constituents into surface waters will have no effect on water resources.

Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Major Exercises under all Alternatives, such as RIMPAC and USWEX, include training and in some cases RDT&E activities. Under Alternative 2 and Alternative 3, Multiple Strike Group training would result in an unspecified number of additional training at the EOD Land Range. Potential impacts from Major Exercises would be similar to those described above for training and RDT&E activities.

4.4.2.5 LIMA LANDING

Table 4.4.2.5-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at Lima Landing. Alternative 3 is the preferred alternative.

Table 4.4.2.5-1. Training at Lima Landing

Training	
• Mine Neutralization	• Special Warfare Operations (SPECWAROPS)

A review of the 13 resources against training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed at Lima Landing. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would not be any air emission sources at Lima Landing associated with training. Use of this site would not require control of the airspace above this land area. Training associated with this site adheres to policies and regulations governing noise, as discussed in Appendix C. There is no current or proposed training that could affect land forms, geology, and associated soils development.

There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training at Lima Landing would not generate any waste streams that could impact local water quality.

4.4.2.5.1 Biological Resources—Lima Landing

4.4.2.5.1.1 No-action Alternative (Biological Resources—Lima Landing)

HRC Training and Major Exercises—No-action Alternative

Under the No-action Alternative, up to 62 Mine Neutralization training events per year will continue to occur at locations such as Lima Landing, or about 5 to 6 per month. Individual training events use explosives charges no greater than 0.25 lb net explosive weight. Up to about 1.25 lb of explosives will be used per year. Training follows the relevant Naval Station Pearl Harbor and Navy policies and procedures to minimize impacts on biological resources Table 4.4.2.1.1.1-1.

Explosive Ordnance Disposal Ranges—No-action Alternative

Vegetation

No threatened or endangered plant species have been identified in the region of influence.

Wildlife

Under the No-action Alternative, up to 62 Mine Neutralization training events per year will continue to occur at locations such as Lima Landing, or about 5 to 6 per month. Mine

Neutralization activities may include destruction of inert mines by detonation of no more than 0.25 lb of explosive per inert mine. Prior to actual detonation, the area will be determined to be clear of marine mammals. Training follows the relevant Navy policies and procedures to minimize impacts on biological resources. Standard procedures require tethered mines to be suspended at least 10 ft below the surface of the water. Explosive charges on or near the shallow water bottom will be placed in sandy areas away from exposed reefs and coral. There can be minor and localized loss of some fish and benthic populations from the explosions. All waters around Naval Station Pearl Harbor have been designated as EFH for eggs and larvae of a number of species. The harbor has not been designated as a Habitat Area of Particular Concern. (U.S. Department of the Navy, Commander Navy Region Hawaii, 2001) After training involving underwater detonations, the area will be searched for injured animals. Such detonations occur infrequently.

Impacts on marine mammals, sea turtles, and fish from underwater explosions are discussed in Section 4.1.2. Only sandy areas that avoid/minimize potential impacts on coral are used for explosive charges on the shallow water floor (less than 40 feet of water). Lima Landing is approximately 3 mi from the Honouiliuli Unit of the refuge. Mine Neutralization activities could startle these birds, but suspension of the mines at least 10 ft underwater should dampen the potential for airborne noise effects.

SPECWAROPS include special reconnaissance, reconnaissance and surveillance, combat search and rescue, and direct action. The training event involves fewer than 20 troops and has minimal interaction with the environment, since one of the purposes of the training event is to operate undetected. During amphibious inserts the crews follow established procedures, such as having designated lookouts watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The troops review training overlays that identify the insertion points and any nearby restricted areas. Sensitive biological and cultural resource areas are avoided by the SPECWAROPS troops (Training Guidelines for Resource Protection—All Oahu Training Areas). (U.S. Department of the Navy, 2002a)

Environmentally Sensitive Habitat

No environmentally sensitive habitat has been identified in the immediate area.

4.4.2.5.1.2 Alternative 1 (Biological Resources—Lima Landing)

Increased Tempo and Frequency of Training—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). No increase in the number of training events performed at Lima Landing is anticipated. Impacts on biological resources would be similar to those described previously for the No-action Alternative. Impacts on marine mammals, sea turtles, and fish from underwater explosions are discussed in Section 4.1.2.

Vegetation

Training would take place at existing locations; no expansion of the area would be involved. Compliance with relevant Navy policies and procedures (Table 4.4.2.1.1.1-1) during training would minimize the potential for effects on vegetation, as well as limit the potential for introduction of invasive plant species.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. There would continue to be a minor and localized loss of some fish and benthic populations from the explosions. The increased training would comply with relevant Navy policies and procedures (Table 4.4.2.1.1.1-1), which would minimize the potential for effects on wildlife.

Environmentally Sensitive Habitat

No environmentally sensitive habitat has been identified in the immediate area.

4.4.2.5.1.3 Alternative 2 (Biological Resources—Lima Landing)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and an additional six Mine Neutralization events would occur. Since Mine Neutralization events occur in other areas of the HRC, not all of the additional six per year would necessarily take place at Lima Landing. Prior to actual detonation, the area would be determined as clear of marine mammals. Explosive charges, in less than 40 ft of water, would be placed/neutralized only in sandy areas to avoid/minimize potential impacts on coral. Impacts on marine mammals, sea turtles, and fish from underwater explosions are discussed in Section 4.1.2.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.2.5.1.4 Alternative 3 (Biological Resources—Lima Landing)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.5.2 Cultural Resources—Lima Landing

4.4.2.5.2.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Cultural Resources—Lima Landing)

Lima Landing is a small underwater range situated within the Pearl Harbor National Historic Landmark boundary. Within the vicinity are numerous submerged cultural resources as noted for Naval Station Pearl Harbor; however, none are directly within the region of influence for Lima Landing's underwater demolition activities. Given the restricted size of the explosives used during training (and their associated concussive effects), and the distance from known Landmark features, no effects on underwater cultural resources are expected. If the locations for underwater demolition activities are changed in the future (i.e., expanded north or south where sensitive cultural resources could be encountered), coordination with the Navy Region Hawaii's designated cultural resources coordinator would be required.

4.4.2.5.3 Hazardous Materials and Waste—Lima Landing

4.4.2.5.3.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Hazardous Materials and Waste—Lima Landing)

HRC Training—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3, up to five training events per year can occur at Lima Landing. Training would use explosives charges of no more than 0.25 lb net explosive weight each, for a total of about 1.25 lb per year of explosives under the No-action Alternative, Alternative 1, and Alternative 2. The transport, handling, and use of such small quantities of hazardous materials on an infrequent basis will have no effect on ongoing hazardous materials management activities. No RCRA hazardous wastes will be generated by this training.

Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Major Exercises under all Alternatives, such as RIMPAC and USWEX, include training and in some cases RDT&E activities. Under Alternative 2 and Alternative 3, Multiple Strike Groups would conduct demolition and SPECWAROPS at Lima Landing. This very limited, short-term use of the range is not expected to substantially affect hazardous materials use on or hazardous waste generation from the range. Potential impacts from Major Exercises would be similar to those described above for training and RDT&E activities.

4.4.2.5.4 Health and Safety—Lima Landing

4.4.2.5.4.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Health and Safety—Lima Landing)

HRC Training—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Underwater demolition activities at Lima Landing under the No-action Alternative and Alternatives 1 and 2 would consist of up to five training events per year, using no more than 0.25 lb net explosive weight of ordnance per training event. The public would not be exposed to the energetic effects of the detonations because these effects would be completely contained within the range and adjacent waters controlled by the Navy and from which the public is excluded. Existing Navy safety protocols for the use of explosives would ensure that no non-participants would be in the area during training. Accordingly, future Navy training at Lima Landing would have no effect on public health and safety.

Demolition activities will be conducted in accordance with COMNAVSURFPAC Instruction 3120.8F (U.S. Department of the Navy, 1993). COMNAVSURFPAC Instruction 3120.8F specifies detonation procedures for underwater ordnance to avoid endangering the public or impacting other non-military activities, such as shipping, recreational boaters, divers, and commercial or recreational fishermen.

Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Major Exercises under all Alternatives, such as RIMPAC and USWEX, include training and in some cases RDT&E activities. Under Alternative 2 and Alternative 3, Multiple Strike Groups would conduct limited, short-term Demolition and SPECWAROPS at Lima Landing. Potential impacts from Major Exercises would be similar to those described above for training and RDT&E activities.

4.4.2.6 U.S. COAST GUARD AIR STATION BARBERS POINT/KALAELOA AIRPORT

Table 4.4.2.6-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at the U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport. Alternative 3 is the preferred alternative.

Table 4.4.2.6-1. Training at Coast Guard Air Station Barbers Point/Kalaeloa Airport

Training	
• Air Operations	• Special Warfare Operations (SPECWAROPS)
• Aircraft Support Operations	

A review of the 13 resources against training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for the U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, cultural resources, geology and soils, hazardous materials and hazardous waste, health and safety, land use, socioeconomics, transportation, utilities, and water resources.

HRC training associated with Coast Guard Air Station Barbers Point/Kalaeloa Airport would not impact regional air quality. There is no planned construction or alteration associated with the Navy that would affect the cultural resources in the vicinity. There are no current or proposed training that could affect land use, land forms, geology, and associated soils development. Training associated with this site adhere to policies and regulations governing hazardous materials and hazardous waste, and health and safety, as discussed in Appendix C.

There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training at the site would not generate any waste streams that could impact local water quality.

4.4.2.6.1 Airspace—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport

4.4.2.6.1.1 No-action Alternative (Airspace—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport)

HRC Training—No-action Alternative

Aircraft Support Operations will require coordination with the State of Hawaii and the Coast Guard and will use existing facilities for fueling and minor maintenance.

No new airspace proposal or any modification to the existing controlled airspace has been identified to accommodate Aircraft Support Operations. Special use airspace will not be used, and aircraft will use existing approach and departure procedures. Coordination with Kalaeloa Airport will be the same as for other military aircraft using the runways.

Major Exercises—No-action Alternative

Major Exercises such as RIMPAC and USWEX can include Aircraft Support Operations at Kalaeloa Airport. These Major Exercises include extensive planning and coordination with the Federal Aviation Administration (FAA). RIMPAC planning conferences, which include coordination with the FAA, are conducted beginning in March of the year prior to each RIMPAC Exercise. USWEX training would generally not include Aircraft Support Operations at Kalaeloa Airport. If aircraft support were required, it would be coordinated with the FAA well in advance of each 3- or 4-day Major Exercise.

The advance planning and coordination with the FAA regarding aircraft involved in Major Exercises result in minimal impacts on airspace.

4.4.2.6.1.2 Alternative 1 (Airspace—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport)

Increased Tempo and Frequency of Training—Alternative 1

Aircraft Support Operations would require coordination with the State of Hawaii and the Coast Guard and would use existing facilities for fueling and minor maintenance. Increased training would result in a minor increase in the number of Aircraft Support Operations.

No new airspace proposal or any modification to the existing controlled airspace has been identified to accommodate Aircraft Support Operations. Special use airspace would not be used, and aircraft would use existing approach and departure procedures. Coordination with Kalaeloa Airport would be the same as for other military aircraft using the runways.

Major Exercises—Alternative 1

RIMPAC planning conferences, which include coordination with the FAA, are conducted beginning in March of the year prior to each RIMPAC Exercise. The increase from one aircraft carrier to two during RIMPAC under Alternative 1 would require a minor increase in Aircraft Support Operations and subsequent coordination between the Navy and FAA. USWEX training would generally not include Aircraft Support Operations at Kalaeloa Airport. If aircraft support was required it would be coordinated with the FAA well in advance of each 3- or 4-day Major Exercise.

The advance planning and coordination with the FAA regarding aircraft involved in Major Exercises result in minimal impacts on airspace.

4.4.2.6.1.3 Alternative 2 (Airspace—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport)

Increased Tempo and Frequency of Training—Alternative 2

An increased tempo and frequency of training would be similar to the ongoing training support. Aircraft Support Operations would require coordination with the State of Hawaii and the Coast Guard and would use existing facilities for fueling and minor maintenance. Increased tempo and frequency of training would result in a minor increase in the number of Aircraft Support Operations.

No new airspace proposal or any modification to the existing controlled airspace has been identified to accommodate Aircraft Support Operations. Special use airspace would not be used, and aircraft would use existing approach and departure procedures. Coordination with Kalaeloa Airport would be the same as for other military aircraft using the runways.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

In addition to RIMPAC and USWEX, Alternative 2 includes a Multiple Strike Group Training Exercise. However, the Multiple Strike Group Training would generally not include Aircraft Support Operations at Kalaeloa Airport. If aircraft support was required it would be coordinated with the FAA well in advance of the Major Exercise. The advance planning and coordination with the FAA regarding aircraft involved in Major Exercises result in minimal impacts on airspace.

4.4.2.6.1.4 Alternative 3 (Airspace—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on airspace under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.6.2 Biological Resources—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport

4.4.2.6.2.1 No-action Alternative (Biological Resources—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport)

HRC Training and Major Exercises—No-action Alternative

There are few biological resources associated directly with the facility. Aircraft Support Operations use existing facilities for fueling and minor maintenance. SPECWAROPS also use existing facilities, concrete aprons, hangars, and adjacent open areas for various activities. Navy activities at the site would be performed in accordance with all applicable biological opinions and existing Coast Guard regulations. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Coast Guard regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

Vegetation

Areas known to contain the endangered `akoko shrub or the round-leafed chaff-flower are avoided.

Wildlife

Air Support Operations and SPECWAROPS would continue to result in noise and movement of personnel, vehicles, helicopters, and landing craft. However, training events are generally short in duration and they occur in areas regularly used for such training. Air Operations are a routine occurrence on the installation. All participants in training events are to adhere to the Navy guidelines provided in Table 4.4.2.1.1.1-1, along with applicable Coast Guard procedures, to assist in minimizing impacts on biological resources. Any potential impacts to listed bird species such as the ae`o (Hawaiian stilt) would be addressed through coordination/consultation with the USFWS. While individual migratory birds may be startled, the training events (Air Operations, Aircraft Support Operations, and SPECWAROPS) being currently performed are not likely to significantly impact a population of any of the migratory species that occur in the U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport area and thus would be exempt from the MBTA take prohibitions.

Environmentally Sensitive Habitat

The Kalaeloa Unit of the Pearl Harbor National Wildlife Refuge supports the second largest population of endangered ewa hina hina (*Achyranthes splendens*). Activities performed on U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport would avoid this unit of the refuge.

4.4.2.6.2.2 Alternative 1 (Biological Resources—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). Air Operations, Aircraft Support Operations, and SPECWAROPS would not increase in number, but may increase in tempo.

Vegetation

Training would continue to take place at existing locations; no expansion of the area would be involved. Compliance with relevant Coast Guard and Navy policies and procedures (Table 4.4.2.1.1.1-1) during training would minimize the potential for effects on vegetation, as well as limit the potential for introduction of invasive plant species. No threatened or endangered plant species are known to occur at the airport.

Wildlife

Although not necessarily their preferred habitat, there is additional suitable habitat nearby for birds, the most common form of wildlife on the site, such as the black-crowned night heron, great frigate bird, Pacific golden plover, and sanderling on U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport to use if they temporarily leave the area affected by an increase in training. The increased training would comply with relevant Coast Guard and Navy policies and procedures (Table 4.4.2.1.1.1-1), which would further reduce the potential for effects on wildlife.

Environmentally Sensitive Habitat

The Kalaeloa Unit of the Pearl Harbor National Wildlife Refuge supports the second largest population of endangered ewa hina hina. Activities performed on U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport would avoid this unit of the refuge.

4.4.2.6.2.3 Alternative 2 (Biological Resources—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training could also increase. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.2.6.2.4 Alternative 3 (Biological Resources—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.6.3 Noise—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport

Impacts of noise on human receptors are evaluated based on whether or not a noise event would exceed DoD or Occupational Safety and Health Administration (OSHA) guidelines.

4.4.2.6.3.1 No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 (Noise—U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport)

HRC Training and Major Exercises—No-action Alternative, Alternative 1, Alternative 2, and Alternative 3

Under the No-action Alternative, Aircraft Support Operations, SPECWAROPS, and Air Operations will continue to occur at U.S. Coast Guard Station Barbers Point/ Kalaeloa Airport. SPECWAROPS use existing facilities, concrete aprons, hangars, and adjacent open areas for various activities. Due to the non-intrusive nature of these activities, a limited amount of noise will continue to be produced and will stay within the existing noise contours.

These same training events are proposed for Alternatives 1 and 2. Noise levels associated with the increased tempo and frequency of training events and Major Exercises would be similar to existing noise levels. The total number of training events that affect noise would increase; however, there would be no anticipated increase to the level of noise produced.

4.4.2.7 MARINE CORPS BASE HAWAII (MCBH)

Table 4.4.2.7-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at MCBH. Alternative 3 is the preferred alternative.

Table 4.4.2.7-1. Training at Marine Corps Base Hawaii

Training	
• Air Operations	• Command and Control
• Humanitarian Assistance/Non-combatant Evacuation Operations (HAO/NEO)	• Humanitarian Assistance/Disaster Relief Operations (HA/DR)
• Aircraft Support Operations	• Special Warfare Operations (SPECWAROPS)
• Field Carrier Landing Practice (FCLP) (Alternative 1)	• Expeditionary Assault

A review of the 13 resources against training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for MCBH. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, geology and soils, hazardous materials and hazardous waste, health and safety, land use, transportation, utilities, and water resources.

There would be no air emissions generated at MCBH other than that from an occasional aircraft training and Expeditionary Assault training. The Air Operations and Aircraft Support Operations would not change regional air quality. The addition of Field Carrier Landing Practice (FCLP) would not alter air quality at MCBH as air emissions would be the same as existing activities. There is no current or proposed training that could affect land use, land forms, geology, and associated soils development. Geology and soils impacts would be limited to short-term minor disturbance of beach sand and near-shore ocean floor along existing Expeditionary Assault access routes.

Training associated with MCBH adhere to policies and regulations governing hazardous materials and hazardous waste, and health and safety, as discussed in Appendix C. There would be no impact on Oahu's transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Water resources would not be affected by the training events which, after moving from the beach, would primarily occur in developed areas on MCBH.

4.4.2.7.1 Airspace—MCBH

4.4.2.7.1.1 No-action Alternative (Airspace—MCBH)

HRC Training—No-action Alternative

No use of controlled airspace is planned for HRC training other than localized use of rotary and fixed-wing aircraft within predefined areas.

Major Exercises—No-action Alternative

Major Exercises such as RIMPAC include training and, in some cases, RDT&E activities. At MCBH this training will include rotary and fixed wing aircraft. These Air Operations and Aircraft Support Operations are a part of ongoing training routinely conducted by the air wings at MCBH. RIMPAC planning conferences, which include coordination with the FAA, are conducted beginning in March of the year prior to each RIMPAC. The advance planning and coordination with the FAA regarding aircraft involved in Major Exercises result in minimal impacts on airspace.

4.4.2.7.1.2 Alternative 1 (Airspace—MCBH)

Increased Tempo and Frequency of Training—Alternative 1

Increased training would involve minor increases in the use of rotary and fixed-wing aircraft.

Major Exercises—Alternative 1

An additional proposed training activity associated with Major Exercises is FCLP. This activity involves pilots from an aircraft carrier air wing practicing landings at a land runway. As discussed in Chapter 2.0, the runway at MCBH could be used for FCLP. For each pilot the FCLP would include 8 to 10 touch-and-go landings at the MCBH runway during both daytime and at night. The carrier wing aircraft would be operating within the MCBH Class D and Class E airspace and the adjacent area. FCLP activities would be below and north of the V12-13 airway.

RIMPAC planning conferences, which include coordination with the FAA, are conducted beginning in March of the year prior to each RIMPAC. Each of the USWEX training events, up to six per year, would include coordination with the FAA well in advance of the 3- or 4-day Major Exercise. FAA coordination would include discussions regarding the anticipated number of aircraft including FCLP activities.

The advance planning and coordination with the FAA regarding scheduling of special use airspace, and coordination of Navy training relative to en route airways and jet routes, result in minimal impacts on airspace from Major Exercises. The increase from one aircraft carrier to two during RIMPAC under Alternative 1 would require a minor increase in coordination and scheduling by the Navy and FAA. The increased training would be readily accommodated within the existing airspace.

4.4.2.7.1.3 Alternative 2 (Airspace—MCBH)

Increased Tempo and Frequency of Training—Alternative 2

Increased training would involve minor increases in the use of rotary and fixed-wing aircraft.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

In addition to RIMPAC and USWEX, Alternative 2 includes a Multiple Strike Group Training Exercise that would include rotary and fixed wing aircraft. These Air Operations and Aircraft Support Operations are a part of ongoing training routinely conducted by the air wings at MCBH.

An additional proposed training activity associated with Major Exercises is FCLP. This activity involves pilots from an aircraft carrier air wing practicing landings at a land runway. As discussed in Chapter 2.0, the runway at MCBH could be used for FCLP. For each pilot the FCLP would include 8 to 10 touch-and-go landings at the MCBH runway during both daytime and at night. The carrier wing aircraft would be operating within the MCBH Class D and Class E airspace and the adjacent area. FCLP activities would be below and north of the V12-13 airway.

Multiple Strike Group training would include coordination with the FAA well in advance of the Major Exercise. FAA coordination would include discussions regarding the anticipated number of aircraft including FCLP activities. The advance planning and coordination with the FAA regarding scheduling of special use airspace, and coordination of Navy training relative to en route airways and jet routes, result in minimal impacts on airspace from Major Exercises. The use of three aircraft carriers during a Major Exercise would require an increase in coordination and scheduling by the Navy and FAA. The increased training would be readily accommodated within the existing airspace.

4.4.2.7.1.4 Alternative 3 (Airspace—MCBH)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on airspace under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.7.2 Biological Resources—MCBH

4.4.2.7.2.1 No-action Alternative (Biological Resources—MCBH)

Navy activities at the site would be performed in accordance with all applicable biological opinions and existing Marine Corps regulations. Adherence to established SOPs at MCBH would result in minimal impacts on the physical environment and avoid potential impacts on threatened and endangered species. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Marine Corps regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

HRC Training and Major Exercises—No-action Alternative

Vegetation

The terrestrial habitat typically consists of sparse ground cover composed of indigenous grasses and shrubs. Most of the vegetation on MCBH is dominated by introduced species. Humanitarian Assistance Operations and Non-Combatant Evacuation Operations (HAO/NEO) and Humanitarian Assistance/Disaster Relief (HA/DR) and SPECWAROPS use existing open areas and facilities. Some temporary structures, including tents, may be used. All participants are briefed on current guidelines to avoid undue impacts on vegetation. Training follows the guidelines provided in Table 4.4.2.1.1.1-1, which assist in minimizing the potential for impacts on beach vegetation.

Wildlife

Navy activities would continue to result in noise and movement of personnel, vehicles, helicopters, and landing craft. However, training events are short in duration and are not expected to affect the areas where the birds are most likely to nest. Training within the range areas regularly used for training should not substantially increase the threat to these species. Night lighting is shielded to the extent practical to minimize its potential effect on night-flying species in the beach area. Any potential impacts to listed bird species, such as the koloa maoli (Hawaiian duck), `alae ke`oke`o (Hawaiian coot), `alae `ula (Hawaiian common moorhen) and ae`o (Hawaiian stilt), would be addressed through coordination/consultation with the USFWS. Military readiness activities are exempt from the take prohibitions of the MBTA provided they do not result in a significant adverse effect on the population of a migratory bird species. While individual birds may be startled, the training events (C2, Air Operations, Aircraft Support Operations, FCLPs, and SPECWAROPS) being currently performed are not likely to significantly impact a population of any of the migratory species, such as the Pacific golden-plover and ruddy turnstone, that occur in the MCBH area and thus would be exempt from the MBTA take prohibitions.

Beach surveys are conducted prior to a training event to identify any sea turtle nests. If present, these sites are marked and the immediate area placed off limits to personnel. Adherence to established SOPs at MCBH results in minimal impacts on the physical environment and avoids potential impacts on threatened and endangered species. The beach and offshore waters are monitored for the presence of marine mammals and sea turtles 1 hour before and during Major Exercises. If any are seen, the training event is delayed until the animals leave the area.

Environmentally Sensitive Habitat

Nearby wetlands, including the Nuupia Ponds complex at the southern boundary of the base, are avoided during range activities.

4.4.2.7.2.2 Alternative 1 (Biological Resources—MCBH)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). While training events would not increase in number, their tempo may, but the likelihood of a similar increase in adverse impacts on biological resources is small, as discussed below.

Vegetation

Training would take place at existing locations; no expansion of the area would be involved. Compliance with relevant Marine Corps and Navy policies and procedures (Table 4.4.2.1.1.1-1) during training would minimize the potential for effects on vegetation, as well as limit the potential for introduction of invasive plant species. No threatened or endangered plant species are known to occur on MCBH.

Wildlife

Although not necessarily their preferred habitat, there is additional suitable habitat nearby for birds on MCBH to use if they temporarily leave the area affected by an increase in training. The increased training would comply with relevant Marine Corps and Navy policies and procedures (Table 4.4.2.1.1.1-1), which would further reduce the potential for effects on wildlife.

The beach and offshore waters would continue to be monitored for the presence of marine mammals and sea turtles 1 hour before and during training. If any are seen, then the training event would be delayed until the animals leave the area.

New Training

An additional proposed training event associated with Major Exercises is FCLP, which involves pilots from an aircraft carrier air wing practicing landings at a land runway. For each pilot, the FCLP would include 8 to 10 touch-and-go landings during both daytime and at night. Sound levels from this training would be similar to sound levels currently occurring at the MCBH. Other than startle effects, no substantial impacts on wildlife, including threatened and endangered species, are anticipated.

Environmentally Sensitive Habitat

Nearby wetlands, including the Nuupia Ponds complex at the southern boundary of the base, would be avoided during training.

4.4.2.7.2.3 Alternative 2 (Biological Resources—MCBH)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. The increased tempo and frequency of training would comply with relevant Marine Corps and Navy policies and procedures (Table 4.4.2.1.1.1-1), which would further reduce the potential for effects on wildlife. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.2.7.2.4 Alternative 3 (Biological Resources—MCBH)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.7.3 Cultural Resources—MCBH

4.4.2.7.3.1 No-action Alternative (Cultural Resources—MCBH)

HRC Training and Major Exercises—No-action Alternative

HAO/NEO and HA/DR

Training with the potential to affect terrestrial cultural resources at MCBH includes HAO/NEO and HA/DR. Both of these training events exhibit similar activities that involve personnel and equipment (e.g., Amphibious Assault Vehicles [AAVs], SDVs, supply trucks) crossing beach areas or following existing transit routes from the shoreline and dispersing into designated areas for from 1 to 18 days of realistic training. HA/DR activities also include the establishment of a safe haven camp or Civil-Military Operations Center, which can use either existing buildings or the erection of tents and portable latrines. The MCBH insertion points are shown in Appendix D. Training will take place within a landing zone that has been heavily disturbed through long-term use by the military and the public and near existing, heavily used trails and roads. Roads may require grading; however, the grading will not exceed the existing road width or alignment. Although there are areas of MCBH that are sensitive for cultural resources, none have been identified within the HAO/NEO or HA/DR training areas. Training overlays that identify the transit route, camp location, and any nearby restricted areas or sensitive biological and cultural resource areas are used by participants. As a result, adverse effects on cultural resources are not expected. However, in the event unanticipated cultural remains are identified (particularly human remains), all training will cease in the immediate vicinity and the Hawaii SHPO will be immediately notified in accordance with the Programmatic Agreement (see Appendix H).

According to NOAA's location maps there are several shipwrecks and Native Hawaiian fishponds in the vicinity of MCBH (see Figures 3.1.3-2 and 3.4.1.3.2-1); however, none are located within the direct offshore region of influence for HA/DR insertion.

4.4.2.7.3.2 Alternative 1 (Cultural Resources—MCBH)

Increased Tempo and Frequency of Training—Alternative 1

Increased tempo and frequency of training under Alternative 1 would not increase the potential for impacts to occur on cultural resources in sensitive areas. There are no sensitive cultural resources within or adjacent to the training areas for HAO/NEO and HA/DR at MCBH. Training currently use designated beach zones, transit routes, and staging areas, and mitigation measures are in place that would avoid adverse impacts. No impacts on cultural resources will occur as a result of the additional training and frequency of conducting those training events under Alternative 1.

4.4.2.7.3.3 Alternative 2 (Cultural Resources—MCBH)

Increased Tempo and Frequency of Training—Alternative 2

Increased tempo and frequency of training under Alternative 2 would not increase the potential for impacts to occur on cultural resources in sensitive areas. Training currently uses designated beach zones and transit routes and mitigation measures are in place that would avoid adverse impacts. No impacts on cultural resources would occur as a result of the additional training under Alternative 2.

4.4.2.7.3.4 Alternative 3 (Cultural Resources—MCBH)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on cultural resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.7.4 Noise—MCBH

Impacts of noise on human receptors are evaluated based on whether a noise event would exceed DoD or OSHA guidelines. Noise effects on wildlife are discussed in Section 4.4.2.7.2, Biological Resources.

4.4.2.7.4.1 No-action Alternative (Noise—MCBH)

HRC Training—No-action Alternative

Under the No-action Alternative existing training at MCBH will continue and there will be no increase to existing noise levels. MCBH maintains a hearing protection program that includes monitoring the hearing of personnel exposed to high noise levels and identifying and posting notification of noise hazard areas. Personnel required to work in noise hazard areas are required to use appropriate hearing protection to bring noise levels within established safety levels.

Major Exercises—No-action Alternative

Under the No-action Alternative, existing Major Exercises at MCBH typically include C2, Air Operations, Underwater Mine Warfare Exercises, HAO/NEO, HA/DR, SPECWAROPS, and Expeditionary Assault.

During a typical training event at MCBH, a combination of ambient noise and noise produced during the training will be heard. Ambient noise sources can include wind, surf, highway traffic, Aircraft Support Operations, and other local noise-generating land uses. Noise sources from the listed training events can include helicopter training and amphibious assault vehicles and craft.

Typical Amphibious Assault Operations include landings at MCTAB and Barking Sands by three to four AAVs or one LCAC and will in the future include Expeditionary Fighting Vehicles (EFVs). LCAC craft, powered by four gas turbine engines, produce noise in proportion to their lift (i.e., load requirements). Noise levels associated with LCAC activities have been known to exceed 95 to 105 A-weighted decibels (dBA) at 50 ft from the source. Measured noise levels for the AAV moving over land are 87 dBA SEL, and for EFV are slightly higher at 90 dBA. Four EFVs operating simultaneously will generate an increased source level of approximately 96 dBA. These activities are conducted in the offshore and on-island environment, and the nearest non-participant human receptors will be at MCTAB, where a housing development lies approximately 2,500 ft southwest of the Expeditionary Assault Operations. Using a single LCAC at 105 dBA as the greatest source level, the sound will decrease to a theoretical level of less than 75 dBA (which assumes a 6-dB drop each doubling of the distance). The actual received level will be lower due to the sound attenuation caused by almost solid tree cover between the training location and the housing area, likely to a level of 60 to 65 dBA. Therefore, no adverse impacts are expected.

The noise levels of landing craft activities are less than those projected for current airfield activities. However, under certain weather conditions, the sound generated by a landing craft can reach off-post areas. This impact will be mitigated by public notification and restricting training in the bay to daylight hours.

4.4.2.7.4.2 Alternative 1 (Noise—MCBH)

Increased Tempo and Frequency of Training—Alternative 1

Noise levels associated with increased tempo and frequency of training would be similar to existing noise levels. The total number of training events that affect noise would increase by approximately 9 percent above the No-action Alternative. Training would take place at existing locations. While the number of training events would increase, the types of training would be the same and would not overlap. There would be no anticipated increase to the level of noise produced.

The Navy proposes to conduct an FCLP for a small number of pilots each year in Hawaii using F/A-18 aircraft. An FCLP is a series of touch-and-go landings conducted during day or night periods, each consisting of six to eight touch-and-go landings per pilot. The MCBH is one of the sites proposed for this activity in Hawaii.

F/A-18 aircraft have been previously stationed at MCBH. F/A-18 flight activities included FCLPs. In 1993, 12,692 day F/A-18 flight activities and 99 night F/A-18 flight activities occurred and were considered in the *1990 AICUZ Update for MCBH Kaneohe Bay.* Between 1993 and 1994, the F/A-18 aircraft squadrons were relocated from MCBH to other locations. While F/A-18s are not longer based at MCBH, transient flight activity using F/A-18s continue to occur on an irregular basis.

The current AICUZ for MCBH (*MCBH Kaneohe Bay Air Installations Compatible Use Zones* [Naval Facilities Engineering Command, 2003]) modeled for 176,850 flight activities. Modeling performed was based on 1999 flight activity levels at MCBH, including 1,476 day F/A-18 flight activities and six night F/A-18 flight activities. These flight activities by F/A-18 accounted for less than 0.01 percent of the modeled flight activities at MCBH. Figure 3.4.2.7.4-1 depicts modeled noise contours based on these flight activities for MCBH. Modeling analysis determined that the only off-base land areas that would be impacted by noise levels greater than DNL 60 are Coconut Island and other small uninhabited islands. Land uses within the DNL 65 noise contour on-base include the industrial area near the runway, maintenance facilities, portions of the officers' family housing and bachelor enlisted quarters, a portion of the golf course, beach areas, operational and maintenance uses on both sides of the runway, and the runway itself. (Naval Facilities Engineering Command, 2003)

Alternative 1 proposes that to accommodate the needs of three pilots per year that may arrive in Hawaii in need of field qualification, up to 12 FCLP periods would be required. Twelve FCLP periods would be within the currently modeled flight activities for MCBH, and it is anticipated that the noise levels for the proposed activities would not exceed the levels described in the *MCBH Kaneohe Bay Air Installations Compatible Use Zones* (Naval Facilities Engineering Command, 2003)

4.4.2.7.4.3 Alternative 2 (Noise—MCBH)

Increased Tempo and Frequency of Training—Alternative 2

Noise levels associated with increased training, including up to 16 FCLP periods, would be similar to existing noise levels described in Section 4.4.2.7.4.2. Sixteen FCLP periods would also be within the currently modeled flight operations for MCBH, and it is anticipated that the noise levels for the proposed activities would not exceed the levels described in the *MCBH Kaneohe Bay Air Installations Compatible Use Zones* (Naval Facilities Engineering Command, 2003). The total number of training events that affect noise would increase, but there would be no anticipated increase to the level of noise produced.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. The training proposed would be similar to those occurring during current Major Exercises, with impacts on noise levels similar to those described above.

4.4.2.7.4.4 Alternative 3 (Noise—MCBH)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on noise under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.7.5 Socioeconomics—MCBH

4.4.2.7.5.1 No-action Alternative (Socioeconomics—MCBH)

The No-action Alternative stands as no change from current levels of training, and the Navy will continue its current activities at the HRC. Table 2.2.2.3-1 lists current HRC training associated with MCBH, and Appendix D includes a full description. Appendix E includes a description of current weapon systems. There are no RDT&E activities associated with MCBH, and Table 2.2.2.6-1 lists current Major Exercise events. Training events include Expeditionary Assault where amphibious landing could occur on MCBH; SPECWAROPS which are performed by Naval SEALs and Marines; C2, which can provide continuous command and control support from MCBH; Aircraft Support Operations, which include space for the various types or aircraft, equipment for refueling and maintenance; Aircraft Operations, which are a part of daily and Major Exercises; HAO/NEO which provides training for humanitarian assistance; and HA/DR which provide training in responding to a United Nations request for complex emergency support. Additionally, training for Major Exercises includes C2, Aircraft Operations, Underwater Mine Warfare Exercise which occurs offshore, HAO/NEO, HA/DR, SPECWAROPS and Expeditionary

Assault. Section 4.4.2.1.3 discusses the socioeconomic characteristics of Oahu which include the Kailua and Kaneohe communities.

4.4.2.7.5.2 Alternative 1 (Socioeconomics—MCBH)

Increased Tempo and Frequency of Training and New Training—Alternative 1

Under Alternative 1, there are no increases in the occurrence of onshore training on Marine Corps Base Hawaii.

The airfield located on MCBH is a proposed site for the FCLP. The proposed FCLPs would affect a small number (exact number is not known) of pilots each year in Hawaii. An FCLP is a series of touch-and-go landings conducted to train and field qualify pilots for aircraft carrier landings. Under Alternative 1 there are 12 proposed FCLP events per year. Normally, four FCLP periods would be required per pilot (2 day/ 2 night practice landings). The FCLP pilots would be carrier based and would not bring permanent personnel to MCBH.

The civilian communities closest to MCBH are Kailua and Kaneohe. These communities are predominately single-family suburban “bedroom communities.” Of the two communities, Kaneohe is likely to be more affected by MCBH airfield activities because the major flight tracks are closer to Kaneohe, and airfield activities are more visible to Kaneohe residents. Figure 3.4.2.7.4-1 indicates that Kaneohe is located outside the 55 L_{dn} (Day-Night Average Sound Level), and the *MCBH Kaneohe Bay Air Installation Compatible Use Zones* (Naval Facilities Engineering Command, 2003) determined that only off-base areas impacted by noise levels greater than 60 L_{dn} are Coconut Island and other small uninhabited islands. The L_{dn} is the average noise level over a 24-hour period except for noise occurring at night (between the hours of 10:00 p.m. and 7:00 a.m.). The proposed FCLPs would not occur outside the 60 L_{dn} which only impacts Coconut Island. The Kaneohe residents could be economically impacted by the increase in the number of aircraft due to the 12 FCLPs if it was determined that the socioeconomic characteristics of Kaneohe (population size, and the type and cost of housing) would be negatively affected by the 12 FCLPs events per year. For additional analysis see Section 4.4.2.7.4.

Increased RDT&E Activities—Alternative 1

There are no onshore RDT&E activities associated with MCBH.

Major Exercises—Alternative 1

Under Alternative 1, USWEX frequency would increase by 50 percent (from 4 to 6 times per year). Appendix D shows the matrix of training generally used during a USWEX Exercise by location. Under Alternative 1 there are no increases in the training on Marine Corps Base Hawaii that are associated with USWEX. The USWEX events under Alternative 1 would not affect Marine Corps Base Hawaii. The level of employment and defense initiatives associated with the No-action Alternative on Oahu would continue to benefit the local economy of Oahu.

The FCLPs would be conducted during a Major Exercise, and a small number of pilots would train at the airfield located on MCBH. The Kaneohe residents could be economically impacted by the increase in the number of aircraft due to the 12 FCLPs if it was determined that the socioeconomic characteristics of Kaneohe (population size, and the type and cost of housing) would be negatively affected by the 12 FCLPs events per year. For additional analysis see Section 4.4.2.7.4.

4.4.2.7.5.3 Alternative 2 (Socioeconomics—MCBH)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, HRC training events associated with Marine Corps Base Hawaii that would increase are Expeditionary Assault, C2 and Aircraft Support Operations. Under Alternative 2 Expeditionary Assault would increase by 9 percent and the C2 and Aircraft Support Operations each would increase by 100 percent. Support would continue to be provided from facilities on MCBH. The Navy would not require new construction or an increase in personnel in order to provide the support for these increases. Support would not change from the requirements under the No-action Alternative.

Sixteen FCLPs events are proposed to be conducted at the airfield at MCBH. FCLPs are not conducted under the No-action Alterative. Under Alternative 2, 16 FCLPs would be an increase of approximately 33 percent (from 12 to 16 FCLP events per year) from the proposed number under Alternative 1. The Navy would not require any new construction to support the FCLP events at the airfield. The FCLP pilots would be carrier based and would not bring permanent personnel to MCBH. The Kaneohe residents could be economically impacted by the increase in the number of aircraft due to the 16 FCLPs if it was determined that the socioeconomic characteristics of Kaneohe (population size, and the type and cost of housing) would be negatively affected by the 16 FCLPs events per year. For additional analysis see Section 4.4.2.7.4.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Under Alternative 2, up to three Strike Groups would be allowed to conduct training simultaneously in the HRC (Figure 1.2-3). Depending on the Major Exercise being performed MCBH would provide support for training. The Strike Groups would not be homeported in Hawaii, but would be in Hawaii for up to 10 days per Major Exercise. During this time, sailors and marines could visit Oahu while transiting. An increase in the income generated on Oahu could be expected for tourism-related services, which would affect the personal income of some Oahu residents during the 10-day training period. No increase in population size, renter-occupied homes, or single-family owned homes would be expected. The potential for requiring FCLPs increases. These FCLPs would be conducted on MCBH; however, the FCLP pilots would be carrier based and would not bring permanent personnel to MCBH. The Kaneohe residents could be economically impacted by the increase in the number of aircraft due to the 16 FCLPs if it was determined that the socioeconomic characteristics of Kaneohe (population size, and the type and cost of housing) would be negatively affected by the 16 FCLPs events per year. For additional analysis see Section 4.4.2.7.4.

4.4.2.7.5.4 Alternative 3 (Socioeconomics—MCBH)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1

and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on socioeconomics under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.8 MARINE CORPS TRAINING AREA/BELLOWS (MCTAB)

Table 4.4.2.8-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at MCTAB. Alternative 3 is the preferred alternative.

Table 4.4.2.8-1. Training at MCTAB

Training	
• Expeditionary Assault	• Special Warfare Operations (SPECWAROPS)
• Humanitarian Assistance/Non-combatant Evacuation Operations (HAO/NEO)	• Humanitarian Assistance/Disaster Relief Operations (HA/DR)
• Swimmer Insertion/Extraction	

A review of the 13 resources against training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for MCTAB. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would be no air emissions generated at MCTAB other than that from an occasional Aircraft Operation and Expeditionary Assault training. The Aircraft Operations would not change regional air quality. Airspace use at MCTAB is limited to rotary wing aircraft. MCTAB does not affect the existing airspace structure in the region. Training associated with MCTAB adheres to policy and regulation for hazardous materials and hazardous waste, health and safety, and noise, as discussed in Appendix C. Most training would be within existing Takeoff Safety Zones and Approach-Departure Clearance Surfaces that are delineated over the runways and do not extend off-base.

Geology and soils impacts at MCTAB would be limited to short-term minor disturbance of beach sand and near-shore ocean floor along existing Expeditionary Assault access routes. Movement from the beach would also result in minor, short-term disturbance to soils along pre-defined access routes. Primary surface water features are defined as off-limits during the training events, therefore avoiding impact on groundwater. There would be no impact on Oahu’s socioeconomics, transportation, utilities, and land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative.

4.4.2.8.1 Biological Resources—MCTAB

4.4.2.8.1.1 No-action Alternative (Biological Resources—MCTAB)

Navy activities at the site would be performed in accordance with all applicable biological opinions and existing Marine Corps regulations. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Marine Corps regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

HRC Training and Major Exercises—No-action Alternative

Vegetation

Native vegetation on MCTAB has largely been replaced by exotic species. However, unique strand vegetation can be found on sea cliffs and sand dunes at MCTAB. Amphibious landings have taken place for many years at MCTAB. According to previous research, Marines and Soldiers training on foot are not expected to adversely affect vegetation in the beach landing areas. Damage to vegetation from tracked vehicles during Expeditionary Assault training events is not likely as long as the vehicles continue to use existing tank trails and do not travel off-road. Training guidelines for resource protection on Oahu are listed Table 4.4.2.1.1.1-1.

C2 is achieved through a network of communication devices strategically located at selected DoD installations around the islands with no impacts on biological resources. HAO/NEO and HA/DR events use existing open areas and facilities. Some temporary structures, including tents, may be used. All participants are briefed on current guidelines to avoid undue impacts on vegetation. Amphibious landings have taken place for many years at MCTAB, and damage to vegetation from training is not likely if vehicles are restricted to existing tank trails and do not travel off-road. No rare, threatened, or endangered plant species are known to occur on or near MCTAB.

Wildlife

Navy activities would continue to result in noise and movement of personnel, vehicles, helicopters, and landing craft may temporarily displace sensitive bird species from feeding, resting, and nesting areas. Training events are short in duration, however, and are not expected to affect the areas where birds are most likely to nest. Training within the range areas regularly used for current activities should not substantially increase the threat to these species. Threatened and endangered bird species (the endangered koloa maoli [Hawaiian duck], `alae ke`ok`o [Hawaiian coot], alae ula [Hawaiian common moorhen], and ae`o [Hawaiian black-necked stilt]) have been observed in wetlands along Waimanalo Stream north of the amphibious landing beach. Any potential impacts to these listed bird species would be addressed through coordination/consultation with the USFWS. Military readiness activities are exempt from the take prohibitions of the MBTA provided they do not result in a significant adverse effect on the population of a migratory bird species. While individual birds may be startled, the training (Expeditionary Assault, HAO/NEO, and SPECWAROPS) being currently performed is not likely to significantly impact a population of any of the migratory species, such as the Pacific golden plover and wandering tattler, that occur in the MCTAB area and thus would be exempt from the MBTA take prohibitions.

To further minimize potential impacts on biological resources, instructions to Service elements engaged in Swimmer Insertion/Extraction, Expeditionary Assault, HAO/NEO, HA/DR, and Mine Countermeasures (MCM) activities will include:

- Conducting surveys prior to use of amphibious launch vehicles to ensure that humpback whales are not disturbed.
- Establishing buffer zones in locations where green turtles are known to feed so that amphibious training events do not disturb these areas.
- Marking and monitoring green turtle nests discovered on beaches so they are not affected by training.

Environmentally Sensitive Habitat

Regular transit routes are used to avoid wetland acreage on MCTAB.

4.4.2.8.1.2 Alternative 1 (Biological Resources—MCTAB)

Increased Tempo and Frequency of Training—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). While training events would not increase in number, the tempo may increase, but the likelihood of a similar increase in adverse impacts on biological resources is small as discussed below.

Vegetation

Training would continue to take place at existing locations; no expansion of the area would be involved. Compliance with relevant MCTAB and Navy policies and procedures during training would minimize the potential for effects on vegetation, as well as limit the potential for introduction of invasive weed plant species. No rare, threatened, or endangered plant species are known to occur on or near MCTAB.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. It is not likely that a bird or any other species of wildlife on MCTAB would be injured or killed as a result of increased training. The increased training would comply with relevant MCTAB and Navy policies and procedures (Table 4.4.2.1.1.1-1), which would further reduce the potential for effects on wildlife.

Environmentally Sensitive Habitat

The continued use of regular transit routes should avoid the wetland acreage on MCTAB.

4.4.2.8.1.3 Alternative 2 (Biological Resources—MCTAB)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. Wildlife exhibits a wide variety of responses to noise. Some species are more sensitive to noise disturbances than others. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.2.8.1.4 Alternative 3 (Biological Resources—MCTAB)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.8.2 Cultural Resources—MCTAB

4.4.2.8.2.1 No-action Alternative (Cultural Resources—MCTAB)

HRC Training and Major Exercises—No-action Alternative

Training with the potential to affect terrestrial cultural resources at MCTAB includes Swimmer Insertion/Extraction, Expeditionary Assault, boat raids, HAO/NEO, and HA/DR.

All of these training events similarly involve personnel and equipment (e.g., AAVs, SDVs) crossing beach areas or following existing transit routes from the shoreline and dispersing into designated areas for from 1 to 18 days of realistic training. HA/DR also include the establishment of a safe haven camp or Civil-Military Operations Center, which can use either existing buildings or erect tents and portable latrines. At MCTAB, the insertion point for training is within a landing zone that has been heavily disturbed through long-term use by the military and the public and has been specifically designated for these types of training events (see Appendix D).

Nonetheless, large portions of MCTAB are sensitive for archaeological and traditional Hawaiian resources, in particular the banks of Waimanalo and Inoaole Streams and some sections of beach dunes. Archaeological excavation at a former waste disposal site adjacent to the northern end of the amphibious landing beach yielded no artifacts of traditional Hawaiian manufacture (U.S. Air Force, 15th Airlift Wing, 2005). However, an Environmental Impact Statement prepared for the Bellows Air Force Station (AFS) land use and development plan determined that crossing Waimanalo Stream and other training events can adversely affect cultural resources. Measures identified to mitigate this potential impact include having proper documents in place in advance, crossing streams only at pre-selected locations, restricting vehicle crossings to existing bridges or pre-selected fords with no sensitive resources, and selecting stream crossings to avoid known cultural deposits. In the event unanticipated cultural remains are identified (particularly human remains), all training will cease in the immediate vicinity and the Bellows AFS designated cultural resources coordinator will be notified.

There are known terrestrial archaeological areas within and adjacent to MCTAB. There are no underwater cultural resources within the direct MCM region of influence. The nearest cultural resources include scattered shipwrecks in nearby waters (see Figure 3.1.3-2) and Site 4854 (a shoreline burial complex) north of the region of influence. With the implementation of established procedures no impacts on cultural resources will occur.

4.4.2.8.2.2 Alternative 1 (Cultural Resources—MCTAB)

Increased Tempo and Frequency of Training—Alternative 1

Increased tempo and frequency of training under Alternative 1 would increase the potential for impacts to occur on cultural resources in sensitive areas. For MCTAB, this would be most apparent within the archaeologically sensitive beach areas where training would be conducted. Training currently uses designated beach zones and transit routes. The same beach zones and transit routes would be used for the increased training. Mitigation measures are in place that would minimize adverse impacts from the increase in training.

4.4.2.8.2.3 Alternative 2 (Cultural Resources—MCTAB)

Increased Tempo and Frequency of Training—Alternative 2

The tempo and frequency of training under Alternative 2 would increase the potential for impacts to occur on cultural resources in sensitive areas. However, training currently uses designated beach zones and transit routes, and mitigation measures are in place that would avoid adverse impacts from the additional tempo and frequency of training under Alternative 2. Alternative 2 will not result in additional impacts.

4.4.2.8.2.4 Alternative 3 (Cultural Resources—MCTAB)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on cultural resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.9 HICKAM AIR FORCE BASE (AFB)

Table 4.4.2.9-1 lists ongoing training and RDT&E activities for the No-action Alternative and proposed training and RDT&E activities for Alternatives 1, 2, and 3 at Hickam AFB. Alternative 3 is the preferred alternative.

Table 4.4.2.9-1. Training and RDT&E Activities at Hickam AFB

Training	Research, Development, Testing, and Evaluation (RDT&E) Activities
• Air Operations • Command and Control • Aircraft Support Operations • Special Warfare Operations (SPECWAROPS)	• Directed Energy (Alternative 2/3)

A review of the 13 resources against training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Hickam AFB. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, cultural resources, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

HRC Air Operations and minor increase in the number of Aircraft Support Operations associated with Hickam AFB would not impact regional air quality. There is no planned construction or alteration associated with the Navy that would affect the cultural resources in the vicinity. There are no current or proposed training and RDT&E activities that could affect land use, land forms, geology, and associated soils development.

Training and RDT&E activities associated with Hickam AFB adhere to policies and regulations governing hazardous materials and hazardous waste, and health and safety, as discussed in Appendix C. Hazardous materials associated with the proposed Directed Energy facility would require separate/additional environmental documentation. There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training and RDT&E at the site would not generate any waste streams that could impact local water quality.

4.4.2.9.1 Airspace—Hickam AFB

4.4.2.9.1.1 No-action Alternative (Airspace—Hickam AFB)

HRC Training—No-action Alternative

Aircraft Support Operations will require coordination with the Air Force and will use existing facilities for fueling and minor maintenance.

No new airspace proposal or any modification to the existing controlled airspace has been identified to accommodate Aircraft Support Operations. Special use airspace will not be used, and aircraft will use existing approach and departure procedures. Coordination with Honolulu International Airport will be the same as for other military aircraft using the runways.

Major Exercises—No-action Alternative

Major Exercises such as RIMPAC and USWEX can include Aircraft Support Operations at Hickam AFB. These Major Exercises include extensive planning and coordination with the FAA. RIMPAC planning conferences are conducted beginning in March of the year prior to each RIMPAC. USWEX training would generally not include Aircraft Support Operations at Hickam AFB. If aircraft support was required it would be coordinated with the FAA well in advance of each 3- or 4-day Major Exercise.

The advance planning and coordination with the FAA regarding aircraft involved in Major Exercises result in minimal impacts on airspace.

4.4.2.9.1.2 Alternative 1 (Airspace—Hickam AFB)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Aircraft Support Operations would require coordination with the Air Force and would use existing facilities for fueling and minor maintenance. Increased training would result in a minor increase in the number of Aircraft Support Operations.

No new airspace proposal or any modification to the existing controlled airspace has been identified to accommodate Aircraft Support Operations. Special use airspace would not be used, and aircraft would use existing approach and departure procedures. Coordination with Honolulu International Airport would be the same as for other military aircraft using the runways.

The increase from one Strike Group to two during RIMPAC under Alternative 1 would require a minor increase in Aircraft Support Operations and subsequent coordination between the Navy and FAA. USWEX training would generally not include Aircraft Support Operations at Hickam AFB. If aircraft support was required it would be coordinated with the FAA well in advance of each 3- or 4-day Major Exercise.

The advance planning and coordination with the FAA regarding aircraft involved in Major Exercises result in minimal impacts on airspace.

4.4.2.9.1.3 Alternative 2 (Airspace—Hickam AFB)

Increased Tempo and Frequency of Training—Alternative 2

An increased tempo and frequency of training would require similar training support as at present. Aircraft Support Operations would require coordination with the Air Force and would use existing facilities for fueling and minor maintenance. No new airspace proposal or any modification to the existing controlled airspace has been identified to accommodate Aircraft Support Operations. Special use airspace would not be used and aircraft would utilize existing approach and departure procedures. Coordination with Honolulu International Airport would be the same as for other military aircraft using the runways.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

In addition to RIMPAC and USWEX, Alternative 2 includes a Multiple Strike Group Training Exercise that would be similar to the requirements for a USWEX and would generally not include Aircraft Support Operations at Hickam AFB. If aircraft support was required it would be coordinated with the FAA well in advance of the Major Exercise.

4.4.2.9.1.4 Alternative 3 (Airspace—Hickam AFB)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on airspace under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.9.2 Biological Resources —Hickam AFB

4.4.2.9.2.1 No-action Alternative (Biological Resources—Hickam AFB)

Navy activities at the site would be performed in accordance with all applicable biological opinions and existing Air Force regulations. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Air Force regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

HRC Training and Major Exercises—No-action Alternative

C2 is achieved through a network of communication devices strategically located at selected DoD installations around the islands with no impacts on biological resources. Training and Major Exercises will continue to follow the Navy guidelines provided in Table 4.4.2.1.1.1-1, along with applicable Hickam AFB procedures, to assist in minimizing impacts on biological resources on the base and in offshore waters.

Vegetation

Vegetation on Hickam AFB consists primarily of managed landscaping. There are no threatened or endangered vegetation species on the base. Training is conducted in existing open areas and facilities.

Wildlife

Navy activities would continue to result in noise and movement of personnel, vehicles, helicopters, and landing craft. However, training events are generally short in duration, and they occur in areas regularly used for such training. Air Operations in support of Major Exercises are a routine occurrence on the base. All participants in training are to adhere to the Navy guidelines provided in Table 4.4.2.1.1.1-1, along with applicable Hickam AFB procedures, to assist in minimizing impacts on biological resources on the base and in offshore waters. Any potential impacts to listed bird species such as the ae`o (Hawaiian stilt) would be addressed through coordination with the USFWS. Military readiness activities are exempt from the take prohibitions of the MBTA provided they do not result in a significant adverse effect on the population of a migratory bird species. While individual birds may be startled, the training (Air Operations, Aircraft Support Operations, and SPECWAROPS) being currently performed is not likely to significantly impact a population of any of the migratory species, such as the wedge-tailed shearwater, that occur in the Hickam AFB area and thus would be exempt from the MBTA take prohibitions. A Bird Aircraft Strike Hazard (BASH) program is at every Air Force base with a runway in order to prevent as many wildlife strikes to aircraft as possible. Habitat and terrain controls include mowing for specific vegetation heights, brush and tree removal, and dewatering and netting small ponds near runways. Navy activities would be performed in accordance with all applicable Air Force Biological Opinions, rules and regulations, including those addressed under the Air Force BASH Program.

Environmentally Sensitive Habitat

Wetlands on Hickam AFB are avoided during Major Exercises.

4.4.2.9.2.2 Alternative 1 (Biological Resources—Hickam AFB)

Increased Tempo and Frequency of Training Operations and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). While training events would not increase in number, they could increase in tempo, but the likelihood of a similar increase in adverse impacts on biological resources is small as discussed below.

Vegetation

Training would continue to take place at existing locations; no expansion of the area would be involved. Compliance with relevant Navy guidelines (Table 4.4.2.1.1.1-1), and other applicable Hickam AFB procedures, during training would minimize the potential for effects on vegetation, as well as limit the potential for introduction of invasive plant species. No threatened or endangered plant species are known to occur on Hickam AFB.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. The increased tempo of the training would need to include compliance with relevant Air Force and Navy policies and procedures, which would further reduce the potential for effects on birds and other wildlife species.

Environmentally Sensitive Habitat

Wetlands on Hickam AFB would be avoided during increased training.

4.4.2.9.2.3 Alternative 2 (Biological Resources—Hickam AFB)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training could also increase. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.2.9.2.4 Alternative 3 (Biological Resources—Hickam AFB)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.10 WHEELER ARMY AIRFIELD

Table 4.4.2.10-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at Wheeler Army Airfield. Alternative 3 is the preferred alternative.

Table 4.4.2.10-1. Training at Wheeler Army Airfield

Training	
• Air Operations	• Aircraft Support Operations
• Command and Control	• Special Warfare Operations (SPECWAROPS)

A review of the 13 resources against training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Wheeler Army Airfield. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, cultural resources, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

Air Operations and minor increase in the number of Aircraft Support Operations associated with Wheeler Army Airfield would not impact regional air quality. There is no planned construction or alteration associated with the Navy that would affect the cultural resources in the vicinity. There is no current or proposed training that could affect land use, land forms, geology, and associated soils development. Training associated with this site adhere to policies and regulations governing hazardous materials and hazardous waste, and health and safety, as discussed in Appendix C.

There would be no impact on Oahu's socioeconomics, transportation, utilities, or land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training at the site would not generate any waste streams that could impact local water quality.

4.4.2.10.1 Airspace—Wheeler Army Airfield

4.4.2.10.1.1 No-action Alternative (Airspace—Wheeler Army Airfield)

HRC Training—No-action Alternative

Aircraft Support Operations will require coordination with the Army and will use existing facilities for fueling and minor maintenance.

No new airspace proposal or any modification to the existing controlled airspace has been identified to accommodate Aircraft Support Operations. Special Use Airspace will not be used, and aircraft will use existing approach and departure procedures.

Major Exercises—No-action Alternative

Major Exercises such as RIMPAC and USWEX can include Aircraft Support Operations at Wheeler Army Airfield. These Major Exercises include extensive planning and coordination with the FAA. RIMPAC planning conferences are conducted beginning in March of the year prior to each RIMPAC. USWEX training would generally not include Aircraft Support Operations at

Wheeler Army Airfield. If aircraft support was required it would be coordinated with the FAA well in advance of each 3- or 4-day Major Exercise.

The advance planning and coordination with the FAA regarding aircraft involved in Major Exercises result in minimal impacts on airspace.

4.4.2.10.1.2 Alternative 1 (Airspace—Wheeler Army Airfield)

Increased Tempo and Frequency of Training—Alternative 1

Aircraft Support Operations would require coordination with the Army and would use existing facilities for fueling and minor maintenance. Increased training would result in a minor increase in the number of Aircraft Support Operations.

No new airspace proposal or any modification to the existing controlled airspace has been identified to accommodate Aircraft Support Operations. Special use airspace would not be used, and aircraft would use existing approach and departure procedures.

4.4.2.10.1.3 Alternative 2 (Airspace—Wheeler Army Airfield)

Increased Tempo and Frequency of Training—Alternative 2

An increased tempo and frequency of training would require similar training support as at present. Aircraft Support Operations would require coordination with the Army and would use existing facilities for fueling and minor maintenance.

No new airspace proposal or any modification to the existing controlled airspace has been identified to accommodate Aircraft Support Operations. Special use airspace would not be used, and aircraft would use existing approach and departure procedures.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

In addition to RIMPAC and USWEX, Alternative 2 includes a Multiple Strike Group Training Exercise that would be similar to the requirements for a USWEX and would generally not include Aircraft Support Operations at Wheeler Army Airfield. If aircraft support was required it would be coordinated with the FAA well in advance of the Major Exercise.

4.4.2.10.1.4 Alternative 3 (Airspace—Wheeler Army Airfield)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on airspace under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.10.2 Biological Resources—Wheeler Army Airfield

4.4.2.10.2.1 No-action Alternative (Biological Resources—Wheeler Army Airfield)

Navy activities at the site would be performed in accordance with all applicable biological opinions and existing Army regulations. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

HRC Training and Major Exercises—No-action Alternative

C2 is achieved through a network of communication devices strategically located at selected DoD installations around the islands with no impacts on biological resources. Training and Major Exercises adhere to the Navy's guidelines provided in Table 4.4.2.1.1.1-1, along with applicable Army procedures, to assist in minimizing impacts on biological resources at the airfield.

Vegetation

Wheeler Army Airfield is a developed area containing mostly nonnative urban vegetation with no known threatened or endangered species. No impacts on vegetation are anticipated from use of existing runways and associated facilities and cleared areas.

Wildlife

Navy activities would continue to result in noise and movement of personnel, vehicles, helicopters, and landing craft. However, training events are short in duration and they occur in areas regularly used for such training. Air Operations in support of Major Exercises are a routine occurrence at the airfield. Military readiness activities are exempt from the take prohibitions of the MBTA provided they do not result in a significant adverse effect on the population of a migratory bird species. While individual birds may be startled, the training events (C2, Air Operations, Aircraft Support Operations, and SPECWAROPS) being currently performed are not likely to significantly impact a population of any of the migratory species that occur in the Wheeler Army Airfield area, such as the black-crowned night heron, Pacific golden plover, and white-tailed tropicbird, and thus would be exempt from the MBTA take prohibitions.

Environmentally Sensitive Habitat

No critical habitat has been identified on Wheeler Army Airfield.

4.4.2.10.2.2 Alternative 1 (Biological Resources—Wheeler Army Airfield)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). While training events would not increase in number at Wheeler Army Airfield, the tempo of the training may increase, but the likelihood of a similar increase in adverse impacts on biological resources is small, as discussed below.

Vegetation

Training would continue to take place at existing locations; no expansion of the area would be involved. Compliance with relevant Navy guidelines (Table 4.4.2.1.1.1-1), and other applicable Army procedures, during training would minimize the effects on vegetation, as well as limit the potential for introduction of invasive plant species. No threatened or endangered plant species are known to occur on Wheeler Army Airfield.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. The increased training and Major Exercises would comply with relevant Army and Navy policies and procedures, which would further reduce the potential for effects on wildlife.

Environmentally Sensitive Habitat

No critical habitat has been identified at the airfield.

4.4.2.10.2.3 Alternative 2 (Biological Resources—Wheeler Army Airfield)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resource similar to those described above.

4.4.2.10.2.4 Alternative 3 (Biological Resources—Wheeler Army Airfield)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.11 MAKUA MILITARY RESERVATION

Table 4.4.2.11-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at Makua Military Reservation. Alternative 3 is the preferred alternative.

Table 4.4.2.11-1. Training at Makua Military Reservation

Training	
• Special Warfare Operations (SPECWAROPS)	• Live Fire Exercise (LFX)

A review of the 13 resources against training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Makua Military Reservation. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and hazardous waste, land use, socioeconomics, transportation, utilities, and water resources.

There would be no air emissions generated at the Makua Military Reservation other than that from localized use of rotary wing aircraft within pre-defined areas. The Aircraft Operations would not change regional air quality. Makua Military Reservation training would not affect the existing airspace structure in the region. Geology and soils impacts would be limited to short-term minor disturbance of beach sand. Movement from the beach would also result in minor, short-term disturbance to soils along pre-defined access routes.

Training associated with Makua Military Reservation adheres to policies and regulations governing hazardous materials and waste, as discussed in Appendix C. Preliminary aerial surveys of the firing range at Makua Military Reservation were inconclusive for depleted uranium (DU). The Army is currently assessing if there is a presence of DU at Makua Military Reservation as well as all Army ranges in Hawaii (U.S. Army, Pacific Public Affairs, 2007). Guidance provided to users of Makua Military Reservation would be followed. There would be no impact on Oahu's socioeconomics, transportation, utilities, and land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Water resources would not be affected by the movement of people and materials along existing roads during training.

4.4.2.11.1 Biological Resources—Makua Military Reservation

4.4.2.11.1.1 No-action Alternative (Biological Resources—Makua Military Reservation)

Navy activities at the site would be performed in accordance with all applicable biological opinions and existing Army regulations. Adherence to established SOPs at the Makua Military Reservation would result in minimal impacts on the physical environment and avoids potential impacts on threatened and endangered species. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

HRC Training and Major Exercises—No-action Alternative

Live Fire Exercises (LFX) and SPECWAROPS follow the Navy's guidelines provided in Table 4.4.2.1.1.1-1, along with applicable Army procedures, to assist in minimizing the potential for impacts on biological resources. These activities at Makua Military Reservation were addressed in the 1998 RIMPAC EA (U.S. Department of the Navy, 1998d).

Vegetation

Makua Military Reservation contains 31 endangered plant species. These species are generally confined to remote mountainous areas along the fringe of the range, outside maintained open areas and the impact area. Army procedures restrict training and Major Exercises to areas that are outside of sensitive habitat. An Endangered Species Management Plan has been prepared for the Reservation that establishes a series of preventative and restorative activities appropriate to these resources. Major Exercises follow the preventive measures outlined in the management plan.

In 1999, the U.S. Fish and Wildlife Service (USFWS) issued a Biological Opinion concluding that routine military training will not jeopardize the endangered species on Makua Military Reservation if certain conditions are met. These include restrictions to military training, and preparation and implementation of a Wildland Fire Management Plan. The Army is also required to complete an Implementation Plan to stabilize the targeted plant and animal populations. (U.S. Department of the Army, 2005) Major Exercises comply with these restrictions. The *Integrated Wildland Fire Management Plan Oahu and Pohakaloa Training Areas* was completed in 2003 (U.S. Army, Hawaii and 25th Infantry Division [Light], 2003). The Army also completed an Implementation Plan in 2003 to stabilize the targeted plant and animal populations. An Addendum was submitted to the USFWS in 2005 that emphasized management of three population units per plant taxon. (U.S. Department of the Navy, 2002a; U.S. Army Garrison, Hawaii, 2005)

Wildlife

Military readiness activities are exempt from the take prohibitions of the MBTA provided they do not result in a significant adverse effect on the population of a migratory bird species. The low probability of one of the training events being capable of significantly impacting a population of the migratory species that occur in the Makua area should exempt the HRC from the take prohibitions.

Potential SPECWAROPS generally include reconnaissance activities and a helicopter raid. Noise from munitions during LFX is considered momentary (intrusive noise), while noise from helicopters or other mobile sources is continuous. Short helicopter hovering periods result in noise levels at Makua Beach of 88 dB. Although these noise levels can cause flushing of birds, the effects are temporary and birds return to the area following completion of training.

The Army funded a study at Schofield Barracks of the effects of artillery noise on the Oahu `elepaio. Noise from 155-mm and 105-mm howitzers, 81-mm and 60-mm mortars, and hand grenades were investigated. Results determined that `elepaio nesting behavior was not significantly affected and the population was not seriously disturbed by artillery training. Nesting attendance and nestling survival rates during training periods were similar to rates in Honouliuli, where there is no military training. (U.S. Department of the Army, 2005)

The only marine mammals that might exist in the region of influence are the Hawaiian monk seal and the humpback whale. Of the five species of sea turtles that occur in Hawaiian waters, only the green turtle and leatherback turtle are likely to be in the region of influence. All participants in training are to adhere to the Navy guidelines provided in Table 4.4.2.1.1.1-1, along with applicable Army procedures, to assist in minimizing impacts on biological resources on the Reservation and in offshore waters. The beach and offshore waters will continue to be monitored for the presence of marine mammals and sea turtles 1 hour before and during an increase in Major Exercises. If any are seen, the training event will be delayed until the animals leave the area. Underwater noise effects are discussed in Section 4.1.2.

Environmentally Sensitive Habitat

The USFWS designated critical habitat on Makua Military Reservation in 2001 for the Oahu `elepaio, which is avoided where possible. Critical habitat for endangered plants is located outside the boundary of the reservation.

4.4.2.11.1.2 Alternative 1 (Biological Resources—Makua Military Reservation)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). While training events would not increase in number, the tempo may increase, but the likelihood of a similar increase in adverse impacts on biological resources is small, as described below.

Vegetation

Training would continue to take place at existing locations; no expansion of the area would be involved. Compliance with relevant Navy guidelines (Table 4.4.2.1.1.1-1) and other applicable Army procedures during training would minimize the potential for effects on vegetation, as well as limit the potential for introduction of invasive plant species.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. The increased training would comply with relevant Army and Navy policies and procedures, which would further reduce the effects on wildlife.

Environmentally Sensitive Habitat

Critical habitat areas would continue to be avoided, where possible.

4.4.2.11.1.3 Alternative 2 (Biological Resources—Makua Military Reservation)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training could also increase. Training would take place at existing locations; no expansion of the area would be involved. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.2.11.1.4 Alternative 3 (Biological Resources—Makua Military Reservation)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.11.2 Cultural Resources—Makua Military Reservation

4.4.2.11.2.1 No-action Alternative (Cultural Resources—Makua Military Reservation)

HRC Training—No-action Alternative

Live Fire Exercises (LFX)

Training at Makua Military Reservation with the potential to affect cultural resources include LFX, which involves the movement of troops through target objectives using a wide range of air/ground weapons. Troop levels range from a few personnel to brigade level (3,000 to 5,000 personnel). At Makua Military Reservation, training occurs within the RIMPAC (Pililaau Range) areas shown in Appendix D.

The traditional and cultural use of Makua Military Reservation is extensive. Approximately 25 percent of the lands at Makua Military Reservation have been surveyed for the presence of cultural sites, and a large number and wide range of site types have been identified. There is a high probability for additional cultural sites in the areas not yet surveyed. Many of the sites are located adjacent to training areas and training restrictions are in place. The management of cultural resources at Makua Military Reservation is guided by a Programmatic Agreement among the Army, the Hawaii SHPO, and the Advisory Council on Historic Preservation (see Section 3.4.2.11.2), and an updated ICRMP for all Army installations in Hawaii is in progress. An Ecosystem Management Plan Report for the protection of these resources has also been developed (U.S. Army Garrison, Hawaii and U.S. Army Corps of Engineers, 1998) that focuses on identification, education, and avoidance of known archaeological sites.

Limited LFX can be conducted at Makua Military Reservation under a court-approved settlement plan of October 2001. Any training proposed for Makua Military Reservation is reviewed by the Army before training is conducted. Extensive planning for training is required and includes coordination meetings 8 weeks and 10 days before the training event, a written plan of maneuver and fire support, and a risk assessment of the training event. SOPs require troops to review training overlays that identify insertion points and any nearby restricted areas. Sensitive biological and cultural resource areas are avoided. (U.S. Department of the Navy, Commander, THIRD Fleet, 2004, 2006; U.S. Department of the Navy, 2002a)

In the event cultural materials of any type are unexpectedly encountered during LFX (particularly human remains), all training in the immediate vicinity of the find will cease and the Schofield Barracks Cultural Resources Manager will be notified.

In accordance with the 2000 Programmatic Agreement, access for Native Hawaiians to Makua Military Reservation is granted on a case-by-case basis (see Appendix H).

Major Exercises—No-action Alternative

Any training proposed for Makua Military Reservation is reviewed by the Army before Major Exercises are conducted. Extensive planning for Major Exercises is required, and sensitive biological and cultural resource areas are avoided. (U.S. Department of the Navy, Commander, THIRD Fleet, 2004, 2006; U.S. Department of the Navy, 2002a). In the event cultural materials of any type are unexpectedly encountered during training events, all training in the immediate vicinity of the find will cease and the Schofield Barracks Cultural Resources Manager will be notified.

4.4.2.11.2.2 Alternative 1 (Cultural Resources—Makua Military Reservation)

Increased Tempo and Frequency of Training—Alternative 1

Training under Alternative 1 would increase the potential for impacts on occur to cultural resources in sensitive areas. However, training currently use designated training areas, and mitigation measures are in place that avoid adverse impacts.

4.4.2.11.2.3 Alternative 2 (Cultural Resources—Makua Military Reservation)

Increased Tempo and Frequency of Training—Alternative 2

The tempo and frequency of training under Alternative 2 would increase the potential for impacts on cultural resources in sensitive areas. However, training currently uses designated training areas, and mitigation measures are in place that would avoid adverse impacts. The increased frequency of training over and above Alternative 1 is not expected to cause adverse effects.

4.4.2.11.2.4 Alternative 3 (Cultural Resources—Makua Military Reservation)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on cultural resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.11.3 Health and Safety—Makua Military Reservation

4.4.2.11.3.1 No-action Alternative (Health and Safety—Makua Military Reservation

Under the No-action Alternative, existing training at the Makua Military Reservation will continue and there will be in no adverse impacts on health and safety. The Makua Military Reservation takes every reasonable precaution during planning and execution of training to prevent injury to human life or property.

HRC Training—No-action Alternative

The Navy does not currently conduct routine training at Makua Military Reservation.

Major Exercises—No-action Alternative

LFX and SPECWAROPS typically occur at Makua Military Reservation as part of Major Exercises. Under the No-action Alternative, there will be no impacts on health and safety at the reservation. Every reasonable precaution is taken during the planning and execution of training to prevent injury to human life or damage to property. Specific safety plans have been developed to ensure that each training event is in compliance with applicable policy and requirements, and to ensure that the general public and range personnel and assets are provided an acceptable level of safety. In addition, SOPs have been developed that outline all safety requirements for use of Makua Military Reservation.

4.4.2.11.3.2 Alternative 1 (Health and Safety—Makua Military Reservation

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

An increase in tempo and frequency of training and Major Exercises is not anticipated to adversely impact health and safety at Makua Military Reservation. The total number of training events that affect health and safety would increase by approximately 9 percent above the No-action Alternative. While the number of training events would increase, the types of training would remain the same and existing SOPs would be used.

4.4.2.11.3.3 Alternative 2 (Health and Safety—Makua Military Reservation)

Increased Tempo and Frequency of Training—Alternative 2

An increase in tempo and frequency of training is not anticipated to adversely impact health and safety at Makua Military Reservation. While the number of training events would increase, the types of training would remain the same and existing SOPs would be used.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would perform training events and RDT&E activities in the vicinity of Hawaii. The Major Exercises proposed would be similar to those occurring during Major Exercises, with impacts on health and safety at Makua Military Reservation similar to those described above.

4.4.2.11.3.4 Alternative 3 (Health and Safety—Makua Military Reservation)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on health and safety under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.11.4 Noise—Makua Military Reservation

Impacts of noise on human receptors are evaluated based on whether or not a noise event would exceed DoD or OSHA guidelines. Noise effects on wildlife are discussed in Section 4.4.2.11.1, Biological Resources.

4.4.2.11.4.1 No-action Alternative (Noise—Makua Military Reservation)

Under the No-action Alternative, existing training at the U.S. Army's Makua Military Reservation will continue, and there will be no increase to existing noise levels. The Makua Military Reservation maintains a hearing protection program that includes monitoring the hearing of personnel exposed to high noise levels and identifying and posting notification of noise hazard areas. Personnel working in are noise hazard areas are required to use appropriate hearing protection to bring noise levels within established safety levels.

HRC Training—No-action Alternative

The Navy does not currently conduct routine training at Makua Military Reservation.

Major Exercises—No-action Alternative

LFX and SPECWAROPS typically occur at Makua Military Reservation as part of Major Exercises. There will be no increase to existing noise levels during the continuing Major Exercises listed above. The total perceived noise will be the combination of ambient noise and noise from the Major Exercises. Ambient noise sources may include wind, surf, highway traffic, Aircraft Operations, and other local noise-generating land uses. Noise sources from the Major Exercise will include the use of helicopters and small arms munitions.

4.4.2.11.4.2 Alternative 1 (Noise—Makua Military Reservation)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Noise levels associated with increased tempo and frequency of training and Major Exercises would be similar to existing noise levels. The total number of training events that affect noise would increase by approximately 9 percent above the No-action Alternative. Training would take place at existing locations. While the number of training would increase there would be no anticipated increase to the level of noise produced.

4.4.2.11.4.3 Alternative 2 (Noise—Makua Military Reservation)

Increased Tempo and Frequency of Training—Alternative 2

Noise levels associated with increased tempo and frequency of training would be similar to existing noise levels. The total number of training events that affect noise would increase. While the number of training events would increase, there would be no anticipated increase to the level of noise produced.

Additional Major Exercises—Multiple Carrier Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. The training proposed would be similar to that occurring during current Major Exercises, with impacts on noise levels similar to those described above.

4.4.2.11.4.4 Alternative 3 (Noise—Makua Military Reservation)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on noise under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.12 KAHUKU TRAINING AREA

Table 4.4.2.12-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at Kahuku Training Area. Alternative 3 is the preferred alternative.

Table 4.4.2.12-1. Training at Kahuku Training Area

Training	
• Special Warfare Operations (SPECWAROPS) • Humanitarian Assistance/Non-combatant Evacuation Operations (HAO/NEO)	• Humanitarian Assistance/Disaster Relief Operations (HA/DR)

A review of the 13 resources against training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Kahuku Training Area. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would be no air emissions generated at the Kahuku Training Area other than that from localized use of rotary wing aircraft within pre-defined areas. The Aircraft Operations would not change regional air quality. Kahuku Training Area training would not affect the existing airspace structure in the region. Geology and soils impacts would be limited to short-term minor disturbance of beach sand. Movement from the beach would also result in minor, short-term disturbance to soils along pre-defined access routes.

Training associated with the Kahuku Training Area adhere to policies and regulations governing hazardous materials and waste, health and safety, and noise as discussed in Appendix C. There would be no impact on Oahu's socioeconomics, transportation, utilities, and land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Water resources would not be affected by the movement of people and materials along existing roads during the training.

4.4.2.12.1 Biological Resources—Kahuku Training Area

4.4.2.12.1.1 No-action Alternative (Biological Resources—Kahuku Training Area)

Navy training at the site would be performed in accordance with all applicable biological opinions and existing Army regulations. Adherence to established SOPs at the Kahuku Training Area would result in minimal impacts on the physical environment and avoids potential impacts on threatened and endangered species. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

HRC Training and Major Exercises—No-action Alternative

Vegetation

The Army's Kahuku Training Area contains 10 species of endangered plants. SPECWAROPS at the range include a reconnaissance and survey mission, and a tactical aircrew recovery event. Potential HA/DR and HAO/NEO events use existing open areas and facilities. Some temporary structures, including tents, may be used. All participants in training are to adhere to the Navy's guidelines provided in Table 4.4.2.1.1.1-1, along with applicable Army procedures, to minimize potential impacts on the endangered vegetation, as well as limit the potential for introduction of invasive plant species.

Wildlife

SPECWAROPS activities generally include reconnaissance activities and a helicopter raid. Although noise levels can cause flushing of individual birds, the effects are temporary. Any potential impacts to listed bird species such as the Oahu `elepaio or `Alauahio (Oahu creeper) would be addressed through coordination with the USFWS. Military readiness activities are exempt from the take prohibitions of the MBTA provided they do not result in a significant adverse effect on the population of a migratory bird species. The low probability of one of the training events being capable of significantly impacting a population of the migratory species that occur in the Kahuku area, such as the great frigate bird or Pacific golden plover, should exempt the HRC from the take prohibitions.

Environmentally Sensitive Habitat

Training will avoid critical habitat for the Oahu `elepaio and other biologically significant areas in the region of influence.

4.4.2.12.1.2 Alternative 1 (Biological Resources—Kahuku Training Area)

Increased Tempo and frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). While training events would not increase in number, their tempo may increase, but the likelihood of a similar increase in adverse impacts on biological resources is small, as discussed below.

Vegetation

Training would continue to take place at existing locations; no expansion of the area would be involved. Compliance with relevant Navy guidelines (Table 4.4.2.1.1.1-1), and other applicable Army procedures, during training would minimize the potential for effects on vegetation, as well as limit the potential for introduction of invasive plant species.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. The increased training would comply with relevant Army and Navy policies and procedures, which would further reduce the potential for effects on wildlife.

Environmentally Sensitive Habitat

Critical habitat for the Oahu `elepaio and other biologically significant areas would continue to be avoided where possible.

4.4.2.12.1.3 Alternative 2 (Biological Resources—Kahuku Training Area)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.2.12.1.4 Alternative 3 (Biological Resources—Kahuku Training Area)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.12.2 Cultural Resources—Kahuku Training Area

4.4.2.12.2.1 No-action Alternative (Cultural Resources—Kahuku Training Area)

HRC Training—No-action Alternative

Expeditionary Assault, HAO/NEO, and HA/DR

These three training events (Expeditionary Assault, HAO/NEO, and HA/DR) exhibit similar activities that involve personnel and equipment (e.g., AAVs, SDVs) crossing beach areas or following existing transit routes from the shoreline and dispersing into designated areas for from 1 to 18 days of realistic training. HA/DR events also include the establishment of a safe haven camp or Civil-Military Operations Center, which can use either existing buildings or the erection of tents and portable latrines. At Kahuku Training Area, the insertion point for training is within a landing zone that is one of the more widely used military training areas in Hawaii; the area has been specifically designated for these types of events (see Appendix D).

Surveys of Kahuku Training Area indicate that all archaeological and traditional Hawaiian sites are considered significant (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998); however, there will be no unmonitored ground-disturbing activities, land clearing, or use of vehicles off existing trails and roads. Training events use an existing training trail and access road that will be graded before the training event (if required). However, in accordance with

SOPs, grading will not exceed the road width or alignment. Training overlays that identify the transit route, camp location, and any nearby restricted areas or sensitive biological and cultural resource areas will be used by all participants. All personnel entering the Kahuku Training Area will adhere to the training guidelines presented in the Ecosystem Management Plan Report (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998). Therefore, no impacts on cultural resources within the Kahuku Training Area are anticipated.

In the event cultural materials are unexpectedly encountered during the course of Expeditionary Assault, HAO/NEO, or HA/DR events (particularly human remains), all training will cease in the immediate vicinity of the find and the Schofield Barracks Cultural Resources Manager will be notified.

According to NOAA's shipwreck and fishpond location maps, there are numerous shipwrecks (see Figure 3.1.3-2 and 3.4.1.3.2-1), but no known Native Hawaiian fishponds in the vicinity of the HAO/NEO and HA/DR insertion point for Kahuku Training Area. Offshore HAO/NEO activities are performed in waters that are shallow, and most shipwrecks are found in deeper waters.

Major Exercises—No-action Alternative

Elements of Major Exercises (RIMPAC) have been analyzed above. Major Exercises are well planned in advance, use existing trails and roads, and avoid sensitive cultural areas. In the event cultural materials are unexpectedly encountered during the course of Major Exercises, all training will cease in the immediate vicinity of the find and the Schofield Barracks Cultural Resources Manager will be notified. Therefore, no impacts on cultural resources within the Kahuku Training Area are anticipated.

4.4.2.12.2.2 Alternative 1 (Cultural Resources—Kahuku Training Area)

Increased Tempo and Frequency of Training—Alternative 1

Training under Alternative 1 would increase the potential for impacts to occur on cultural resources in sensitive areas. Training currently uses designated training areas, and mitigation measures are in place that would avoid adverse impacts (see above discussions).

4.4.2.12.2.3 Alternative 2 (Cultural Resources—Kahuku Training Area)

Increased Tempo and Frequency of Training—Alternative 2

The tempo and frequency of training under Alternative 2 would increase the potential for impacts to occur on cultural resources in sensitive areas; however, training currently uses designated training areas and mitigation measures are in place that would avoid adverse impacts.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Additional Major Exercises would be similar in nature to those described above and would employ the same mitigation measures. As a result, no impacts are expected.

4.4.2.12.2.4 Alternative 3 (Cultural Resources—Kahuku Training Area)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on cultural resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.13 DILLINGHAM MILITARY RESERVATION

Table 4.4.2.13-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at Dillingham Military Reservation. Alternative 3 is the preferred alternative.

Table 4.4.2.13-1. Training at Dillingham Military Reservation

Training
• Special Warfare Operations (SPECWAROPS)

A review of the 13 resources against training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Dillingham Military Reservation. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would be no air emissions generated at the Dillingham Military Reservation other than that from localized use of rotary wing aircraft within pre-defined areas. The Aircraft Operations would not change regional air quality. Dillingham Military Reservation training would not affect the existing airspace structure in the region. Geology and soils impacts would be limited to short-term minor disturbance of beach sand. Movement from the beach would also result in minor, short-term disturbance to soils along pre-defined access routes.

Training associated with the Dillingham Military Reservation adhere to policies and regulations governing hazardous materials and waste, health and safety, and noise as discussed in Appendix C. There would be no impact on Oahu's socioeconomics, transportation, utilities, and land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Water resources would not be affected by the movement of people and materials along existing roads during training.

4.4.2.13.1 Biological Resources—Dillingham Military Reservation

4.4.2.13.1.1 No-action Alternative (Biological Resources—Dillingham Military Reservation)

Navy training at the site would be performed in accordance with all applicable biological opinions and existing Army regulations. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

HRC Training and Major Exercises—No-action Alternative

Vegetation

At the Army's Dillingham Military Reservation, four endangered plant species can be found within the cliff ecological zone. SPECWAROPS activities at the range include a reconnaissance and survey mission, and a tactical aircrew recovery event. All participants in training are to adhere to the Navy's guidelines provided in Table 4.4.2.1.1.1-1, along with applicable Army procedures, to minimize potential impacts on the endangered vegetation, as well as limit the potential for introduction of invasive plant species.

Wildlife

SPECWAROPS activities generally include reconnaissance activities and a helicopter raid. Short helicopter hovering periods could result in noise levels at ground level of 88 dB. Although these noise levels can cause flushing of individual birds, the affects are temporary. Any potential impacts to listed bird species, such as the endangered `alae ke`oke`o (Hawaiian coot), `alae`ula (Hawaiian moorhen), koloa maoli (Hawaiian duck), and nene (Hawaiian goose), would be addressed through coordination with the USFWS. Military readiness activities are exempt from the take prohibitions of the MBTA provided they do not result in a significant adverse effect on the population of a migratory bird species. The low probability of one of the training events being capable of significantly impacting a population of the migratory species that occur in the Dillingham area should exempt the HRC from the take prohibitions.

Dillingham Military Reservation is adjacent to a small segment of beachfront, which is monitored for the presence of Hawaiian monk seals and green turtles. The beach and offshore waters are monitored for the presence of marine mammals and sea turtles 1 hour before and during Major Exercises. If any are seen, the training event is delayed until the animals leave the area. All training participants are briefed on resource protection guidelines (Table 4.4.2.1.1.1-1) for training on Oahu, which minimize the potential for harm to endangered species.

Environmentally Sensitive Habitat

An Army Corps of Engineers jurisdictional wetland on the reservation is outside of the area used for maneuver training.

4.4.2.13.1.2 Alternative 1 (Biological Resources—Dillingham Military Reservation)

Increased Tempo Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). While training events would not increase in number, their tempo may, but the likelihood of a similar increase in adverse impacts on biological resources is small, as described below.

Vegetation

Training would continue to take place at existing locations; no expansion of the area would be involved. Compliance with relevant Navy guidelines (Table 4.4.2.1.1.1-1), and other applicable Army procedures, during training would minimize the potential for effects on vegetation, as well as limit the potential for introduction of invasive plant species.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. The increased training would comply with relevant Army and Navy policies and procedures, which would further reduce the potential for effects on wildlife. The beach and offshore waters would continue to be monitored for the presence of monk seals and sea turtles 1 hour before and during an increase in Major Exercises. If any are seen, the training event would be delayed until the animals leave the area.

Environmentally Sensitive Habitat

An Army Corps of Engineers jurisdictional wetland on the reservation is outside of the area used for maneuver training.

4.4.2.13.1.3 Alternative 2 (Biological Resources—Dillingham Military Reservation)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training could also increase. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003c).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.4.2.13.1.4 Alternative 3 (Biological Resources—Dillingham Military Reservation)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.13.2 Cultural Resources—Dillingham Military Reservation

4.4.2.13.2.1 No-action Alternative (Cultural Resources—Dillingham Military Reservation)

HRC Training and Major Exercises—No-action Alternative

For SPECWAROPS under RIMPAC, Navy and Marine training with the potential to affect cultural resources at Dillingham Military Reservation include helicopter insertions and raids and downed pilot training. Training involves inserting personnel and equipment to conduct combat search and rescue, covert access to military assets, intelligence gathering, staged raids, and return to the host unit. Reconnaissance inserts and beach surveys are often conducted before large-scale amphibious landings and can involve several units gaining covert access using a boat, typically to locate and recover a downed aircrew. (U.S. Department of the Navy, 2002a) Dillingham Military Reservation is also used by the Army for small unit maneuvers of platoon- and squad-sized elements or combat support operations; airmobile operations and paradrop operations; and helicopter night-vision goggle training, which requires the absence of bright man-made sources of light (U.S. Army Garrison, Hawaii, 1996).

As described in Section 3.4.2.13.2, Dillingham Military Reservation has archaeological and traditional Hawaiian resources, including indications of pre-contact use of the coastal dunes for burials. However, all personnel entering the Dillingham Military Reservation will adhere to training guidelines regarding cultural resources. There will be no unmonitored ground-disturbing activities, land clearing, or use of vehicles off existing trails and roads; assembly of "hasty fortifications"; or litter accumulation, as discussed in the Ecosystem Management Plan Report (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998). As a result, no impacts on cultural resources are anticipated. In the event cultural materials are unexpectedly encountered during SPECWAROPS activities (particularly human remains), training in the vicinity of the find will cease and follow the appropriate military branch protocols. If the find is made by Marine Corps or Navy personnel, the Hawaii SHPO will be immediately notified in accordance with the Programmatic Agreement (see Appendix H). If the find is unexpectedly encountered during Army activities, the Schofield Barracks Cultural Resources Manager will be immediately notified.

4.4.2.13.2.2 Alternative 1 (Cultural Resources—Dillingham Military Reservation)

Increased Tempo and Frequency of Training—Alternative 1

Training under Alternative 1 would increase the potential for impacts on occur to cultural resources in sensitive areas. Training currently uses designated training areas and mitigation measures are in place that would avoid adverse impacts.

4.4.2.13.2.3 Alternative 2 (Cultural Resources—Dillingham Military Reservation)

Increased Tempo and Frequency of Training—Alternative 2

The tempo and frequency of training under Alternative 2 would increase the potential for impacts on occur to cultural resources in sensitive areas. However, training currently uses designated training areas and mitigation measures are in place that would avoid adverse impacts.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Elements of Major Exercises are analyzed in the No-action Alternative. Training currently uses designated training areas and mitigation measures are in place that would avoid adverse impacts.

4.4.2.13.2.4 Alternative 3 (Cultural Resources—Dillingham Military Reservation)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on cultural resources under Alternative 3 would be the same as those described for Alternative 2.

4.4.2.14 KEEHI LAGOON

A review of the 13 environmental resources against Salvage Operations training determined that the proposed alternatives would not result in either short- or long-term environmental impacts at Keehi Lagoon. Alternative 3 is the preferred alternative.

Use of Keehi Lagoon does not require control of the airspace above this area. There are no reports of emission from training affecting the air quality for Keehi Lagoon. Because no ground disturbance or building modifications would occur, there would be no impact on biological resources, cultural resources, or geology and soils. Additionally, there are no known significant archaeological sites at Keehi Lagoon. Geology and soils impacts would be limited to short-term minor disturbance of the lagoon bottom. Water resources effects would include minor, temporary increase in turbidity as the Salvage Operations are implemented. There are no air emission issues from HRC training associated with Keehi Lagoon.

Every effort would be made to limit actions that would decrease visibility in order to have effective training for the divers. Training associated with this site adheres to policies and regulations governing hazardous materials and waste, health and safety, and noise, as discussed in Appendix C. There is no impact on native or naturalized vegetation or wildlife within Keehi Lagoon. The proposed training associated with Alternative 1, Alternative 2, or Alternative 3 would not affect socioeconomic characteristics, modes of transportation, or utilities demand on Oahu. There are no prehistoric, historic, or archaeological sites associated with Keehi Lagoon. Additionally, there is no planned construction or alteration associated with the Navy that would affect land use.

4.4.2.15 KAENA POINT

A review of the 13 environmental resources against training determined that the proposed alternatives would not result in either short- or long-term environmental impacts at Kaena Point. Alternative 3 is the preferred alternative.

No air emissions would be generated from training unless use of diesel generators would be required for backup power at Kaena Point. The site does not affect the existing airspace structure in the region. Telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the Terminal High Altitude Area Defense (THAAD) radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005). Because no ground disturbance or building modifications would occur, there would be no impact on biological resources (including the Laysan albatross eggs being accepted from PMRF), cultural resources, or geology and soils. Training events using the radar do require the use of small amounts of hazardous materials for facility maintenance such as paint repair and oil for the radar unit and generates small amounts of hazardous waste. All hazardous materials used and hazardous waste generated would continue to be managed in accordance with Air Force, Federal, and State regulations. There is an established safety zone around the radar unit to prevent electromagnetic radiation hazards exposures, which eliminates health and safety issues.

Kaena Point is compatible with existing surrounding land uses, and training are consistent to the maximum extent practicable with the Hawaii Coastal Zone Management Program. No noise is generated by training. The site, which employs up to 15 personnel, would not affect local transportation levels of service or utilities. There is no socioeconomic impact from training. Existing or proposed training would not generate any waste streams that could impact local water quality.

4.4.2.16 MT. KAALA

A review of the 13 environmental resources against training determined that the proposed alternatives would not result in either short- or long-term environmental impacts at Mt. Kaala. Alternative 3 is the preferred alternative.

No air emissions would be generated from training at Mt. Kaala unless use of diesel generators would be required for backup power. The site does not affect the existing airspace structure in the region. Telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the THAAD radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005). Because no ground disturbance or building modifications would occur, there would be no impact on biological resources, cultural resources, or geology and soils. HRC training at this location would continue to use small amounts of hazardous materials and generate hazardous waste associated with facility maintenance to prevent building corrosion. All hazardous materials used and hazardous waste generated would continue to be handled in accordance with Federal and State regulations.

Mt. Kaala does not represent any public health and safety issues. The site is compatible with existing surrounding land uses and training is consistent to the maximum extent practicable with the Hawaii Coastal Zone Management Program. No noise is generated by training. The site, which is only operated by a few personnel, would not affect local transportation levels of service or utilities. There is no socioeconomic impact from use of Mt. Kaala. HRC training would not generate any waste streams that could impact local water quality.

4.4.2.17 WHEELER NETWORK SEGMENT CONTROL/PMRF COMMUNICATION SITES

A review of the 13 environmental resources against training determined that the proposed alternatives would not result in either short- or long-term environmental impacts at Wheeler Network Communications Control. Alternative 3 is the preferred alternative.

No air emissions would be generated from training at Wheeler Network Segment Control/PMRF Communication Sites unless use of diesel generators would be required for backup power. These sites do not affect the existing airspace structure in the region. Telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the THAAD radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005). Because no ground disturbance or building modifications would occur, there would be no impact on biological resources, cultural resources, or geology and soils.

Use of Wheeler Network Segment Control/PMRF Communication Sites does require small amounts of hazardous materials for facility maintenance and generate small amounts of hazardous waste. All hazardous materials used and hazardous waste generated would continue to be managed in accordance with applicable regulations. There is no electromagnetic radiation generated at the sites; therefore, there are no public health and safety issues. The site is compatible with existing surrounding land uses, and training is consistent to the maximum extent practicable with the Hawaii Coastal Zone Management Program.

No noise is generated by training at Wheeler Network Segment Control/PMRF Communication Sites. The sites, which are only manned during training, employ two to four persons. Such a small work force would not affect local transportation levels of service or utilities. There is no socioeconomic impact from the training at the site. HRC training at the site would not generate any waste streams that could impact local water quality.

4.4.2.18 MAUNA KAPU COMMUNICATION SITE

A review of the 13 environmental resources against training determined that the proposed alternatives would not result in either short- or long-term environmental impacts at the Mauna Kapu Communication Site. Alternative 3 is the preferred alternative.

No air emissions would be generated from training at the Mauna Kapa Communication Site unless use of diesel generators would be required for backup power. The site does not affect the existing airspace structure in the region. Telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the THAAD radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005). Because no ground disturbance or building modifications would occur, there would be no impact on biological resources, cultural resources, or geology and soils. Use of this site does require small amounts of hazardous materials for facility maintenance and generates small amounts of hazardous waste. All hazardous materials used and hazardous waste generated would continue to be managed in accordance with applicable regulations.

There is no electromagnetic radiation generated at the Mauna Kapu Communication Site; therefore, there are no public health and safety issues. The site is compatible with existing surrounding land uses, and training is consistent to the maximum extent practicable with the Hawaii Coastal Zone Management Program. No noise is generated by training at the site. The site, which is only manned during training, employs two to four persons. Such a small work force would not affect local transportation levels of service or utilities. There is no socioeconomic impact from the use of the site. HRC training at the site would not generate any waste streams that could impact local water quality.

4.4.2.19 MAKUA RADIO/REPEATER/CABLE HEAD

A review of the 13 environmental resources against training determined that the proposed alternatives would not result in either short- or long-term environmental impacts at Makua Radio/Repeater/Cable Head. Alternative 3 is the preferred alternative.

No air emissions would be generated from training at the Makua Radio/Repeater/ Cable Head unless use of diesel generators would be required for backup power. The site does not affect the existing airspace structure in the region. Telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the THAAD radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005). Because no ground disturbance or building modifications would occur, there would be no impact on biological resources, cultural resources, or geology and soils. Use of this site does require small amounts of hazardous materials for facility maintenance and generates small amounts of hazardous waste. All hazardous materials used and hazardous waste generated would continue to be managed in accordance with applicable regulations. There is no electromagnetic radiation generated at the site; therefore, there are no public health and safety issues.

The Makua Radio/Repeater/Cable Head is compatible with existing surrounding land uses, and training is consistent to the maximum extent practicable with the Hawaii Coastal Zone Management Program. No noise is generated by training at the site. The site, which is only manned during training, employs two to four persons. Such a small work force would not affect local transportation levels of service or utilities. There is no socioeconomic impact from the use of the site. HRC training at the site would not generate any waste streams that could impact local water quality.

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4.5 MAUI

4.5.1 MAUI OFFSHORE

Maui Offshore is used for submarine training. Table 4.5.1-1 lists ongoing training and research, development, test, and evaluation (RDT&E) activities for the No-action Alternative and proposed training and RDT&E activities for Alternatives 1, 2, and 3 in Maui Offshore. Alternative 3 is the preferred alternative.

Table 4.5.1-1. Training and RDT&E Activities in the Maui Offshore

Training	Research, Development, Test, and Evaluation (RDT&E) Activities
• Anti-Submarine Warfare (ASW) Tracking Exercise • ASW Torpedo Exercise • Integrated ASW Training	• Portable Undersea Tracking Range (Alternative 1) • Large Area Tracking Range Upgrade (Alternative 1) • Enhanced Electronic Warfare Training (Alternative 1) • Expanded Training Capability for Transient Air Wings (Alternative 1)

A review of the 13 environmental resources against program training and RDT&E activities determined there would be no impacts from training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Maui Offshore. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, airspace, cultural resources, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

There would be no emissions from training and RDT&E activities affecting the air quality for the Maui Offshore area. Use of this area does not require control of the airspace. This site has no prehistoric or historic artifacts, archaeological sites (including underwater sites), historic buildings or structures, or traditional resources that could be affected by Hawaii Range Complex (HRC) training and RDT&E activities. Training and RDT&E activities associated with this area would adhere to policies and regulations governing hazardous materials and waste, health and safety, and noise, as discussed in Appendix C. There would be no offshore HRC training or RDT&E activities in Maui Offshore that would adversely affect earth resources (land forms, geology and soils). The socioeconomic characteristics of Maui are not affected by training and RDT&E activities associated with Maui Offshore. HRC training and RDT&E activities would not affect local transportation levels of service or utilities. The area is compatible with existing and surrounding land uses. Water resources would not be affected by the movement of submarines during training.

4.5.1.1 MAUI OFFSHORE

4.5.1.1.1 Biological Resources—Maui Offshore

4.5.1.1.1.1 No-action Alternative (Biological Resources—Maui Offshore)

HRC Training and Major Exercises—No-action Alternative

According to the Hawaiian Islands Humpback Whale National Marine Sanctuary Environmental Impact Statement (EIS) (U.S. Department of Commerce, National Oceanic and Atmospheric Administration and State of Hawaii, Office of Planning, 1997), "… the waters adjacent to Maui, Molokai, and Lanai are important training areas for Navy ships homeported in Pearl Harbor. The channel between Maui, Lanai and Molokai is extensively used for biennial RIMPAC [Rim of the Pacific] Exercises, EOD/MCM [explosive ordnance disposal/mine countermeasures] Exercises, and as well for shallow-water ASW [anti-submarine warfare]… The areas inside the 100-fathom isobath surrounding Maui, Molokai and Lanai, and specifically the channel between these islands, are used for shallow-water ASW operations."

The waters inside the 100-fathom isobath surrounding Maui, Molokai, and Lanai, and specifically the channel between these islands, would continue to be used for RIMPAC Exercises, including EOD and MCM Exercises, as well as shallow-water ASW events.

Submarine events occur throughout much of the HRC. Weapon firing mainly occurs in the Pacific Missile Range Facility (PMRF) Shallow Water Training Range and the training areas within the 100-fathom isobath contour between the islands of Kahoolawe, Maui, Lanai, and Molokai. Most submarine operations occur between approximately 15 fathoms below the water surface and the ocean floor. Multiple in-water runs of MK-48 torpedoes (with no warheads) using one submarine as both target and launch platform occur in the Penguin Bank area.

Endangered humpback whales are normally seen during the winter months, November to May, in the region of influence, with peak concentrations in mid-February to mid-March. The whales seem to prefer areas within the 100-fathom contours such as the Molokai–Lanai–Maui–Kahoolawe channels and Penguin Bank. Humpback whale sightings are mainly concentrated north of Kahoolawe in protected channel areas.

Integrated ASW Training events involving multiple air, surface, and subsurface units of the ASW Tracking Exercise combined, over a period of several days, are called a Major Exercise. No new or unique events take place during integrated training; it is merely the compilation of numerous ASW events as conducted by multiple units over a period of time ranging from 3 to 30 days.

Personnel are aware that they are not to harm or harass whales, Hawaiian monk seals, or sea turtles. Commander Navy Region Hawaii also issues a Navy message annually when the humpback whales return to Hawaiian waters (based on the first sightings) as a means to increase general awareness and emphasize those regulations specific to humpback whales in Hawaii. The Navy has conducted these submarine operations in the Hawaiian Islands for decades, and no harmful effects on these species have been observed to date. As part of the required clearance before a training event, the target area will be inspected visually and determined to be clear. Aircrews are trained to visually scan the surface of the water for anomalies. Due in part to this additional emphasis on visual scanning and the availability of extra crew members to conduct such searches, it is unlikely that whales, monk seals, or sea turtles would be undetected when the aircraft are flying at lower altitudes. If animals are detected, the submarine's path can be adjusted. Submarine events, including those in existing underwater training areas between the islands of Kahoolawe, Maui, Lanai, and Molokai, follow established clearance procedures to ensure the activity will not adversely impact marine mammals and sea turtles. The potential to harm whales, monk seals, or sea turtles from the firing and tracking of non-explosive torpedoes in these training areas, as part of the various Major Exercises, is remote.

4.5.1.1.1.2 Alternative 1 (Biological Resources—Maui Offshore)

Increased Tempo and Frequency of Training—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise, including two Strike Groups conducting training simultaneously in the HRC, and other continuing training (See Table 2.2.2.3-1). The number of tracking and torpedo events would not increase, but the tempo of the events may. Two additional integrated ASW training events would be added as part of Alternative 1. The likelihood of a similar increase in adverse impacts on biological resources would be small because no new or unique events take place; personnel are aware that they are not to harm or harass whales, monk seals, or sea turtles; and the Navy would continue to monitor its events for potential impacts.

HRC Enhancements—Alternative 1

The Portable Undersea Tracking Range would be developed to provide submarine training in areas where the ocean depth is between 300 and 2,000 feet (ft) and at least 3 nautical miles from land (Figure 2.2.3.6.3-1). The underwater range instrumentation hardware could be deployed, and a temporary range created anywhere within the region shown in Figure 2.2.3.6.3-1. The Portable Undersea Tracking Range would also be used in areas around Maui with water depths greater than 300 ft. When training is complete, the Range equipment could be recovered and moved to another location. All of these areas have been used for submarine training since World War II. Other than the temporary disturbance to marine species during instrumentation installation and recovery, no impacts would be expected to occur.

Sources such as the proposed Portable Undersea Tracking Range, underwater communications, and electronic warfare systems that may be deployed in the ocean are beyond the frequency range or intensity level to affect marine animals. Flat areas with no known coral concentration would be selected for the Portable Undersea Tracking Range when possible. In areas that have not been mapped for coral presence, the Navy would develop appropriate habitat data and any necessary Best Management Practices and mitigations in coordination with the National Marine Fisheries Service and U.S. Fish and Wildlife Service (USFWS). The Navy will continue to work with regulatory agencies throughout the planning and development process to minimize the potential for impacts on coral, fish, and marine mammals.

As part of the Joint National Training Capability, PMRF would provide dedicated equipment to enable Mid-Pacific and transiting Strike Groups to participate in either live or virtual training. This capability would allow links between Third Fleet and Seventh Fleet to Mid-Pacific to demonstrate group level Navy Continuous Training Environment. PMRF would be able to participate in major in-port training with at-sea assets. A node would be created in an existing building at PMRF. The node would connect to a sound source in the ocean, such as a transiting submarine in the Maui Offshore area. The sound source would have three alternatives for bandwidth: (1) less than 1 kilohertz (kHz); (2) between 3 kHz and 8 kHz; and (3) greater than 10 kHz. These bandwidths are not anticipated to affect marine mammals or sea turtles. The effects of sound in the water are discussed in Section 4.1.2.

4.5.1.1.1.3 Alternative 2 (Biological Resources—Maui Offshore)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training operations would be increased and the frequency of operations could also increase. However, the potential for effects on marine mammals and sea turtles would be minor since personnel are aware that they are not to harm them, clearance procedures are established, and similar to those occurring during current training, as described above.

4.5.1.1.1.4 Alternative 3 (Biological Resources—Maui Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.5.1.2 SHALLOW-WATER MINEFIELD SONAR TRAINING AREA OFFSHORE

A review of the 13 environmental resources against training and RDT&E activities determined that the proposed alternatives would not result in either short- or long-term environmental impacts at the Shallow-water Minefield Sonar Training Area. Alternative 3 is the preferred alternative.

Use of the Shallow-water Sonar Minefield Sonar Training Area does not require control of the airspace above this area. There are no reports of emissions from training or RDT&E activities affecting the air quality in the area. Training and RDT&E activities associated with this site adhere to policies and regulations governing hazardous materials and waste, health and safety, and noise, as discussed in Appendix C. During the preparation of a 1997 Environmental Assessment, exploration of the site indicated no archeological or historic submerged sites or coral reefs in the area.

The Shallow-water Minefield Training Area is located within the Hawaiian Islands Humpback Whale National Marine Sanctuary; however, the inert shapes and mine detection equipment used in training or RDT&E activities at the shallow water training area would be clean and free from residual materials and invasive species from prior use, and no environmental effects on biological resources are anticipated. Since the shapes will rest on the ocean bottom, they would pose no entanglement hazard to marine mammals and sea turtles. A minimum of one inspection per year of the training area and mooring cables/anchor chain is performed.

The Shallow-water Minefield Sonar Training Area is compatible with existing surrounding land uses. There are no earth resources (land forms, geology and soils) that are adversely affected by training or RDT&E activities associated with the site. HRC training and RDT&E activities would not affect local transportation levels of service or utilities. The socioeconomic characteristics of Maui are not affected by training and RDT&E activities associated with this training area. Additionally, water resources would not be affected by the movement of submarines during the training and RDT&E activities.

4.5.2 MAUI ONSHORE

The PMRF capability for Electronic Warfare training would be enhanced to include sites on other islands (e.g., Maui and Hawaii). During Electronic Warfare training, Electronic Warfare emitters transmit signals that replicate hostile radars and weapon systems. Ship and aircraft crews attempt to identify the electronic signals, and react defensively if appropriate. Transmitters could be antennas or mobile vehicles. Where possible, existing towers would be chosen to incorporate new equipment with minimal modifications needed and no substantial impacts on wildlife. The construction of any new towers on Maui would occur at locations selected by personnel familiar with local environmental constraints, including the presence of threatened or endangered species. Additional environmental documentation could be required once specific sites are identified. The placement of new equipment to enhance electronic warfare training capability would be collocated on an existing communication tower or other structure. Any new towers would not be sited in or near wetlands, other known bird concentration areas (e.g., state or Federal refuges, staging areas, rookeries), in known migratory or daily movement flyways, or in habitat of threatened or endangered species. Any required lighting would be shielded in accordance with existing policy. The Navy would continue to consult with USFWS to ensure compliance under Section 7 of the Endangered Species Act.

4.5.2.1 MAUI SPACE SURVEILLANCE SYSTEM

A review of the 13 environmental resources against program training and RDT&E activities determined that the proposed alternatives would not result in either short- or long-term environmental impacts at the Maui Space Surveillance Site. Alternative 3 is the preferred alternative.

The Maui Space Surveillance System is located within 6.2 miles of the Haleakala National Park, which is a prevention of significant deterioration Class I area, as defined by the Clean Air Act. No air emissions would be generated from training and RDT&E activities unless use of diesel generators would be required for backup power; therefore, the proposed alternatives would not affect this special air quality designation. The site does not affect the existing airspace structure in the region. Telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the Terminal High Altitude Area Defense (THAAD) radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005). Because no ground disturbance or building modifications would occur as a result of proposed training and RDT&E activities, there would be no impact on biological resources, cultural resources, or geology and soils.

The use of hazardous materials and generation of hazardous waste at Maui Space Surveillance System, would be in accordance with applicable regulations. There are established safety zones around electromagnetic radiation hazards, which eliminate health and safety issues. The site is compatible with existing surrounding land uses. No noise is generated by training and RDT&E activities, and the site is operated by up to 60 persons. This small staff would not affect local transportation levels of service or utilities. There is no socioeconomic impact from training and RDT&E activities. Training and RDT&E activities would not generate any waste streams that could impact local water quality.

4.5.2.2 MAUI HIGH PERFORMANCE COMPUTING CENTER

A review of the 13 environmental resources against program activities determined that the proposed alternatives would not result in either short- or long-term environmental impacts at the Maui High Performance Computing Center. Training and RDT&E activities at this site consist of data processing. Alternative 3 is the preferred alternative.

No air emissions would be generated from training and RDT&E activities at the Maui High Performance Computing Center unless use of diesel generators would be required for backup power. The site does not affect the existing airspace structure in the region. Because no ground disturbance or building modifications would occur, there would be no impact on biological resources, cultural resources, or geology and soils.

Use of the Maui High Performance Computing Center does require small amounts of hazardous materials for facility maintenance and generates small amounts of hazardous waste. All hazardous materials used and hazardous waste generated would continue to be managed in accordance with applicable regulations. There is no electromagnetic radiation generated at the site; therefore, there are no public health and safety issues.

The Maui High Performance Computing Center is compatible with existing surrounding land uses. No noise is generated by training and RDT&E activities at the site. HRC training and RDT&E operations would not affect local transportation levels of service or utilities. There is no socioeconomic impact from use of the site. HRC training and RDT&E activities at the site would not generate any waste streams that could impact local water quality.

4.5.2.3 SANDIA MAUI HALEAKALA FACILITY

A review of the 13 environmental resources against program activities determined that the proposed alternatives would not result in either short- or long-term environmental impacts at the Sandia Maui Haleakala Facility. Alternative 3 is the preferred alternative.

The Sandia Maui Haleakala Facility is located within 6.2 miles of the Haleakala National Park, which is a Prevention of Significant Deterioration Class I area, as defined by the Clean Air Act. No air emissions would be generated from site events unless use of diesel generators would be required for backup power; therefore, the proposed alternatives would not affect this special air quality designation. The site does not affect the existing airspace structure in the region. Telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the THAAD radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005). Because no ground disturbance or building modifications would occur, there would be no impact on biological resources, cultural resources, or geology and soils.

Use of the Sandia Maui Haleakala Facility site does require small amounts of hazardous materials for facility maintenance and generates small amounts of hazardous waste. All hazardous materials used and hazardous waste generated would continue to be managed in accordance with applicable regulations. There is no electromagnetic radiation generated at the site; therefore, there are no public health and safety issues. The site is compatible with existing surrounding land uses.

No noise is generated by training and RDT&E activities at the Sandia Maui Haleakala Facility. HRC training and RDT&E activities would not affect local transportation levels of service or utilities. There is no socioeconomic impact from use of the site. HRC training and RDT&E activities at the site would not generate any waste streams that could impact local water quality.

4.5.2.4 MOLOKAI MOBILE TRANSMITTER SITE

A review of the 13 environmental resources against program activities determined that the proposed alternatives would not result in either short- or long-term environmental impacts at the Molokai Mobile Transmitter Site. Alternative 3 is the preferred alternative.

There are no reports of emissions from training or RDT&E activities affecting the air quality in the area. The site does not affect the existing airspace structure in the region. Telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the THAAD radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005). Because no ground disturbance or building modifications would occur, there would be no impact on biological resources, cultural resources, or geology and soils.

Use of the Molokai Mobile Transmitter Site does require small amounts of hazardous materials and generates small amounts of hazardous waste. All hazardous materials used and hazardous waste generated would continue to be managed in accordance with applicable regulations. There are established safety zones, which eliminate health and safety issues. The site is compatible with existing surrounding land uses.

No noise is generated by training and RDT&E activities at the Molokai Mobile Transmitter Site. HRC training and RDT&E activities would not affect local transportation levels of service or utilities. There is no socioeconomic impact from use of the site. HRC training and RDT&E activities at the site would not generate any waste streams that could impact local water quality.

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4.6 HAWAII

4.6.1 HAWAII OFFSHORE

4.6.1.1 KAWAIHAE PIER OFFSHORE

Table 4.6.1.1-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 offshore at Kawaihae Pier. Alternative 3 is the preferred alternative.

Table 4.6.1.1-1. Training at Kawaihae Pier Offshore

Training	
• Expeditionary Assault	• Special Warfare Operations (SPECWAROPS)

A review of the 13 resources against offshore program training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Kawaihae Pier. The following resources are not addressed because the proposed alternatives have no potential to adversely affect such resources air quality, airspace, cultural resources, geology and soils, hazardous material and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

No air emissions would be generated from Kawaihae Pier offshore training unless use of diesel generators would be required for backup power. Use of Kawaihae Pier does not require control of the airspace above this land area. Kawaihae Pier has no prehistoric and historic artifacts, archaeological sites (including underwater sites), historic buildings or structures, or traditional resources that could be affected by Hawaii Range Complex (HRC) training. Because no ground disturbance or building modifications would occur as a result of proposed training, there would be no impact on geology and soils.

Offshore training associated with Kawaihae Pier adheres to policies and regulations governing hazardous materials and waste, health and safety, and noise, as discussed in Appendix C. There are no concerns with noise as it relates to offshore HRC training at Kawaihae Pier. There would be no impact on socioeconomics, transportation, utilities, and land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. HRC training would not generate any waste streams that could impact local water quality.

4.6.1.1.1 Biological Resources—Kawaihae Pier—Offshore

4.6.1.1.1.1 No-action Alternative (Biological Resources—Kawaihae Pier—Offshore)

The Navy will work with the current land owner for activities that may not be covered under existing consultation or regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

HRC Training and Major Exercises—No-action Alternative

Vegetation

The small beach area located immediately adjacent to the pier contains no vegetation. No threatened or endangered vegetation has been identified in the Kawaihae Harbor area (U.S. Department of the Navy, 2002a).

Expeditionary Assault landing personnel are briefed on existing procedures for entering the harbor and unloading equipment and supplies at the boat ramp. These procedures include inspections by appropriate Federal and/or State agencies of vehicles and equipment from foreign countries to prevent the introduction of invasive or alien species. A recycling wash rack is used to clean foreign country vehicles and equipment prior to back-loading to control the spread of alien species.

Wildlife

The Expeditionary Assault will continue to be conducted in compliance with Executive Order (EO) 13089, *Coral Reef Protection*. Expeditionary Assault landing personnel are briefed on existing procedures for entering the harbor and unloading equipment and supplies at the boat ramp. Before each Expeditionary Assault is conducted, a hydrographic survey is performed to map out the precise transit routes through sandy bottom areas. Within 1 hour of initiation of the Expeditionary Assault landing events, the landing routes and beach areas are determined to be clear of marine mammals and sea turtles. If any are seen, the training event will be delayed until the animals leave the area. During the landing the crews follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The water on this leeward side of the island provides habitat for humpback mother and calf pods and for resting dolphin pods. No threatened or endangered species have been identified within the harbor (U.S. Department of the Navy, 2002a).

During Special Warfare Operations (SPECWAROPS), crews for amphibious inserts follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals (whales or Hawaiian monk seals), and sea turtles. Personnel review training overlays that identify the insertion points and any nearby restricted areas; sensitive biological resource areas are avoided.

Hawaiian Islands Humpback Whale National Marine Sanctuary

Although the Kawaihae Pier area is not included within the Hawaiian Islands Humpback Whale National Main Sanctuary (HIHWNMS) located off the northwestern shore of Hawaii, Army and Marine Corps helicopter training events regularly occur over the area within the HIHWNMS boundary. Navy and Army landing craft frequently offload and load supplies and equipment at Kawaihae Pier in support of military training at Pohakuloa Training Area. These training events will continue as approved military actions in the HIHWNMS Environmental Impact Statement/Management Plan.

Potential effects on marine biological resources from mid-frequency active/high-frequency active (MFA/HFA) sonar usage are discussed in the applicable Open Ocean No-action Alternative sections.

4.6.1.1.1.2 Alternative 1 (Biological Resources—Kawaihae Pier—Offshore)

No increases in training and Major Exercises at Kawaihae Pier are expected. Impacts would be the same as those discussed above for the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage are discussed in the applicable Open Ocean No-action Alternative sections.

4.6.1.1.1.3 Alternative 2 (Biological Resources—Kawaihae Pier—Offshore)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training events would be increased and the frequency of events could also increase. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003d). Potential effects on marine biological resources from MFA/HFA sonar usage are discussed in the applicable Open Ocean Alternative 2 sections.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area for up to 10 days per Major Exercise. The Major Exercises would be similar to those occurring during the Rim of the Pacific (RIMPAC) Exercise and the Undersea Warfare Exercise (USWEX), with the exception of impacts associated with MFA sonar use (Section 4.1.2), impacts on biological resource similar to those described above for the No-action Alternative.

4.6.1.1.1.4 Alternative 3 (Biological Resources—Kawaihae Pier—Offshore)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced research, development, test, and evaluation (RDT&E) activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Potential effects on marine biological resources from MFA/HFA sonar usage determined for Alternative 3 are discussed in the applicable Open Ocean No-action Alternative sections. Potential effects on marine biological resources from non-ASW (sonar usage) training and RDT&E activities determined for Alternative 3 are the same as those analyzed for Alternative 2.

4.6.2 HAWAII ONSHORE

4.6.2.1 POHAKULOA TRAINING AREA

Table 4.6.2.1-1 lists ongoing training and RDT&E activities for the No-action Alternative and proposed training and RDT&E activities for Alternatives 1, 2, and 3 at Pohakuloa Training Area (PTA). Alternative 3 is the preferred alternative.

Table 4.6.2.1-1. Training and RDT&E Activities at PTA

Training	Research, Development, Test, and Evaluation (RDT&E) Activities
• Air-to-Ground Gunnery Exercise (A-G GUNEX) • Bombing Exercises • Special Warfare Operations (SPECWAROPS) • Live Fire Exercise (LFX)	• Large Area Tracking Range Upgrade (Alternative 1) • Enhanced Electronic Warfare Training (Alternative 1) • Expanded Training Capability for Transient Air Wings (Alternative 1)

A review of the 13 resources against program training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for PTA. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, hazardous materials and hazardous waste, geology and soils, land use, socioeconomics, transportation, utilities, and water resources.

The southern portion of the PTA range complex is proposed for Air-to Ground Gunnery Exercises (A-G GUNEX), Bombing Exercises, and Live Fire Exercises (LFXs). This location is within 6.2 miles (mi) of the Hawaii Volcanoes National Park, which is a Prevention of Significant Deterioration Class I area as defined by the Clean Air Act. The proposed alternatives would not affect this special air quality designation because the limited duration of these events would minimize or eliminate the cumulative effects of particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM-10). The Navy would defer to Army procedures for use of any area within the PTA range where depleted uranium (DU) contamination has been found.

No building modifications would occur. Any ground disturbance as a result of training and RDT&E activities would be handled in accordance with existing practices, and no impact on geology and soils is expected.

The use of hazardous materials and generation of hazardous waste at PTA would be in accordance with applicable regulations. PTA is compatible with existing surrounding land uses. HRC training and RDT&E activities would not affect local transportation levels of service or utilities. The socioeconomic characteristics of the area are not affected by training and RDT&E activities associated with this site. Training and RDT&E activities would not generate any hazardous waste streams that could impact local water quality.

4.6.2.1.1 Airspace—PTA

4.6.2.1.1.1 No-action Alternative (Airspace—PTA)

HRC Training—No-action Alternative

HRC training can include LFXs at PTA. These types of training events are confined to the special use airspace R-3103 located above the range associated with PTA. Air activity is controlled and coordinated by PTA Range Control. For training that includes 10 or more aircraft, the Bradshaw Army Airfield manager submits a Notice to Airmen (NOTAM) to the Federal Aviation Administration (FAA) Honolulu Flight Service Station to be published as a Honolulu Local NOTAM and as a Class D NOTAM. The Bradshaw Army Airfield manager provides this information to the airfield Air Traffic Information Service (U.S. Army Garrison, Hawaii, 1996).

The nearest en route airway is located approximately 10 nautical miles north of R-3103. Access to R-3103 would be via Air Traffic Control Assigned Airspace (ATCAA) Pele, shown on Figure 3.6.2.1.1-1. This access route would be above the en route airways and Class D and Class E airspace above Kona Airport. By appropriately containing military activities within the Restricted Airspace and coordinating the use of the ATCAA area, non-participating traffic is advised or separated accordingly, resulting in minimal impacts on airspace from HRC training.

Major Exercises—No-action Alternative

Major Exercises such as RIMPAC and USWEX include combinations of ongoing training events. For PTA this includes LFX and SPECWAROPS. These types of training events are confined to the special use airspace R-3103 located above the range associated with PTA. Air activity is controlled and coordinated by PTA Range Control. For training that includes 10 or more aircraft, the Bradshaw Army Airfield manager submits a NOTAM to Honolulu Flight Service Station to be published as a Honolulu Local NOTAM and as a Class D NOTAM. The Bradshaw Army Airfield manager provides this information to the airfield Air Traffic Information Service (U.S. Army Garrison, Hawaii, 1996).

RIMPAC planning conferences, which include coordination with the FAA, are conducted beginning in March of the year prior to each RIMPAC. Each USWEX, up to six per year, will include coordination with the FAA well in advance of each 3- or 4-day Major Exercise. The advanced planning and coordination with the FAA regarding scheduling of special use airspace and coordination of Navy training relative to en route airways and jet routes result in minimal impacts on airspace from Major Exercises.

4.6.2.1.1.2 Alternative 1 (Airspace—PTA)

Increased Tempo and Frequency of Training—Alternative 1

Increased training could include additional LFXs at PTA. The total number of training events that affect airspace could increase by approximately 29 percent above the No-action Alternative. No new airspace proposal or any modification to the existing controlled airspace would be required. HRC training would continue to use the existing special use airspace including the R-3103 Restricted Airspace and the Pele ATCAA shown on Figure 3.6.2.1.1-1. By appropriately containing military activities within the Restricted Airspace and coordinating the use of the ATCAA area, non-participating traffic is advised or separated accordingly.

The increase in training under Alternative 1 would require an increase in coordination and scheduling by the Navy, Bradshaw Army Airfield, and the FAA. The increase in training would be readily accommodated within the existing airspace. Consequently, there would be no airspace conflicts.

HRC Enhancements—Alternative 1

HRC enhancements would include a new ground relay station to support the Large Area Tracking Range. The relay station would be added to an existing building. Use of the new ground relay station would not require control of the airspace above this land area.

Major Exercises—Alternative 1

Major Exercises such as RIMPAC and USWEX include combinations of ongoing training events. For PTA this includes LFX and SPECWAROPS. These types of training events are confined to the special use airspace R-3103 located above the range associated with PTA. Air activity is controlled and coordinated by PTA Range Control. For training that includes 10 or more aircraft, the Bradshaw Army Airfield manager submits a NOTAM to Honolulu Flight Service Station to be published as a Honolulu Local NOTAM and as a Class D NOTAM. The Bradshaw Army Airfield manager provides this information to the airfield Air Traffic Information Service (U.S. Army Garrison, Hawaii, 1996).

RIMPAC planning conferences, which include coordination with the FAA, are conducted beginning in March of the year prior to each RIMPAC. The increase from one aircraft carrier to two during RIMPAC under Alternative 1 would require a minor increase in coordination and scheduling by the Navy and FAA. Each USWEX, up to six per year, will include coordination with the FAA well in advance of each 3- or 4-day Major Exercise. The advance planning and coordination with the FAA regarding scheduling of special use airspace and coordination of Navy training relative to en route airways and jet routes result in minimal impacts on airspace from Major Exercises.

4.6.2.1.1.3 Alternative 2 (Airspace—PTA)

Increased Tempo and Frequency of Training—Alternative 2

Increased tempo and frequency of training could result in additional LFXs at PTA. The total number of training events that affect airspace could increase by approximately 48 percent above the No-action Alternative. No new airspace proposal or any modification to the existing controlled airspace would be required. The training would continue to use the existing special use airspace including the R-3103 Restricted Airspace and the Pele ATCAA shown on Figure 3.6.2.1.1-1. By appropriately containing military activities within the Restricted Airspace and coordinating the use of the ATCAA area, non-participating traffic is advised or separated accordingly.

The increase in training under Alternative 1 would require an increase in coordination and scheduling by the Navy, Bradshaw Army Airfield, and the FAA. The increase in training would be accommodated within the existing airspace. Consequently, there would be no airspace conflicts.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

In addition to RIMPAC and USWEX, Alternative 2 includes a Multiple Strike Group Major Exercise that could include additional LFXs at PTA. The advance planning and coordination with the FAA regarding scheduling of special use airspace, and coordination of Navy training relative to en route airways and jet routes result in minimal impacts on airspace from Major Exercises. The use of three aircraft carriers during a Major Exercise would require an increase in coordination and scheduling by the Navy, Bradshaw Army Airfield, and the FAA. The increased training would be accommodated within the existing airspace.

4.6.2.1.1.4 Alternative 3 (Airspace—PTA)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on airspace under Alternative 3 would be the same as those described for Alternative 2.

4.6.2.1.2 Biological Resources—PTA

4.6.2.1.2.1 No-action Alternative (Biological Resources—PTA)

Navy training and RDT&E activities at the site would be performed in accordance with all applicable biological opinions and existing Army regulations. The Navy will work with the current Department of Defense (DoD) land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

HRC Training and Major Exercises—No-action Alternative

Vegetation

LFXs, which are confined to the Impact Area, are conducted at PTA as part of ongoing training. Strike Warfare for RIMPAC and USWEX includes Bombing and A-G GUNEX, also confined to the Impact Area. A-G GUNEX involve helicopter crews fire guns against stationary land targets for live fire target practice. SPECWAROPS primarily use existing trails and roads. Personnel review training overlays that identify the insertion points and any nearby restricted areas. Although the Impact Area has not been surveyed for biological resources—due to the risks posed by unexploded ordnance—impacts from ordnance and other munitions landing over a long period of use have most likely already degraded the habitat. In addition, numerous ordnance-related fires over the years have tended to favor non-native invasive species over Native Hawaiian species, which generally are not fire-adapted and recover slowly after a fire.

Military activities, other than fire, seem to have had little impact on rare plants. Approximately 25 percent of the installation is covered by lava, with little vegetative development. Dust from training can also negatively impact a threatened or endangered species, as listed in Table 3.6.2.1.2-1, if it is growing close to a road. However, many of the threatened and endangered plants inhabit remote areas of PTA with little or no chance of being impacted by military activity. (Shaw, 1997)

An Integrated Natural Resources Management Plan (INRMP) has been prepared to address protection and management of resources for PTA. Compliance with this plan and the Ecosystem Management Plan during training events and Major Exercises further reduces the potential for effects of training on biological resources and limits the potential for introduction of invasive weed plant species. The risk of impacting threatened or endangered plants can be further minimized by locating training away from areas with these species whenever possible. The effects of continued training on biological resources within the Impact Area will be minor in the context of the overall quantity of ordnance deliveries to this area from various training events.

Air-to-surface missile training as part of strike warfare at PTA is confined to the special use airspace R-3103 associated with Bradshaw Army Airfield and the impact area associated with PTA. Air activity is coordinated by PTA Range Control. The following restrictions from the PTA External Standard Operating Procedures (SOPs) are applicable to all training areas on the installation:

- All off-road driving is prohibited.
- All fenced areas are off-limits.
- All lava tubes and sinkholes are off-limits.
- Digging is only permitted in previously disturbed areas.

Wildlife

The U.S. National Park Service, through an interagency agreement, fenced approximately 6,500 acres to keep feral goats, sheep, and pigs from disturbing native habitat and listed species. The U.S. Department of Agriculture, Wildlife Services staff removes the feral animals. Explosive ordnance disposal specialists assist in these efforts due to safety considerations. (U.S. Army Corps of Engineers, 2001)

For missile and weapons systems, PTA Safety establishes criteria for the safe execution of the test event in the form of Range Safety Approval and Range Safety Operational Plan documents. These plans are required for all weapon and target systems using PTA. The plans include the allowable launch and flight conditions, and flight control methods necessary to contain the missile flight and impacts within the predetermined impact hazard areas. PTA safety criteria also provide for protection of biological and cultural resources. The impact area is in a barren and isolated area with restricted access.

Military readiness activities are exempt from the take prohibitions of the Migratory Bird Treaty Act (MBTA) provided they do not result in a significant adverse effect on the population of a migratory bird species. The low probability of one of the training events being capable of significantly impacting a population of the migratory species that occur in the PTA area should exempt the HRC from the take prohibitions.

Native birds common to PTA, such as honeycreepers (`apapane and Hawaiian `amakihi), can be startled or flushed by intermittent noise associated with training. These effects, however, are temporary and the birds continue to return to the area following completion of training. Any potential impacts to listed bird species, such as the `io (Hawaiian hawk) and nene, which are the only endangered forest birds seen on PTA, would be addressed through coordination with the U.S. Fish and Wildlife Service (USFWS).. Compliance with the PTA INRMP and Ecosystem

Management Plan during training can further reduce the potential for effects on wildlife. The continuance of current training is not likely to adversely affect the long-term well-being, reproduction rates, or survival of these native or listed species.

Section 3.6.2.1.4 describes DU and the recently discovered presence of DU on remote sections of PTA. All Navy activities will follow existing Army SOPs, as well as future plans and regulations concerning DU at PTA.

Environmentally Sensitive Habitat

The USFWS determined that critical habitat for the listed plant species was not necessary since the PTA INRMP and Ecosystem Management Plan encompass management actions that will benefit the listed species for which critical habitat was originally proposed (U.S. Fish and Wildlife Service, 2003c).

The critical habitat established for the endangered palila, a finch-billed honeycreeper, is located outside the areas likely to be affected by the current training.

4.6.2.1.2.2 Alternative 1 (Biological Resources—PTA)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Air-to-Ground Gunnery would increase in number from 16 per year to 18 (See Table 2.2.2.3-1), The likelihood of a similar increase in adverse impacts on biological resources would be small since different areas of PTA's Impact Area would be used for each independent activity, and only two additional Major Exercises are being added per year. Other training at PTA will not increase; LFX will remain at three per year.

Vegetation

Training would continue to take place at existing locations; no expansion of the area would be involved. Compliance with the PTA INRMP and Ecosystem Management Plan during increased training events would minimize the potential for effects on vegetation, as well as limit the potential for introduction of invasive plant species. The risk of impacting threatened or endangered plants could be further minimized by continuing to locate training away from areas with native, threatened, or endangered plant species, whenever possible.

Wildlife

Impacts on wildlife would be similar to those described previously for the No-action Alternative. The increased training events would comply with the PTA INRMP and Ecosystem Management Plan, which could further reduce the potential for effects on wildlife.

Environmentally Sensitive Habitat

The critical habitat established for the endangered palila is located outside the areas likely to be affected by the increased training and Major Exercises.

HRC Enhancements—Alternative 1

To support the Large Area Tracking Range, a new ground relay station would be added to PTA. The relay station would not require new construction, but would be added to an existing building. No impacts on wildlife other than temporary startling by additional personnel involved in the installation are anticipated.

Also under Alternative 1, PTA would receive two Joint Threat Emitters. These transmitters are threat simulators capable of generating radar signals associated with threat systems and consist of a computer controlled multiple emitter and receiver system (one or two command and control units). The proposed transmitters could be antenna or mobile vehicles. When possible, existing towers would be used to incorporate new equipment with minimal modifications. If new towers are needed, additional environmental analysis would be required before such activities could occur. Command and control sensors are passive systems that do not present the same potential for impacts as the radar systems such as the Terminal High Altitude Area Defense (THAAD) radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005).

Adherence to established SOPs at PTA would result in minimal impacts on the physical environment and avoids potential impacts on threatened and endangered species. New training events that are not covered under current regulations at PTA would not be implemented until appropriate coordination has been completed.

4.6.2.1.2.3 Alternative 2 (Biological Resources—PTA)

Increased Tempo and Frequency of Training—Alternative 2

Under this portion of Alternative 2, the tempo of training would be increased and frequency of events could also be increased. Wildlife exhibits a wide variety of responses to noise. Some species are more sensitive to noise disturbances than others. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003d).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area once a year for up to 10 days per Major Exercise. The Major Exercises proposed would occur mainly in the Open Ocean and would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.6.2.1.2.4 Alternative 3 (Biological Resources—PTA)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.6.2.1.3 Cultural Resources—PTA

4.6.2.1.3.1 No-action Alternative (Cultural Resources—PTA)

HRC Training and Major Exercises—No-action Alternative

Live Fire Exercises (LFX)

LFXs involve activities within the PTA impact area and along designated, heavily disturbed roads and trails.

Approximately 30 percent of PTA has been surveyed for cultural resources, and approximately 300 archaeological and traditional Hawaiian sites have been identified; some of the sites are eligible for inclusion in the National Register of Historic Places. These surveys of PTA encompass the Keamuku area. Some of the identified sites are located in proximity to existing trails and roads; however, none are located within the impact training area (U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998; U.S. Department of the Navy, 2002a). Personnel review training overlays that identify insertion points and nearby restricted areas and sensitive biological and cultural resource areas are avoided (U.S. Department of the Navy, 2002a). In the event unexpected cultural materials are encountered (particularly human remains) during LFX, activities in the immediate vicinity of the find will cease and the Schofield Barracks Cultural Resources Manager will be contacted. In addition, if the alignment of trails requires alteration or grading, or other ground disturbing activities are required, coordination with the Schofield Barracks Cultural Resources Manager would be required. Because of the required preplanning of LFX activities and the implementation of the described mitigation measures, no impacts are expected to cultural resources at PTA.

The Army will continue to provide Native Hawaiians with access to traditional religious and cultural properties, in accordance with the American Indian Religious Freedom Act and EO 13007, on a case-by-case basis.

4.6.2.1.3.2 Alternative 1 (Cultural Resources—PTA)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Training and Major Exercises under Alternative 1 could increase the potential for impacts on occur to cultural resources in sensitive areas. For PTA, this would be most apparent along the roads and trails used for LFX, where there are identified archaeological sites. With continued implementation of mitigations specified for the No-action Alternative, no impacts would be anticipated for the increase in tempo and number of training events that make up Alternative 1. If no grading, widening, or other alteration of the roads and trails widths or alignments is required, the increased potential for adverse effects is minimal. However, if alteration to the roads and trails is necessary, coordination with the Schofield Barracks Cultural Resources Manager would be completed prior to the changes (see above analysis under the No-action Alternative for LFX).

HRC Enhancements—Alternative 1

Large Area Tracking Range Upgrade

To support Large Area Tracking Range, a new ground relay station would be added to PTA. The relay station would not require new construction, but would be added to an existing building. A 2002 historic evaluation of the 129 buildings and structures with the cantonments at PTA and Bradshaw Army Airfield identified 107 potential historic buildings. Twenty of the facilities were recommended for retention; however, the report had not been reviewed by the Hawaii State Historic Preservation Officer (Godby, 2007). Once the specific building has been identified for erection of the relay station, coordination with the PTA cultural resources manager will be required to confirm the eligibility of the facility and determine any potential impacts.

4.6.2.1.3.3 Alternative 2 (Cultural Resources—PTA)

Increased Tempo and Frequency of Training—Alternative 2

The tempo and frequency of training over and above Alternative 1 could increase the potential for impacts on cultural resources in sensitive areas. See discussion under Alternative 1. As with Alternative 1, the continued use of mitigations mentioned earlier would minimize potential impacts on cultural resources.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Elements of Major Exercises with the potential to affect cultural resources have been analyzed above for the No-action Alternative and Alternative 1.

4.6.2.1.3.4 Alternative 3 (Cultural Resources—PTA)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on cultural resources under Alternative 3 would be the same as those described for Alternative 2.

4.6.2.1.4 Health and Safety—PTA

4.6.2.1.4.1 No-action Alternative (Health and Safety—PTA)

Under the No-action Alternative, existing training at PTA will continue and there will be no adverse impacts on health and safety. PTA takes every reasonable precaution during planning and execution of training to prevent injury to human life or property. Section 3.6.2.1.4 describes DU and the recently discovered presence of DU on remote sections of PTA. All Navy activities will follow existing Army SOPs, as well as future plans and regulations concerning DU at PTA.

HRC Training—No-action Alternative

Under the No-action Alternative, LFXs, which are confined to the Impact Area, are conducted at PTA as part of ongoing HRC training. Every reasonable precaution is taken during the planning and execution of training to prevent injury to human life or damage to property. Specific safety plans have been developed to ensure that each training event is in compliance with applicable policy and regulations, and to ensure that the general public and range personnel and assets are provided an acceptable level of safety. The impact area is in an isolated area with restricted access located away from the civilian population. Safety and health precautions are covered in external SOPs and are briefed by the PTA Operations Center.

Major Exercises—No-action Alternative

Strike Warfare Exercises, LFX, and SPECWAROPS routinely occur at PTA. Every reasonable precaution is taken during the planning and execution of training to prevent injury to human life or damage to property. Specific safety plans have been developed to ensure that each training event is in compliance with applicable policy and regulations and to ensure that the general public and range personnel and assets are provided an acceptable level of safety.

For missile and weapons systems, the PTA Safety Office establishes criteria for the safe execution of training in the form of Range Safety Approval and Range Safety Operational Plan documents, which are required for all weapon and target systems using PTA. These include the allowable launch and flight conditions and flight control methods to contain the missile flight and impacts within the predetermined impact hazard areas that have been determined to be clear of nonessential personnel and aircraft.

The impact area is in an isolated area with restricted access located away from the civilian population. Safety and health precautions are covered in external SOPs and are briefed by the PTA Operations Center. Impacts from the continuing Major Exercises at PTA on safety and health are not anticipated.

4.6.2.1.4.2 Alternative 1 (Health and Safety—PTA)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise (including two Strike Groups conducting training simultaneously in the HRC), and other continuing training events; resulting in an increase of approximately 9 percent. While training events would increase in number, it is anticipated that existing SOPs and specific safety plans that have been developed would ensure that the general public and range personnel and assets are provided an acceptable level of safety.

HRC Enhancements—Alternative 1

Under Alternative 1 an upgrade to the existing Large Area Tracking Range would include modifications to existing facilities at the PTA. No construction would be required, and the proposed minor modifications would be to expand training capability. Existing SOPs and specific safety plans have been developed and would ensure that the general public and range personnel and assets are provided an acceptable level of safety.

Also under Alternative 1, PTA would receive two Joint Threat Emitters. These transmitters are threat simulators capable of generating radar signals associated with threat systems and consist of a computer controlled multiple emitter and receiver system (one or two command and control units). The proposed transmitters could be antenna or mobile vehicles. When possible, existing towers would be used to incorporate new equipment with minimal modifications. If new towers are needed, additional environmental analysis would be required before such activities could occur. Command and control sensors are passive systems that do not present the same potential for impacts as the radar systems such as the THAAD radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities (U.S. Department of Defense, 2005). SOPs and specific safety plans have been developed and would ensure that the general public and range personnel and assets are provided an acceptable level of safety.

4.6.2.1.4.3 Alternative 2 (Health and Safety—PTA)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. Although the number of training events would increase, the type of training would remain the same.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during Major Exercises, with potential impacts on health and safety at PTA similar to those described in Section 4.6.2.1.4.1. Existing SOPs and specific safety plans that have been developed would ensure that the general public and range personnel and assets are provided an acceptable level of safety.

4.6.2.1.4.4 Alternative 3 (Health and Safety—PTA)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on health and safety under Alternative 3 would be the same as those described for Alternative 2.

4.6.2.1.5 Noise—PTA

Impacts of noise on human receptors are evaluated based on whether or not a noise event would exceed DoD or Occupational Safety and Health Administration guidelines. Potential noise effects on wildlife are discussed in Section 4.6.2.1.2, Biological Resources.

4.6.2.1.5.1 No-action Alternative (Noise—PTA)

HRC Training—No-action Alternative

Under the No-action Alternative, LFXs and Bombing Exercises, which are confined to the Impact Area, are conducted at PTA as part of ongoing HRC training. PTA maintains a hearing protection program that includes monitoring the hearing of personnel exposed to high noise levels and identifying and posting notification of noise hazard areas. Personnel required to work in noise hazard areas are required to use appropriate hearing protection and to bring noise levels within established safety levels. The impact area is in an isolated area with restricted access located away from the civilian population. Figure 3.6.2.1.5-1 shows existing noise levels from activities at PTA. Existing noise levels, as discussed in Section 3.6.2.1.5, do not impact noise-sensitive land use areas.

Major Exercises—No-action Alternative

Major Exercises such as RIMPAC and USWEX include combinations of ongoing training. For PTA this includes LFX and SPECWAROPS. LFX and SPECWAROPS typically occur at PTA as part of Major Exercises. There will be no increase to existing noise levels during the continuing training events listed above. The total perceived noise will be the combination of ambient noise and noise from the Major Exercises. Noise sources from the Major Exercise will include the use of helicopters and small arms munitions.

4.6.2.1.5.2 Alternative 1 (Noise—PTA)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

Alternative 1 would include up to six USWEXs per year, the biennial RIMPAC Exercise (including two Strike Groups conducting training simultaneously in the HRC), and other continuing training events, resulting in an increase of training events by approximately 9 percent. While training events would increase in number, the type of training would be the same. The noise levels produced by proposed Navy training and Major Exercises would not increase the current noise levels at PTA (Figure 3.6.2.1.5-1). The proposed activities would be individual events and would not occur simultaneously.

HRC Enhancements—Alternative 1

Under Alternative 1, an upgrade to the existing Large Area Tracking Range, enhancing Electronic Warfare Training, and expanding training capability for Transient Air Wings would include modifications to existing facilities at the PTA. No construction would be required, and the proposed minor modifications would be to expand training capability. The Large Area Tracking Range upgrade would not produce additional noise levels as the proposed expansion would be contained within existing facilities at PTA.

4.6.2.1.5.3 Alternative 2 (Noise—PTA)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training could also increase. Although the number of training events would increase, the type of training would remain the same and there would be no anticipated increase in the level of noise produced. The noise levels produced by proposed training would not increase the current noise levels at PTA (Figure 3.6.2.1.5-1). The proposed training would be individual events similar to existing training and would not occur simultaneously.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would be added to the Major Exercises occurring in the HRC. These ships would not be homeported in Hawaii, but would be in the area for up to 10 days per Major Exercise. The Major Exercises proposed would be similar to those occurring during RIMPAC and USWEX and would not increase the existing noise levels at PTA.

4.6.2.1.5.4 Alternative 3 (Noise—PTA)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on noise under Alternative 3 would be the same as those described for Alternative 2.

4.6.2.2 BRADSHAW ARMY AIRFIELD

Table 4.6.2.2-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at Bradshaw Army Airfield. Alternative 3 is the preferred alternative.

Table 4.6.2.2-1. Training at Bradshaw Army Airfield

Training	
• Special Warfare Operations (SPECWAROPS)	• Command and Control
• Air Operations	• Aircraft Support Operations

A review of the 13 resources against program training under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Bradshaw Army Airfield. Initial analysis indicated that the proposed alternatives would not result in either short- or long-term impacts on air quality, geology and soils, hazardous materials and hazardous waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

No significant air emissions would be generated from localized use of rotary wing aircraft or use of diesel emergency generators at Bradshaw Army Airfield. There would be no ground-disturbing activities or building modifications that could affect geology and soils at Bradshaw Army Airfield. The use of hazardous materials and generation of hazardous waste at this site would be in accordance with applicable regulations (see Appendix C).

Training at Bradshaw Army Airfield would be performed in accordance with all applicable safety regulations (see Appendix C). A review of Table 2.2.2.3-1 indicates that training at Bradshaw Army Airfield has the potential to increase for Command and Control (from one to two events) and Aircraft Support Operations (from one to two events). This increase does not require the Navy to increase the number of personnel “living on” or “traveling to” Bradshaw, nor acquire additional land, or require any new construction, or modification to any current facilities. The proposed increase would not alter current land use patterns on-base or off-base, socioeconomic characteristics, transportation level of service (LOS) for roadway usage or increase utilities demand. Training would not generate any waste streams that could impact local water quality.

4.6.2.2.1 Airspace—Bradshaw Army Airfield

4.6.2.2.1.1 No-action Alternative (Airspace—Bradshaw Army Airfield)

HRC Training—No-action Alternative

HRC training can include localized use of rotary wing aircraft within predefined areas for reconnaissance and survey inserts. Helicopter raids will involve approximately six helicopters over a 2- to 6-hour period; there will be less than six helicopter raids per year. Airspace use within the Bradshaw Army Airfield Class D airspace will be coordinated with the PTA Range Control, minimizing potential impacts on airspace users.

Major Exercises—No-action Alternative

Major Exercises such as RIMPAC include training as described above. Helicopter raids will involve approximately six helicopters over a 2- to 6-hour period. Airspace use within the

Bradshaw Army Airfield Class D airspace will be coordinated with the PTA Range Control. RIMPAC planning conferences, which include coordination with the FAA, are conducted beginning in March of the year prior to each RIMPAC. The advanced planning and coordination with the FAA and Bradshaw Army Airfield regarding scheduling of special use airspace and coordination of Navy training relative to en route airways and jet routes result in minimal impacts on airspace from Major Exercises.

4.6.2.2.1.2 Alternative 1 (Airspace—Bradshaw Army Airfield)

Increased Tempo and Frequency of Training—Alternative 1

Increased training could result in minor additional use of rotary wing aircraft within predefined areas for reconnaissance and survey inserts. Helicopter raids will involve approximately six helicopters over a 2- to 6-hour period. Airspace use within the Bradshaw Army Airfield Class D airspace will be coordinated with the PTA Range Control, minimizing potential impacts on airspace users.

Major Exercises—Alternative 1

Major Exercises such as RIMPAC include training as described above. Helicopter raids will involve approximately six helicopters over a 2- to 6-hour period. Airspace use within the Bradshaw Army Airfield Class D airspace will be coordinated with the PTA Range Control. RIMPAC planning conferences, which include coordination with the FAA, are conducted beginning in March of the year prior to each RIMPAC. The advanced planning and coordination with the FAA and Bradshaw Army Airfield regarding scheduling of special use airspace and coordination of Navy training relative to en route airways and jet routes result in minimal impacts on airspace from Major Exercises.

4.6.2.2.1.3 Alternative 2 (Airspace—Bradshaw Army Airfield)

Increased Tempo and Frequency of Training—Alternative 2

Increased tempo and frequency of training could result in minor additional use of rotary wing aircraft within predefined areas for reconnaissance and survey inserts. Helicopter raids will involve approximately six helicopters over a 2- to 6-hour period. Airspace use within the Bradshaw Army Airfield Class D airspace will be coordinated with the PTA Range Control, minimizing potential impacts on airspace users.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

In addition to RIMPAC and USWEX, a Multiple Strike Group Major Exercise could include minor additional use of rotary wing aircraft within predefined areas for reconnaissance and survey inserts. Airspace use within the Bradshaw Army Airfield Class D airspace will be coordinated with the PTA Range Control. Advanced planning and coordination with the FAA and Bradshaw Army Airfield regarding the Multiple Carrier Strike Group and scheduling of special use airspace and coordination of Navy training relative to en route airways and jet routes result in minimal impacts on airspace from Major Exercises.

4.6.2.2.1.4 Alternative 3 (Airspace—Bradshaw Army Airfield)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on airspace under Alternative 3 would be the same as those described for Alternative 2.

4.6.2.2.2 Biological Resources—Bradshaw Army Airfield

4.6.2.2.2.1 No-action Alternative (Biological Resources—Bradshaw Army Airfield)

Navy events at the site would be performed in accordance with all applicable biological opinions and existing Army regulations. The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

HRC Training and Major Exercises—No-action Alternative

Vegetation

Current use of the Bradshaw Army Airfield includes Command and Control, Aircraft Support Operations, and SPECWAROPS (generally helicopter raids and survey and reconnaissance insertions). These training events are limited in scope and are not anticipated to impact the areas beyond the airfield itself. All personnel entering Bradshaw Army Airfield will be briefed on the guidelines set forth in the PTA Ecosystem Management Plan. Adherence to these guidelines will limit the potential for introduction of invasive plant species and reduce any risk of fire or damage due to training.

Wildlife

Since the area has been cleared for the runway, only small mammals and birds are likely to be in the region of influence. Current training is limited in scope and is not anticipated to impact the areas beyond the airfield itself.

Aircraft Support Operations include space for various types or aircraft and equipment for refueling and maintenance. Air Operations are a part of daily and Major Exercises. These types of training events are part of the ongoing activities at Bradshaw and would result in potentially temporarily startling wildlife.

SPECWAROPS activities include special reconnaissance, reconnaissance and surveillance, combat search and rescue, and direct action. Reconnaissance inserts and beach surveys are often conducted before large-scale amphibious landings and can involve several units gaining covert access. The training event involves fewer than 20 troops and has minimal interaction with the environment, since one of the purposes of the training event is to operate undetected. During amphibious inserts the troops review training overlays that identify the insertion points and any nearby restricted areas. Sensitive biological resource areas are avoided by the SPECWAROPS troops. (U.S. Department of the Navy, 2002a)

Although the potential exists for transient threatened or endangered birds to be in the area, such occurrences are considered rare, especially at the airfield. Military readiness activities are exempt from the take prohibitions of the MBTA provided they do not result in a significant adverse effect on the population of a migratory bird species. The low probability of one of the training events being capable of significantly impacting a population of the migratory species that occur in the Makua area should exempt the HRC from the take prohibitions. Compliance with the PTA INRMP and Ecosystem Management Plan during training and Major Exercises reduces the potential for adverse effects on wildlife.

Environmentally Sensitive Habitat

Critical habitat for the endangered palila established both north and southeast of Bradshaw Army Airfield will not be affected by training.

4.6.2.2.2.2 Alternative 1 (Biological Resources—Bradshaw Army Airfield)

Increased Tempo and Frequency of Training—Alternative 1

Alternative 1 (See Table 2.2.2.3-1) would not include an increase in training, but the tempo of training events may increase. The likelihood of a similar increase in adverse impacts on biological resources is small since the area has been cleared for the runway and only small mammals and birds are likely to be in the affected areas.

Vegetation

Training would continue to take place in current existing locations; no expansion of the area would be involved. Compliance with the PTA INRMP and Ecosystem Management Plan during increased training should minimize the effects on vegetation, as well as limit the potential for introduction of weed plant species. The risk of impacting threatened or endangered plants could be minimized by continuing to locate training away from areas with native, threatened, or endangered plant species whenever possible.

Wildlife

There is additional suitable habitat nearby for birds such as the endangered `io and nene to use if they temporarily leave the area affected by an increase in training. It is not likely that a bird or any other species of wildlife on Bradshaw Army Airfield would be injured or killed since compliance with the PTA INRMP and Ecosystem Management Plan help to reduce the potential for effects on wildlife. An increase in training is unlikely to adversely affect the long-term well-being, reproduction rates, or survival of these native or listed birds or other forms of wildlife in the area.

Environmentally Sensitive Habitat

The critical habitat established for the endangered palila is located outside the areas likely to be affected by the increased training.

4.6.2.2.2.3 Alternative 2 (Biological Resources—Bradshaw Army Airfield

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003d).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area once a year for up to 10 days per Major Exercise. The Major Exercises proposed would occur mainly in the open ocean and would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resources similar to those described above.

4.6.2.2.2.4 Alternative 3 (Biological Resources—Bradshaw Army Airfield

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.6.2.2.3 Cultural Resources—Bradshaw Army Airfield

4.6.2.2.3.1 No-action Alternative (Cultural Resources—Bradshaw Army Airfield)

HRC Training and Major Exercises—No-action Alternative

There are no training or Major Exercises actions with the potential to affect cultural resources at Bradshaw Army Airfield.

4.6.2.2.3.2 Alternative 1 (Cultural Resources—Bradshaw Army Airfield)

Increased Tempo and Frequency of Training—Alternative 1

For actions associated with Alternative 1, there is no training with the potential to affect cultural resources at Bradshaw Army Airfield.

HRC Enhancements—Alternative 1

Large Area Tracking Range Upgrade

Potential impacts on buildings and structures at Bradshaw Army Airfield are the same as described for PTA (see Section 4.6.2.1.3.2).

4.6.2.2.3.3 Alternative 2 (Cultural Resources—Bradshaw Army Airfield)

Increased Tempo and Frequency of Training—Alternative 2

There is no training with the potential to affect cultural resources at Bradshaw Army Airfield.

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

For actions associated with Alternative 2, there are no Major Exercises involving multiple Strike Group training with the potential to affect cultural resources at Bradshaw Army Airfield.

4.6.2.2.3.4 Alternative 3 (Cultural Resources—Bradshaw Army Airfield)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on cultural resources under Alternative 3 would be the same as those described for Alternative 2.

4.6.2.3 KAWAIHAE PIER

Table 4.6.2.3-1 lists ongoing training for the No-action Alternative and proposed training for Alternatives 1, 2, and 3 at Kawaihae Pier. Alternative 3 is the preferred alternative.

Table 4.6.2.3-1. Training at Kawaihae Pier

Training	
• Expeditionary Assault	• Special Warfare Operations (SPECWAROPS)

A review of the 13 resources against training from site activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 was performed for Kawaihae Pier. The following resources are not addressed because the proposed alternatives have no potential to adversely affect such resources: air quality, airspace, cultural resources, geology and soils, hazardous material and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

No air emissions would be generated from Kawaihae Pier training events unless use of diesel generators would be required for backup power. Use of Kawaihae Pier does not require control of the airspace above this land area. Kawaihae Pier has no prehistoric and historic artifacts, archaeological sites, historic buildings or structures, or traditional resources that could be affected by HRC training. Because no ground disturbance or building modifications would occur as a result of proposed training, there would be no impact on geology and soils.

Training associated with this site adhere to policies and regulations governing hazardous materials and waste, health and safety, and noise, as discussed in Appendix C. There are no concerns with noise as it relates to HRC training at Kawaihae Pier. There would be no impact on socioeconomics, transportation, utilities, and land use because the training population is transient, all services (food, transportation, lodging, fuel) are supplied by the military, and training sites remain the same for each alternative. Training would not generate any waste streams that could impact local water quality.

4.6.2.3.1 Biological Resources—Kawaihae Pier

4.6.2.3.1.1 No-action Alternative (Biological Resources—Kawaihae Pier)

HRC Training and Major Exercises—No-action Alternative

Vegetation

Amphibious landings are restricted to specific areas of designated beaches. The small beach area located immediately adjacent to the pier contains no vegetation. No threatened or endangered vegetation has been identified in the Kawaihae Harbor area (U.S. Department of the Navy, 2002a). Vehicles are restricted to existing roads, trails, and other disturbed areas and do not use undisturbed, off-road areas where they might harm vegetation. Expeditionary Assault landing personnel are briefed on existing procedures for entering the harbor and unloading equipment and supplies at the boat ramp. These procedures include inspections by appropriate Federal and/or State agencies of vehicles and equipment from foreign countries to prevent the introduction of invasive or alien species. A recycling wash rack is used to clean foreign country vehicles and equipment prior to back-loading to control the spread of alien species.

Wildlife

No threatened or endangered species have been identified in the Kawaihae Harbor area (U.S. Department of the Navy, 2002a). The potential for adverse effects on biological resources related to offloading and loading vehicles and equipment is minimal. These training events use existing ramps and a small open beach adjacent to the ramps. Reef or coral areas will be avoided. Expeditionary Assault landing personnel are briefed on existing procedures for entering the harbor and unloading equipment and supplies at the boat ramp. These procedures include inspections by appropriate Federal and/or State agencies of vehicles and equipment from foreign countries to prevent the introduction of alien species. A recycling wash rack is used to clean foreign country vehicles and equipment prior to back-loading to control the spread of alien species.

During SPECWAROPS, crews for amphibious inserts follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. Personnel review training overlays that identify the insertion points and any nearby restricted areas; sensitive biological resource areas are avoided.

Environmentally Sensitive Habitat

No critical habitat has been designated at Kawaihae Pier.

4.6.2.3.1.2 Alternative 1 (Biological Resources—Kawaihae Pier)

Increased Tempo and Frequency of Training and Major Exercises—Alternative 1

No increases in training and Major Exercises at Kawaihae Pier are expected. Impacts would be the same as those discussed above for the No-action Alternative.

4.6.2.3.1.3 Alternative 2 (Biological Resources—Kawaihae Pier)

Increased Tempo and Frequency of Training—Alternative 2

Under Alternative 2, the tempo of training would be increased and the frequency of training events could also increase. The intensity and duration of wildlife startle responses decrease with the number and frequency of exposures. The tendency of a bird to flush from a nest declines with habituation to the noise, although the startle response is not completely eliminated (U.S. Fish and Wildlife Service, 2003d).

Additional Major Exercises—Multiple Strike Group Training—Alternative 2

Up to three Strike Groups would visit the area once a year for up to 10 days per Major Exercise. The Major Exercises would occur mainly in the open ocean and would be similar to those occurring during RIMPAC and USWEX, with impacts on biological resource similar to those described above for the No-action Alternative.

4.6.2.3.1.4 Alternative 3 (Biological Resources—Kawaihae Pier)

The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. Alternative 3 would include all of the training associated with Alternative 2 (see Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.7). As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events (Table 2.2.2.3-1), future and enhanced RDT&E activities (Table 2.2.2.5-1), and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Effects on biological resources under Alternative 3 would be the same as those described for Alternative 2.

4.7 HAWAIIAN ISLANDS HUMPBACK WHALE NATIONAL MARINE SANCTUARY (HIHWNMS)

Military Activities in Hawaiian Waters

In 1995, the Navy prepared a document entitled "Report on Military Activities in Hawaiian Waters." The National Marine Fisheries Service (NMFS) concluded that Navy activities were "not likely to adversely affect" listed marine species, provided that the following modifications were made to Navy procedures:

1. All mine warfare and mine countermeasures involving the use of explosive charges or live munitions must include safe zones for marine mammals. These zones should be calculated for each training event based on charge type, charge weight, depth of water, and depth of the charge in the water column. Visual surveys by divers in the vicinity of the charge(s) and surveys by small boat(s) should be conducted in order to ensure that safe range minimum distances are appropriate; acoustic monitoring for marine mammals should also be conducted.
2. Shallow water submarine training around Maui, Molokai, Lanai, Kahoolawe, Oahu, and Kauai should be conducted with great care due to the increasingly dense populations of humpback whales during the winter reproductive season.
3. A sensor array capable of detecting vocalizing marine mammals should be put in place.
4. The Navy should consider shifting Prospective Submarine Commanding Officer training outside of the humpback whale season.

Measures Applicable to Hull-Mounted Surface and Submarine Active Sonar

1. Avoid critical habitats, marine sanctuaries, and the Humpback Whale Sanctuary.
2. Surface vessels only: Use observers to visually survey for and avoid operating active sonar when sea turtles and/or marine mammals are observed. Submarines and surface units: Monitor acoustic detection devices for indications of close aboard marine mammals (high bearing rate biological contacts). When a surface combatant or a submarine conducting active sonar training detects a marine mammal close aboard, reduce maximum sonar transmission level to avoid harassment in accordance with the following specific actions.

    a. When marine mammals are detected by any means (aircraft, observer, or aurally) within 600 feet (ft) of the sonar dome, the ship or submarine will limit active transmission levels to at least 4 decibels (dB) below their equipment maximum for sector search modes.

    b. Ship and submarines will continue to limit maximum transmission levels by this 4-dB factor until they determine the marine mammal is no longer within 600 ft of the sonar dome.

    c. Should the marine mammal be detected closing to inside 300 ft of the sonar dome, the principal risk to the mammal changes from acoustic harassment to one of potential physical injury from collision. Accordingly, ships and submarines shall maneuver to avoid collision. Standard whale strike avoidance procedures apply.

d. When seals are detected by any means within 1,050 ft of the sonar dome, the ship or submarine shall limit active transmission levels to at least 4 dB below equipment maximum for sector search mode. Ships or submarines shall continue to limit maximum ping levels by this 4-dB factor until the ships and submarines determine that the seal is no longer within 1,050 ft of the sonar dome.

4.7.1 BIOLOGICAL RESOURCES—HIHWNMS

Appendix C contains as Exhibit C-1, Appendix F of the 1997 HIHWNMS Final Environmental Impact Statement (EIS)/Management Plan, which lists military activities in Hawaii that had been or were being conducted before the effective date of the regulations (final rule published in November 1999). If the military activity is proposed after the official date of the regulations, then the activity is also an allowable activity but subject to prohibited activities provision under 15 CFR §922.184 (that is, distance restrictions on vessel and aircraft approaches to humpback whales, discharge of materials prohibitions, and prohibitions on the taking or possessing of humpback whales) unless the military activities are not subject to consultation (not likely to destroy, cause the loss of, or injure any sanctuary resource). For any military activity that is subsequently modified in a way that causes the activity to be “likely to destroy, cause the loss of, or injure a Sanctuary resource in a manner significantly greater than was considered in previous consultation” then the activity is treated as a new military activity for which consultation may be necessary.

Based on a review of these listed activities, no new activities are being proposed by the Navy in the HRC within the Sanctuary boundaries that were not previously reviewed, and further these activities do not have “a significantly greater” chance of causing destruction or injury to sanctuary resources than was considered in previous consultations. Activities and their potential for impacts on biological resources are discussed below for each applicable island.

4.7.1.1 KAUAI—BIOLOGICAL RESOURCES—HIHWNMS

Few training or research, development, test, and evaluation (RDT&E) activities occur in the area north of Kauai originally included in the Sanctuary. Warning Areas W-186 and W-188 airspace over the Open Ocean is outside the Sanctuary boundary. The Warning Areas are used for missile, bomb, and gunnery training events. Air, surface, and underwater training events are conducted in the surface area of W-186 and W-188. Activities that occur within sanctuary waters would continue to follow all applicable procedures such as using observers to visually survey for and thus avoid humpbacks and other whales.

The HIHWNMS EIS/Management Plan (U.S. Department of Commerce, National Oceanic and Atmospheric Administration and State of Hawaii, Office of Planning, 1997) recognizes that the Pacific Missile Range Facility (PMRF) plays an important role in national defense training. The EIS includes missile launches as one of the DoD activities that currently occur within the sanctuary boundaries. The proposed launches would have impacts within the parameters of ongoing missile programs.

4.7.1.2 OAHU—BIOLOGICAL RESOURCES—HIHWNMS

No current or planned HRC activities are/would be performed within the Sanctuary's boundaries. Transiting military vessels continue to follow all applicable procedures such as using observers to visually survey for and thus avoid humpbacks and other whales.

4.7.1.3 MAUI—BIOLOGICAL RESOURCES—HIHWNMS

The waters inside the 100-fathom isobath surrounding Maui, Molokai, and Lanai, and specifically the channel between these islands, would continue to be used for biennial Rim of the Pacific Exercises, including Explosive Ordnance Disposal and Mine Countermeasures training, as well as shallow-water ASW. Training and RDT&E activities would continue to follow the applicable measures listed above.

4.7.1.4 HAWAII—BIOLOGICAL RESOURCES—HIHWNMS

Although the Kawaihae Pier area is not included within the HIHWMNS located off the northwestern shore of Hawaii, Army, and Marine Corps helicopter training regularly occur over the area within the Sanctuary boundary. Navy and Army landing craft frequently offload and load supplies and equipment at Kawaihae Pier in support of military training at Pohakuloa Training Area. HRC training will continue as approved military actions in the HIHWNMS EIS/Management Plan.

4.8 CONFLICTS WITH FEDERAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AREA CONCERNED

Based on an evaluation of consistency with statutory obligations, the Navy's proposed training and RDT&E activities for the HRC do not conflict with the objectives or requirements of Federal, State, regional, or local plans, policies, or legal requirements. The proposed training and RDT&E activities would not alter the use of the sites that currently support missile and rocket testing. Enhancement of the HRC would be in accordance with applicable Federal, State, and local planning plans and policies. The DoD maintains Federal jurisdiction for on-installation land use. Table 4.8-1 provides a summary of environmental compliance requirements that may apply to the proposed training and RDT&E activities.

Table 4.8-1. Summary of Environmental Compliance Requirements

Plans, Policies, and Statutory Requirements	Responsible Agency	Compliance Status
National Environmental Policy Act (NEPA) (42 U.S.C. § 4321, et seq.) Department of the Navy Procedures for Implementing NEPA (OPNAVINST 5090.1B, February 1998)	U.S. Navy	This Environmental Impact Statement and Overseas Environmental Impact Statement (EIS/OEIS) has been prepared in accordance with Council on Environmental Quality regulations (40 Code of Federal Regulations [CFR] § 1500-1508) and Navy NEPA procedures. Public participation and review is being conducted in compliance with the NEPA statute.
Endangered Species Act (16 U.S.C. § 1531) Marine Mammal Protection Act (16 CFR § 1431 et seq.) Magnuson-Stevens Fishery Conservation & Management Act, 16 USC Section 1801-1882	U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS)	Effects on listed species are the subject of consultations with USFWS and NMFS. The Navy prepared an essential fish habitat assessment and concluded no adverse effect.
Fish and Wildlife Coordination Act of 1934 [16 U.S.C. 661 et seq.; 48 Stat. 401	USFWS	The Act authorizes the Secretaries of Agriculture and Commerce to provide assistance to and cooperate with Federal and State agencies to protect fish and wildlife. Effects on fish and wildlife are analyzed in the EIS/OEIS.
Clean Water Act Section 401/402 (§§ 4101-402, 33 U.S.C. § 1251 et seq.) Section 404 (§ 404, 33 U.S.C. § 1251 et seq.)	U.S. Environmental Protection Agency (USEPA) and U.S. Army Corps of Engineers (USACE)	The proposed training and RDT&E activities would not discharge dredged or fill material. Discharges into the water will not result in contaminant concentrations above regulatory standards.
Rivers and Harbors Act (33 U.S.C. § 401 et seq.)	USACE	A Section 10 permit in accordance with the Rivers and Harbors Act may be required.
Clean Air Act (CAA) (42 U.S.C. § 7401 et seq.)	USEPA	The proposed training and RDT&E activities would not compromise the air quality in Hawaii.

Table 4.8-1. Summary of Environmental Compliance Requirements (Continued)

Plans, Policies, and Statutory Requirements	Responsible Agency	Compliance Status
National Marine Sanctuaries Act	National Oceanic and Atmospheric Administration	No new consultation requirement; all activities previously reviewed; not a significantly greater chance of destruction or injury to sanctuary resources
National Historic Preservation Act (NHPA) (16 U.S.C. 470 et seq.)	Advisory Council on Historic Preservation, Hawaii State Historic Preservation Officer	No new consultation requirement; all activities previously reviewed.
Coastal Zone Management Act (CZMA) (16 CFR § 1451, et seq.)	Hawaii Coastal Zone Management Program	The Navy has made a Coastal Consistency Determination in accordance with the CZMA.
Executive Order (EO) 12114 Environmental Effects Abroad of Major Federal Actions	U.S. Navy	EO 12114 requires environmental consideration for actions that may affect the environment outside of U.S. Territorial Waters. This EIS/OEIS satisfies the requirement of EO 12114.
Presidential Proclamation 8031 Establishment of Northwestern Hawaiian Islands Marine National Monument, now called Papahānaumokuākea Marine National Monument	U.S. Navy	Activities and training of the Armed Forces will be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities; these activities and training are exempt from the proclamation's prohibitions.
EO 13089 Coral Reef Protection	U.S. Navy	Coral reef ecosystems are identified and avoided in accordance with the Department of Defense Coral Reef Protection Implementation Plan.
EO 13112 Invasive Species	U.S. Navy	EO 13112 requires Agencies to identify actions that may affect the status of invasive species and take measures to avoid introduction and spread of these species. This EIS/OEIS satisfies the requirement of EO 13112 with regard to the proposed training and RDT&E activities.
EO 11990 Protection of Wetlands	U.S. Navy	The proposed training and RDT&E activities would not have a significant impact on wetlands.
EO 12962 Recreational Fisheries	U.S. Navy	EO 12962 requires Agencies to fulfill certain duties with regard to promoting the health and access of the public to recreational fishing areas. The proposed training and RDT&E activities do not have a significant impact on Navy actions in support of this EO.
EO 12898, Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations	U.S. Navy	The proposed training and RDT&E activities would not disproportionately affect minority or low-income populations.
EO 13045, Protection of Children from Environmental Health and Safety Risks	U.S. Navy	The proposed training and RDT&E activities would not disproportionately affect children.

4.9 ENERGY REQUIREMENTS AND CONSERVATION POTENTIAL

The proposed training and RDT&E activities include increased training and testing events in the HRC. In order to implement the proposed training and RDT&E activities, increased amounts of fossil fuels would be required to power the increased use by ships and aircraft. These fuels are currently in adequate supply from either Navy-owned sources or from commercial distributors. The required electricity demands would be met by the existing electrical generation infrastructure on the Hawaiian Islands.

Anticipated energy requirements of the continued use and enhancement of the HRC would be well within the energy supply capacity of all facilities. Energy requirements would be subject to any established energy conservation practices at each facility. No additional power generation capacity other than the potential use of generators would be required for any of the training and RDT&E activities. In conjunction with EO 13423, *Strengthening Federal Environmental, Energy and Transportation Management,* the use of energy sources has been minimized wherever possible without compromising safety, training, or testing. No additional conservation measures related to direct energy consumption by the proposed training and RDT&E activities are identified.

4.10 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of nonrenewable resources such as fuels. Human labor is also considered a nonrenewable resource. Use of these resources is considered irreversible or irretrievable since they would be committed to the proposed training and RDT&E activities and would not be available for other purposes. Furthermore, unavoidable destruction of natural resources as a result of the proposed training and RDT&E events is considered an irreversible or irretrievable commitment of resources if the potential uses of these resources become limited.

The proposed training and RDT&E activities would have an irreversible or irretrievable effect due to the use of nonrenewable energy sources: hydrocarbon fuels for aircraft, vessels, and vehicles. However, the costs of fuel and the climatic consequences of large scale combustion of hydrocarbon fuel are not any less significant for alternative training scenarios. Implementation of the proposed training and RDT&E activities would not result in the destruction of environmental resources so as to cause the potential uses of the environment of the HRC to be limited. The proposed training and RDT&E activities would not adversely affect the biodiversity or cultural integrity within the HRC including the marine, terrestrial, or human environment.

4.11 RELATIONSHIP BETWEEN SHORT-TERM USE OF THE HUMAN ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The National Environmental Policy Act (NEPA) requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This means that choosing one option may reduce future flexibility in pursuing other options, or that committing a resource to a certain use may often eliminate the possibility for other uses of that resource.

The proposed training and RDT&E activities would result in both short- and long-term environmental effects. The Navy is committed to sustainable range management, including co-use of the HRC with the general public and commercial interests. This commitment to co-use will enhance the long-term productivity of the range areas and surrounding areas.

4.12 FEDERAL ACTIONS TO ADDRESS ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS (EXECUTIVE ORDER 12898)

An Environmental Justice analysis is included in this document to comply with the intent of Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* Navy, and Department of Defense guidance. The EO states that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." In addition, the EO requires that minority and low-income populations be given access to information and opportunities to provide input to decision-making on Federal actions.

As described in Chapter 1.0, scoping is an early and open process for developing the "scope" of issues to be addressed in the EIS and for identifying significant issues related to a proposed action. During scoping, the public helps define and prioritize issues and convey these issues to the agency through both oral and written comments. Four scoping meetings were held on the islands of Maui, Oahu, Hawaii, and Kauai, respectively. The scoping meetings were held in an open house format, presenting informational posters and written information, and making Navy staff and project experts available to answer participants' questions. The public also had an additional opportunity to review the proposed actions during their review of the Draft EIS/OEIS.

The Navy has evaluated training, RDT&E activities and proposed enhancements in the HRC, specifically related to the islands that could potentially be affected by HRC training and RDT&E activities, due to the nature of the activities proposed on and around the islands. Training and RDT&E activities occur in the open ocean, offshore, and within existing Navy, Army, or Marine Corps installations boundaries generally away from population centers. No expansion of the area encompassed within the HRC is planned. In addition, there would be no displacement of persons associated with training, RDT&E activities and proposed HRC enhancements.

The percentage of minority or low-income population in the census area exceeds 50 percent (see Table 4.12-1); and thus the proposed training and RDT&E activities need to comply with EO 12898. Demographics of the population of Kauai and Oahu in 2000 were previously presented in Table 3.3.2.1.10-1 and Table 3.4.2.1.3-1, respectively.

Table 4.12-1. Population and Ethnicity for the State of Hawaii

Geographic Area	Total Population	Race								
		Total	White	Black or African American	American Indian	Asian	Native Hawaiian	Some Other Race	Two or More Races	Hispanic or Latino (of Any Race)
Hawaii	1,211,537	952,194	294,102	22,003	3,535	503,868	113,539	15,147	59,343	87,699
County										
Hawaii	148,677	106,389	46,904	698	666	39,702	16,724	1,695	42,288	14,111
Honolulu	876,156	710,532	186,484	20,619	2,178	403,371	77,680	11,200	74,624	58,729
Kalawao	147	138	38	0	0	25	71	4	9	6
Kauai	58,463	44,525	17,255	177	212	21,042	5,334	505	13,938	4,803
Maui	128,094	99,610	43,421	509	479	39,728	13,730	1,743	28,484	10,050

Source: U.S. Census Bureau, 2000a

According to Council on Environmental Quality environmental justice guidance under NEPA, agencies should consider three factors when determining whether human health effects are disproportionately high and adverse:

- Whether the health effects (bodily impairment, infirmity, illness, or death) are significant, according to NEPA, or above generally accepted norms
- Whether the risk or rate of exposure to an environmental hazard by a minority or low-income population is significant under NEPA and appreciably exceeds or is likely to appreciably exceed that of the general population or appropriate comparison group
- Whether health effects occur in a minority or low-income population affected by cumulative or multiple adverse exposures from environmental hazards

The following factors should be considered when determining whether environmental effects are disproportionately high and adverse:

- Whether there is or will be an impact on the natural or physical environment (ecological, cultural, human health, economic, or social) that significantly, under NEPA, and adversely affects a minority or low-income population that appreciably exceeds or is likely to appreciably exceed that of the general population or appropriate comparison group

- Whether environmental effects are significant, under NEPA, and are or may be having an adverse impact on minority or low-income populations
- Whether environmental effects occur or would occur in a minority or low-income population affected by cumulative or multiple adverse exposures from environmental hazards

The following discussion provides an analysis of environmental justice concerns grouped into the following resource categories: air quality, airspace, biological resources, cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources. In accordance with the requirements of EO 12898, the Navy has determined that proposed training, RDT&E activities and HRC enhancements would not result in disproportionately high and adverse environmental or health impacts on minority or low-income populations. There would be no direct or indirect environmental, cultural, health, or economic impacts specific to any groups from minority or low-income populations nor have any such effects been identified in this EIS/OEIS. Therefore, there would be no impacts related to Environmental Justice under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 as described below.

4.12.1 AIR QUALITY

Environmental justice concerns associated with air quality would occur if the current air quality attainment status would change as a result of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 or if air emissions exceed a health-based standard in a minority or low-income area. Results of analysis conducted for HRC activities determined that there would be no change to the current attainment status and no health-based air quality standards would be exceeded in minority or low-income neighborhoods.

4.12.2 AIRSPACE

Environmental justice concerns associated with airspace would occur if modifications or a need for additional airspace is required as a result of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 or significant (under NEPA) impacts on commercial airspace use were determined in a minority or low-income area. Results of analysis conducted for HRC activities determined that there would be no modifications or need for additional airspace and no significant impacts on commercial airspace use in minority or low-income neighborhoods.

4.12.3 BIOLOGICAL RESOURCES

Environmental justice concerns associated with biological resources would occur if local subsistence food sources (e.g., fish) would be adversely impacted by the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Although some fish may be injured or killed, as discussed under the biological resources sections, vegetation and wildlife are not anticipated to be significantly (under NEPA) impacted by current or proposed HRC activities.

4.12.4 CULTURAL RESOURCES

Environmental justice concerns associated with cultural resources would occur if traditional resources or properties to which religious and cultural significance is attached are impacted as a result of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3. Although access to some traditional resource areas may be denied during current or proposed HRC activities for safety reasons, this would only be temporary. The Navy would consult with the State Historic Preservation Officer (SHPO) and the Office of Hawaiian Affairs prior to any construction.

4.12.5 GEOLOGY AND SOILS

Environmental justice concerns associated with impacts on geology and soils would occur from construction-related ground disturbance and the potential for soil contamination. No minority or low-income populations are located within the areas proposed for construction. The potential for minority or low-income populations to come in contact with soil (beach) that could be affected by missile emissions and hazardous materials does exist. However, any spill or terminated flight debris would be quickly remediated to prevent any soil contamination.

4.12.6 HAZARDOUS MATERIALS AND WASTE

Environmental justice concerns associated with hazardous materials and waste as a result of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 would occur if minority or low-income populations were to be exposed. All hazardous materials used and hazardous waste generated would be conducted in accordance with Federal and State regulations. There are no minority or low-income populations residing adjacent to where most of the hazardous materials and waste activities would occur. Any hazardous materials that would result from an early missile flight termination would be cleared from the ground hazard area, and any contamination would be remediated.

4.12.7 HEALTH AND SAFETY

Environmental justice concerns associated with health and safety would occur if the risk or rate of exposure to an environmental hazard by a minority or low-income population is significant under NEPA and appreciably exceeds or is likely to appreciably exceed that of the general population or appropriate comparison group. As addressed in the health and safety sections, there are minimal health and safety risks associated with the No-action Alternative, Alternative 1 Alternative 2, or Alternative 3. Transportation of hazardous materials would follow all applicable Federal and State regulations. Some minority and low-income populations do use the ocean adjacent to the military installations where training and RDT&E activities occur. Navy, Army, and Marine Corps personnel take every reasonable precaution during planning and execution of training and RDT&E activities to prevent injury to human life or property. Specific safety plans have been developed to ensure that each training event is in compliance with applicable policy and regulations, and to ensure that the general public and range personnel and assets are provided an acceptable level of safety.

Missile launches by their very nature involve some degree of risk, and it is for this reason that DoD and PMRF have specific launch and range safety policies and procedures to ensure that any potential risk to the public and government assets (launch support facilities) is minimized. Applicable State and Federal regulations and range safety plans and procedures are followed in transporting and handling potentially explosive ordnance and hazardous materials. Missile components, including any propellant, are transported in Department of Transportation and military designed and approved shipping containers. An explosive safety quantity-distance (ESQD) surrounding the missile launcher is calculated based on the equivalent explosive force of all propellant and pyrotechnic materials contained on the flight vehicle. All potentially hazardous debris resulting from an accident on the launcher will be contained entirely within the ESQD, which will already have been cleared of unprotected personnel. To protect people from injury from either nominal launches or accidents, two primary mitigation measures are in place: flight termination and clearance of specified regions. Clearance areas include the ground hazard area for land areas, Ship Exclusion Zones for ocean areas, and Restricted Airspace and Altitude Reservations for airspace.

Prior to each mission, the PMRF Flight Safety Office performs a comprehensive analysis of the proposed mission, including flight plans, planned impact areas, vehicle response to malfunctions, and effects of flight termination action. A probabilistic analysis is performed with sufficient conservative assumptions incorporated to ensure that the risks from the mission are acceptable. These acceptable risk criteria are designed to ensure that the risk to the public from range activities is lower than the average background risk for other third-party activities (for example, the risk of a person on the ground being injured from an airplane crash).

Range safety would be responsible for ensuring the safe usage of the proposed laser systems on the PMRF range. Range safety would require the proposed high-energy laser program to provide specific information about the proposed usage so that a safety analysis of all types of hazards could be completed and appropriate remedial procedures would be taken before initiation of potentially hazardous laser activities.

4.12.8 LAND USE

The potential impacts on land use from the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 would occur from the addition of new facilities, potential incompatible land uses, and restriction of access to popular beach, fishing, and hunting areas. All of the activities within the HRC occur adjacent to compatible land uses. There are no residential land use areas that would be affected by current or proposed activities. However, minority and low-income populations do use the ocean adjacent to the islands for subsistence fishing, and hunt near some of the support sites. Residents place a high value on traditional fishing and gathering activities and on Hawaiian customs and practices. The availability of an alternate source of food gives residents a sense of self-sufficiency and freedom and reduces dependence on a cash economy. Subsistence activities, therefore, are important in supplementing relatively low family incomes, as well as maintaining the preferred lifestyle of community.

As discussed under the land use sections, access to some of the beaches adjacent to the military installations within the HRC for fishing is allowed and some of these areas would be restricted during hazardous activities. Other areas within the HRC would be available for use. Advance notification is provided of closure times (through a 24-hour hotline at PMRF), so minimal impacts on subsistence fishing are expected. Closure of the southern portion of Polihale State Park on Kauai would occur no more than 30 minutes per launch or up to 15 hours total per year and would only affect the southern end of the park, which in turn would only affect the ability of minority and low-income populations to subsistence fish for short periods during the year.

4.12.9 NOISE

Environmental justice concerns associated with noise would occur if the risk or rate of exposure to a noise level by a minority or low-income population that exceeds DoD or the Occupational Safety and Health Administration (OSHA) safety requirements outside of areas where the public is excluded. Construction related noise on PMRF would be temporary in nature and would only affect a very limited area. Construction related noise would not impact any minority or low-income residential areas on the island.

Launch related noise may be quite high under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3. However, none of the noise levels would exceed either DoD or OSHA safety requirements outside of the ground hazard area where non-essential personnel and the public are excluded (during launches). Personnel within the ground hazard area would wear hearing protection devices. Noise levels from launches from the southern end of PMRF may startle, awaken, or distract low-income and minority neighborhoods in the town of Kekaha. However, the number of launches from southern PMRF would be infrequent, with most occurring on the northern end of the island. Other noise generating activities within the HRC would occur near the source and are not expected to significantly (under NEPA) impact any minority or low-income areas.

4.12.10 SOCIOECONOMICS

As discussed under the socioeconomic sections, the activities under the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3 would provide an economic benefit to the islands affected by HRC training and RDT&E activities. The opportunities and economic benefit provided help support all industries on the islands and assist both minority and low-income populations. The potential restriction of areas used for commercial fishing and tourist related industries does not affect those industries. Potential impacts on subsistence fishing and gathering activities is addressed above under land use.

4.12.11 TRANSPORTATION

Environmental justice concerns associated with transportation would occur if adverse impacts on the transportation systems used by a minority or low-income population is significant under NEPA and appreciably exceed or are likely to appreciably exceed that of the general population or appropriate comparison group. As addressed in the transportation sections, during activities, the potential for range users would vary from small teams working for 3 to 6 months to as many as 300 individuals visiting for 1 to 2 days to witness and participate in a specific mission. The amount of traffic on the main island highways and potentially other local roadways could be temporarily affected during these training and RDT&E activities. Overall, the effect on roadways would be temporary and the effect on roadways from enhanced RTD&E events would also be temporary and only occur during the time the activity is being conducted.

4.12.12 UTILITIES

The increase on utilities demand would occur during the training and RDT&E activities, which are discrete and intermittent. These increases would be within the available capacity of island utility systems with no effect on minority or low-income populations. The current power supply from Kauai Island Utility Cooperative is sufficient to support the new Range Operations Control

Building and associated building conversions or relocations proposed for PMRF. Domestic waterlines would be added on PMRF to accommodate increases in demand, and the wastewater treatment system would be constructed and connected to the current system.

4.12.13 WATER RESOURCES

Environmental justice concerns associated with water resources would occur if adverse impacts on water quality used by a minority or low-income population are significant under NEPA and appreciably exceed or are likely to appreciably exceed that of the general population or appropriate comparison group. Analysis of launch-related impacts is covered in the Strategic Target System EIS (U.S. Army Strategic Defense Command, 1992), which evaluated the potential impacts of launch emissions, spills of toxic materials, and early flight termination. The analysis concluded that hydrogen chloride emissions would not significantly affect the chemical composition of surface or groundwater; that there would be no significant increase in aluminum oxide in surface waters due to launches; that sampling of surface waters in the vicinity of the launch site showed that hydrogen chloride, potentially deposited during past launches, has not affected surface water quality on PMRF or adjacent areas; and that contamination from spills of toxic materials will be highly unlikely. Subsequent sampling and analysis, prior to and following a 26 February 1993 Strategic Target System target launch, showed little or no evidence that the launch produced any adverse impact on water, soil, or vegetation (U.S. Army Space and Strategic Defense Command, 1993b). As described in Chapter 3.0, sampling for perchlorate was conducted at PMRF in October and November 2006 and the results indicated perchlorate levels were within guidelines. Therefore, HRC RDT&E activities are not expected to affect water resources used by minority or low-income populations.

Based on the estimated total concentrations of munitions constituents dissolved in rainwater migrating from the EOD Land Range on Oahu, their contribution to concentrations of water pollutants in Pearl Harbor will be negligible. These inputs would be periodic, and tidal flushing would further substantially disperse and dilute them. Thus, these intermittent, short-term discharges of very small amounts of munitions constituents into surface waters will have no effect on water resources.

4.13 FEDERAL ACTIONS TO ADDRESS PROTECTION OF CHILDREN FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS (EXECUTIVE ORDER 13045, AS AMENDED BY EXECUTIVE ORDER 13229)

Since the majority of training and RDT&E activities, as part of continued use and enhancement of the HRC, would be conducted on DoD property and out in the open ocean, this EIS/OEIS has not identified any environmental health and safety risks that may disproportionately affect children.

4.14 HAWAII'S COASTAL ZONE MANAGEMENT PROGRAM

The Navy has requested a review and concurrence from Hawaii's Coastal Zone Management Program on the Navy's consistency determination based on an assessment provided in the July 2007 HRC Draft EIS/OEIS and the February 2008 HRC Supplement to the Draft EIS/OEIS. The Navy has determined, based on information provided in those documents and in light of the applicable enforceable policies of Hawaii's Coastal Zone Management Program, that there are no adverse direct or indirect (cumulative or secondary) effects on coastal uses or resources. Further, the Proposed Action and its Alternatives are consistent, to the maximum extent practicable, with the enforceable policies of Hawaii's approved Coastal Zone Management Program.

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5.0 Cumulative Impacts

5.0 CUMULATIVE IMPACTS

5.1 REQUIREMENT FOR CUMULATIVE IMPACT ANALYSIS

The National Environmental Policy Act (NEPA) requires an assessment of cumulative impacts arising from the Proposed Action and alternatives. The Council on Environmental Quality (CEQ) regulations define “cumulative effects” as:

“. . . the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 Code of Federal Regulations [CFR] 1508.7).

The contribution of a Proposed Action to the overall impacts in a region of influence is of particular concern. While a single project may have individually minor impacts, when it is considered together with other projects on a regional scale, the effect may be collectively significant. A cumulative impact is the additive effect of all projects in the geographic area.

CEQ provides guidance on cumulative impacts analysis in *Considering Cumulative Effects Under the National Environmental Policy Act* (CEQ 1997). This guidance further identifies cumulative effects as those environmental effects resulting “from spatial and temporal crowding of environmental perturbations. The effects of human activities will accumulate when a second perturbation occurs at a site before the ecosystem can fully rebound from the effects of the first perturbation.” Noting that environmental impacts result from a diversity of sources and processes, this CEQ guidance observes that “no universally accepted framework for cumulative effects analysis exists,” while noting that certain general principles have gained acceptance. One such principal provides that “cumulative effects analysis should be conducted within the context of resource, ecosystem, and community thresholds—levels of stress beyond which the desired condition degrades.” Thus, “each resource, ecosystem, and human community must be analyzed in terms of its ability to accommodate additional effects, based on its own time and space parameters.” Therefore, cumulative effects analysis normally will encompass geographic boundaries beyond the immediate area of the Proposed Action, and a time frame including past actions and foreseeable future actions, in order to capture these additional effects. Bounding the cumulative effects analysis is a complex undertaking, appropriately limited by practical considerations. Thus, CEQ guidelines observe, “[i]t is not practical to analyze cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful.”

5.2 APPROACH

This Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) will analyze the cumulative environmental effects of the Proposed Action and Alternatives by considering the following criteria:

- The area in which the effects of the proposed project will be felt;
- The impacts that are expected in the area from the proposed project;
- Other actions, past, present and reasonably foreseeable that have had or are expected to have impacts in the same area;
- The impacts or expected impacts from these other actions; and
- -The overall impact that can be expected if the individual impacts are allowed to accumulate.

For the purposes of determining cumulative effects in this chapter, the Navy reviewed environmental documentation regarding known current and past Federal and non-Federal actions associated with the resources analyzed in Chapter 4.0. Additionally, projects in the planning phase were considered, including reasonably foreseeable (rather than speculative) actions that have the potential to interact with the proposed Navy action. The level of information available for different projects varies. The best available science is used in this analysis.

5.3 GEOGRAPHIC BOUNDARIES FOR CUMULATIVE ANALYSIS

Geographic boundaries for analyses of cumulative impacts in this EIS/OEIS vary for different resources and environmental media. For air quality, the potentially affected air quality regions are the appropriate boundaries for assessment of cumulative impacts from releases of pollutants into the atmosphere. For wide-ranging or migratory wildlife, specifically marine mammals and sea turtles, any impacts from the Proposed Action or alternatives might combine with impacts from other sources within the range of the population. Therefore, identification of impacts elsewhere in the range of a potentially affected population is appropriate. For terrestrial biological resources, the Hawaiian Islands is the appropriate geographical area for assessing cumulative impacts. For all other ocean resources, the ocean ecosystem of the central North Pacific Ocean is the appropriate geographic area for analysis of cumulative impacts. The Table 5.3-1 identifies the geographic scope of this cumulative impacts analysis, by resource area.

Table 5.3-1. Geographic Areas for Cumulative Impacts Analysis

Resource	Area for Impacts Analysis
Air Quality	Kauai
Airspace	Central North Pacific Ocean
Marine Biological Resources	Central North Pacific Ocean
Terrestrial Biological Resources	Hawaiian Islands
Cultural Resources	HRC OPAREA, Kauai, Oahu, and Hawaii
Geology and Soils	Kauai, Oahu
Hazardous Materials & Wastes	HRC OPAREA, Kauai, and Oahu
Health and Safety	HRC OPAREA, Kauai, Oahu, and Hawaii
Land Use	Kauai
Noise	HRC OPAREA, Kauai, Oahu, and Hawaii
Socioeconomics	Kauai, Oahu
Transportation	Kauai
Utilities	Kauai
Water Resources	HRC OPAREA, Kauai, and Oahu,

5.4 OTHER PROJECTS AND ACTIVITIES ANALYZED FOR CUMULATIVE IMPACTS

5.4.1 OTHER PROJECTS

Past, present, and reasonably foreseeable actions in the cumulative effects region or region of influence are summarized in Table 5.4.1-1. The following represents a list of past, present, and planned projects with the potential to interact with each of the project alternatives but which are neither dependent on nor part of the Proposed Action.

Table 5.4.1-1. Cumulative Projects List

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
U.S. Fish and Wildlife Service (USFWS) Plant Critical Habitat	Oahu	USFWS	Protection of habitat for federally designated threatened and endangered plants.	Ongoing	Beneficial	Terrestrial
Prescribed Burns at Makua Military Reservation (MMR)	MMR	U.S. Army	Prescribed burns conducted to reduce fuel load at MMR and to facilitate unexploded ordnance (UXO) clearance and surveys for cultural resources.	2002, 2003, and ongoing	Additive	Terrestrial
Stryker Brigade Combat Team Transformation	Oahu and Hawaii	U.S. Army	Multiple construction projects and land acquisitions for converting the 2nd Brigade of the 25th ID(L) into a Stryker Brigade Combat Team.	Unknown; all construction to commence by 2008	Additive	Terrestrial
Prescribed Burns at Army Installations on Oahu (other than MMR)	Oahu	U.S. Army	Prescribed burn to reduce fuel load at ranges. This also facilitates UXO clearance and surveys for cultural resources.	2003 and ongoing	Additive	Terrestrial
Kahuku Windmill and Hook Parcels Land Acquisition	Kahuku Training Area (KTA)	U.S. Army	Purchase adjacent lands for Current Forces training.	2003	Neutral	Terrestrial
Turtle Bay Resort Improvements	KTA	Turtle Bay Resort	Hotel expansion and renovations.	2004	Neutral	Terrestrial
Residential Communities Initiative	Army Bases on Oahu	U.S. Army	The Army plans to turn over approximately 8,300 units of housing on Oahu to a private developer for redevelopment and operation for 50 years.	2004-2054	Neutral	Terrestrial
Farrington Highway Improvements	Mākaha (near MMR)	State of Hawaii	Construct safety and operation improvements for Farrington Highway, including sidewalks, signalized pedestrian crosswalk or bridges, and continuous left turn fences.	Funded through 2004	Additive	Terrestrial
Farrington Highway, Replacement of Mākaha Bridges 3 and 3A	Mākaha (near MMR)	State of Hawaii	Replace two timber bridges in the vicinity of Mākaha Beach Park.	Funded through 2004	Neutral	Terrestrial
Integrated Training Area Management (ITAM)	All Oahu ranges	U.S. Army	The intent of the ITAM program is to systematically provide uniform training land management capability across U.S. Army, Hawaii (USARHAW) and to ensure that the carrying capacity of the training lands is maintained over time.	Ongoing	Beneficial	Terrestrial

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
Implementation of the Integrated Natural Resources Management Plan (INRMP)	Oahu	U.S. Army	The INRMP "preserves, protects and enhances natural and cultural resources and complies with all applicable laws and regulations, while improving the Army's capability to conduct training and maintain military readiness."	Not all projects funded. Plan covers 2002-2006	Beneficial	Terrestrial
Implementation of the Integrated Cultural Resource Management Plan (ICRMP)	Oahu	U.S. Army	The intent of the ICRMP is to preserve, protect, and enhance cultural resources; it complies with all applicable laws and regulations, while improving the Army's capability to conduct training and maintain military readiness.	Ongoing	Beneficial	Terrestrial
Implementation of Proposed Range and Training Land Program Development Plan Actions	Oahu	U.S. Army	A planning document for managing range facilities and training areas based on Army training doctrine and resource guidance.	Ongoing	Beneficial	Terrestrial
Installation Information Infrastructure Architecture (I3A)	Schofield Barracks Military Reservation (SBMR) - Main Post; Wheeler Army Airfield (WAAF)	U.S. Army	Install fiber optic cables from the cantonment area to the ranges, motor pool, and other facilities within the installation.	2004	Additive	Terrestrial
Drum Road Upgrade	Helemano Military Reservation (HMR) to KTA	U.S. Army	Align, widen, and harden approximately 23 miles (37 kilometers) of the dirt and gravel road that runs from the end of the paved road at HMR to the end of the paved road at KTA. Road upgrade done to accommodate Current Forces training.	2005/2006	Additive	Terrestrial
Residential Development	Wai`anae	Not available (N/A)	Constructed 7 housing units.	2001/2002	Additive	Terrestrial
Residential Development	Wai`anae	N/A	Construct 1,504 housing units.	2002 and beyond	Additive	Terrestrial
Residential Development	Ewa	N/A	Constructed 636 housing units.	2000/2001	Additive	Terrestrial

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
Residential Development	Ewa	N/A	Constructed 900 housing units.	2001/2002	Additive	Terrestrial
Residential Development	Ewa	N/A	Construct 22,049 housing units.	Unknown	Additive	Terrestrial
Kapolei Parkway	Ewa	Dept. of Transportation Services (DTS)	Construct a new four-lane (six lanes, if needed) boulevard across much of the Ewa plain, from Ko Olina to Ocean Pointe.	Unknown	Additive	Terrestrial
North-South Road	Ewa	State Dept. of Transportation (DOT)	Construct a new four-lane boulevard makai from a future H-1 interchange to near Ewa Villages.	Underway	Additive	Terrestrial
Land Transfer – Dillingham Military Reservation (DMR)	DMR	U.S. Army	Return of the portion of the beach land in front of DMR to the state.	Unknown	Neutral	Terrestrial
Advanced Wastewater Treatment Upgrade	SBMR	U.S. Army	Upgrade current sewage treatment to an advanced treatment and effluent system.	2005	Neutral	Terrestrial Marine
Army Facility Strategy Program	SBMR/WAAF	U.S. Army	Projects include an aviation motor pool complex at WAAF, two physical fitness centers (SBMR, WAAF), a general instruction building, and upgrades to the range at SBMR.	Unknown	Additive	Terrestrial
Hot Cargo Pad	Hickam Air Force Base (HAFB)	U.S. Air Force	Construct facilities to simultaneously load three C-5/ C-17 aircraft.	Unknown	Additive	Terrestrial
Lā`ie Wastewater Collection System Expansion Phase II – Lā`ie	Lā`ie (adjacent to KTA)	Town of Lā`ie	Upgrade the sewage collection system in Lā`ie.	2004	Neutral	Terrestrial Marine
Drydock 2 Waterfront Support Facility	Pearl Harbor (near HAFB)	U.S. Navy	Construct two story metal buildings, renovate latrine, and demolish several buildings.	2003	Neutral	Terrestrial
Kamehameha Highway Bridge Replacements	Kawela Camp Road, Kaukonahua Road (near SBMR)	State of Hawaii	Replace Kawela Stream bridge and Upper Poamoho Stream Bridge.	Funded through 2004	Neutral	Terrestrial Marine

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
Kamehameha Highway Traffic Improvements	Kahalu`u to Waimea Bay (near KTA)	State of Hawaii	Construct passing lanes and turning lanes at intersections, modify traffic signals, and install signs, flashers, and other warning devices.	Funded through 2004	Beneficial	Terrestrial
Wai`anae Sustainable Communities Plan	Waianae	Honolulu Dept. of Planning and Permitting	A 20-year land use plan for the Wai`anae planning area.	Ongoing	Neutral	Terrestrial
Central Oahu Sustainable Communities Plan	Central Oahu	Honolulu Dept. of Planning and Permitting	A 25-year plan guiding land use planning for central Oahu.	Ongoing	Neutral	Terrestrial
25th ID(L) & USARHAW Revitalization Program	Oahu	U.S. Army	Construct and renovate water tanks and central ID Lab.	2006-2008	Additive	Terrestrial
Proposal to base eight C-17 aircraft at HAFB and the departure of four C-130 aircraft from HAFB.	HAFB	U.S. Air Force	Basing of eight C-17 aircraft at HAFB; four C-130 aircraft would depart from HAFB.	Unknown	Additive	Terrestrial
Department of Hawaiian Homelands Residential and Agricultural Development	Nānākuli-Wai`anae	Department of Hawaiian Homelands	Development of 16 parcels to provide up to 3,684 single family homes and farm lots.		Additive	Terrestrial
Maluohai Phase III	Kapolei	Unknown	Construct 45 homes.	August 2004	Additive	Terrestrial
Golf Course Development	Ewa, Central Oahu, and Wai`anae	N/A	Develop 171 golf holes on 1,798 acres at nine golf courses.	2002 and beyond	Additive	Terrestrial
Makaha 242-foot Reservoir No. 2	Wai`anae	Board of Water Supply (BWS)	Construct a new water reservoir in Makaha Valley, adjacent to the first reservoir.	Completed	Additive	Terrestrial Marine
Nānākuli 242-foot Reservoir	Wai`anae	BWS	Construct a new reservoir on Puu Haleakala in Nānākuli.	Unknown	Additive	Terrestrial Marine
Wai'anae Regional Park	Wai`anae	Dept. of Design and Construction (DDC)	Expand the existing regional park and add other improvements, such as an ocean recreation center and additional fields.	Underway	Additive	Terrestrial
Wai`anae Wastewater Treatment Plant Modification	Wai`anae	DDC	Wastewater improvements to the existing treatment plant.	Completed	Neutral	Terrestrial Marine

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
Wai`anae Coast Emergency Alternate Route	Wai`anae	DTS	Develop a second through-road (for emergencies only) Mauka of Farrington Highway from Makaha to Nānākuli, by constructing new road links between existing sections of public or private road.	Unknown	Additive	Terrestrial
Honouliuli Waste Water Treatment Plant (WWTP) Effluent Reuse	Ewa	DDC	Modify transmission system to distribute 13 million gallons per day (MGD) of reclaimed wastewater, as required by consent decree.	Completed	Neutral	Terrestrial
Honouliuli WWTP Handling Upgrades	Ewa	DDC	Modify solids handling facilities and odor control to improve operations within current 38 MGD capacity.	Underway	Neutral	Terrestrial
Honouliuli WWTP Expansion	Ewa	DDC	Increase the primary liquid treatment capacity (an increase of 13 MGD).	Unknown	Neutral	Terrestrial
Kamokila (Honokai Hale) Community Park	Ewa	DDC	Acquire the land under an existing city park, including land needed for access.	Underway	Neutral	Terrestrial
Ewa Mahiko District Park	Ewa	DDC	Develop a new park at the old mill site in Ewa Villages.	Underway	Neutral	Terrestrial
Honouliuli WWTP site Expansion (Mauka)	Ewa	DDC	Add 27 acres to the existing WWTP site so that ultimate capacity can be raised above 51 MGD.	Underway	Neutral	Terrestrial
Asing Community Park	Ewa	DDC	Develop a new 24-acre park to serve West Loch Estates and Fairways.	Underway	Additive	Terrestrial
Farrington Highway Improvement	Ewa	DDC	Increase the right-of-way and widen highway from two lanes to six lanes along 12 miles from Fort Weaver Road to the proposed North-South Road.	Unknown	Additive	Terrestrial
Oneula Beach Park Expansion	Ewa	DDC	Add six acres in conjunction with the development of the Ocean Pointe community.	Underway	Neutral	Terrestrial
Kalaeloa Regional Park	Ewa	DDC	Develop a new regional park on approximately 456 acres of the former Barbers Point Naval Air Station.	Underway	Neutral	Terrestrial

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
Makakilo Neighborhood Park	Ewa	DDC	Develop a new neighborhood park in the Makakilo area of the water park.	Underway	Neutral	Terrestrial
Renton Road Improvements (Ewa Town)	Ewa	DTS	Widening the road from two to four lanes within Ewa Villages.	Underway	Additive	Terrestrial
Kaloi Gulch Channel	Ewa	N/A	Drainage improvements in the Varona Village area of Ewa Villages.	Underway	Neutral	Terrestrial
Kalaeloa Desalination Plant	Ewa	BWS	Construct a new, high-technology 15 MGD water production facility in Campbell Industrial Park.	Underway	Neutral	Terrestrial
Ewa Shaft Renovation	Ewa	BWS	Convert an existing private irrigation source into a municipal water production facility.	Underway	Neutral	Terrestrial
Park Row Road	Ewa	DTS	Construct a short extension of Park Row Road makai from Renton Road to the future Kapolei Parkway.	Underway	Neutral	Terrestrial
Residential Development	Central Oahu	N/A	Constructed 644 housing units.	2000/2001	Additive	Terrestrial
Residential Development	Central Oahu	N/A	Constructed 811 housing units.	2001/2002	Additive	Terrestrial
Residential Development	Central Oahu	N/A	Construct 8,710 housing units.	2002 and beyond	Additive	Terrestrial
Pearl Harbor Historic Trail (Middle Loch Park)	Central Oahu	DDC	Aiea and Pearl City communities interested in enhancing a walking trail from Ewa to Ko Olina Resort along old OR&L railroad corridor. Trail is intended to preserve land and open space and offer viewscapes of Pearl Harbor and nearby wetlands.	2001 and beyond	Neutral	Terrestrial
Waipahu Wells III	Central Oahu	BWS	Potable well installation along with 5 pumps to produce 2-3 MGD for the surrounding area.	Underway	Neutral	Terrestrial
Waipio Peninsula Recreation Complex	Central Oahu	DDC	Public soccer complex and park includes soccer fields, stadium, parking lot, and park.	Completed	Neutral	Terrestrial

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
Central Oahu Regional Park (Waiola Sports Complex)	Central Oahu	DDC	Public sports complex includes a park, baseball fields, and tennis courts.	Underway	Neutral	Terrestrial
Waipahu Wells II Addition (two projects)	Central Oahu	BWS	Construction of pump and reservoir improvements including a 1.5 MGD well.	Underway	Neutral	Terrestrial
Waipahu Wells IV	Central Oahu	BWS	Installation of four 1.5 MGD wells, and GAC treatment facility.	Underway	Neutral	Terrestrial
Haleiwa Drainage Improvements	North Shore	DDC	Upgrades to the existing drainage ditch along Haleiwa Road (mauka side).	Underway	Neutral	Terrestrial
Banzai Rock Beach Support Park	North Shore	DDC	Develop a new parking area (and possibly bath house) mauka of Kamehameha Highway.	Underway	Neutral	Terrestrial
Kaunala Beach Park	North Shore	DDC	Create a new beach park at the Velzyland surf site, including a comfort station and a pavilion.	Underway	Neutral	Terrestrial
Kahawai Beach Support Park (including Sunset Beach Recreation Center)	North Shore	DDC	Create a new 2.6-acre park mauka of Kamehameha Highway near Pupukea Beach Park, to include a recreation center, comfort station, additional parking, and an area for an open market.	Underway	Neutral	Terrestrial
Waimea Valley Park	North Shore	DDC	Purchase the Waimea Falls Park, a private recreational area and botanical garden, in order to preserve the scenic valley and the botanical collection and keep the tourist attraction running.	Land acquisition underway	Beneficial	Terrestrial
Residential Development	Primary Urban Center	N/A	Constructed 74 housing units.	2000/2001	Additive	Terrestrial
Residential Development	Primary Urban Center	N/A	Constructed 91 housing units.	2001/2002	Additive	Terrestrial
Residential Development	Primary Urban Center	N/A	Construct 1,667 housing units.	2002 and beyond	Additive	Terrestrial
Nimitz Highway Reconstructed Sewer (Fort Street Mall to Alakea Street)	Primary Urban Center	N/A	Install 30-inch-diameter, 800-foot long subsurface water line between Fort Street Mall and Alakea Street.	2000/2001	Additive	Terrestrial

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Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
Moanalua Road Widening	Primary Urban Center	DDC	Widening one lane of a 1,000-foot-long corridor.	2001 and beyond (no design to date; funding pending)	Additive	Terrestrial
Pele Street Mini-Park	Primary Urban Center	DDC	Small community park.	2004	Neutral	Terrestrial
Residential Development	East Honolulu	N/A	Constructed 204 housing units.	2000/2001	Additive	Terrestrial
Residential Development	East Honolulu	N/A	Constructed 165 housing units.	2001/2002	Additive	Terrestrial
Residential Development	East Honolulu	N/A	Construct 1,177 housing units.	2002 and beyond	Additive	Terrestrial
Waialae Nui Well	East Honolulu	BWS	Construct a new potable well near the Waialae Nui residential subdivision.	Completed	Neutral	Terrestrial
Kalama Valley Community Park	East Honolulu	DDC	Construct new recreation building and related site improvements.	Underway	Additive	Terrestrial
Koko Crater Botanical Garden	East Honolulu	DDC	Construct a new visitor center and related site improvements.	Underway	Additive	Terrestrial
Koko Head Regional Park and Nature Preserve	East Honolulu	DDC	Modifications include education and visitor centers, parking, roadways, comfort stations, an enhanced trail system, and a people mover system.	Underway	Additive	Terrestrial
Aina Haina Nature Preserve	East Honolulu	DDC	Develop a new nature park, complete with a trail system, parking, and related improvements.	Unknown	Additive	Terrestrial
Queen’s Beach Park (Wawamalu)	East Honolulu	DDC	Construct a new beach park in the Queen’s Beach area, east of the Hawaii Kai Golf Course.	Completed	Neutral	Terrestrial
Hanauma Bay Modification	East Honolulu	DDC	Modifications included parking, food concessions, and information/education centers.	Completed	Neutral	Terrestrial
Kamilo Iki Community Park Modifications	East Honolulu	DDC	Develop new athletic fields and courts at an existing park.	Underway	Neutral	Terrestrial
Ka Iwi Shoreline Park	East Honolulu	DDC	Construct limited park improvements along Ka Iwi Coast, in conjunction with the state.	Land acquisition completed	Neutral	Terrestrial

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
Wailupe Stream Flood Control	East Honolulu	DDC	Plan to channelize Wailupe Stream in Aina Haina and expand the existing upland drainage basin.	Underway	Additive	Terrestrial Marine
Aina Haina Slide Remediation, Zone B	East Honolulu	DDC	Plan to create a passive park by compacting, regrading, and landscaping to stabilize a slide area.	Underway	Neutral	Terrestrial
Koko Crater Access Road	East Honolulu	DDC	Construct a boulevard to replace and relocate the existing private road into Koko Crater.	Underway	Additive	Terrestrial
Koko Crater Entrance Park	East Honolulu	DDC	Construct a new passive park between Queens Gate and the proposed Koko Villas subdivision.	Underway	Neutral	Terrestrial
Residential Development	Koolaupoko	N/A	Constructed 75 housing units.	2000/2001	Additive	Terrestrial
Residential Development	Koolaupoko	N/A	Constructed 86 housing units.	2001/2002	Additive	Terrestrial
Residential Development	Koolaupoko	N/A	Construct 1,381 housing units.	2002 and beyond	Additive	Terrestrial
Kamehameha Highway Scenic Enhancement	Koolaupoko	DDC	Acquiring and preserving the Waihee Marsh along the shoreline in the Kahaluu area.	Unknown	Beneficial	Terrestrial
Haiku Valley Nature Preserve	Koolaupoko	DDC	Plans to purchase and improve the former US Coast Guard Omega Station and the Haiku Stairs as a park and nature preserve.	Underway	Beneficial	Terrestrial
Waiahole Beach Park	Koolaupoko	DDC	Plans to expand and improve the existing Waiahole Beach Park.	Underway	Neutral	Terrestrial
Waimanalo Well II	Koolaupoko	BWS	Construct a new potable water well mauka of the former Meadow Gold Dairies pasture land.	Unknown	Neutral	Terrestrial
Kahaluu Regional Park	Koolaupoko	DDC	Plans to expand the existing regional park mauka toward the Kahaluu Elementary School and adjacent park.	Underway	Neutral	Terrestrial
Kailua 272 Reservoir	Koolaupoko	BWS	Construct a new reservoir at Kalae O Kaiwa Ridge in Kailua.	Underway	Additive	Terrestrial

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
Kaneohe Stream Green Belt Park	Koolaupoko	DDC	Plans to establish a greenbelt park along the lower reaches of Kaneohe Stream.	Underway	Neutral	Terrestrial
Kawa Stream Improvements	Koolaupoko	DDC	Channelize Kawa Stream within the Piloiloa Subdivision behind Castle High School in Kaneohe.	Underway	Additive	Terrestrial
Kailua Beach Park Improvements	Koolaupoko	DDC	Construct a new pavilion, canoe halau, relocated comfort station, and various grounds improvements.	Unknown	Neutral	Terrestrial
Waimanalo Treatment and Disposal System	Koolaupoko	DDC	Expand the existing Waimanalo Wastewater Treatment Plant to accommodate increasing demand and to provide service to areas currently using cesspools.	Underway	Neutral	Terrestrial Marine
Kawai Nui Gateway Park	Koolaupoko	DDC	Plans to create a nature walk, dog park, and additional landscaping at various places along the northern and eastern borders of Kawai Nui Marsh.	Underway	Neutral	Terrestrial
Kawai Nui Community Park	Koolaupoko	DDC	Improve an existing park by adding a recreation building, comfort station, and play courts.	Completed	Neutral	Terrestrial
Kailua Park	Koolaupoko	DDC	Develop a new nature park in Maunawili Valley, surrounding and including the existing Luana Hills Golf Course.	Land acquisition underway	Neutral	Terrestrial
Pali Golf Course Improvements	Koolaupoko	DDC	Modifications include replacing the clubhouse and improving all areas of the golf course.	Underway	Neutral	Terrestrial
Kaneohe Bayside Park (Kahua O Waikalua Neighborhood Park)	Koolaupoko	DDC	Create a new park on the site of the soon-to-be-phased-out Kaneohe Sewage Treatment Plant, to include ball fields and open spaces.	Underway	Neutral	Terrestrial
Waikane Nature Preserve	Koolaupoko	DDC	Establish a nature preserve in Waikane Valley, with improvements limited to walking trails.	Underway	Neutral	Terrestrial
Kuou Well III	Koolaupoko	DDC	Construct a new potable water well next to Ho'omaluhia Botanical Garden in Kaneohe.	Completed	Neutral	Terrestrial

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
Kualoa Regional Park	Koolaupoko	DDC	Upgrade an existing park by constructing a sewage system and improving buildings and roads.	Underway	Neutral	Terrestrial
Kailua Sewage Treatment Plant Modification	Koolaupoko	DDC	Upgrade the existing plant to increase storage capacity and improve odor control.	Underway	Neutral	Terrestrial
Kaneohe Sewage Treatment Plant Modification	Koolaupoko	DDC	Convert the existing treatment plant to a pretreatment facility that has additional capacity to handle wet-weather flows, and demolish the existing structures and tanks so that the land can be used as a park.	Completed	Neutral	Terrestrial
Heeia Kea Park	Koolaupoko	DDC	Create a nature park and passive recreational area within Heeia Kea Valley.	Underway	Neutral	Terrestrial
Kalaeloa Artificial Reef	Ewa	State of Hawaii	Establish an artificial reef site on the seafloor offshore from the Ewa District of the Island of Oahu.	Unknown	Beneficial	Terrestrial
Kaluanui Well Addition	Koolauloa	BWS	Construct a new potable water well within Heeia Kea Valley.	Underway	Beneficial	Terrestrial
Hauula Community Park Building Expansion	Koolauloa	DDC	Expand the existing multi-purpose building and construct related improvements.	Underway	Neutral	Terrestrial
Opana Wells	Koolauloa	BWS	Construct a new potable water well in the Kawela area mauka of the proposed Kuilima Resort.	Completed	Neutral	Terrestrial
Kahuku District Park Improvements	Koolauloa	DDC	Construct a new multi-purpose building, play courts, and related improvements.	Underway	Neutral	Terrestrial
Laie Beach Park (Bluff)	Koolauloa	DDC	Expand the existing beach park and construct related park improvements.	Underway	Neutral	Terrestrial
Hauula Fire Station Relocation	Koolauloa	DDC	Construct a new fire station (possibly including an ambulance facility) outside of the flood plain area.	Underway	Neutral	Terrestrial
Hawaii Superferry		DOT, Harbors Division	Operation of a high-speed ferry between the islands of Oahu, Maui, and Kauai, running in designated close-to-shore water lanes.	2007	Additive	Terrestrial

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
ATG Trainer Facility		U.S. Navy	Warehouse structure to house Anti-terrorism Force Protection trainers/simulators.	To Be Determined	Neutral	Terrestrial
Waterfront Upgrade		U.S. Navy	Wharf and supporting facilities to berth Pearl Harbor homeported submarines.	To Be Determined	Additive	Terrestrial
Consolidated fire station	Naval Station area	U.S. Navy	Consolidation of three fire stations into one new station.	To Be Determined	Neutral	Terrestrial
Fire station	West Loch	U.S. Navy	Replacement of existing fire station.	To Be Determined	Neutral	Terrestrial
Compressed air plant	Pearl Harbor Naval Shipyard dry docks, Yankee and Sierra piers	U.S. Navy	Compressed air plant to support submarine overhauls and repairs.	To Be Determined	Additive	Terrestrial
Magazine driveway paving	Driveways to Naval Magazine (NAVMAG) ammunition magazines	U.S. Navy	Pavement of unpaved driveways.	To Be Determined	Additive	Terrestrial
Renovate Facilities for Naval Undersea Warfare Center Detachment Hawaii	Ford Island	U.S. Navy	Renovate five buildings and construct underwater test facility.	Unknown	Additive	Terrestrial
Ship Maintenance Waterfront Facility		U.S. Navy	Building renovations.	To Be Determined	Additive	Terrestrial
P-587 Pacific Fleet Submarine Drive-In	Beckoning Point, Pearl Harbor, HI	Naval Station Pearl Harbor	Construction of a concrete slip to support a drive-in Magnetic Silencing Facility.	FY08 program year	Additive	Terrestrial
P-202 Joint Forces Deployment Staging Area	NS Pearl Harbor, HI	Commander, Navy Region Hawaii; Commander, Navy Installations Command	Creation of a deployment staging area to support deployment of Joint Forces.	FY09 program year	Additive	Terrestrial
P-173 Construct Communication Center, Naval Computer and Telecommunications Area Master Station	Wahiawa	U.S. Navy	Construction of a communication center.	FY08 program year	Neutral	Terrestrial

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
P-004 Construct Conference and Technology Learning Center	Ft. DeRussy	U.S. Navy	Construction of a learning center.	To Be Determined	Neutral	Terrestrial
P-005 Joint Prisoner of War/Missing in Action (POW/MIA) Accounting Command	Hickam AFB	U.S. Navy	Construction of a facility to accommodate the Joint POW/MIA Accounting Command.	To Be Determined	Neutral	Terrestrial
P-578 Construct Fitness Center	NAVSTA Main Base	U.S. Navy	Construction of a fitness center.	To Be Determined	Neutral	Terrestrial
P-182 Construct Missile Magazines, NAVMAG WL	NAVMAG PH, West Loch	U.S. Navy	Construction of five earth-covered box magazines.	To Be Determined	Additive	Terrestrial
P-013 Consolidate Command Support Functions	NCTAMS PAC, Wahiawa	U.S. Navy	Renovation and demolition of buildings in support of consolidation of support functions.	2010	Additive	Terrestrial
P-634 Waterfront Upgrades Bravo 21	Bravo docks 20 and 21	U.S. Navy	Construction of new concrete wharves.	2010	Additive	Terrestrial Marine
P-302 Dry Dock Ship Support Services	Dry docks 1 and 2, Bravo piers 1 and 2	U.S. Navy	Modifications of docks and piers to provide ship support services.	2012	Additive	Terrestrial Marine
P-639 Construct Advanced SEAL Delivery System/SEAL Delivery Vehicle (ASDS/SDV) Operations Wharf	Wharf Victor 2	U.S. Navy	Construction of a new wharf structure.	2013	Additive	Terrestrial Marine
FY09 MCON P-422 Advanced Radar Detection Laboratory (ARDEL)	PMRF	U.S. Navy	Construction of Advanced Radar Facility	2009 and beyond	Additive	Terrestrial
Rim of the Pacific (RIMPAC) Exercise	HRC	U.S. Navy	RIMPAC is a biennial, sea controlled projection fleet exercise that has been conducted since 1968.	2006	Additive	Terrestrial Marine

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
Undersea Warfare Exercise (USWEX)	HRC	U.S. Navy	USWEX is an advanced Anti-Submarine Warfare Exercise proposed to be conducted by the U.S. Navy's Carrier Strike Groups and Expeditionary Strike Groups while in transit from the west coast of the United States to the western Pacific Ocean.	2007	Additive	Terrestrial Marine
P-8A Multi-Mission Maritime Aircraft	Hickam AFB	U.S. Navy	Introduction of P-8A Multi-Mission Maritime Aircraft to the Navy Fleet. Proposed action includes transition from existing P-3C aircraft to P-8A Multi-Mission Maritime Aircraft. Hickam AFB has been identified as one of several potential receiving sites. A Notice of Intent to prepare an EIS was published in the *Federal Register* in December 2006.	2011-2019	Additive	Terrestrial
Replacement of F-15 Aircraft with F-22A Aircraft	Hickam AFB	Air Force and Air National Guard	The Air Force and Air National Guard proposes to replace the Hawaii Air National Guard F-15 aircraft with F-22A aircraft at Hickam AFB.	2011	Additive	Terrestrial
Long-range missile tests	HRC Temporary Operating Area, Department of Defense Test Ranges	Missile Defense Agency	Between 2003-2007, 68 different Department of Defense target and interceptor missiles were launched from either Kodiak Launch Complex, Alaska; Vandenberg Air Force Base, California; Pacific Missile Range Facility (PMRF), Hawaii; Ronald Reagan Ballistic Missile Test Site, Marshall Islands, Wake Island, or mobile platforms in to or near the Hawaii Temporary Operating Area. Approximately 628 missile launches occurred during this time period, and the majority of this missile activity was associated with the PMRF fleet training ranges. Current tempo of approximately of 125 launches per year is expected to continue into the future.	Ongoing	Additive	Terrestrial Marine

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Table 5.4.1-1. Cumulative Projects List (Continued)

Project	Related Project Location	Project Sponsor	Project Description	Projected Completion Date	Relevance to HRC EIS/OEIS	Relevance to Terrestrial or Marine Environment
Overseas Environmental Assessment (OEA) for MK 48 Advanced Capability Torpedo Service Weapons Tests in Hawaii	Hawaii	U.S. Navy	The Navy's Undersea Weapons Program Office (PMS 404) proposes to conduct three Service Weapons Tests using the MK 48 Advanced Capability (ADCAP) torpedo in 2008. The goal of the MK 48 ADCAP testing is to fire torpedoes with live warheads at a target to test the full function of the weapon systems and to train submarine crews using actual firing sequences. The Draft OEA concluded that that no significant harmful effects on the environment are reasonably foreseeable.	September 2008	Additive	Marine

Source: U.S. Department of the Army, 2005
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5.4.2 OTHER ACTIVITIES

5.4.2.1 COMMERCIAL FISHING

The Hawaii-based longline fishery is the largest commercial fishery in the central Pacific. It is a limited entry fishery with 164 available permits. Approximately 100 vessels have been active in the fisheries for the past 8 to 10 years. Recorded landings from 1994-99 totaled 17.1 million pounds of bigeye tuna, yellowfin tuna, albacore, and swordfish.

Fishing can adversely affect fish habitat and managed species. Potential impacts of commercial fishing include over-fishing of targeted species and by-catch, both of which negatively affect fish stocks. Lost and discarded gear may foul and disrupt bottom habitats. Recreational fishing also has the potential to affect fish habitats because of the large number of participants and the concentrated use of specific habitats (e.g. bottomfishing in the Main Hawaiian Islands).

Removal of fish by fishing can have a profound influence on individual populations. In a recent study of retrospective data, Jackson et al. (2001) analyzed paleoecological records of marine sediments from 125,000 years ago to present, archaeological records from 10,000 years ago to the present, historical documents, and ecological records from scientific literature sources over the past century. Examining this longer-term data and information, they concluded that ecological extinction caused by overfishing precedes all other pervasive human disturbance to coastal ecosystems including pollution and anthropogenic climatic change.

Bycatch

Bycatch is the term for the inadvertent capture of non-target species in fishing gear. Besides cetaceans and other marine mammals, sea turtles, seabirds, and non-commercial fish species also are regularly caught and killed unintentionally as bycatch. The World Wildlife Fund convened a summit of the world's leading cetacean experts in January 2002 in Annapolis, Maryland, which was attended by 25 scientists from six continents. The group reached consensus that the single biggest threat facing cetaceans worldwide is death as bycatch in fishing gear. More marine mammals die every year by getting entangled in fishing gear than from any other cause. Researchers estimated a global annual average of nearly 308,000 deaths per year—or nearly 1,000 per day (Read et. al., 2002; 2006). As shown on Figure 5.4.2.1-1, the annual number of marine mammal deaths from fishing bycatch and whaling far exceeds the total of all marine mammals that have died relatively coincident with the use of sonar during North Atlantic Treaty Organization (NATO) and Navy Anti-Submarine Warfare (ASW) training over approximately the past 20 years. This is not meant to suggest that few deaths coincident with the use of sonar lack importance, but is only meant to indicate the relative scale of the potential impacts on marine mammals indicating that the cumulative effect of sonar use is minimal by comparison.

Masking

It should be noted that increases in ambient noise levels might have the potential to mask an animal's ability to detect objects, such as fishing gear, and thus increase their susceptibility to bycatch. Mid-frequency active/high-frequency active (MFA/HFA) sonar transmission, however, involves a very small portion of the frequency spectrum and falls between the central hearing range of the (generally) low-frequency specializing baleen whales and the (generally) high-frequency specializing odontocetes. In addition, the active portion of MFA/HFA sonar is intermittent, brief, and individual units engaged in an exercise are separated by large distances. As a result, MFA/HFA sonar use during Navy training activities will not contribute to an increase in baseline anthropogenic ambient noise levels to any significant degree. Additional discussion of MFA/HFA operation parameters is discussed in Section 5.4.2.3.

Directed Harvest

In addition to mortalities from fisheries bycatch an additional significant effect on marine mammals (see Figure 5.4.2.1-1) is directed harvest (purposeful taking), whether for subsistence, commercial harvest, or scientific research. Impacts from military readiness activities in the Hawaii Range Complex (HRC) are not likely to significantly affect any of the species or stocks of marine mammals or sea turtles subject to directed harvest.

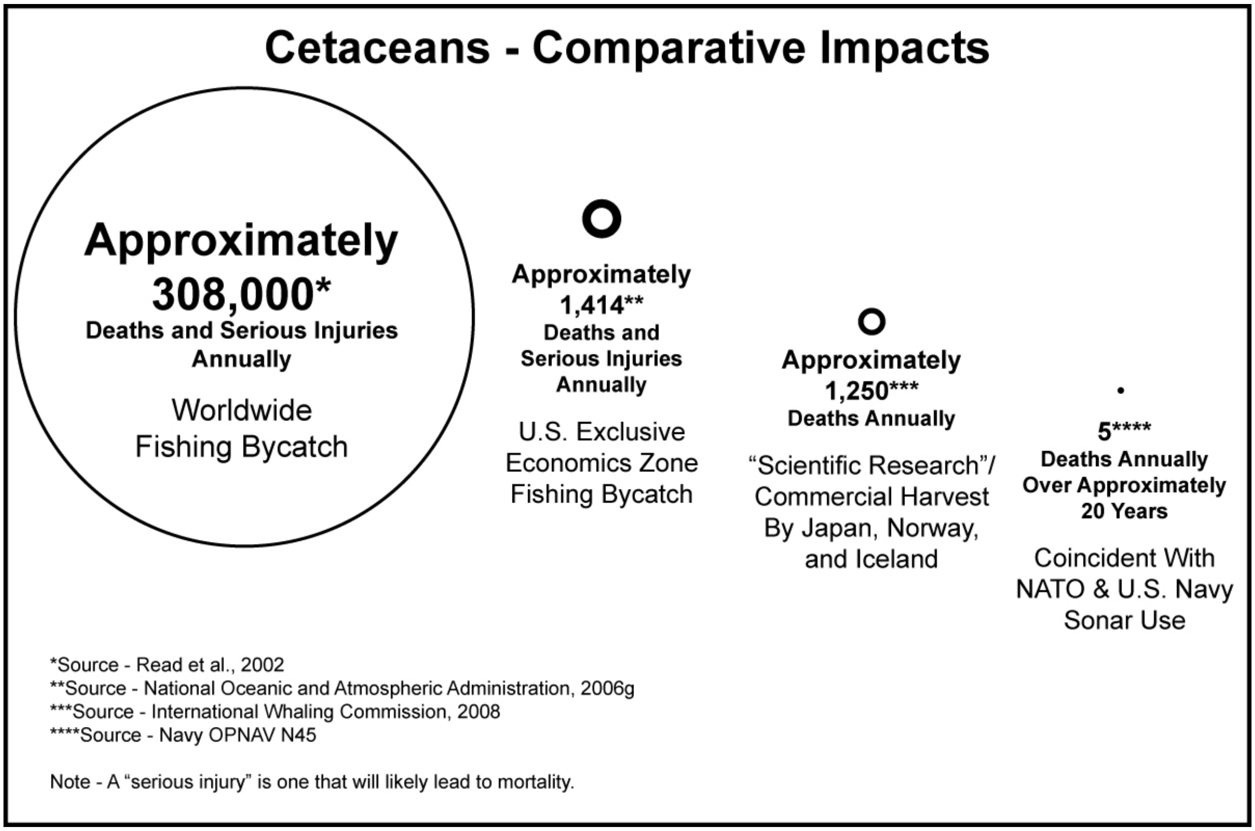

Figure 5.4.2.1-1. Impacts from Fishing and Whaling Compared to Potential Impacts from Sonar Use

5.4.2.2 SHIP STRIKES

Ship strikes, or ship collisions with whales, are a recognized source of whale mortality worldwide. Of the 11 species known to be hit by ships, the most frequently reported is the fin whale. Whale-watching tours are becoming increasingly popular, and ship strikes have risen in recent years. In the Hawaiian Islands, ship strikes of the humpback whale are of particular concern. According to the National Marine Fisheries Service (NMFS) Pacific Islands Region Marine Mammal Response Network Activity Update (dated January 2007), there were nine reported collisions with humpback whales in 2006. Whale watching could also have an effect on whales by distracting them, displacing them from rich food patches, or by dispersing food patches with wake or propeller wash (Katona and Kraus, 1999).

A review of recent reports on ship strikes provides some insight regarding the types of whales, locations and vessels involved, but also reveal significant gaps in the data. The Large Whale Ship Strike Database provides a summary of the 292 worldwide confirmed or possible whale/ship collisions from 1975 through 2002 (Jensen and Silber, 2003). The report notes that the database represents a minimum number of collisions, because the vast majority probably go undetected or unreported.

While there are reports and statistics of whales struck by vessels in U.S. waters, the magnitude of the risks that commercial ship traffic poses to marine mammal populations is difficult to quantify or estimate. In addition, there is limited information on vessel strike interactions between ships and marine mammals outside of U.S. waters (de Stephanis and Urquiola, 2006). Laist et al. (2001) concluded that ship collisions may have a negligible effect on most marine mammal populations in general, except for regionally-based small populations where the significance of low numbers of collisions would be greater, given smaller populations or population segments.

The Hawaii Superferry (which started operations between the islands of Oahu, Maui, and Kauai in late 2007), operates in designated close-to-shore water lanes and changes routes during the winter humpback whale season. Given the vessel's nominally high speed (approximately 35 knots), there is a potential for collisions with marine mammals, in particular humpback whales, due to their density and distribution during the winter. Mitigation requirements imposed by the State of Hawaii for the Superferry include the use of dedicated observers, reduction in speed, and route modifications. Recent litigation has resulted in the requirement to prepare an EIS (under the Hawaii Environmental Policy Act of 1974) to evaluate the effects of the operation of the Superferry on the environment, including humpback whales, infrastructure impacts to local harbor destinations, transport of invasive species and socioeconomic and cultural resources.

5.4.2.3 ANTHROPOGENIC CONTRIBUTORS TO OCEAN NOISE LEVELS

The potential cumulative impact issue associated with MFA/HFA sonar use during a Navy Training exercise is the addition of underwater sound to oceanic ambient noise levels, which in turn could have impacts on marine animals. Anthropogenic sources of ambient noise that are most likely to have contributed to increases in ambient noise are vessel noise from commercial shipping and general vessel traffic, oceanographic research, and naval and other use of sonar.

Ambient noise is environmental background noise. It is generally described as unwanted sound—sound that clutters and masks other sounds of interest (Richardson et al., 1995a). Any potential for cumulative impact should be put into the context of recent changes to ambient sound levels in the world’s oceans as a result of anthropogenic activities. It should be noted, however, that there is a large and variable natural component to the ambient noise level as a result of events such as earthquakes, rainfall, waves breaking, and lightning hitting the ocean as well as biological noises such as those from snapping shrimp and the vocalizations of marine mammals.

Anthropogenic sources of ambient noise that are most likely to contribute to increases in ambient noise levels are commercial shipping, offshore oil and gas exploration and drilling, and naval and other use of sonar (International Council for the Exploration of the Sea, 2005). Andrew et al. (2002) compared ocean ambient sound from the 1960s with the 1990s for a receiver off the California coast. The data showed an increase in ambient noise of approximately 10 decibels (dB) in the frequency range of 20 to 80 hertz (Hz) and 200 and 300 Hz, and about 3 dB at 100 Hz over a 33-year period. A possible explanation for the rise in ambient noise is the increase in shipping noise. There are approximately 11,000 supertankers worldwide, each operating 300 days per year, producing constant broadband noise at source levels of 198 dB (Hildebrand, 2004). The most energetic regularly-operated sound sources are seismic air gun arrays from approximately 90 vessels with typically 12 to 48 individual guns per array, firing about every 10 seconds (Hildebrand, 2004). Of the anthropogenic noise sources identified above, only offshore oil and gas exploration and drilling are not reasonably foreseeable within the action area.

5.4.2.3.1 Commercial Shipping

The Final Report of the National Oceanic and Atmospheric Administration (NOAA) International Symposium on "Shipping Noise and Marine Mammals: A Forum for Science, Management, and Technology" stated that the worldwide commercial fleet has grown from approximately 30,000 vessels in 1950 to over 85,000 vessels in 1998 (National Research Council, 2003; Southall, 2005). Between 1950 and 1998, the U.S. flagged fleet declined from approximately 25,000 to less than 15,000 and currently represents only a small portion of the world fleet. Foreign waterborne trade in the United States has increased from 718 to 1,164 million gross metric tons from 1981 to 2001. From 1985 to 1999, world seaborne trade doubled to 5 billion tons and currently includes 90 percent of the total world trade, with container shipping movements representing the largest volume of seaborne trade. It is unknown how international shipping volumes and densities will continue to grow. However, current statistics support the prediction that the international shipping fleet will continue to grow at the current rate or at greater rates in the future. Shipping densities in specific areas and trends in routing and vessel design are as significant (or possibly more significant) than the total number of vessels. Densities along existing coastal routes are expected to increase both domestically and internationally. New routes are also expected to develop as new ports are opened and existing ports are expanded. Vessel propulsion systems are also advancing toward faster ships operating in higher sea states for lower operating costs; and container ships are expected to become larger along certain routes (Southall, 2005).

Increases in ambient noise levels have the potential to mask a marine species' ability to detect approaching vessels, thus increasing their susceptibility to ship strikes.

5.4.2.3.2 Vessel Mechanical Noise Sources

Boats and ships produce sound due to propeller cavitation (or propeller singing) as well as other machinery. Propeller singing has a frequency between 100 and 1,000 Hz (Richardson et al., 1995a). Noise from propulsion machinery enters the water through the hull of the ship. Propulsion machinery sources include rotating shafts, gear reduction transmissions, reciprocating parts, gear teeth, fluid flow turbulence, and mechanical friction. Other sources of noise include fathometers, pumps, non-propulsion engines, generators, ventilators, compressors, flow noise from water dragging on the hull, and bubbles breaking in the wake. Medium and large vessels generate frequencies up to approximately 50 Hz, primarily from propeller blade rate and secondarily from the engine cylinder firing rates and shaft rotation (Richardson et al., 1995a). Propeller cavitation and flow noise can produce frequencies as high as 100 kilohertz (kHz) but generally peak energy occurs between 50 and 150 Hz; and auxiliary machinery (pumps and compressors) may produce frequencies up to several kilohertz (Richardson et al., 1995a). Moreover, most (83 percent) of the acoustic field surrounding large vessels is the result of propeller cavitation (Southall, 2005). Larger ships generally are diesel-powered and have two propellers, which are larger and slower rotating. These propellers typically have four blades, which turn at a rate of approximately 160 rpm and have a frequency of 10 to 11 Hz (Richardson et al., 1995a). It is generally believed that acoustic source levels are not a function of speed for modern diesel vessels across most of their common operations (Heitmeyer et al., 2004). Supply ships often have bow thrusters to help maneuver the ship. A bow thruster may create a harmonic tone with a high fundamental frequency, depending on the rotation rate of the thrusters. One study found nine harmonics, extending up to 1,064 Hz. In another study, the noise increased by 11 dB when the bow thrusters began operating.

Small boats with large outboard engines produce source levels of 175 dB at frequencies up to several hundred hertz (Richardson et al., 1995a; Erbe, 2002). A study was also conducted on the effects of watercraft noise on the acoustic behavior of bottlenose dolphins in Florida (Buckstaff, 2004). The study focused on short-term changes in whistle frequency range, duration, and rate of production. The frequency range and duration of signature whistles did not significantly change due to approaching vessels. However, dolphins whistled more often at the onset of approaching vessels compared to during and after vessel approaches. The whistle rate also increased more at the onset of a vessel approach than when there were no vessels present.

5.4.2.3.3 Whale Watching

Studies on the effects of boat noise and general disturbance resulting from whale-watching vessels have been conducted on pods of killer whales and dolphins (Foote et al., 2004; Bain et al., 2006; Stockin et al., 2008). Foote et al., (2004) found there was a significant increase in call duration for all three killer whale pods studied in the presence of boats from 2001 to 2003. Bain et al. (2006) found the presence of significant effects in both Northern and Southern resident killer whales after decades of intense whale-watching suggest habituation to whale watching is far from complete. Stockin et al., (2008) determined that the presence of whale watch vessels in New Zealand “significantly disrupted” foraging and resting behavior of common dolphins. Bejder et al, (2006) found that dolphin watching vessels could have significant population effects on small, closed, resident or endangered populations of dolphins. “The substantial effect of tour vessels on dolphin abundance in a region of low-level tourism calls into question the presumption that dolphin-watching tourism is benign” (Bejder et al., 2006).

In Hawaii, a study was conducted on the effects of boat noise from whale-watching vessels on the interaction of humpback whales (Au and Green, 2000). Two inflatable boats were equipped with outboard engines. Two were larger coastal boats with twin inboard diesel engines, and the fifth boat was a small water plane area twin hull (SWATH) ship. The study concluded that it is unlikely that the levels of sounds produced by the boats in the study would have any serious effect on the auditory system of humpback whales.

5.4.2.3.4 Commercial and Military Sonar

Active sonar was probably the first wide-scale, intentional use of anthropogenic noise within the oceans. The outbreak of World War I in 1914 was the impetus for the development of a number of military applications of sonar (Urick, 1983); by 1918, both Britain and the United States had built active sonar systems. The years of peace following World War I saw a steady, though extremely slow, advance in applying underwater sound to practical needs. By 1935 several adequate sonar systems had been developed, and by 1938 with the imminence of World War II, quantity production of sonar sets started in the United States (Urick, 1983). The National Research Council (2003) notes that there are both military and commercial sonars: military sonars are used for target detection, localization, and classification. Commercial sonars are typically higher in frequency and lower in power and are used for depth sounding, bottom profiling, fish finding, and detecting obstacles in the water. Commercial sonar use is expected to continue to increase, although it is not believed that the acoustic characteristics will change.

Commercial Sonar Use in Hawaii

Almost all vessels at sea are equipped with active sonar fathometers. Many vessels engaged in commercial or recreational fishing also use active sonar commonly referred to as “fish-finders.” Both types of sonar tend to be higher in frequency and lower in power than the hull-mounted MFA sonar used during Navy training; however, there are many more of these sonars, and they are in use much more often and in more locations than Navy sonars.

While oil and gas exploration is not conducted in the Hawaiian Islands, undersea research using active sound sources does occur; sound sources employed include powerful multibeam and sidescan sonars that are generally used for mapping the ocean floor and include both MFA and HFA systems. During mapping surveys, these sonars run continuously, sweeping the large areas of ocean to accurately chart the complex bathymetry present on the ocean floor.

LFA Sonar Use

Although not part of the Proposed Action in this EIS/OEIS, the future use of Surveillance Towed Array Sensor System Low-Frequency Active (SURTASS LFA) is reasonably foreseeable in or around the HRC study area as it has been proposed in the SURTASS LFA Supplemental EIS. Ongoing litigation over the SURTASS LFA Supplemental EIS may minimize or preclude the use of SURTASS LFA in and around the HRC study area. Nonetheless, LFA is included in this cumulative analysis as described below.

The potential cumulative impact issue associated with SURTASS LFA sonar operations is the addition of underwater sound to oceanic ambient noise levels, which in turn could have impacts on marine animals. Anthropogenic sources of ambient noise that are most likely to contribute to increases in ambient noise levels are commercial shipping, offshore oil and gas exploration and drilling, and naval and other use of sonar (International Council for the Exploration of the Sea, 2005).

SURTASS LFA Sonar Combined with Other Human-Generated Sources of Oceanic Noise

The potential for cumulative impacts and synergistic effects from SURTASS LFA transmissions was analyzed in relation to overall oceanic ambient noise levels, including the potential for LFA sound to add to overall ambient levels of anthropogenic noise. Increases in ambient noise levels have the potential to cause masking, and decrease in distances that underwater sound can be detected by marine animals. These effects have the potential to cause a long-term decrease in a marine mammal’s efficiency at foraging, navigating, or communicating (International Council for the Exploration of the Sea, 2005). National Research Council (2003) discussed acoustically-induced stress in marine mammals. National Research Council stated that sounds resulting from one-time exposure are less likely to have population-level effects than sounds that animals are exposed to repeatedly over extended periods of time. The potential for acoustically-induced stress from LFA transmissions is discussed below.

Ambient Noise Levels and Masking

Broadband, continuous low-frequency shipping noise is more likely to affect marine mammals than narrowband, low duty cycle SURTASS LFA sonar. SURTASS LFA sonar bandwidth is limited (approximately 30 Hz), the average maximum pulse length is 60 seconds, signals do not remain at a single frequency for more than 10 seconds, and during an operation the system is off nominally 90 to 92.5 percent of the time. Most mysticete vocalizations are in the low frequency band below 1 kHz. No direct auditory measurements have been made for any mysticete, but it is generally believed that their frequency band of best hearing is below 1,000 Hz, where their calls have the greatest energy (Clark, 1990; Edds-Walton, 2000; Ketten, 2000). However, with the nominal duty cycle of 7.5 to 10 percent, masking would be temporary. For these reasons, any masking effects from SURTASS LFA sonar are expected to be negligible and extremely unlikely.

Odontocetes have a broad acoustic range and hearing thresholds measure between 400 Hz and 100 kHz (Richardson, et al., 1995a; Finneran et al., 2002). It is believed that odontocetes communicate above 1,000 Hz and echolocate above 20 kHz (Würsig and Richardson, 2002). While the upward spread of masking is known to exist, the phenomenon has a limited range in frequency. Yost (2000) showed that magnitude of the masking effect decreases as the difference between signal and masking frequency increase; i.e., the masking effect is lower at 3 times the frequency of the masker than at 2 times the frequency. Gorga et al. (2002) demonstrated that for a 1.2-kHz masking signal, the upward spread of masking was extinguished at frequencies of 6 kHz and higher. Therefore, while the phenomenon of upward spread of masking does exist, it is unlikely that LFA would have any significant effect on the hearing of higher frequency animals. Gorga et al. (2002) also demonstrated that the upward spread of masking is a function of the received level of the masking signal. Therefore, a large increase in the masked bandwidth due to upward masking would only occur at high received levels of the LFA signal.

In a recent analysis for the Policy on Sound and Marine Mammals: An International Workshop sponsored by the Marine Mammal Commission (United States) and the Joint Nature Conservation Committee (United Kingdom) in 2004, Dr. John Hildebrand provided a comparison of anthropogenic underwater sound sources by their annual energy output. On an annual basis, four SURTASS LFA systems are estimated to have a total energy output of 6.8×10^{11} Joules/yr. Seismic air gun arrays were two orders of magnitude greater with an estimated annual output of 3.9×10^{13} Joules/year. MFA and super tankers were both greater at 8.5×10^{12} and 3.7×10^{12} Joules/year, respectively (Hildebrand, 2004). Hildebrand concluded that increases in anthropogenic sources most likely to contribute to increased noise in order of importance are: commercial shipping, offshore oil and gas exploration and drilling, and naval and other uses of sonar. The use of SURTASS LFA sonar is not scheduled to increase past the originally analyzed four systems during the next 5-year regulation under the Marine Mammal Protection Act (MMPA). The percentage of the total anthropogenic acoustic energy budget added by each LFA source is actually closer to 0.5 percent per system (or less), when other man-made sources are considered (Hildebrand, 2004). When combined with the naturally occurring and other man-made sources of noise in the oceans, the intermittent LFA signals barely contribute a measurable portion of the total acoustic energy.

In a recently released report entitled “Ad-Hoc Group on the Impact of Sonar on Cetaceans,” the International Council for the Exploration of the Sea (International Council for the Exploration of the Sea, 2005) concluded that shipping accounts for more than 75 percent of all human sound in the sea, and sonar amounts to no more than 10 percent or so. It further stated that sonar (noise budget) would probably never exceed 10 percent, but that sonar deployment seems likely to increase in the future.

Therefore, the SURTASS LFA Final Supplemental Environmental Impact Statement (SEIS) dated April 2007 concluded that because LFA transmissions would not significantly increase anthropogenic oceanic noise, cumulative impacts and synergistic effects from the proposed four SURTASS LFA sonar systems for masking would not be a reasonably foreseeable significant adverse impact on marine animals.

Stress

Stress can be defined as a threat to homeostasis[1] and is frequently measured with changes in blood chemistry. Smith et al. exposed goldfish (a hearing-specialist fish) to continuous background noise of 160-170 dB RL. There was a "transient spike" in blood cortisol levels within 10 minutes of the onset of noise that was loud enough to cause TTS. However, this cortisol spike did not persist and there was no long-term physiological stress reaction in the animals.

Thomas et al. (1990) exposed captive belugas to recorded industrial noise for 30 minutes at a time, with a total exposure of 4.5 hours over 13 days with a source level of 153 dB. Catecholamine blood levels were checked both before and after noise exposure; however, no significant differences in blood chemistry were observed. Another experiment that measured blood chemistry, but also varied the sound level is described in Romano et al. (2004). In this experiment, a beluga was exposed to varying levels of an impulsive signal produced by a watergun. The levels of three stress-related blood hormones (norepinephrine, epinephrine, and dopamine) were measured after control, low-level sound (171-181 dB sound equivalent level [SEL]) exposure and high-level (184–187 dB SEL) sound exposure. There were no significant differences between low-level sound exposure and control, while the high-level sound exposure did produce elevated levels for all three hormones. Furthermore, regression analysis demonstrated a linear trend for increased hormone level with sound level.

These data support a linear dose-response function (like the LFA risk continuum) for sound exposure and the onset of stress, with only high levels of sound possibly leading to a stress reaction. The extrapolation of the response thresholds from the Romano et al. (2004) experiment (based on watergun signals) to the LFA situation is tenuous because of the differences in the signals, but the relationship between sound level and stress is supported by several studies. There are some recent data (e.g., Evans, 2003) implicating synergistic effects from multiple stressors, including noise. Although there are no data to support synergistic effects, similar impacts might occur with marine mammals, given the multiple stressors that often occur in their environment. This indicates that while stress in marine animals could possibly be caused by operation of the LFA source, it is likely to be constrained to an area much smaller than the zone of audibility, more similar in size to the mitigation zone around the vessel.

National Research Council (2003) discussed acoustically-induced stress in marine mammals and stated that sounds resulting from one-time exposure are less likely to have population-level effects than sounds that animals are exposed to repeatedly over extended periods of time. National Research Council (2003) stated that although techniques are being developed to identify indicators of stress in natural populations, determining the contribution of noise exposure to those stress indicators will be very difficult, but important, to pursue in the future

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1 Homeostasis is the property of an open system, especially living organisms, to regulate its internal environment to maintain a stable, constant condition, by means of multiple dynamic equilibrium adjustments, controlled by interrelated regulation mechanisms.

when the techniques are fully refined. There are scientific data gaps regarding the potential for LFA to cause stress in marine animals. Even though an animal's exposure to LFA may be more than one time, the intermittent nature of the LFA signal, its low duty cycle, and the fact that both the vessel and animal are moving mean that there is a very small chance that LFA exposure for individual animals and stocks would be repeated over extended periods of time, such as those caused by shipping noise.

The SURTASS LFA Final SEIS concluded that transmissions would not significantly increase anthropogenic oceanic noise; therefore, cumulative impacts and synergistic effects from stress are not a reasonably foreseeable significant adverse impact on marine animals from exposure to LFA.

Synergistic Effects

The potential for synergistic effects of the operation of SURTASS LFA sonar with overlapping sound fields from other anthropogenic sound sources was initially analyzed based on two LFA sources (U.S. Department of the Navy, 2007). In order for the sound fields to converge, the multiple sources would have to transmit exactly in phase (at the same time), requiring similar signal characteristics, such as time of transmissions, depth, vertical steering angle, waveform, wavetrain, pulse length, pulse repetition rate, and duty cycle. In the very unlikely event that this ever occurred, the analysis demonstrated that the “synergistic” sound field generated would be 75 percent or less of the value obtained by adding the results. Therefore, adding the results conservatively bounds the potential effects of employing multiple LFA sources. In the areas where marine mammals would potentially be affected by significant behavioral changes, they would be far enough away that they would discern each LFA sonar as an individual source. Standard operational employment of two SURTASS LFA sonars calls for the vessels to be nominally at least 185 km (100 nm) apart (U.S. Department of the Navy, 2007). Moreover, LFA sources would not normally operate in proximity to each other and would be unlikely to transmit in phase as noted above. Based on this and the coastal standoff restriction, it is unlikely that LFA sources, under any circumstances, could produce a sound field so complex that marine animals would not know how to escape it if they desired to do so.

Because of the potential for seismic surveys to interfere with the reception of passive signals and return echoes, SURTASS LFA sonar operations are not expected to be close enough to these activities to have any synergistic effects. Because of the differences between the LFA coherent signal and seismic air gun impulsive “shots,” there is little chance of producing a “synergistic” sound field. Marine animals would perceive these two sources of underwater sound differently and any addition of received signals would be insignificant. This situation would present itself only rarely, as LFA testing and training operations have not been, and are not expected to be conducted in proximity to any seismic survey activity.

If SURTASS LFA sonar operations were to occur concurrent with other military (including MFA/HFA sonars) and commercial sonar systems, synergistic effects are not probable because of differences between these systems (U.S. Department of the Navy, 2007). For the sound fields to converge, the multiple sources would have to transmit exactly in phase (at the same time), requiring similar signal characteristics, such as time of transmissions, depth, frequency, bandwidth, vertical steering angle, waveform, wavetrain, pulse length, pulse repetition rate, and duty cycle. The potential for this occurring is negligible.

Another area for potential cumulative effects would be those associated with SURTASS LFA to marine mammal populations. To evaluate the effects of SURTASS LFA sonar operations, it is necessary to place it in perspective with other anthropogenic impacts on marine resources.

Bycatch

Increases in ambient noise levels have the potential to mask an animal's ability to detect objects, such as fishing gear, thus increasing their susceptibility to bycatch. Because LFA transmissions are intermittent and would not significantly increase anthropogenic oceanic noise, cumulative impacts and synergistic effects from masking by LFA signals are not a reasonably foreseeable significant adverse impact on marine animals from exposure to LFA.

Ship Strikes

Ship strikes are generally not an issue for SURTASS LFA sonar vessels because of their slow operational speed (3 to 5 knots) and transit speed (10 to 12 knots). However, increases in ambient noise levels have the potential to mask an animal's ability to detect approaching vessels, thus increasing their susceptibility to ship strikes. Because LFA transmissions are intermittent and will not significantly increase anthropogenic oceanic noise, cumulative impacts and synergistic effects from ship strikes due to masking from LFA signals are not a reasonably foreseeable significant adverse impact on marine animals from exposure to LFA.

Authorized Whale Takes

As discussed in the SURTASS LFA Final SEIS, scientific research and subsistence whaling are activities authorized for lethal takes of marine mammals. Based on extensive evaluation in the SURTASS LFA document, the operation of SURTASS LFA sonar with monitoring and mitigation would result in no lethal takes. Therefore, there were no cumulative impacts due to LFA operations.

5.4.2.4 ENVIRONMENTAL CONTAMINATION AND BIOTOXINS

Insufficient information is available to determine how, or at what levels and in what combinations, environmental contaminants may affect cetaceans (Marine Mammal Commission, 2003). There is growing evidence that high contaminant burdens are associated with several physiological abnormalities, including skeletal deformations, developmental effects, reproductive and immunological disorders, and hormonal alterations (Reijnders and Aguilar, 2002). It is possible that anthropogenic chemical contaminants initially cause immunosuppression, rendering whales susceptible to opportunistic bacterial, viral, and parasitic infection (De Swart et al., 1995). Specific information regarding the potential effects of environmental contamination on marine species in the Hawaiian Islands is not available, and therefore cumulative effects cannot be determined.

5.4.2.5 COASTAL DEVELOPMENT ACTIVITIES

Habitat loss and degradation is now acknowledged to be a significant threat to cetacean populations (Kemp, 1996). The impact of coastal development on whales has not been thoroughly investigated. Habitat alteration has the potential to disrupt the social behavior, food supply, and health of whales. Such activities may stress the animals and cause them to avoid traditional feeding and breeding areas, or migratory routes. The most serious threat to cetacean populations from habitat destruction may ultimately prove to be its impact on the lower trophic levels in their food chains (Kemp, 1996).

Likewise, habitat loss and degradation for listed sea turtles (e.g. green and hawksbill turtles) that rest and forage in the nearshore and nest on selected beaches in the Hawaiian Archipelago pose a serious potential threat to their recovery as noted in their Recovery Plans.

5.4.2.6 SCIENTIFIC RESEARCH PERMITS

There are currently 30 scientific research permits and General Authorizations for research issued by the NMFS for cetacean work in the wild in the North Pacific. Of these, 14 specify Hawaiian waters either as one location or the primary location for research. The most invasive research involves tagging or biopsy, while the remainder focus on vessel and aerial surveys and close approach for photo-identification. Species covered by these permits and authorizations include small odontocetes, sperm whales, and large mysticetes. There is one scientific research permit issued to the NMFS Pacific Islands Fisheries Science Center for Hawaiian monk seals that covers tagging, marking, relocation, rehabilitation and stranding response. One permit issued to the Office of Protected Resources, NMFS allows for responses to strandings and entanglements of listed marine mammals. NMFS has also issued General Authorizations for commercial photography of non-listed marine mammals, provided that the activity does not rise to Level A Harassment of the animals. These authorizations are usually issued for no more than 1 or 2 years, depending on the project.

Given the analysis and scrutiny given to permit applications (NEPA, MMPA, and Endangered Species Act [ESA]), it is assumed that any adverse effects are largely transitory (e.g., inadvertent harassment, biopsy effects, etc.). Further, where monitoring of individuals subjected to this level of impact is possible, required reports generally indicate either no significant behavioral changes or short-term changes with relatively quick return to normal behavior. Data to assess population level effects from research are not currently available, and even if data were available it is uncertain that research effects could be separately identified from other adverse effects to cetacean populations in Hawaiian waters.

5.4.2.7 OTHER CONSIDERATIONS

Natural stresses include storms and climate-based environmental shifts, such as algal blooms and hypoxia. Disturbance from ship traffic and exposure to biotoxins and anthropogenic contaminants may stress animals, weakening their immune systems, and making them vulnerable to parasites and diseases that would not normally compromise natural activities or be fatal.

Chronic or continuous anthropogenic sound can affect marine mammals by masking important natural sounds, causing physiological effects and stress, habituation, and sensitization (review by Richardson et al., 1995a).

The combination of potential impacts resulting from implementing either of the Proposed Alternatives and other human activities or natural occurrences can affect marine species and their habitats. In general, naturally occurring events such as earthquakes, major storms, the variable presence of prey species, and other natural forces acting on the marine environment, as well as disease processes, contamination, or biotoxins are responsible for increases or decreases in the population and distribution of marine species on a much larger scale than the dispersed, infrequent, and intermittent activity associated with a Navy Training event. However, information regarding the specific impacts these natural occurrences have on marine species is not readily available, and therefore their role in cumulative impacts is not well known.

The effects of global warming on habitats such as coral reefs could be significant. Sea level rise and sea temperature rise can result in coral die offs significantly affecting fish and sea turtle habitat. These potentially adverse impacts are could be so large in scale and area that the dispersed, infrequent, and intermittent activity associated with a Navy Training event would have no significant cumulative effect on fringing coral reefs. Deep sea corals are not likely to be affected by either global warming or Navy training activities.

Potential impacts to Essential Fish Habitat (EFH) are discussed and evaluated in *Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS* (U.S. Department of the Navy, 2007b) and a summary for each proposed Navy training activity is provided. Due to the mitigation measures implemented to protect sensitive habitats, and the localized and temporary impacts of the Proposed Action and alternatives, it is concluded that the potential impact of the Proposed Action and alternatives would have no affect on EFH.

5.5 CUMULATIVE IMPACT ANALYSIS

This section addresses the additive effects of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in combination with the projects identified in Section 5.2. Since environmental analyses for some of the projects listed are not complete or do not include quantitative data, cumulative impacts are addressed qualitatively and are described below.

5.5.1 AIR QUALITY

Activities affecting air quality in the region include, but are not limited to, mobile sources such as automobiles and aircraft, and stationary sources such as power generating stations, manufacturing operations and other industries, and volcanic eruptions. Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the cumulative actions listed in Table 5.4.1-1 would result in increases in air emissions within the region of influence. However, the State of Hawaii is generally in compliance with the Federal National Ambient Air Quality Standards and the State Ambient Air Quality Standards. Air pollution levels in Hawaii are generally low due to the small size and isolation of the state. Historic air quality monitoring data do not show any recent upward or downward trends in average air quality conditions in Oahu or Hawaii (U.S. Department of the Army, 2005). Federal ozone standards have not been exceeded in Hawaii during the past decade, despite the cumulative emissions from highway traffic, commercial and military aircraft operations, commercial and industrial facility operations, agriculture operations, and construction projects in both urban and rural areas. Training events that occur in the open ocean have limited effect on air quality due to their distance offshore and meteorological conditions. For events occurring at Pacific Missile Range Facility (PMRF), a Title V Covered Source Permit has been issued and was renewed in 2003 to cover all significant stationary emissions sources on PMRF. Aircraft and missile exhaust emissions are considered mobile sources and are thus exempt from permitting requirements. Minor increases in air emissions may occur as a result of implementation of Alternatives 1, 2, and 3; however, these increases would not violate the Federal or State ambient air quality standards or any other Federal or State air standards, rules, or regulations.

5.5.2 AIRSPACE

The development of military lands prior to and after World War II had the biggest impact on airspace in the Hawaiian Islands. The expansion of military airfields continued as larger and more military aircraft were stationed in Hawaii. Following World War II, the increase in tourism resulted in an expansion of civilian airfields and airports. As with the military, the civilian aircraft increased in numbers and size requiring expansion of the existing airports. This historic development resulted in close monitoring of airspace as the land area is small in Hawaii with limited airspace (U.S. Department of the Army, 2004).

Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the cumulative actions listed in Table 5.4.1-1 would not incrementally affect airspace within the region of influence because no airspace impacts were identified in the analysis presented in Chapter 4.0. No other projects in the region of influence have been identified that would have the potential for incremental additive cumulative impacts on controlled or uncontrolled airspace, special use airspace, military training routes, en route airways and jet routes, airports/airfields, or air traffic control. Consultation with the Federal Aviation Administration on all matters affecting airspace would eliminate the possibility of indirect adverse impacts and associated cumulative impacts on airspace use in the Hawaiian Islands.

5.5.3 BIOLOGICAL RESOURCES

5.5.3.1 OPEN OCEAN AND OFFSHORE BIOLOGICAL RESOURCES

Marine Plants and Invertebrates

Potential cumulative impacts on marine plants and invertebrates in the HRC include releases of chemicals into the ocean, introduction of debris into the water column and onto the seafloor, and mortality and injury of marine organisms near the detonation or impact point of ordnance or explosives. The presence of persistent organic compounds such as DDT and PCBs are of particular concern. In light of these concerns, Navy activities would have small or negligible potential impacts. There would be no long-term changes to species abundance or diversity, no loss or degradation of sensitive habitats, and no effects to threatened and endangered species. None of the potential impacts would affect the sustainability of resources, the regional ecosystem, or the human community.

Fish

Potential cumulative impacts of Navy activities include release of chemicals into the ocean, introduction of debris into the water column and onto the seafloor, mortality and injury of marine organisms near the detonation or impact point of ordnance or explosives, and, physical and acoustic impacts of vessel activity. The overall effect on fish stocks would be negligible additions to impacts of commercial and recreational fishing in the HRC.

Due to the wide geographic separation of most of the operations, Navy activities would have small or negligible potential impact, and their potential impacts are not additive or synergistic.

Relatively small numbers of fish would be killed by shock waves from mines, inert bombs, and intact missiles and targets hitting the water surface. These and several other types of activities common to many exercises or tests have less-than-significant effects on fish: aircraft, missile, and target overflights; muzzle blast from 5-inch naval guns; releases of munitions constituents; falling debris and small arms rounds; entanglement in military-related debris; and chaff and flares. There would be no long-term changes in species abundance or diversity, no loss or degradation of sensitive habitats, and no significant effects to threatened and endangered species. None of the potential impacts would affect EFH, sustainability of resources, the regional ecosystem, or the human community.

Sea Turtles

Five species of sea turtles, leatherback, loggerhead, olive ridley, hawksbill, and green, may occur in the HRC. Each of these species is globally distributed, and each is listed as threatened or endangered. Refer to Section 3.1.2.3 for more complete information regarding the distribution and conservation status of these sea turtle species.

Incidental take in fishing operations, or bycatch, is one of the most serious threats to sea turtle populations (Table 5.5.3.1-1). In Hawaii, NMFS requires measures (e.g., gear modifications, changes to fishing practices, time/area closures, and incidental take limits) to reduce sea turtle bycatch in the Hawaii-based pelagic longline fisheries. These measures have significantly reduced the level of incidental take of sea turtles in these fisheries. Between 1994 and 1999 observers recorded data on 239 interactions between sea turtles and the Hawaii-based longline fisheries. The reductions in interactions and incidental takes is highlighted in the takes observed from 2003 to 2007.

Table 5.5.3.1-1. Sea Turtles Captured Incidentally in the Hawaii-Based Long Line Fishery 2003–2007

Species	Injured	Dead	Unknown
Leatherback	20	3	0
Loggerhead	45	1	0
Olive Ridley	2	37	0
Green	0	3	0
Hawksbill	0	0	0
Unidentified	1	0	1

Source: Van Fossen, 2008

Sea turtles commonly ingest or become entangled in marine debris (e.g., tar balls, plastic bags, plastic pellets, balloons, and ghost fishing gear) as they feed along oceanographic fronts, where debris and their natural food items converge. Marine pollution from coastal runoff, marina and dock construction, dredging, aquaculture, increased underwater noise, and boat traffic can degrade marine habitats used by sea turtles. Sea turtles swimming or feeding at or just beneath the surface of the water are vulnerable to boat and vessel strikes, which can result in serious propeller injuries and death. Increased predation by sharks is also a concern for sea turtles in Hawaii. Disease, specifically fibropapillomatosis, is a threat to green turtles in some areas of the world, in particular Hawaii. In addition, scientists have documented fibropapillomatosis in populations of loggerhead, olive ridley, and flatback turtles. The effects of fibropapillomatosis at the population level are not well understood. How some marine turtle species function within the marine ecosystem is still poorly understood. Global warming could potentially have an extensive impact on all aspects of a turtle's life cycle, as well as impact the abundance and distribution of prey items. Loss or degradation of nesting habitat resulting from erosion control through beach nourishment and armoring, beachfront development, artificial lighting, non-native vegetation, and sea level rise is a serious threat affecting nesting females and hatchlings (National Oceanic and Atmospheric Administration, 2007).

Sea turtles can be found throughout the HRC; two species are known to nest in the Hawaiian Archipelago, the green and hawksbill. All five species migrate through and forage in the offshore and oceanic waters of the HRC. Adult green turtles and hawksbill turtles are more often associated with nearshore habitats where they forage and nest on selected beaches in the Northwestern Hawaiian Islands and the Main Hawaiian Islands. Temporary disturbance incidents associated with HRC activities, such as Mine Neutralization Training, Gunnery Exercise (GUNEX), Sinking Exercise (SINKEX), or Service Weapons Tests could result in an incremental contribution to cumulative impacts on sea turtles. However, the mitigation measures identified in Chapter 6.0 would minimize any potential adverse effects on sea turtles from explosives. Further, since it is not likely that sea turtles can hear MFA/HFA sonar, the Navy believes that this activity would not constitute a significant contribution to cumulative effects on sea turtles from other sources of impact including anthropogenic sound. The impacts of the No-action and Proposed Action Alternatives are not likely to affect the species' or stock's annual rates of recruitment or survival. Therefore, the incremental impacts of the No-action and Proposed Action Alternatives would not present a significant contribution to the effects on sea turtles when added to effects on sea turtles from other past, present, and reasonably foreseeable future actions.

Marine Mammals

Risks to marine mammals emanate primarily from ship strikes, exposure to chemical toxins or biotoxins, exposure to fishing equipment that may result in entanglements, and disruption or depletion of food sources from fishing pressure and other environmental factors. Potential cumulative impacts of Navy activities on marine mammals would result primarily from possible ship strikes, MFA sonar, and use of explosives.

Stressors on marine mammals and marine mammal populations can include both natural and human-influenced causes listed below and described in the following sections:

<u>Natural Stressors</u>

- Disease
- Natural toxins
- Weather and climatic influences
- Navigation errors
- Social cohesion

<u>Human-Influenced Stressors</u>

- Fisheries interactions/bycatch

- Ship strikes
- Pollution and ingestion
- Noise
- Whale watching

Natural Stressors

Significant natural causes of mortality, die-offs, and stranding discussed below include disease and parasitism; marine neurotoxins from algae; navigation errors that lead to inadvertent stranding; and climatic influences that impact the distribution and abundance of potential food resources (i.e., starvation). Stranding also is caused by predation by other species such as sharks (Cockcroft et al., 1989; Heithaus, 2001), killer whales (Constantine et al., 1998; Guinet et al. 2000; Pitman et al. 2001), and some species of pinniped (Hiruki et al., 1999; Robinson et al., 1999).

Disease

Like other mammals, marine mammals frequently suffer from a variety of diseases of viral, bacterial, and fungal origin (Visser et al., 1991; Dunn et al., 2001; Harwood, 2002). Gulland and Hall (2005, 2007) provide a summary of individual and population effects of marine mammal diseases.

Marine Neurotoxins

Some single-celled marine algae common in coastal waters, such as dinoflagellates and diatoms, produce toxic compounds that can bio-accumulate in the flesh and organs of fish and invertebrates (Geraci et al., 1999; Harwood, 2002). Marine mammals become exposed to these compounds when they eat prey contaminated by these naturally produced toxins (Van Dolah, 2005).

Weather Events and Climate Influences

Severe storms, hurricanes, typhoons, and prolonged temperature extremes may lead to local marine mammal strandings (Geraci et al., 1999; Walsh et al., 2001). Storms in 1982-1983 along the California coast led to deaths of 2,000 northern elephant seal pups (Le Boeuf and Reiter 1991). Seasonal oceanographic conditions in terms of weather, frontal systems, and local currents may also play a role in stranding (Walker et al., 2005).

The effect of large-scale climatic changes to the world's oceans and how these changes impact marine mammals and influence strandings are difficult to quantify, given the broad spatial and temporal scales involved, and the cryptic movement patterns of marine mammals (Moore 2005; Learmonth et al. 2006). The most immediate, although indirect, effect is decreased prey availability during unusual conditions. This, in turn, results in increased search effort required by marine mammals (Crocker et al. 2006), potential starvation if not successful, and corresponding stranding due directly to starvation or succumbing to disease or predation while in a weakened, stressed state (Selzer and Payne 1988; Geraci et al. 1999; Moore, 2005; Learmonth et al. 2006; Weise et al. 2006).

Navigational Error

Geomagnetism

Like some land animals and birds, marine mammals may be able to orient to the Earth's magnetic field as a navigational cue, and areas of local magnetic anomalies may influence strandings (Bauer et al., 1985; Klinowska 1985; Kirschvink et al. 1986; Klinowska 1986; Walker et al., 1992; Wartzok and Ketten 1999).

Echolocation Disruption in Shallow Water

Some researchers believe stranding may result from reductions in the effectiveness of echolocation in shallow water, especially in the pelagic species of odontocetes who may be less familiar with coastlines (Dudok van Heel, 1966; Chambers and James, 2005). For an odontocete, echoes from echolocation signals contain important information on the location and identity of underwater objects and the shoreline. The authors postulate that the gradual slope of a beach may present difficulties to the navigational systems of some cetaceans, since live strandings commonly occur along beaches with shallow, sandy gradients (Brabyn and McLean, 1992; Mazzuca et al., 1999; Maldini et al., 2005; Walker et al., 2005). A factor contributing to echolocation interference in turbulent, shallow water is the presence of microbubbles from the interaction of wind, breaking waves, and currents. Additionally, ocean water near the shoreline can have an increased turbidity (e.g., floating sand or silt, particulate plant matter) due to the run-off of fresh water into the ocean, either from rainfall or from freshwater outflows (e.g., rivers and creeks). Collectively, these factors can reduce and scatter the sound energy in echolocation signals and reduce the perceptibility of returning echoes of interest.

Social Cohesion

Many pelagic species such as sperm whales, pilot whales, melon-head whales, and false killer whales, and some dolphins occur in large groups with strong social bonds between individuals. When one or more animals strand due to any number of causative events, then the entire pod may follow suit out of social cohesion (Geraci et al., 1999; Conner, 2000; Perrin and Geraci, 2002; National Marine Fisheries Service, 2007).

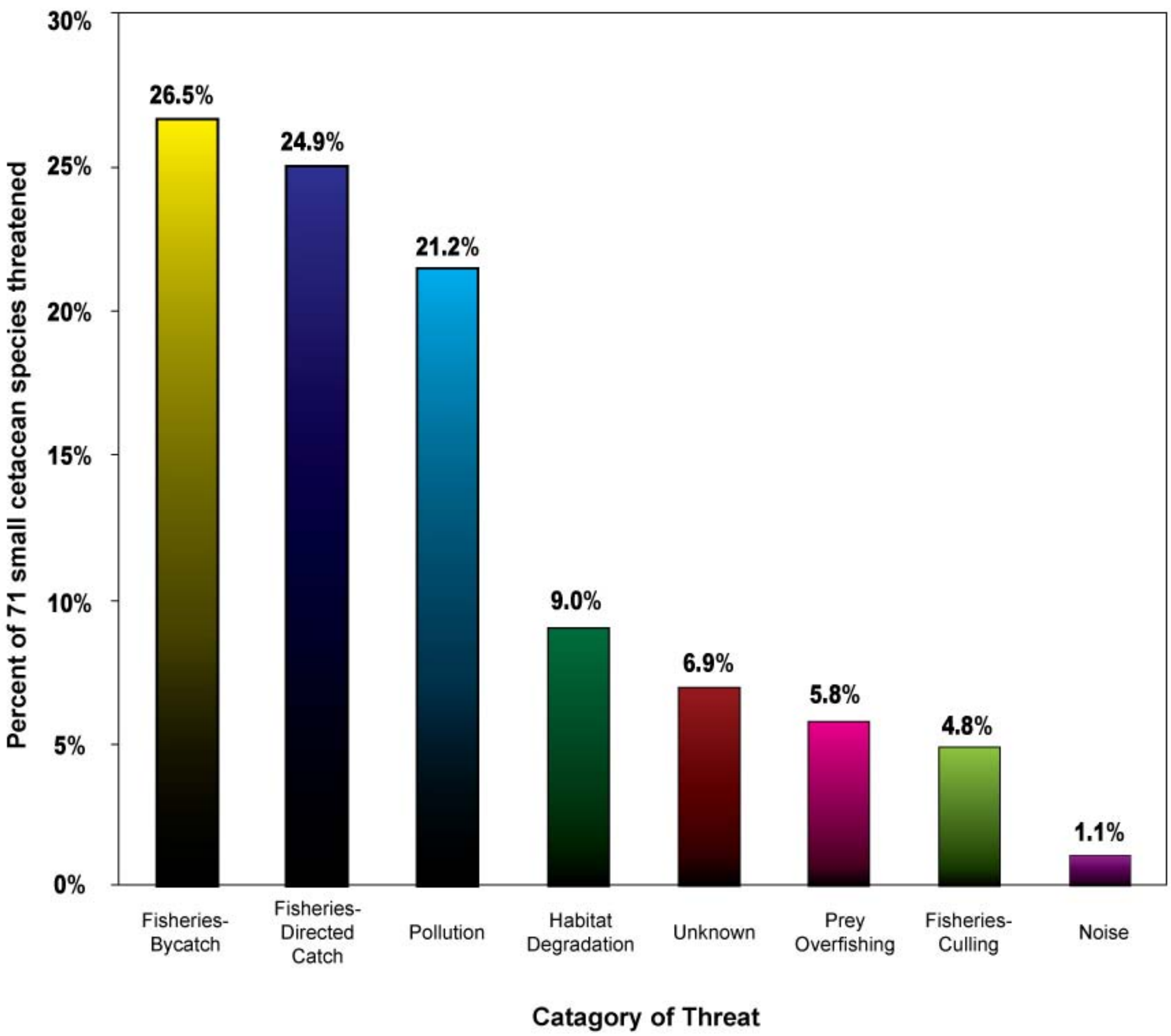
Anthropogenic Stressors

During the past few decades there has been an increase in marine mammal mortalities associated with a variety of human activities (Geraci et al., 1999; National Marine Fisheries Service, 2007). These activities include fisheries interactions (bycatch and directed catch), pollution (marine debris, toxic compounds), habitat modification (degradation, prey reduction), ship strikes (Laist et al., 2001), and gunshots (Figure 5.5.3.1-1).

Ship Strikes

Many of the migratory species of large whales examined in this EIS/OEIS could be at risk to ship strike from all sources during their migrations within the HRC as well as their destinations outside of the HRC operating area. These species include humpback whales, fin whales, sperm whales, sei whales, Bryde's whales, and minke whales. Commercial shipping and commercial fishing could contribute to ship strike as part of cumulative effects. As noted in Jensen and Silber (2003), certain classes of vessels are likely over-represented in the data, in particular Federal vessels including Navy and Coast Guard ships, which are required to report all strikes of marine mammals. Factors that contribute to this include non-reporting by commercial vessels, failure to recognize ship-strikes by larger ships (e.g., ≥40,000 tons), smaller Navy and

Coast Guard ships, and greater numbers of dedicated observers/watch standers aboard Navy and Coast Guard ships which result in more and better reporting. Over the past decade there have been two ship strikes by Navy vessels in Hawaiian waters, each involving a humpback whale, neither of which appeared injured. One of the vessels was a submarine entering the channel at Pearl Harbor, and the other was a torpedo retrieval boat off of Kekaha, Kauai. In comparison, in 2006 there were nine ship strikes by vessels engaged in whale watching according to the Pacific Islands Region Marine Mammal Response Network.



Source: Culik, 2002

Figure 5.5.3.1-1. Human Threats to World-wide Small Cetacean Populations

Navy vessel traffic is a small fraction (approximately 2 percent) of the overall U.S. commercial and fishing vessel traffic (Jensen and Silber, 2003). While Navy vessel movements may contribute to the ship strike threat, given the lookout and mitigation measures adopted by the Navy, probability of vessel strikes is greatly reduced. Furthermore, actions to avoid close interaction of Navy ships and marine mammals and sea turtles, such as maneuvering to keep away from any observed marine mammal and sea turtle are part of existing at-sea protocols and standard operating procedures. Navy ships three bridge watchstanders during at-sea movements who would be searching for any whales, sea turtles, or other obstacles on the water surface. Such lookouts are expected to further reduce the chances of a collision.

Note that the majority of ships participating in Navy Training exercises, such as Navy destroyers, have a number of advantages for avoiding ship strike as compared to most commercial merchant vessels.

- The Navy ships have their bridges positioned forward, offering good visibility ahead of the bow.
- Crew size is much larger than merchant ships
- During all ASW, Mine Integrated Warfare (MIW) events and some nearshore ship movements, there are lookouts posted scanning the ocean for anything detectible in the water; anything detected is reported to the Officer of the Deck.
- Navy lookouts receive extensive training including Marine Species Awareness Training designed to provide marine species detection cues and information necessary to detect marine mammals and sea turtles.
- Navy ships are generally much more maneuverable than commercial merchant vessels.

The contribution to cumulative effects by military readiness activities within the HRC with respect to ship strike are expected to be minimal given the relatively small percentage of ship traffic represented by Navy ships and the mitigation measures identified in Chapter 6.0.

Hawaii Superferry

There is a potential for collisions between the Superferry and humpback whales in Hawaiian waters during the winter humpback season. In order to address this and other issues the State of Hawaii imposed operating restrictions on the Superferry by which include routing changes and certified lookouts/observers. A State EIS is being prepared while the ferry continues to operate. Military readiness activities within the HRC are not expected to contribute to cumulative impacts from the Superferry given the routes and training areas Navy ships use, and the mitigation measures identified in Chapter 6.0. The State EIS should also evaluate all other impacts attributable to the Superferry.

Fisheries Interaction: Bycatch, Entanglement, and Directed Catch

The incidental catch of marine mammals in commercial fisheries is a significant threat to the survival and recovery of many populations of marine mammals (Geraci et al., 1999; Baird, 2002; Culik, 2002; Carretta et al., 2004; Geraci and Lounsbury, 2005; National Marine Fisheries Service, 2007b). Interactions with fisheries and entanglement in discarded or lost gear continue to be a major factor in marine mammal deaths worldwide (Geraci et al., 1999; Nieri et al., 1999; Geraci and Lounsbury, 2005; Read et al., 2006; Zeeberg et al., 2006). For instance, baleen whales and pinnipeds have been found entangled in nets, ropes, monofilament line, and other fishing gear that has been discarded out at sea (Geraci et al., 1999; Campagna et al., 2007). (See Figure 5.4.2.1-1).

Bycatch

Bycatch is the catching of non-target species within a given fishing operation and can include non-commercially used invertebrates, fish, sea turtles, birds, and marine mammals (National Research Council, 2006). Read et al. (2006) attempted to estimate the magnitude of marine mammal bycatch in U.S. and global fisheries. Within U.S. fisheries, between 1990 and 1999 the mean annual bycatch of marine mammals was 6,215 animals. Eighty-four percent of cetacean bycatch occurred in gill-net fisheries, with dolphins and porpoises constituting most of the cetacean bycatch (Read et al., 2006). Over the decade there was a 40 percent decline in marine mammal bycatch, primarily due to effective conservation measures that were implemented during this time period.

With global marine mammal bycatch likely to be in the hundreds of thousands every year, bycatch in fisheries are the single greatest threat to many marine mammal populations around the world (Read et al., 2006).

For Hawaii, entanglements in fishing gear are a serious concern. According to the NMFS Pacific Islands Region Marine Mammal Response Network Activity Update (dated July 2007), there were reports of 26 distressed marine mammals in Hawaii found entangled in fishing gear for the 6-month period, November to April 2007). Over a 12-month period there were five monk seals found that had been injured by fish hooks. From the NOAA Fisheries observer program to date, there have been three observed interactions with ESA listed whale species and Hawaii-based pelagic longline fisheries. Two of the incidents involved humpback whales, and one involved a sperm whale. Recent Biological Opinions associated with the Fishery Management Plan (FMP) have concluded that the region's pelagic fisheries are not likely to have an adverse effect on the populations of the seven ESA listed whale species in the region. There are documented interactions with several non-ESA listed marine mammals as well, although observer data from the Hawaii-based longline fishery show that interactions with non-ESA listed marine mammals are infrequent. At present, the Hawaii-based pelagic fisheries are classified as Category I fisheries under Section 118 of the MMPA, which defines them to have frequent incidental mortality and serious injury of marine mammals. (National Oceanic Atmospheric Administration Fisheries, 2004)

Section 118 of the MMPA requires that the NMFS implement take reduction plans to reduce interactions between commercial fishing gear and marine mammals, as necessary. NMFS has also assessed the potential risk for marine mammal interactions in the United States and assigned each fishery to a Category (Category I, II, or III) depending on the likelihood of interactions with marine mammals in a particular fishery. Additional information on NMFS' efforts to implement the MMPA and minimize interactions with marine mammals and fisheries can be found on the official NOAA website, “Marine Mammal Protection Act (MMPA) of 1972” (National Oceanic and Atmospheric Administration, 2008a).

Entanglement

Entanglement in active fishing gear is a major cause of death or severe injury among the endangered whales in the action area. Entangled marine mammals may die as a result of drowning, escape with pieces of gear still attached to their bodies, or manage to be set free either of their own accord or by fishermen. Many large whales carry off gear after becoming entangled (Read et al., 2006). When a marine mammal swims off with gear attached, the result can be fatal. The gear may become too cumbersome for the animal, or it can be wrapped around a crucial body part and tighten over time. Stranded marine mammals frequently exhibit signs of previous fishery interaction, such as scarring or gear attached to their bodies. For stranded marine mammals, death is often attributed to such interactions (Baird and Gorgone, 2005). Because marine mammals that die due to fisheries interactions may not wash ashore and not all animals that do wash ashore exhibit clear signs of interactions, data probably underestimate fishery-related mortality and serious injury (National Marine Fisheries Service, 2005b).

<u>Directed Catch</u>

Within the region of influence authorized whale kills from scientific research and subsistence harvest are not known to occur. Therefore, no cumulative effects are expected from military readiness activities within the HRC with respect to authorized directed kills of marine mammals.

Ingestion of Plastic Objects and Other Marine Debris and Toxic Pollution Exposure

For many marine mammals, debris in the marine environment is a great hazard. Not only is debris a hazard because of possible entanglement, animals may mistake plastics and other debris for food (National Marine Fisheries Service, 2007h). Sperm whales have been known to ingest plastic debris, such as plastic bags (Evans et al., 2003; Whitehead, 2003). While this has led to mortality, the scale on which this is affecting sperm whale populations is unknown, but Whitehead (2003) suspects it is not substantial at this time.

High concentrations of potentially toxic substances within marine mammals along with an increase in new diseases have been documented in recent years. Scientists have begun to consider the possibility of a link between pollutants and marine mammal mortality events. NMFS takes part in a marine mammal bio-monitoring program not only to help assess the health and contaminant loads of marine mammals, but also to assist in determining anthropogenic impacts on marine mammals, marine food chains, and marine ecosystem health. Using strandings and bycatch animals, the program provides tissue/serum archiving, samples for analyses, disease monitoring and reporting, and additional response during disease investigations (National Marine Fisheries Service, 2007b).

The impacts of these activities are difficult to measure. However, some researchers have correlated contaminant exposure with possible adverse health effects in marine mammals (Borell, 1993; O'Shea and Brownell, 1994; O'Hara and Rice, 1996; O'Hara et al., 1999).

The manmade chemical PCB (polychlorinated biphenyl), and the pesticide DDT (dichlorodiphyenyltrichloroethane), are both considered persistent organic pollutants that are currently banned in the United States for their harmful effects in wildlife and humans (National Marine Fisheries Service, 2007d). Despite having been banned for decades, the levels of these compounds are still high in marine mammal tissue samples taken along U.S. coasts (Hickie et al., 2007; Krahn et al., 2007; National Marine Fisheries Service, 2007e). Both compounds are long-lasting, reside in marine mammal fat tissues (especially in the blubber), and can have toxic effects such as reproductive impairment and immunosuppression (National Marine Fisheries Service, 2007d).

In addition to direct effects, marine mammals are indirectly affected by habitat contamination that degrades prey species availability, or increases disease susceptibility (Geraci et al., 1999).

Navy vessel operation between ports and exercise locations has the potential to release small amounts of pollutant discharges into the water column. Navy vessels are not a typical source, however, of either pathogens or other contaminants with bioaccumulation potential such as pesticides and PCBs. Furthermore, any vessel discharges such as bilgewater and deck runoff associated with the vessels would be in accordance with international and U.S. requirements for eliminating or minimizing discharges of oil, garbage, and other substances, and not likely to contribute significant changes to ocean water quality or to affect marine mammals.

Anthropogenic Sound

As one of the potential stressors to marine mammal populations, noise and acoustic influences may disrupt marine mammal communication, navigational ability, and social patterns, and may or may not influence stranding. Many marine mammals use sound to communicate, navigate, locate prey, and sense their environment. Both anthropogenic and natural sounds may interfere with these functions, although comprehension of the type and magnitude of any behavioral or physiological responses resulting from man-made sound, and how these responses may contribute to strandings, is rudimentary at best (National Marine Fisheries Service, 2007b). Marine mammals may respond both behaviorally and physiologically to anthropogenic sound exposure, (e.g., Richardson et al., 1995a; Finneran et al., 2000; Finneran et al., 2003; Finneran et al., 2005). However, the range and magnitude of the behavioral response of marine mammals to various sound sources is highly variable (Richardson et al., 1995a) and appears to depend on the species involved, the experience of the animal with the sound source, the motivation of the animal (e.g., feeding, mating), and the context of the exposure.

Marine mammals are regularly exposed to several sources of natural and anthropogenic sounds. Anthropogenic noise that could affect ambient noise arises from the following general types of activities in and near the sea, any combination of which can contribute to the total noise at any one place and time. These noises include transportation; dredging; construction; oil, gas, and mineral exploration in offshore areas; geophysical (seismic) surveys; sonar; explosions; and ocean research activities (Richardson et al., 1995a). Commercial fishing vessels, cruise ships, transport boats, recreational boats, and aircraft, all contribute sound into the ocean (National Research Council, 2003; 2006). Several investigators have argued that anthropogenic sources of noise have increased ambient noise levels in the ocean over the last 50 years (National Research Council, 1994, 2000, 2003, 2005; Richardson et al., 1995a; Jasny et al., 2005; McDonald et al., 2006). Much of this increase is due to increased shipping due to ships becoming more numerous and of larger tonnage (National Research Council, 2003; McDonald et al., 2006). Andrew et al. (2002) compared ocean ambient sound from the 1960s with the 1990s for a receiver off the California coast. The data showed an increase in ambient noise of approximately 10 dB in the frequency range of 20 to 80 Hz and 200 and 300 Hz, and about 3 dB at 100 Hz over a 33-year period.

Navy MFA/HFA Sonar

The Navy's most powerful surface ship sonar is the SQS-53, which has the nominal source level of 235 dB re 1 squared micropascal-second (μPa^2-s) at 1.09 yards (or 1 meter [m]). Generally (based on water conditions) a ping will lose approximately 60 dB after traveling 1,000 yards from the sonar dome, resulting in a received level of 175 dB at 1,000 yards from the sonar dome. The Navy's standard mitigation measures consider the area within 1,000 yards of the bow (the sonar dome) a Safety Zone. The resulting 175 dB sound level at 1,000 yards, where the Navy's mitigation Safety Zone begins, is for comparison, less than source level produced by the vocalization of many marine mammals and less than other sounds marine mammals may be exposed to, such as humpback fluke and flipper slaps at source levels of 183 to 192 dB (Richardson et al., 1995a).

The Navy's standard mitigation measures are designed to prevent direct injury to marine mammals as a result of the sonar's acoustic energy. The Navy currently employs the mitigation measures described in Chapter 6.0. These are designed to prevent direct injury to marine mammals as a result of the sonar's acoustic energy. If any marine mammal is sighted within 1,000 yards of the bow, the sonar power is reduced by 75 percent (6 dB). The average level (195 dB) at which the onset of measurable physiological change to hearing (technically referred to as "temporary threshold shift [TTS]") could be determined occurs approximately 200 yards from a sonar dome transmitting a 1-second, 235 dB ping. The Safety Zone distance of 1,000 yards is more than four times the average distance at which the onset of a measurable and temporary physiological change occurs, and yet a significant power reduction is mandated if a marine mammal comes within this range. Additional measures, detailed in Chapter 6.0 involving exercise planning, to lessen the potential for there to be cumulative impacts or synergistic effect from the use of sonar during training exercises.

A nominal sonar ping is approximately 1 second in duration followed by a period of silence lasting 30 seconds or longer during which the MFA sonar system listens for a return reflection of that ping. An Undersea Warfare (USWEX) event can last for 72 to 96 hours, although the ASW portions of the exercise (modeled as three periods lasting approximately 16 hours each) are a subset of the total exercise timeframe. Within the ASW event where hull-mounted MFA sonar is used, the sonar system produces sound in the water only a small fraction of the time ASW is being conducted or, as in the preceding example, 2 seconds of sound every minute. When compared against naturally occurring and other man-made sources of noise in the oceans, the sonar pings during ASW events are only a brief and intermittent portion of the total acoustic noise.

Sound emitted from large vessels, particularly in the course of transit, is the principal source of noise in the ocean today, primarily due to the properties of sound emitted by civilian cargo vessels (Richardson et al., 1995a; Arveson and Vendittis, 2000). Ship propulsion and electricity generation engines, engine gearing, compressors, bilge and ballast pumps, as well as hydrodynamic flow surrounding a ship's hull and any hull protrusions, contribute to a large vessels' noise emissions in the marine environment. Prop-driven vessels also generate noise through cavitation, which accounts much of the noise emitted by a large vessel depending on its travel speed. Military vessels underway or involved in naval operations or exercises, also introduce anthropogenic noise into the marine environment. Noise emitted by large vessels can be characterized as low-frequency, continuous, and tonal. The sound pressure levels at the vessel will vary according to speed, burden, capacity, and length (Richardson et al., 1995a; Arveson and Vendittis, 2000). Vessels ranging from 135 to 337 meters generate peak source sound levels from 169 - 200 dB between 8 Hz and 430 Hz, although Arveson and Vendittis (2000) documented components of higher frequencies (10-30 kHz) as a function of newer merchant ship engines and faster transit speeds. Given the propagation of low-frequency sounds, a large vessel in this sound range can be heard 139-463 kilometers away (Ross 1976 in Polefka 2004). Navy vessels, however, have incorporated significant underwater ship quieting technology to reduce their acoustic signature (as compared to a similarly-sized vessel) and thus reduce their vulnerability to detection by enemy passive acoustics (Southall, 2005).

Vessel Mechanical Noise Sources

Mechanical noise on Navy ships, especially those engaged in ASW, is very quiet in comparison to civilian vessels of similar or larger size. Most Navy ships are built to reduce radiated noise so as to assist with the ship's passive ASW and make the ship harder for submarines to detect and classify them passively. This general feature is also enhanced by the use of additional quieting technologies (i.e., gas turbine propulsion) as a means of limiting passive detection by opposing submarines.

Airborne Sound Source

Airborne sound from a low-flying helicopter or airplane may be heard by marine mammals and turtles while at the surface or underwater. Due to the transient nature of sounds from aircraft involved in at-sea operations, such sounds would not likely cause physical effects but have the potential to affect behaviors. Responses by mammals and turtles could include hasty dives or turns, or decreased foraging (Soto et al., 2006); whales may also slap the water with flukes or flippers and swim away from the aircraft track.

Seismic and Explosive Sources

There are no reasonably foreseeable oil and gas exploration activities that would be occurring in the action area and thus no impacts from air guns or explosives to marine mammals are expected. Seismic exploration and nearshore/harbor construction employing explosives may contribute to anthropogenic noise within the action area. Temporary disturbance incidents associated with HRC activities, such as Mine Neutralization Training, GUNEX, SINKEX, or Service Weapons Tests could result in an incremental contribution to cumulative impacts on marine mammals. However, the mitigation measures identified in Chapter 6.0 should eliminate any potential adverse effects to marine mammals from explosives and no cumulative effects are anticipated.

MFA/HFA Sonar

Naval sonars are designed for three primary functions: submarine hunting, mine hunting, and shipping surveillance. There are two classes of sonars employed by the Navy: active sonars and passive sonars. Most active military sonars operate in a limited number of areas, and are most likely not a significant contributor to a comprehensive global ocean noise budget (International Council for the Exploration of the Sea, 2005c).

Increases in ambient noise levels might have the potential to mask an animal's ability to detect objects, such as fishing gear, and thus increase their susceptibility to bycatch. MFA sonar transmission, however, involves a very small portion of the frequency spectrum and falls between the central hearing range of the (generally) low-frequency specializing baleen whales and the (generally) high-frequency specializing odontocetes. In addition, the active portion of MFA/HFA sonar is intermittent, brief, and individual units engaged in the exercise are separated by large distances. As a result, MFA/HFA sonar use during Navy training activities will not contribute to an increase in baseline anthropogenic ambient noise levels to any significant degree. Additional discussion of MFA/HFA operational parameters is found in Section 5.4.2.3.

During training exercises, MFA/HFA sonar will add to regional sound levels, but the cumulative effects of potential short-term and intermittent acoustic exposure to marine mammals are not well known. The analysis of potential effects of MFA sonar from training events determined there is a potential for harassment of marine mammals. It is possible that harassment in any form may cause a stress response (Fair and Becker, 2000). Cetaceans can exhibit some of the same stress symptoms as found in terrestrial mammals (Curry, 1999). Disturbance from ship traffic, noise from ships and aircraft, and/or exposure to biotoxins and anthropogenic contaminants may stress animals, weakening their immune systems, and making them more vulnerable to parasites and diseases that normally would not be fatal. Any minimal incremental contribution to cumulative impacts on marine mammals from possible temporary harassment incidents associated with military readiness training within the HRC would not likely be significant. The mitigation measures identified in Chapter 6.0 would be implemented to further minimize any potential adverse effects on marine mammals.

As discussed previously, because MFA/HFA sonar transmissions are brief and intermittent, cumulative impacts from ship strikes due to masking from MFA/HFA sonar signals are not a reasonably foreseeable significant adverse impact on marine animals

Impacts from military readiness activities associated with the HRC, including the use of MFA/HFA sonar, are not likely to affect the identified species or stock of marine mammals through effects on annual rates of recruitment or survival. Therefore, the incremental impacts from these activities would not represent a significant contribution to the cumulative effects on marine mammals or sea turtles when added to other past, present, and reasonably foreseeable future actions.

Cumulative Impacts and Synergistic Effects of LFA/MFA/HFA

MFA/HFA sonars make use of distinct and narrow fractions of the mid-frequency and high-frequency sound spectrum as noted previously. Other Navy systems (i.e., fathometers) are specifically designed to avoid use of these same frequencies, which would otherwise interfere with the MFA/HFA sonars. These HFA sonar systems generally employ weaker power levels at higher frequencies which both result rapid attenuation of the sound levels. There should, therefore, be no cumulative impacts from multiple systems using the same frequency. For the same reason, there should be no synergistic effects from the MFA/HFA systems in use during Navy training. Because of major differences in signal characteristics between LFA sonar, MFA/HFA sonar, and seismic air guns, there is negligible chance of producing a “synergistic” sound field. It is also unlikely that LFA sources, if operated in proximity to each other, would produce a sound field so complex that marine animals would not be able to escape. The potential for sound waves from multiple sources and a marine mammal would converge at the same time to cause harm to the mammal is so unlikely that it is statistically insignificant.

The potential simultaneous use of both LFA sonar and MFA/HFA sonar systems in the HRC would involve transmissions in portions of both the low, mid-, and high frequency sound spectrums. This raises a question regarding the potential for masking from the simultaneous use of these systems. There are, however, large differences between LFA and MFA/HFA sonar systems’ signal characteristics given the time of transmission, depth, vertical steering angle, waveform, wavetrain, pulse length, pulse repetition rate, bandwidth, and duty cycle. As noted above, the portion of the low frequency spectrum that LFA can affect is both small and short in duration. As described previously, MFA sonar transmissions are very brief, in a narrow frequency band, and typically on the order of a 1-second ping with 30 seconds between pings. Similarly, the HFA sources used are lower in power and generally at a single distinct frequency. Therefore, transmissions of LFA and MFA/HFA sonar, if overlapping in time, would do so only temporarily and would each be in narrow, non-overlapping and distinct frequency bands. They would, therefore, not be additive in a masking sense, even if they did overlap in time (they would mask different signals), though in the rare instances where there were overlapping signals from LFA and MFA/HFA sonar they could affect a broader portion of the broadband signals. However, due to the differences in the operational characteristics, especially signal duration, any cumulative masking effects from the simultaneous use of LFA and MFA/HFA systems are expected to be negligible and extremely unlikely.

Summary of Cumulative Impacts Associated with SURTASS LFA

Given the information provided in the SURTASS LFA Final SEIS, the potential for cumulative impacts and synergistic effects from the operations of up to four SURTASS LFA sonars was considered to be small and has been addressed by limitations proposed for employment of the system (i.e., geographical restrictions and monitoring mitigation). Even if considered in combination with other underwater sounds, such as commercial shipping, other operational, research, and exploration activities (e.g., acoustic thermometry, hydrocarbon exploration and production), recreational water activities, naturally-occurring sounds (e.g., storms, lightning strikes, subsea earthquakes, underwater volcanoes, whale vocalizations, etc.) and MFA/HFA sonar, the proposed four SURTASS LFA sonar systems would not add appreciably to the underwater sounds to which fish, sea turtle and marine mammal stocks would be exposed. Moreover, SURTASS LFA sonar will cause no lethal takes of marine mammals (U.S. Department of the Navy 2007d). Therefore, cumulative impacts and synergistic effects of the operation of up to four SURTASS LFA sonar systems in conjunction with the Proposed Action alternatives, in particular MFA/HFA, are not reasonably foreseeable.

Whale Watching

All whale and dolphin watching conducted from vessels in Hawaii are specifically directed at following, closely observing these animals, or placing swimmers/divers to swim with dolphins and whales. Conversely Navy ships attempt to avoid marine mammals and sea turtles when they are observed or detected. While these commercial whale watching activities may have as yet undetected adverse impacts on marine mammals, including population level effects, military readiness activities within the HRC are not expected to contribute to cumulative effects associated with whale watching in Hawaiian waters.

Scientific Research

The effects of scientific research on marine mammals within the HRC are not expected to be significant, and the contribution of military readiness activities within the HRC to cumulative effects of scientific research are expected to be additive but minimal with implementation of the monitoring plan and mitigation measures presented in Chapter 6.0, and scientific research permit application evaluations conducted by NMFS.

Where state, county, and private coastal development may likely affect green and hawksbill turtle foraging and resting habitat, and marine mammal habitats, particularly in the Main Hawaiian Islands, both NEPA and ESA analysis will likely be conducted to evaluate impacts on these species. Based on the mitigation measures presented in Chapter 6.0, military readiness activities within the HRC are not expected to contribute to cumulative effects on sea turtle habitat.

It is worthy of mention that the causes for concern involving whale mortalities generally involve beaked whales at other locations (such as the Bahamas) occurring far from Hawaii, which do not relate to the Hawaiian context (see discussion on the critical nature of “context” presented in Southall et al. (2007)). There have been no known strandings or deaths of any beaked whales associated with the use of sonar in Hawaii. It has also been suggested that marine mammals will not strand in Hawaii, but would die and sink at sea. As discussed in Chapter 4, the claim that a significant number of marine mammal carcasses would be missed is unreasonable, not supported by science, and not supported by the regular occurrence of floating or stranded marine mammals in Hawaii. For the reasons noted above, the Navy does not believe that continuing what has been decades of sonar use in Hawaii will result in any injury to beaked whales or other marine mammals.

Summary of Cumulative Impacts to Open Ocean and Offshore Biological Resources

As discussed above, there should be no cumulative impacts to marine plants, invertebrates, fish, or sea turtles as a result of the Proposed Actions. All Level B harassments of marine mammals are quantified in a cumulative manner given that they are a summation of individual estimated exposures over an annual basis before consideration of the Navy’s standard operating procedures, which serve as mitigation measures. It is unlikely there will be any impacts in addition to the behavioral harassments given these standard protective measures. The Navy does not believe that there will be any significant cumulative impacts to marine mammals in the HRC as a result of the Proposed Actions. In total, impacts resulting from the Proposed Actions in the HRC are not expected to result in any significant cumulative impacts to affected Open Ocean and Offshore resources.

5.5.3.2 ONSHORE BIOLOGICAL RESOURCES

Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the cumulative actions listed in Table 5.4.1-1 could affect terrestrial biological resources within the region of influence. Several events contribute cumulatively to habitat degradation, including disturbance to soils and vegetation, spread of invasive non-native species, erosion and sedimentation, and impacts on native plant species. Although individual impacts may be less than significant, collectively they have the potential to be significant over time and space. Some potential effects of invasive species are difficult to foresee (such as leading to a change in fire frequency or intensity); however, it is clear that the potential for damage associated with introduction or spread of invasive plant species is high and increases over time with repeated training missions, especially exercises that cover a very large area, because of the difficulty in effectively monitoring for invasive establishment and achieving timely control. The Navy is addressing these effects with several strategies including (1) implementation of Integrated Natural Resources Management Plans (INRMPs), (2) continued development and implementation of measures to prevent the establishment of invasive plant species by minimizing the potential for introductions of seed or other plant parts (propagules) of exotic species, and (3) finding and eliminating incipient populations before they are able to spread. Key measures include:

- Minimizing the amount of seed or propagules of non-native plant species introduced to the islands through continued efforts to remove seed and soil from all vehicles (including contractor vehicles) coming to the island by pressure washing at the ports of debarcation, and stepped up efforts to ensure that imported construction materials such as sand, gravel, aggregate, or road base material are weed free.

- Regular monitoring and treatment to detect and eliminate establishing exotic species, focusing on areas where equipment and construction materials come ashore and areas within which there is movement of equipment and personnel and soil disturbance which favor the spread and establishment of invasive species (e.g., along roadsides, and disturbed areas).
- Effective measures to foster the reestablishment of native vegetation in areas where non-native vegetation is present.
- Prohibiting living plant materials to be brought to the islands from the mainland (in order to avoid introduction of inappropriate genetic strains of native plants or exotic species, including weeds, insects and invertebrates).

Although there are impacts associated with the implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 on terrestrial biology within the HRC; these impacts would be mitigated to less than significant level. Any construction project or training event would be required to be in compliance with the established INRMP and U.S. Fish and Wildlife Service Biological Opinions. In addition, any project proposed within the HRC affecting threatened or endangered species would have included ESA Section 7 consultation addressing direct, indirect, and cumulative impacts.

5.5.4 CULTURAL RESOURCES

Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the cumulative actions listed in Table 5.4.1-1 would not result in significant cumulative impacts on cultural resources. The types of impacts typically associated with the alternatives include disturbance of archaeological or Native Hawaiian sites during ground disturbance (construction or troop/equipment movement) or the unanticipated discovery of archaeological materials. In accordance with Section 106 of the National Historic Preservation Act (36 CFR 800), cultural resources mitigation measures as described in the various sections of Chapter 4.0 would be implemented, including avoidance of resources (the preferred mitigation) and/or implementation of specific requirements already outlined in agency planning documents for the affected area (e.g., Integrated Cultural Resource Management Plans, Programmatic Agreements, Memorandums of Agreement). Some actions may also require the development of additional mitigation measures through consultation with the Hawaii State Historic Preservation Office, Council (as appropriate), and local Native Hawaiian organizations. Given the rigorous review process required under Section 106 prior to activities taking place, the measures already in place within agency planning documents to mitigate potential effects, and the diverse range of locations where activities would occur (representing different cultural contexts and site types), the implementation of alternatives presented in this EIS/OEIS, either individually or as a whole, would not result in significant cumulative impacts.

5.5.5 GEOLOGY AND SOILS

Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the cumulative actions listed in Table 5.4.1-1 would not result in significant impacts on geology and soils within the region of influence. The impacts on geology are very minor and mostly consist of limited temporal and spatial disturbances to underwater sediments or localized soil disturbance in previously disturbed areas on the islands. Erosion is a naturally recurring issue, but it is not heavily exacerbated by military activities. While construction type projects in the region may have localized erosion, overall cumulative effects would be negligible since Best Management Practices for soil disturbing activities are typically implemented during any construction activity.

5.5.6 HAZARDOUS MATERIALS AND WASTE

Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the cumulative actions listed in Table 5.4.1-1 would not result in cumulative impacts associated with the use of hazardous materials within the region of influence. There are a large number of hazardous materials inherent in the training and RDT&E activities within the HRC. For ordnance items that are used in the water, torpedoes are typically recovered , while the vast majority of non-ordnance items such as sonobuoys are not recovered. Sonobuoys that are not recovered are expended The primary concern with sonobuoys is the metal in the batteries, but studies have shown that with the three types of batteries in use, there is no substantial degradation of marine water quality. There are no hazardous waste disposal sites located on any of the Hawaiian Islands. Hazardous waste is barged to disposal facilities. There are no capacity issues in regards to hazardous waste because it is only sent to a facility that will accept the waste.

The primary impact of cumulative hazardous materials use in the HRC would be to increase the amounts of hazardous constituents that are released to the environment. Hazardous materials settling out of the water column would contribute to contamination of ocean bottom sediments. Relevant activities would include releases of hazardous constituents from fishing vessels, other ocean vessels, wastewater treatment plant outfalls, and non-point source pollution from terrestrial sources. The effects of these activities in the HRC are known only in a very general sense.

Commercial ocean industries, such as fishing and ocean transport, are dispersed over broad areas of the ocean. Discharges of hazardous constituents from non-point source runoff and treatment plant outfalls mostly affect the waters within 3 nm of the coast, whereas most of the Navy activities occur beyond the 12 nm limit of Federal waters. The quantities of contaminants released, however, would be cumulatively insignificant relative to the volume of the water and the area of bottom sediments affected. The use of hazardous materials by the Navy when added to that of other projects, would not significantly impact resources in the HRC.

The primary impact of hazardous materials on Kauai and Oahu would be to contribute contaminants to surface soils and to surface runoff into the ocean. Construction projects and maintenance activities on Kauai and Oahu beyond those included as part of the Proposed Action could also contribute minor amounts of hazardous contaminants to surface soils. The contributions of these other projects would be very minor, however, in comparison to the effects of the training and testing activities. Thus, the cumulative impacts would be substantially the same as the impacts described under each alternative.

5.5.7 HEALTH AND SAFETY

Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the cumulative actions listed in Table 5.4.1-1 would not affect public health and safety within the region of influence. The major factors influencing this analysis are: (1) the distance of hazardous operations from the islands; (2) the dispersed context of the hazardous operations, such that the intensity of the effects are not additive; (3) the lack of synergistic effects; (4) comprehensive Navy safety procedures in place to ensure that members of the general public are not placed in physical jeopardy due to RDT&E and training at sea; and (5) specific range clearance procedures and practices implemented daily prior to commencement of hazardous operations. Based on these factors, no significant cumulative impacts would occur relative to public health and safety.

5.5.8 LAND USE

Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the identified cumulative actions listed in Table 5.4.1-1 would not affect land use within the region of influence because no adverse land use impacts were identified in Chapter 4.0, and most training activities would occur on existing military installations and ranges with no change in use or land use designation. All proposed land uses would be compatible with State of Hawaii planning efforts. PMRF would continue to maintain a strip of coastline for public recreational purposes (except when closed for hazardous operations). Overall, recreational resources would continue to be protected and shoreline access would continue to be unimpeded.

5.5.9 NOISE

Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the cumulative actions listed in Table 5.4.1-1 would not incrementally affect noise within the region of influence. Noise levels are inherently localized because sound levels decrease relatively quickly with increasing distance from the source. Cumulative impacts would occur when multiple projects affect the same geographic areas simultaneously or when sequential projects extend the duration of noise impacts on a given area over a longer period of time. The noise environment in the Hawaiian Islands has changed over the years with the increase in human activity. The increased level of training proposed under Alternatives 1, 2, or 3 would increase noise levels; however, noise levels from training would be intermittent and similar to other noise levels already experienced in the region of influence. In addition, spatial separation among the cumulative projects listed in Table 5.4.1-1 would minimize or preclude cumulative noise impacts within the region of influence.

As part of the Proposed Action, the Navy is proposing to conduct Field Carrier Landing Practice (FCLP) approximately 16 times per year. For each pilot conducting this activity, the FCLP would include 8 to 10 touch-and-go landings during both daytime and at night (refer to Table 2.2.2.3-1). The landings would take place on existing airport runways at MCBH on Oahu or PMRF airfield on Kauai. Because FCLPs would only occur intermittently in association with transiting Strike Groups participating in Major Exercises and would only occur on existing airport runways, these activities would have only minimal effects on noise levels in the region of influence. For the open ocean, the cumulative impact of these projects in a regional context does not reach a level of significance because of the intermittent nature of the noise events and the lack of sensitive receptors over the large ocean areas involved. Potential cumulative impacts associated with underwater noise and impacts on marine mammals are addressed in Section 5.4.2.

On Oahu, the Honolulu International Airport is a major commercial hub for air traffic throughout the Pacific. Introduction of additional military aircraft (P-8A MMA and F-22) noted in Table

5.4.1-1 would not be expected to have a substantial effect on noise contours, which are dominated by commercial traffic.

5.5.10 SOCIOECONOMICS

Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the cumulative actions listed in Table 5.4.1-1 would not result in significant socioeconomic impacts within the region of influence. Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 would not produce any significant regional employment, income, housing, or infrastructure impacts. Effects on commercial and recreational fishermen, commercial tour boats, divers, and boaters would be short term in nature and produce some temporary access limitations. Some offshore events, especially if coincident with peak fishing locations and periods or whale migration periods, could cause temporary displacement and potential economic loss to individual fishermen and commercial tour boat operators. However, most offshore events are of short duration and have a small operational footprint. Effects on fishermen and commercial tour boat operators are mitigated by public notification of scheduled activities. In selected instances where safety requires exclusive use of a specific area, commercial fishing vessels, commercial vessels, or private vessels may be asked to relocate to a safer nearby area for the duration of the exercise. These measures should not significantly impact any individual fisherman, overall commercial revenue, or public recreational opportunity in the open ocean area. Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 would not affect minority or low-income populations disproportionately, nor would children be exposed to increased noise levels or safety risks because events mainly occur at sea.

5.5.11 TRANSPORTATION

Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the cumulative actions listed in Table 5.4.1-1 would not represent a significant increase in average daily traffic on island roadways or vessel traffic in the open ocean. Within the regional context of the Hawaiian Islands, there are large numbers of ship and boat movements. Ship traffic continues to increase on a yearly basis. However, commercial shipping and Navy ship traffic generally tends to steam to and from its original location. Navy ships conducting training events typically remain in range areas for training and RDT&E. Navy training events do not have a significant impact on other vessel traffic in the Hawaiian waters. In regards to the Hawaii Superferry, given the location of the ferry water lanes, it is not anticipated that the increased vessel traffic from this commuting vessel would contribute to the cumulative effects when assessed in combination with the actions proposed in this EIS/OEIS.

5.5.12 UTILITIES

Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the identified cumulative actions listed in Table 5.4.1-1 would not affect utility services within the region of influence because no adverse impacts were identified in Chapter 4.0, and there are no major proposed increases or changes in utility service demand. In addition, implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 would not result in an increase in personnel that would increase utility demand.

5.5.13 WATER RESOURCES

Implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 in conjunction with the identified cumulative actions listed in Table 5.4.1-1 would not result in significant impacts on water quality within the region of influence. For offshore training, the Navy would comply with the *Oil and Hazardous Substance Release and Contingency Plan* (40 CFR 300) developed for Navy activities within the HRC. Water quality impacts associated with implementation of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 are transitory in nature and would not reach a level of significance even in conjunction with the impacts of the other actions considered in a regional context.

6.0 Mitigation Measures

6.0 MITIGATION MEASURES

Effective training in the proposed Hawaii Range Complex (HRC) areas dictates that ship, submarine, and aircraft participants utilize their sensors and weapon systems to their optimum capabilities as required by the exercise objectives. The Navy recognizes that such use has the potential to cause behavioral disruption of some marine mammal species in the vicinity of training (as outlined in Chapter 4.0). National Environmental Policy Act (NEPA) regulations require that an Environmental Impact Statement (EIS) include analysis of appropriate mitigation measures not already included in the Proposed Action or alternatives (40 Code of Federal Regulations [CFR] § 1502.14 [h]). Each of the alternatives, including the Proposed Action considered in this EIS/Overseas EIS (OEIS), includes mitigation measures intended to reduce the environmental effects of Navy activities as discussed throughout this EIS/OEIS.

This chapter presents the Navy's standard protective measures in detail, outlining steps that would be implemented to protect marine mammals and federally listed species during training events. These protective measures will mitigate impacts resulting from training. It should be noted that protective measures have been standard operating procedures since 2004 for all levels of training from unit-level training through Major Exercises. This chapter also presents a discussion of other measures that have been considered but not adopted because they were determined either: (1) not feasible; (2) to present a safety risk; (3) to provide no known or ambiguous protective benefit; or (4) to have an unacceptable impact on training fidelity.

In addition, in order to issue the Marine Mammal Protection Act (MMPA) authorization required for certain activities, it might be necessary for National Marine Fisheries Service (NMFS) to require additional mitigation or monitoring measures beyond those addressed in the EIS/OEIS. These could include measures considered, but eliminated in the EIS/OEIS, or as yet developed measures. The public will have an opportunity to provide information to NMFS through the MMPA process, both during the comment period following NMFS' Notice of Receipt of the Navy's application for a Letter of Authorization (LOA), and during the comment period following publication of the proposed LOA. NMFS may propose additional mitigation or monitoring measures. Measures not considered in the mitigation and monitoring measures in this EIS/OEIS, but required through the MMPA process, might require evaluation in accordance with the National Environmental Policy Act. In doing so, NMFS may consider "tiering," that is, incorporating this EIS/OEIS during the MMPA process.

6.1 CURRENT MITIGATION MEASURES

Current protective measures employed by the Navy include applicable training of personnel and implementation of activity specific procedures resulting in minimization and/or avoidance of interactions with protected resources.

Navy shipboard lookout(s) are highly qualified and experienced observers of the marine environment. Their duties require that they report all objects sighted in the water to the Officer of the Deck (e.g., trash, a periscope, a marine mammal) and all disturbances (e.g., surface disturbance, discoloration) that may be indicative of a threat to the vessel and its crew. There are personnel serving as lookouts on station at all times (day and night) when a ship or surfaced submarine is moving through the water.

Navy lookouts undergo extensive training in order to qualify as a watchstander. This training includes on-the-job instruction under the supervision of an experienced watchstander, followed by completion of the Personal Qualification Standard program, certifying that they have demonstrated the necessary skills (such as detection and reporting of partially submerged objects and night observation techniques). In addition to these requirements, many Fleet lookouts periodically undergo a 2-day refresher training course.

The Navy includes marine species awareness as part of its training for its bridge lookout personnel on ships and submarines. Marine Species Awareness Training (MSAT) was updated in 2005, and the additional training materials are now included as required training for Navy lookouts. This training addresses the lookout's role in environmental protection, laws governing the protection of marine species, Navy stewardship commitments, and general observation information to aid in avoiding interactions with marine species. Marine species awareness and training is reemphasized by the following means:

- **Bridge personnel on ships and submarines**—Personnel utilize marine species awareness training techniques as standard operating procedure, they have available a marine species visual identification aid when marine mammals are sighted, and they receive updates to the current marine species awareness training as appropriate.
- **Aviation units**—Pilots and air crew personnel whose airborne duties during Anti-Submarine Warfare (ASW) operations include searching for submarine periscopes would be trained in marine mammal spotting. These personnel would also be trained on the details of the mitigation measures specific to both their platform and that of the surface combatants with which they are associated.
- **Sonar personnel on ships, submarines, and ASW aircraft**—Both passive and active sonar operators on ships, submarines, and aircraft utilize protective measures relative to their platform. The Navy issues a Letter of Instruction for each Major Exercise which mandates specific actions to be taken if a marine mammal is detected, and these actions are standard operating procedure throughout the exercise.

Implementation of these protective measures is required of all units. The activities undertaken on a Navy vessel or aircraft are highly controlled. The chain of command supervises these activities. Failure to follow orders can result in disciplinary action.

As noted previously, on January 23, 2007, the Deputy Secretary of Defense issued National Defense Exemption (NDE) II exempting all military readiness activities that employ mid-frequency active (MFA) sonar during Major Exercises or within established Department of Defense (DoD) maritime ranges or established operating areas (OPAREAs) from the permitting requirements of MMPA. This exemption covers activities for 2 years from the signing of NDE II. To adhere with NDE II, all exempt military readiness activities employing MFA sonar must follow the required 29 mitigation measures detailed below under three topic headings: Personnel Training (Section 6.1.1); Lookout and Watch Stander Responsibilities (Section 6.1.2); and Operating Procedures (Section 6.1.3). One Operating Procedure involving Safety Zones varies slightly from the NDE II text based on coordination between Navy and NMFS and is captured in its current form in Section 6.1.3. The NDE II language is provided in footnotes. Procedures involving coordination and reporting (the remaining three measures stipulated in the NDEII) are presented in the subsequent section titled Coordination and Reporting since they are not mitigation measures per se.

6.1.1 PERSONNEL TRAINING

All lookouts onboard platforms involved in ASW training events will review the NMFS approved MSAT material prior to MFA sonar use.

All Commanding Officers, Executive Officers, and officers standing watch on the Bridge will have reviewed the MSAT material prior to a training event employing the use of MFA sonar.

Navy lookouts will undertake extensive training in order to qualify as a watchstander in accordance with the Lookout Training Handbook (NAVEDTRA 12968-B).

Lookout training will include on-the-job instruction under the supervision of a qualified, experienced watchstander. Following successful completion of this supervised training period, Lookouts will complete the Personal Qualification Standard program, certifying that they have demonstrated the necessary skills (such as detection and reporting of partially submerged objects). This does not preclude personnel being trained as lookouts from being counted as those listed in previous measures so long as supervisors monitor their progress and performance.

Lookouts will be trained in the most effective means to ensure quick and effective communication within the command structure in order to facilitate implementation of protective measures if marine species are spotted.

6.1.2 LOOKOUT AND WATCHSTANDER RESPONSIBILITIES

On the bridge of surface ships, there will always be at least three people on watch whose duties include observing the water surface around the vessel.

In addition to the three personnel on watch noted previously, all surface ships participating in ASW exercises will have at all times during the exercise at least two additional personnel on watch as lookouts.

Personnel on lookout and officers on watch on the bridge will have at least one set of binoculars available for each person to aid in the detection of marine mammals.

On surface vessels equipped with MFA sonar, pedestal mounted “Big Eye” (20x110) binoculars will be present and in good working order to assist in the detection of marine mammals in the vicinity of the vessel.

Personnel on lookout will employ visual search procedures employing a scanning methodology in accordance with the Lookout Training Handbook (NAVEDTRA 12968-B).

After sunset and prior to sunrise, lookouts will employ Night Lookouts Techniques in accordance with the Lookout Training Handbook.

Personnel on lookout will be responsible for reporting all objects or anomalies sighted in the water (regardless of the distance from the vessel) to the Officer of the Deck, since any object or disturbance (e.g., trash, periscope, surface disturbance, discoloration) in the water may be indicative of a threat to the vessel and its crew or indicative of a marine species that may need to be avoided as warranted.

6.1.3 OPERATING PROCEDURES

A Letter of Instruction, Mitigation Measures Message or Environmental Annex to the Operational Order will be issued prior to the exercise to further disseminate the personnel training requirement and general marine mammal protective measures.

Commanding Officers will make use of marine species detection cues and information to limit interaction with marine species to the maximum extent possible consistent with safety of the ship.

All personnel engaged in passive acoustic sonar operation (including aircraft, surface ships, or submarines) will monitor for marine mammal vocalizations and report the detection of any marine mammal to the appropriate watch station for dissemination and appropriate action.

During MFA sonar operations, personnel will utilize all available sensor and optical systems (such as night vision goggles) to aid in the detection of marine mammals.

Navy aircraft participating in exercises at sea will conduct and maintain, when operationally feasible and safe, surveillance for marine species of concern as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties.

Aircraft with deployed sonobuoys will use only the passive capability of sonobuoys when marine mammals are detected within 200 yards of the sonobuoy.

Marine mammal detections will be immediately reported to assigned Aircraft Control Unit for further dissemination to ships in the vicinity of the marine species as appropriate where it is reasonable to conclude that the course of the ship will likely result in a closing of the distance to the detected marine mammal.

Safety Zones—When marine mammals are detected by any means (aircraft, shipboard lookout, or acoustically), the Navy will ensure that MFA transmission levels are limited to at least 6 decibels (dB) below normal operating levels if any detected animals are within 1,000 yards of the sonar dome (the bow)[1.]

1 NDE II language provides as follows: When marine mammals are detected by any means (aircraft, shipboard lookout, or acoustically) within 1,000 yards of the sonar dome (the bow), the ship or submarine will limit MFA transmission levels to at least 6 decibels (dB) below normal operating levels.

(i) Ships and submarines will continue to limit maximum MFA transmission levels by this 6-dB factor until the marine mammal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.

(ii) The Navy will ensure that MFA sonar transmissions will be limited to at least 10 dB below the equipment's normal operating level if any detected animals are within 500 yards of the sonar dome. Ships and submarines will continue to limit maximum ping levels by this 10-dB factor until the marine mammal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.[2]

(iii) The Navy will ensure that MFA sonar transmissions will cease if any detected animals are within 200 yards of the sonar dome. MFA sonar will not resume until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.[3]

(iv) Special conditions applicable for dolphins and porpoises only: If, after conducting an initial maneuver to avoid close quarters with dolphins or porpoises, the Officer of the Deck concludes that dolphins or porpoises are deliberately closing to ride the vessel's bow wave, no further mitigation actions are necessary while the dolphins or porpoises continue to exhibit bow wave riding behavior.

(v) If the need for MFA sonar power-down should arise as detailed in “Safety Zones” above, the ship or submarine shall follow the requirements as though they were operating MFA sonar at 235 dB—the normal operating level (i.e., the first power-down will be to 229 dB, regardless of at what level above 235 dB the MFA sonar was being operated).

Prior to start up or restart of MFA sonar, operators will check that the Safety Zone radius around the sound source is clear of marine mammals.

MFA sonar levels (generally)—the ship or submarine will operate MFA sonar at the lowest practicable level, not to exceed 235 dB, except as required to meet tactical training objectives.

Helicopters shall observe/survey the vicinity of an ASW exercise for 10 minutes before the first deployment of active (dipping) sonar in the water.

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2 NDE II language provides as follows: Should a marine mammal be detected within or closing to inside 500 yards of the sonar dome, MFA sonar transmissions will be limited to at least 10 dB below the equipment's normal operating level. Ships and submarines will continue to limit maximum ping levels by this 10-dB factor until the marine mammal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.

3 NDE II language provides as follows: Should the marine mammal be detected within or closing to inside 200 yards of the sonar dome, MFA sonar transmissions will cease. MFA sonar will not resume until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.

Helicopters shall not dip their sonar within 200 yards of a marine mammal and shall cease pinging if a marine mammal closes within 200 yards after pinging has begun.

Submarine sonar operators will review detection indicators of close-aboard marine mammals prior to the commencement of ASW events involving MFA sonar.

Increased vigilance during major ASW training with tactical MFA sonar when critical conditions are present.

> Based on lessons learned from strandings in the Bahamas (2000), Madeira (2000), the Canaries (2002), and Spain (2006), beaked whales are of particular concern since they have been associated with MFA sonar operations. The Navy should avoid planning major ASW training with MFA sonar in areas where they will encounter conditions that, in their aggregate, may contribute to a marine mammal stranding event.
>
> The conditions to be considered during exercise planning include:
>
> (i) Areas of at least 1,000-meter (m) depth near a shoreline where there is a rapid change in bathymetry on the order of 1,000 m to 6,000 m occurring across a relatively short horizontal distance (e.g., 5 nautical miles [nm]).
>
> (ii) Cases for which multiple ships or submarines (≥ 3) operating MFA sonar in the same area over extended periods of time (≥ 6 hours) in close proximity (≤ 10 nm apart).
>
> (iii) An area surrounded by land masses, separated by less than 35 nm and at least 10 nm in length, or an embayment, wherein events involving multiple ships/subs (≥ 3) employing MFA sonar near land may produce sound directed toward the channel or embayment that may cut off the lines of egress for marine mammals.
>
> (iv) Although not as dominant a condition as bathymetric features, the historical presence of a strong surface duct (i.e., a mixed layer of constant water temperature extending from the sea surface to 100 or more feet).
>
> If the Major Exercise must occur in an area where the above conditions exist in their aggregate, these conditions must be fully analyzed in environmental planning documentation. The Navy will increase vigilance by undertaking the following additional protective measure:
>
> A dedicated aircraft (Navy asset or contracted aircraft) will undertake reconnaissance of the embayment or channel ahead of the exercise participants to detect marine mammals that may be in the area exposed to active sonar. Where practical, advance survey should occur within about 2 hours prior to MFA sonar use, and periodic surveillance should continue for the duration of the exercise. Any unusual conditions (e.g., presence of sensitive species, groups of species milling out of habitat, any stranded animals) shall be reported to the Officer in Tactical

Command, who should give consideration to delaying, suspending, or altering the exercise.

All safety zone power-down requirements described in Measure 20 apply. The post-exercise report must include specific reference to any event conducted in areas where the above conditions exist, with exact location and time/duration of the event, and noting results of surveys conducted.

6.1.4 CURRENT MITIGATION MEASURES ASSOCIATED WITH EVENTS USING EER/IEER SONOBUOYS

The following are mitigation measures for use with Extended Echo Ranging/Improved Extended Echo Ranging (EER/IEER) given an explosive source generates the acoustic wave used in this sonobuoy.

1. Crews will conduct visual reconnaissance of the drop area prior to laying their intended sonobuoy pattern. This search should be conducted below 500 yards at a slow speed, if operationally feasible and weather conditions permit. In dual aircraft operations, crews are allowed to conduct coordinated area clearances.

2. Crews shall conduct a minimum of 30 minutes of visual and aural monitoring of the search area prior to commanding the first post detonation. This 30-minute observation period may include pattern deployment time.

3. For any part of the briefed pattern where a post (source/receiver sonobuoy pair) will be deployed within 1,000 yards of observed marine mammal activity, deploy the receiver ONLY and monitor while conducting a visual search. When marine mammals are no longer detected within 1,000 yards of the intended post position, co-locate the explosive source sonobuoy (AN/SSQ-110A) (source) with the receiver.

4. When able, crews will conduct continuous visual and aural monitoring of marine mammal activity. This is to include monitoring of own-aircraft sensors from first sensor placement to checking off station and out of communication range of these sensors.

5. Aural Detection: If the presence of marine mammals is detected aurally, then that should cue the aircrew to increase the diligence of their visual surveillance. Subsequently, if no marine mammals are visually detected, then the crew may continue multi-static active search.

6. Visual Detection:
   a. If marine mammals are visually detected within 1,000 yards of the explosive source sonobuoy (AN/SSQ-110A) intended for use, then that payload shall not be detonated. Aircrews may utilize this post once the marine mammals have not been re-sighted for 10 minutes, or are observed to have moved outside the 1,000 yards safety buffer.
   b. Aircrews may shift their multi-static active search to another post, where marine mammals are outside the 1,000 yards safety buffer.

7. Aircrews shall make every attempt to manually detonate the unexploded charges at each post in the pattern prior to departing the operations area by using the “Payload 1 Release” command followed by the “Payload 2 Release” command. Aircrews shall refrain from using the “Scuttle” command when two payloads remain at a given post. Aircrews will ensure that a 1,000 yards safety buffer, visually clear of marine mammals, is maintained around each post as is done during active search operations.

8. Aircrews shall only leave posts with unexploded charges in the event of a sonobuoy malfunction, an aircraft system malfunction, or when an aircraft must immediately depart the area due to issues such as fuel constraints, inclement weather, and in-flight emergencies. In these cases, the sonobuoy will self-scuttle using the secondary or tertiary method.

9. Ensure all payloads are accounted for. Explosive source sonobuoys (AN/SSQ-110A) that cannot be scuttled shall be reported as unexploded ordnance via voice communications while airborne, then upon landing via naval message.

10. Mammal monitoring shall continue until out of own-aircraft sensor range.

6.1.5 MFA/HFA SONAR USE ASSOCIATED WITH TRAINING EVENTS IN THE HUMPBACK WHALE CAUTIONARY AREA

Humpback whales migrate to the Hawaiian Islands each winter to rear their calves and mate. Data indicate that, historically, humpback whales have clearly concentrated in high densities in certain areas around the Hawaiian Islands. NMFS has reviewed the Navy’s data on MFA sonar training in these dense humpback whale areas since June 2006 and found it to be rare and infrequent. While past data is no guarantee of future activity, it documents a history of low level MFA sonar activity in dense humpback areas. In order to be successful at operational missions and against the threat of quiet, diesel-electric submarines, the Navy has, for more than 40 years, routinely conducted ASW training in Major Exercises in the waters off the Hawaiian Islands, including the Humpback Whale National Marine Sanctuary. During this period, no reported cases of harmful effects to humpback whales attributed to MFA sonar use have occurred. Coincident with this use of MFA sonar, abundance estimates reflect an annual increase in the humpback whale stock (Mobley, 2001, 2004).

NMFS and the Navy explored ways of affecting the least practicable impact (which includes a consideration of practicality of implementation and impacts to training fidelity) to humpback whales from exposure to MFA sonar. Proficiency in ASW requires that Sailors gain and maintain expert skills and experience in operating MFA sonar in myriad marine environments. Exclusion zones or restricted areas are impracticable and adversely impact MFA sonar training fidelity. The Hawaiian Islands, including areas in which humpback whales concentrate, contain unique bathymetric features the Navy needs to ensure Sailors gain critical skills and experience by training in littoral waters. Sound propagates differently in shallow water. No two shallow water areas are the same. Each shallow water area provides a unique training experience that could be critical to address specific future training requirements. Given the finite littoral areas in the Hawaii Islands area, maintaining the possibility of using all shallow water training areas is required to ensure Sailors receive the necessary training to develop and maintain critical MFA sonar skills. In real world events, crew members will be working in these types of areas and these are the types of areas where the adversary's quiet diesel-electric submarines will be operating. Without the critical ASW training in a variety of different near-shore environments, crews will not have the skills and varied experience needed to successfully operate MFA sonar in these types of waters, negatively affecting vital military readiness.

The Navy recognizes the significance of the Hawaiian Islands for humpback whales. The Navy has designated a humpback whale cautionary area (described below), which consists of a 5-km buffer zone that has been identified as having one of the highest concentrations of humpback whales during the critical winter months. The Navy has agreed that training exercises in the humpback whale cautionary area will require a much higher level of clearance than is normal practice in planning and conducting MFA sonar training. Should national security needs require MFA sonar training and testing in the cautionary area between 15 December and 15 April, it shall be personally authorized by the Commander, U.S. Pacific Fleet (CPF). The CPF shall base such authorization on the unique characteristics of the area from a military readiness perspective, taking into account the importance of the area for humpback whales and the need to minimize adverse impacts on humpback whales from MFA sonar whenever practicable. Approval at this level for this type of activity is extraordinary. CPF is a four-star Admiral and the highest ranking officer in the U.S. Pacific Fleet. This case-by-case authorization cannot be delegated and represents the Navy's commitment to fully consider and balance mission requirements with environmental stewardship. Further, CPF will provide specific direction on required mitigation prior to operational units transiting to and training in the cautionary area. This process will ensure the decisions to train in this area are made at the highest level in the Pacific Fleet, heighten awareness of humpback whale activities in the cautionary area, and serve to reemphasize that mitigation measures are to be scrupulously followed. The Navy will provide NMFS with advance notification of any such activities.

6.1.5.1 HUMPBACK WHALE CAUTIONARY AREA

The Humpback Whale Cautionary Area is defined as follows: an area extending 5 km from a line drawn from Kaunakakai on the island of Molokai to Kaena Point on the Island of Lanai; and an area extending 5 km from a line drawn from Kaunolu on the Island of Lanai to the most Northeastern point on the Island of Kahoolawe; and within a line drawn from Kanapou Bay on the Island of Kahoolawe to Kanahena Point on the Island of Maui and a line drawn from Cape Halawa on the Island of Molokai to Lipo Point on the Island of Maui, excluding the existing submarine operating area.

6.1.5.2 CAUTIONARY AREA USE, AUTHORIZATION, AND REPORTING

Should national security needs require MFA sonar training and testing in the cautionary area between 15 December and 15 April, it must be personally authorized by the Commander, U.S. Pacific Fleet based on his determination that training and testing in that specific area is required for national security purposes. This authorization shall be documented by the CPF in advance of transiting and training in the cautionary area. Further, CPF will provide specific direction on required mitigation measures prior to operational units transiting to and training in the cautionary area.

The Navy will provide advance notification to NMFS of any such activities.

The Navy will include in its periodic reports for compliance with the MMPA whether or not activities occurred in the area above and any observed effects on humpback whales due to the conduct of these activities.

6.1.6 EVALUATION OF CURRENT MITIGATION MEASURES

The Navy's current mitigation measures reflect the use of the best available science, balanced with the Navy's training needs. To understand the development of these mitigation measures, it is necessary to review the events arising out of the MMPA Incidental Harassment Authorization (IHA) that Navy obtained for Rim of the Pacific (RIMPAC) 2006.

The 2006 RIMPAC IHA was issued on June 27, 2006. It set forth mitigation measures regarding personnel training, use of aviation units to look for marine mammals, use of sonar personnel using passive indicators to check for marine mammals, limits on the sonar levels (generally), coastal exclusion zones, exclusion areas, safety zones, restrictions associated with "choke-points," surface ducting conditions and low visibility, stranding response and reporting protocols. Most of the measures, especially the ones later determined to have been most effective, were already Navy standard operating procedure.

Three days after issuance of the IHA (on June 30, 2006), following consultations with the Department of Commerce and pursuant to Title 16, Section 1371(f) of the United States Code (U.S.C.), the DoD authorized an NDE for a period of 6 months. The NDE exempted military readiness activities from compliance with the requirements of the MMPA involving the use of mid-frequency active (MFA) sonar during major training exercises and on established ranges and operating areas. The Deputy Secretary of Defense required RIMPAC 2006 activities to adhere to the mitigation measures in the 2006 RIMPAC IHA.

Because the RIMPAC 2006 IHA was the first authorization issued by NMFS for MFA sonar use, the mitigation measures required by NMFS in the IHA were purposefully inclusive of all potential mitigation measures without knowledge of either their effectiveness or impact on training fidelity. The IHA recognized the uncertainty associated with the effectiveness of the mandated mitigation measures and therefore required that a report be generated after RIMPAC 2006 that would provide "an assessment of the effectiveness of the mitigation and monitoring measures with recommendations on how to improve them."

In December 2006, the Navy produced the *2006 RIMPAC After-Action Report,* which it subsequently provided to NMFS*.* The assessment consisted of a review of compiled data from operators involved in the exercise, exercise reconstructions, and details of marine mammal detections by exercise participants, shore-based observers, and an aerial marine mammal survey (see Appendix F). The report concluded that certain measures in the IHA should be removed from future consideration because they proved not feasible, presented a safety risk, provided no known or unambiguous protective benefit (having no basis in scientific fact), and/or because they impacted the effectiveness of the required training.

Following the issuance of the *2006 RIMPAC After-Action Report* and consultation between the Navy and NMFS, NDE II was issued. The NDE II included 29 mitigation measures, which incorporated and refined the Navy's standard operating procedures and the measures set forth in the 2006 RIMPAC IHA and NDE I. All of the mandatory mitigation measures contained within NDE II have been utilized in all Navy training in the HRC conducted since January 2007.

After action reports for recent exercises in HRC (see Appendix F) indicate that protective measures have resulted in the minimization of sonar exposure to detected marine mammals. There have been no known instances of marine mammals behaviorally reacting to the use of sonar during these exercises.

The current measures are effective because the typical distances to a received sound energy level associated with temporary threshold shift (TTS) are typically within 200 m of the most powerful active sonar used in the HRC (the AN/SQS 53 MFA sonar); The current safety zone for implementation of power-down and shut-down procedures begins when marine mammals come within 1,000 yards of that sonar.

The Navy has continued to revise mitigation measures based on the best available scientific data, the Navy's training requirements, and evolving regulations. The Navy has previously analyzed and eliminated from further consideration several mitigation measures, many of which were suggested during the public comment period. Potential alternative mitigation or protective measures were assessed based on supporting science, their likely effectiveness in avoiding harm to marine mammals, the extent to which they would adversely impact military readiness activities, including personnel safety, and the practicality of implementation, and impact on the effectiveness of the military readiness activity. These measures, many which were considered previously by the Navy, are discussed in the following section.

6.2 ALTERNATIVE AND/OR ADDITIONAL MITIGATION MEASURES

A number of possible alternative and/or additional mitigation measures have been reviewed in the past in the development of the current measures or have suggested during the public comment period. This section presents those measures and an evaluation based on known science, likely effectiveness, impact to military readiness activities personnel safety, and the practicality of implementation. Alternative measures in addition to those currently in use include the following:

- Using non-Navy personnel onboard Navy vessels to provide surveillance of ASW or other training events to augment Navy lookouts.
- Use non-Navy observers for visual surveillance.
- Survey before, during, and after training events to preclude sonar use.
- Avoid areas seasonally.
- Avoid areas with problematic complex/steep bathymetry and/or seamounts.
- Avoid particular habitats.
- Avoid active sonar use within (1) 12 nautical miles (nm) from shore; (2) 25 kilometers (km) (15.5 miles [mi]) from the 200-m isobath; or (3) 25 nm from shore.

- Use active sonar with output levels as low as possible consistent with mission requirements.
- Use active sonar only when necessary.
- Suspending training at night, periods of low visibility, and in high sea-states when marine mammals are not readily visible.
- Reducing power in strong surface duct conditions.
- Scaling down training to meet core aims.
- Limiting the active sonar event locations.
- Use passive acoustic monitoring to detect and avoid marine mammals.
- Use ramp-up to attempt to clear an exercise area prior to the use of sonar.
- Reduce vessel speed.
- Reporting marine mammal sightings to augment scientific data collection.
- Use of new technology (e.g., unmanned reconnaissance aircraft, underwater gliders, instrumented ranges) to detect marine animals.
- Use of larger shut-down zones.
- Restricting Navy training in “choke-points.”
- Adopt mitigation measures of foreign nation navies.

6.2.1 EVALUATION OF ALTERNATIVE AND/OR ADDITIONAL MITIGATION MEASURES

There is a distinction between effective and feasible monitoring procedures for data collection and measures employed to prevent impacts or otherwise serve as mitigation. The discussion below is in reference to those procedures meant to serve as mitigation measures.

- Using non-Navy personnel onboard Navy vessels to provide surveillance of ASW or other training events to augment Navy lookouts.
  - The protection of marine mammals is provided by a lookout sighting the mammal and prompting immediate action. The premise that Navy personnel cannot or will not do this is unsupportable. Navy lookouts are extensively trained in spotting items at or near the water surface and utilizing chain of command to initiate action. Navy lookouts utilize their skills more frequently than many third party trained marine mammal observers.
  - Use of Navy lookouts is the most effective means to ensure quick and effective communication within the command structure and facilitate implementation of mitigation measures if marine species are spotted. A critical skill set of effective Navy training is communication via the chain of command. Navy lookouts are trained to report swiftly and decisively using precise terminology to ensure that critical information is passed to the appropriate supervisory personnel.

  - Berthing space during Major Exercises, such as USWEX, is very limited. With exercise lengths of 1 to 3 weeks, and given limited at sea transfer, this option would mean that even if berthing is available, a biologist would have to depart with the ship as it leaves port and stay the duration of the exercise. Berthing on non-MFA sonar (i.e., carrier and amphibious assault ships) is more available, but distance from MFA sonar operations would not provide the desired mitigation given the distance to the MFA sources.

  - Lengthy and detailed procedures that would be required to facilitate the integration of information from non-Navy observers into the command structure.

  - Some training will span one or more 24-hour period with events underway continuously in that timeframe. It is not feasible to maintain non-Navy surveillance of these events given the number of non-Navy observers that would be required onboard for the minimally required, three 8-hour shifts.

  - Some surface ships having MFA sonar may have limited berthing capacity. Exercise planning includes careful consideration of this berthing capacity in the placement of exercise controllers, data collection personnel, and Afloat Training Group personnel on ships involved in the training event. Inclusion of non-Navy observers onboard these ships would require that, in some cases, there would be no additional berthing space for essential Navy personnel required to fully evaluate and efficiently use the training opportunity to accomplish the training objectives.

  - Security clearance issues would have to be overcome to allow non-Navy observers onboard event participants.

- Visual surveillance as mitigation using non-Navy observers from non-military aircraft or vessels to survey before, during, and after training events to preclude sonar use in areas where marine mammals may be present.

  - These measures do not result in increased protection to marine species given that the size of the areas, the time it takes to survey, and the movement of marine species preclude real-time mitigation. The areas where training events will mainly occur (the representative areas modeled, see figure 2.2.2.6-1) cover approximately 55,000 square nautical miles within the HRC. Contiguous ASW events may cover many hundreds of square miles in a few hours given the participants are usually not visible to each other (separated by many tens of miles) and are constantly in motion. The number of civilian ships and/or aircraft required to monitor the area around these events would be considerable (in excess of a thousand of square miles). It is, thus, not feasible to survey or monitor the large areas in the time required to ensure these areas are devoid of marine mammals. In addition, marine mammals may move into or out of an area, if surveyed before an event, or an animal could move into an area after an event took place. Therefore, surveillance of the "exercise area" would be impracticable as a mitigation measure given that it will not result in precluding marine mammals from being in the "exercise area."

  - Surveillance of an exercise area during an event raises safety issues with multiple, slow civilian aircraft operating in the same airspace as military aircraft engaged in combat training. In addition, most of the training events take place far from land, limiting both the time available for civilian aircraft to be in the training area and presenting a concern should aircraft mechanical problems arise.

- Scheduling civilian vessel or aircraft surveillance to coincide with training events would negatively impact training effectiveness, if the exercise was contingent on completion of such surveillance. Exercise event timetables cannot be precisely fixed, but are instead based on the free-flow development of tactical situations to closely mimic real combat action. Waiting for civilian aircraft or vessels to complete surveys, refuel, or be on station would interrupt the necessary spontaneity of the exercise and would negatively impact the effectiveness of the military readiness activity.

- The vast majority of HRC training events involve a Navy aerial asset with crews specifically training to detect objects in the water. The capability of sighting from both surface and aerial platforms provides excellent survey capabilities using Navy training assets participating in the event.

- Avoidance of habitats, periods of seasonal presence, and problematic complex/steep bathymetry including seamounts.

  - Avoidance of marine mammal habitats is not possible given that the full habitat requirements for most of the marine mammals in the Hawaiian Islands are unknown (e.g., with regard to beaked whales see Ferguson et al., 2006). Accordingly, there is no information available on possible alternative exercise locations or environmental factors that would otherwise be less important to marine mammals in the Hawaiian Islands. In addition, these exercise locations were very carefully chosen by exercise planners based on training requirements and the ability of ships, aircraft, and submarines to operate safely. Moving the exercise events to alternative locations would impact the effectiveness of the training and has no known benefit (especially as there is no scientific data available to determine which specific areas should be avoided).

  - Avoidance of the seasonal presence of migrating marine mammals fails to take into account the fact that the Navy's current mitigation measures apply to all detected marine mammals no matter the season. Advance planning to avoid the seasonal presence of migrating marine mammals is not possible given the start of any "season" is variable (dependent on largely unknown environmental factors). To the degree possible, however, Navy already has taken a proactive step in this regard by specifically informing all naval vessels to increase vigilance when the first humpback whales have been sighted around the Hawaiian Islands. Otherwise, limiting training operations to the remaining six months of the year would not only concentrate all annual training and testing activities into a shorter six-month time period, but would also not meet the readiness requirements of the Navy's to deploy trained forces.

  - Avoidance of "seamounts" fail to recognize that there are over 300 seamounts in the HRC (making it impossible to avoid them all and still conduct Major Exercises, fail to define scientific parameters for seamounts critical to marine mammals (such as a critical depth from the surface), and fail to define what would constitute a buffer that would "avoid" these areas. Many seamounts are present in training locations where training takes place to avoid the presence of commercial air traffic. Avoidance of as yet undefined "areas" around seamounts, also would concentrate activities in areas where other marine mammals may be present whose habitat requirements are not associated with seamounts.

- Avoidance of “steep bathymetry” or “complex bathymetry” fails to define parameters and fail to recognize that all the islands in the Hawaiian chain rise from the ocean floor in a steep bathymetric rise. The purported need for such suggested mitigation measures is based on findings from other areas of the world that do not have direct application to the unique environment present in Hawaii. Such measures also can not be accurately implemented until there is a scientific understanding defining parameters for the measures. Training needs to take place in representative environments (including areas of steep and complex) given that submarines use these environments (such as at Cross Seamount) to avoid detection. Not being allowed to conduct exercises in these areas would unacceptably impact the effectiveness of the training.

- Avoid active sonar use within 12 nautical miles (nm) from shore or in the alternative 25 kilometers (km) (15.5 miles [mi]) from the 200-m isobath.
  - The measure requiring avoidance of MFA sonar within 25 km of the 200-m isobaths was part of the RIMPAC 2006 authorization by NMFS and was based on the assumption that avoidance of the North American continental shelf was a prudent mitigation measure given the presence of beaked whales in the Gulf of Mexico. NMFS modified the measure (a 200-m isobath replacing the continental shelf criteria) for Hawaii because they had received a public comment during rulemaking for a proposed action taking place elsewhere. This measure lacks any scientific basis when applied to the context in Hawaii (i.e. the bathymetry, sound propagation, width of channels).
  - There is no scientific analysis indicating this measure is any more protective in the Pacific and no known basis for the specific metrics (15.5 mi of the 200-m isobath).
  - During RIMPAC 2006, this mitigation measure precluded active ASW training in the littoral region, which significantly impacted realism and training effectiveness (such as for amphibious landings) even though this measure did not apply to the range at the Pacific Missile Range Facility (PMRF) and the planned exercises taking place in the channels between the islands.
  - This procedure had no observable effect on the protection of marine mammals during RIMPAC 2006 and its value is unclear. However, its effect on realistic training is significant.

- Using active sonar with output levels as low as possible consistent with mission requirements and use of active sonar only when necessary.
  - Operators of sonar equipment are trained to be cognizant of the environmental variables affecting sound propagation. In this regard the sonar equipment power levels are always set consistent with mission requirements.
  - Active sonar is only used when required by the mission since it has the potential to alert opposing forces to the sonar platform’s presence. Passive sonar and all other sensors are used in concert with active sonar to the maximum extent practical when available and when required by the mission.

- Suspending training at night, periods of low visibility and in high sea-states when marine mammals are not readily visible.
  - It is imperative that the Navy train to be able to operate at night, in periods of low visibility, and in high sea-states using the full potential of sonar as a sensor.
  - It would be extremely wasteful for Navy forces at sea to only operate in daylight hours or to wait for weather to clear before undertaking necessary training,

Navy vessels use radar and night vision goggles to detect any object, be it a marine mammal, a periscope of an adversary submarine, trash, debris, or another surface vessel

  - The Navy must train as expected to fight, and adopting this prohibition would eliminate this critical military readiness requirement.

- Reduce power in strong surface ducting conditions:
  - Strong surface ducts are conditions under which ASW training must occur to ensure sailors learn to identify the conditions, how they alter the abilities of MFA sonar systems, and how to deal with strong surface duct effects on MFA sonar systems. The complexity of ASW requires the most realistic training possible for the effectiveness and safety of the sailors. Reducing power in strong surface duct conditions would not provide this training realism because the unit would be operating differently than it would in a combat scenario, reducing training effectiveness and the crew's ability.
  - Additionally and most importantly, water conditions in the exercise areas on the time and distance scale necessary to implement this measure are not uniform and can change over the period of a few hours as effects of environmental conditions such as wind, sunlight, cloud cover, and tide changes alter surface duct conditions. In fact, this mitigation measure cannot be accurately and uniformly employed given the many variations in water conditions across a typical HRC exercise area that the determination of "strong surfacing ducting" is continually changing mitigation requirements and so cannot be accurately implemented.
  - Surface ducting alone, does not increase the risk of MFA sonar impacts to marine mammals. While it is true that surface ducting causes sound to travel farther before losing intensity, simple spherical and cylindrical spreading losses result in a received level of no more than 175 dB at 1,000 meters, even in significant surface ducting conditions.
  - There is no scientific evidence that this mitigation measure is effective or that it provides additional protection for marine mammals than the protection provided through "safety zones."

- Scaling down the exercise to meet core aims.
  - Training events are always constrained by the availability of funding, resources, personnel, and equipment with the result being they are always scaled down to meet only the core requirements.

- Limiting the active sonar use to a few specific locations.
  - Areas where events are scheduled to occur are carefully chosen to provide for the safety of events and to allow for the realistic tactical development of the training scenario. Otherwise limiting the training event to a few areas would adversely impact the effectiveness of the training.
  - Limiting the exercise areas would concentrate all sonar use, resulting in unnecessarily prolonged and intensive sound levels vice the more transient exposures predicted by the current planning that makes use of multiple exercise areas.
  - Major Exercises using integrated warfare components require large areas of the littorals and open ocean for realistic and safe training.
- Passive acoustic detection and location of marine mammals.
  - As noted in the preceding section, passive detection capabilities are used to the maximum extent practicable consistent with the mission requirements to alert training participants to the presence of marine mammals in an event location.
  - Implementation of this measure in and of itself is not more protective of the marine mammals because current technology does not allow for the real time detection and location of marine mammals.
  - Requires that marine mammals be vocalizing to be detected to be of any utility
- Using ramp-up to attempt to clear an area prior to the conduct of training events.
  - Ramp-up procedures involving slowly increasing the sound in the water to necessary levels have been utilized in other non-DoD activities. Ramp-up procedures are not a viable alternative for training events, as the ramp-up would alert opponents to the participants' presence and not allow the Navy to train realistically, thus adversely impacting the effectiveness of the military readiness activity.
  - This would constitute additional unnecessary sound introduced into the marine environment, in and of itself constituting harassment.
  - This measure does not account for the movement of the ASW participants over the period of time when ramp up would be implemented.
  - The implicit assumption is that animals would have an avoidance response to the low power sonar and would move away from the sound and exercise area; however, there is no data to indicate this assumption is correct. The Navy is currently gathering data and assessing it regarding the potential usefulness of this procedure as a mitigation measure. However, given there is only limited data to indicate that this is even minimally effective and because ramp-up would have an impact on the effectiveness of the military readiness activity, it was eliminated from further consideration.
- Vessel speed reduction.
  - Vessels engaged in training use extreme caution and operate at a slow, safe speed consistent with mission and safety. Ships and submarines need to be able to react to changing tactical situations in training as they would in actual

combat. Placing arbitrary speed restrictions would not allow them to properly react to these situations. Training differently than what would be needed in an actual combat scenario would decrease training effectiveness and reduce the crew's abilities.

- Use of new technology (e.g., unmanned reconnaissance aircraft, underwater gliders, instrumented ranges) to detect and avoid marine animals.
  - Although the Navy does work with many new technologies, they remain unproven, very expensive, and limited in availability. The Navy has been collecting data using the hydrophones in the underwater instrumented range at PMRF to collect passive acoustic data on marine mammals. The Navy is working to develop the capability to detect and localize vocalizing marine mammals using these sensors, but based on the current status of acoustic monitoring science, it is not yet possible to use installed systems as mitigation tools. Similarly, research involving a variety of other methodologies (e.g., underwater gliders, radar, lasers, etc.) is to date (2008) not developed to the point where they are effective or could be used as an actual mitigation tool. As part of the proposed Integrated Comprehensive Monitoring Program, the Navy will continue to coordinate passive monitoring and detection research specific to the proposed use of active sonar.

- Use of larger shut-down zones.

  The current power down and shut down zones are based on scientific investigations specific to MFA sonar for a representative group of marine mammals. It is also based on the source level, frequency, and sound propagation characteristics of MFA sonar. The zones are designed to preclude direct physiological effect from exposure to established marine mammal thresholds. Specifically, the current power-downs at 500 yards and 1,000 yards (457 and 914 meters [m]), as well as the 200 yards (183 m) shut-down safety zones were developed to minimize exposing marine mammals to sound levels that could cause temporary threshold shift (TTS) or permanent threshold shift (PTS). These sound level thresholds were established experimentally and are supported by the scientific community. Implementation of the safety zones discussed above were designed to prevent exposure to sound levels greater than that for onset TTS (195 dB re 1 μPa) for animals detected in the zone. Given that the distance to TTS from a single nominal sonar ping is less than 200 yards, there are additional protective buffers built into the safety zone with power-down of the sonar beginning when marine mammals are within 1,000 yards of the sonar (approximately five times the distance to TTS).

  The safety zone the Navy has developed is also based on a lookouts ability to realistically maintain situational awareness over a large area of the ocean and the lookouts ability to detect marine mammals at that distance during most conditions at sea.

  - It should also be noted that lookouts are responsible for reporting all objects or anomalies sighted in the water regardless of the distance from the vessel. Any sighting is reported to the Officer of the Deck since any object, disturbance, or discoloration in the water may be indicative of a threat to the vessel and its crew or indicative of a marine species that may require some action be taken.

- Requirements to implement procedures when marine mammals are present well beyond 1,000 yards require that lookouts sight marine mammals at distances that, in reality, they cannot. These increased distances also greatly increase the area that must be monitored to implement these procedures. For instance, if a power down zone increases from 1,000 to 4,000 yards, the area that must be monitored increases sixteenfold.

- Avoid or limit the use of MFA sonar during ASW training events while conducting transits between islands
  - Conducting ASW training events while transiting between Hawaiian Islands does not present the same conditions as those that resulted in the Bahamas' stranding (see Section 4.1.2.4.10.2). Most importantly, there is no limited egress for marine mammals for events that occur between the Hawaiian Islands.
- Adopt mitigation measures of foreign nation navies
  - Some of these foreign nations' measures (such as predictive modeling) are not applicable to Hawaii given the lack of information upon which to base any modeling. In a similar manner, avoidance of particular seasons or areas of known habitat are not transferrable to the Hawaii context.
  - Other nation's navies do not have the same critical mission to train in ASW as does the Navy. For example, other navies do not possess an integrated Strike Group. As a result, many foreign nations' measures would impact the effectiveness of ASW training to an unacceptable degree. The Navy's ASW training is built around the integrated warfare concept and is based on the Navy's sensor capabilities, the threats faced, the operating environment, and the overall mission.

6.2.1.1 AFTER ACTION REPORTS AND ASSESSMENT

Since RIMPAC 2006, the Navy has completed a number of After Action Reports (AARs). In part, these reports may assess the effectiveness of the preceding mitigation measures.

6.2.1.2 COORDINATION AND REPORTING

There are three procedures in the NDE II (designated by the numbers 27-29 in the NDE II) that are procedures for coordination and reporting of issues involving marine mammals with NMFS as the regulator. These procedures from NDE II are as follows:

The Navy will coordinate with the local NMFS Stranding Coordinator for any unusual marine mammal behavior and any stranding, beached live or dead cetacean(s) or floating marine mammals that may occur at any time during or within 24 hours after completion of MFA sonar use associated with ASW training.

The Navy will submit a report to the Office of Protected Resources, NMFS, within 120 days of the completion of a Major Exercise. This report must contain a discussion of the nature of the effects, if observed, based on both modeled results of real-time events and sightings of marine mammals.

If a stranding occurs during an ASW exercise, NMFS and the Navy will coordinate to determine if MFA sonar should be temporarily discontinued while the facts surrounding the stranding are collected.

6.3 CONSERVATION MEASURES

The Navy will continue to fund ongoing marine mammal research in the Hawaiian Islands. Results of conservation efforts by the Navy in other locations will also be used to support efforts in the Hawaiian Islands. The Navy is coordinating monitoring of marine mammals on various established ranges, range complexes, and OPAREAs:

- Implementing a marine species monitoring plan in the Hawaiian Islands range complex.
- Continuing Navy research and contribution to university/external research to improve the state of the science regarding marine species biology and acoustic effects.
- Sharing data with NMFS and via the literature for research and development efforts.

6.4 UNDERWATER DETONATIONS

To ensure protection of marine mammals and sea turtles during underwater detonation training and Mining Operations, the surveillance area must be determined to be clear of marine mammals and sea turtles prior to detonation. Implementation of the following mitigation measures continue to ensure that marine mammals would not be exposed to temporary threshold shift (TTS) of hearing, permanent threshold shift (PTS) or hearing, or injury from physical contact with training mine shapes during Major Exercises.

6.4.1 DEMOLITION AND SHIP MINE COUNTERMEASURES OPERATIONS (UP TO 20 POUNDS)

6.4.1.1 EXCLUSION ZONES

All Mine Warfare and Mine Countermeasures Operations involving the use of explosive charges must include exclusion zones for marine mammals and sea turtles to prevent physical and/or acoustic effects on those species. These exclusion zones shall extend in a 700-yard arc radius around the detonation site.

6.4.1.2 PRE-EXERCISE SURVEILLANCE

For Demolition and Ship Mine Countermeasures Operations, pre-exercise surveillance shall be conducted within 30 minutes prior to the commencement of the scheduled explosive event. The surveillance may be conducted from the surface, by divers, and/or from the air, and personnel shall be alert to the presence of any marine mammal or sea turtle. Should such an animal be present within the surveillance area, the exercise shall be paused until the animal voluntarily leaves the area.

6.4.1.3 POST-EXERCISE SURVEILLANCE

Surveillance within the same radius shall also be conducted within 30 minutes after the completion of the explosive event.

6.4.1.4 REPORTING

Any evidence of a marine mammal or sea turtle that may have been injured or killed by the action shall be reported immediately to Commander, Pacific Fleet and Commander, Navy Region Hawaii, Environmental Director.

6.4.2 SINKING EXERCISE, GUNNERY EXERCISE, MISSILE EXERCISE AND BOMBING EXERCISE

The selection of sites suitable for Sinking Exercises (SINKEXs) involves a balance of operational suitability, requirements established under the Marine Protection, Research and Sanctuaries Act (MPRSA) permit granted to the Navy (40 Code of Federal Regulations §229.2), and the identification of areas with a low likelihood of encountering ESA listed species. To meet operational suitability criteria, locations must be within a reasonable distance of the target vessels' originating location. The locations should also be close to active military bases to allow participating assets access to shore facilities. For safety purposes, these locations should also be in areas that are not generally used by non-military air or watercraft. The MPRSA permit requires vessels to be sunk in waters which are at least 1,000 fathoms (3,000 m) deep and at least 50 nm from land.

In general, most listed species prefer areas with strong bathymetric gradients and oceanographic fronts for significant biological activity such as feeding and reproduction. Typical locations include the continental shelf and shelf-edge.

Although the siting of the location for the exercise is not regulated by a permit, the range clearance procedures used for Gunnery Exercise (GUNEX), Missile Exercise (MISSILEX), and Bombing Exercise (BOMBEX) are the same as those described below for a SINKEX.

6.4.3 UNDERWATER DETONATIONS MITIGATION PROCEDURES

The Navy has developed range clearance procedures to maximize the probability of sighting any ships or protected species in the vicinity of an exercise, which are as follows:

- All weapons firing would be conducted during the period 1 hour after official sunrise to 30 minutes before official sunset.

Extensive range clearance operations would be conducted in the hours prior to commencement of the exercise, ensuring that no shipping is located within the hazard range of the longest-range weapon being fired for that event.

An exclusion zone with a radius of 1.0 nm would be established around each target. This exclusion zone is based on calculations using a 990-pound (lb) H6 net explosive weight high explosive source detonated 5 feet (ft) below the surface of the water, which yields a distance of 0.85 nm (cold season) and 0.89 nm (warm season) beyond which the received level is below the 182 decibels (dB) re: 1 micropascal squared-seconds (μPa^2-s) threshold established for the *WINSTON S. CHURCHILL* (DDG 81) shock trials (U.S. Department of the Navy, 2001b). An additional buffer of 0.5 nm would be added to account for errors, target drift, and animal movements. Additionally, a safety zone, which extends from the exclusion zone at 1.0 nm out an additional 0.5 nm, would be surveyed. Together, the zones extend out 2 nm from the target.

A series of surveillance over-flights would be conducted within the exclusion and the safety zones, prior to and during the exercise, when feasible. Survey protocol would be as follows:

a. Overflights within the exclusion zone would be conducted in a manner that optimizes the surface area of the water observed. This may be accomplished through the use of the Navy's Search and Rescue Tactical Aid, which provides the best search altitude, ground speed, and track spacing for the discovery of small, possibly dark objects in the water based on the environmental conditions of the day. These environmental conditions include the angle of sun inclination, amount of daylight, cloud cover, visibility, and sea state.

b. All visual surveillance activities would be conducted by Navy personnel trained in visual surveillance. At least one member of the mitigation team would have completed the Navy's marine mammal training program for lookouts.

c. In addition to the overflights, the exclusion zone would be monitored by passive acoustic means, when assets are available. This passive acoustic monitoring would be maintained throughout the exercise. Potential assets include sonobuoys, which can be utilized to detect vocalizing marine mammals (particularly sperm whales) in the vicinity of the exercise. The sonobuoys would be re-seeded as necessary throughout the exercise. Additionally, passive sonar onboard submarines may be utilized to detect any vocalizing marine mammals in the area. The Officer Conducting the Exercise (OCE) would be informed of any aural detection of marine mammals and would include this information in the determination of when it is safe to commence the exercise.

d. On each day of the exercise, aerial surveillance of the exclusion and safety zones would commence 2 hours prior to the first firing.

e. The results of all visual, aerial, and acoustic searches would be reported immediately to the OCE. No weapons launches or firing would commence until the OCE declares the safety and exclusion zones free of marine mammals and threatened and endangered species.

f. If a protected species observed within the exclusion zone is diving, firing would be delayed until the animal is re-sighted outside the exclusion zone, or 30 minutes have elapsed. After 30 minutes, if the animal has not been re-sighted it would be assumed to have left the exclusion zone. This is based on a typical dive time of 30 minutes for traveling listed species of concern. The OCE would determine if the listed species is in danger of being adversely affected by commencement of the exercise.

g. During breaks in the exercise of 30 minutes or more, the exclusion zone would again be surveyed for any protected species. If protected species are sighted within the exclusion zone, the OCE would be notified, and the procedure described above would be followed.

h. Upon sinking of the vessel, a final surveillance of the exclusion zone would be monitored for 2 hours, or until sunset, to verify that no listed species were harmed.

Aerial surveillance would be conducted using helicopters or other aircraft based on necessity and availability. The Navy has several types of aircraft capable of performing this task; however, not all types are available for every exercise. For each exercise, the available asset best suited for identifying objects on and near the surface of the ocean would be used. These aircraft would be capable of flying at the slow safe speeds necessary to enable viewing of marine vertebrates with unobstructed, or minimally obstructed, downward and outward visibility. The exclusion and safety zone surveys may be cancelled in the event that a mechanical problem, emergency search and rescue, or other similar and unexpected event preempts the use of one of the aircraft onsite for the exercise. The exercise would not be conducted unless the exclusion zone could be adequately monitored visually.

In the unlikely event that any listed species are observed to be harmed in the area, a detailed description of the animal would be taken, the location noted, and if possible, photos taken. This information would be provided to National Oceanic and Atmospheric Administration (NOAA) Fisheries via the Navy's regional environmental coordinator for purposes of identification.

An AAR detailing the exercise's time line, the time the surveys commenced and terminated, amount, and types of all ordnance expended, and the results of survey efforts for each event would be submitted to NOAA Fisheries.

6.5 AIRCRAFT OPERATIONS INVOLVING NON-EXPLOSIVE DEVICES

Non-explosive devices such as some sonobuoys, inert bombs, and Mining Operations involve aerial drops of devices that have the potential to hit marine mammals and sea turtles if they are in the immediate vicinity of a floating target. The exclusion zone, therefore, shall be clear of marine mammals and sea turtles around the target location. Pre- and post-surveillance and reporting requirements outlined for underwater detonations shall be implemented during Mining Operations.

6.6 CONDITIONS ASSOCIATED WITH THE BIOLOGICAL OPINION

The Navy will comply with the reasonable and prudent measures and terms and conditions issued by NMFS in their Biological Opinion for HRC training events. In particular, the terms and conditions specify a monitoring program and process for feedback to NMFS following the completion of each exercise event.

6.7 REVIEW OF ENDANGERED SPECIES RECOVERY PLANS

The following sections outline the applicable threats identified in each species Recovery Plan and the mitigation measures adopted by the Navy for the actions covered by this EIS/OEIS. Chapters and page numbers referenced in the following sections refer to the recovery plan being discussed, not the EIS/OEIS.

Recovery plans are developed by the U.S. Fish and Wildlife Service and NMFS to help guide actions that promote the recovery of threatened and endangered species to the point that they may be down-listed and eventually de-listed. Where de-listing may not be reasonably possible given population size or habitat constraints, stopping the decline of the species and establishing a stable population may be interim goals. Recovery plans in general discuss the current status of the species or population, threats to their continued existence, and actions to promote recovery. In many instances one of the primary recovery needs is information on population size and distribution and other basic information such as sex ratios, birth rate/fecundity, recruitment, mortality, hearing sensitivity, and sound production.

Twenty-seven recovery plans for endangered or threatened species have been completed, drafted or are undergoing revision by NMFS. Of these, 10 recovery plans cover species evaluated in this EIS/OEIS: blue whales (*Balaenoptera musculus*), fin whales (*B. physalus*), humpback whales (*Megaptera novaeangliae*), sperm whales (*Physeter macrocephalus*), Hawaiian monk seals (*Monachus schauinslandi*), green turtles (*Chelonia mydas*), hawksbill turtles (*Eretmochelys imbricata*), loggerhead turtles (*Caretta caretta*), olive ridley turtles (*Lepidochelys olivacea*), and leatherback turtles (*Dermochelys coriacea*).

With respect to this EIS/OEIS, a review of the applicable recovery plans found that many plans identified in-water effects such as anthropogenic sound or underwater detonations and ship strikes as possible threats to recovery. In some cases all anthropogenic sources were lumped together, and in others military and civilian sources were broken out separately.

Based on modeling results in this EIS/OEIS, fin whales, sei whales, humpback whales, sperm whales and Hawaiian monk seals might be exposed to acoustic energy that could result in TTS or behavioral modification. Due to the lack of density data for blue whales and North Pacific right whales (*Eubalaena japonicus*)[*] they were not included in the acoustic effects exposure model. There are few sightings for these two species in the Hawaiian Islands area and they are not expected to be exposed to MFA sonar.

For the five species of sea turtles potentially occurring within the HRC, available information suggests that sea turtles are likely not able to hear mid-frequency sounds (2.6 kilohertz [kHz] and 3.3 kHz) in the range produced by active tactical sonars.

[*] There is no current or draft recovery plan for North Pacific right whales.

6.7.1 RECOVERY PLAN FOR THE BLUE WHALE (*BALAENOPTERA MUSCULUS*)—(1998)

Anthropogenic noise was discussed under Habitat Degradation (p.16) and focused on the low-frequency sound transmitted during the Acoustic Thermometry of Ocean Climate (ATOC) experiment conducted in the mid-1990s. Whales observed during the trials were found to be distributed nominally further from the source when it was active than when it was not. No other changes in behavior or distribution were observed. ATOC and the North Pacific Acoustic Laboratory activities are not being considered in this EIS/OEIS.

Under Military Operations Surveillance Towed Array Sensor System (SURTASS) Low Frequency Active (LFA) and ship shock trials were used to illustrate potential effects. However, neither observed nor potential effects were discussed. Detection of two blue whales in the vicinity of the ship shock trial resulted in the relocation of the trial to an area 9 miles from the whales. Scientific research intended to determine whether exposure to low frequency sounds elicited disturbance reactions from feeding blue or fin whales was conducted in 1997. In 19 focal animal observations (4 blue whales and 15 fin whales), no overt behavioral responses were observed. No changes in whale distribution could be related to LFA; whale distributions closely tracked the distribution of food. One preliminary analysis of whale sounds detections indicated a slight decrease in whale calling activity during LFA, but this was not confirmed by a second analysis. SURTASS LFA is not part of the Proposed Action in this EIS/OEIS.

Military vessel traffic was cited as contributory to the overall issue of vessel traffic and ship strikes.

Mitigation Measures—Except for potential ship strikes none of the threats listed above for blue whales is applicable to training within the HRC. Potential ship strikes would be mitigated by the use of lookouts aboard ASW platforms, vessels associated with SINKEX, and vessels used for mine countermeasures and demolition training and observers aboard aircraft when available. Based on available sighting data and the mitigation measures outlined in this chapter, it is unlikely that blue whales would be subject to vessel strikes within the HRC, thus fulfilling Recovery Action 4.2, Identify and implement methods to reduce ship collisions with blue whales.

6.7.2 DRAFT RECOVERY PLAN FOR THE FIN WHALE (*BALAENOPTERA PHYSALUS*)—(2006)

Ship Strikes (p. I-25) was a source of mortality for fin whales off the U.S. west coast from 1990 through 2005.

Although recent military activities (G.9 Military Operations, p. I-28) in the North Pacific are not known to have had impacts on fin whales, there was concern that due to "…the large scale and diverse nature of military activities in this ocean basin …there is always potential for disturbing, injuring, or killing these and other whales."

As noted above for blue whales, the issue of SURTASS LFA was also raised for fin whales.

Mitigation Measures—The effect of SURTASS LFA on fin whales is not applicable to training within the HRC. Potential ship strikes would be mitigated by the use of lookouts aboard ASW platforms, vessels associated with SINKEX, and vessels used for mine countermeasures and demolition training and observers aboard aircraft when available. Based on available sighting data and the mitigation measures outlined Section 6.1, it is unlikely that fin whales would be subject to vessel strikes within the HRC, thus addressing Recovery Action 6.3 - Identify and implement measures to reduce the frequency and severity of ship collisions and gear interactions with fin whales. The use of tactical active sonars within the HRC would be governed by the mitigation measures outlined in Section 6.1, which include the requirement for lookouts, aircraft surveillance when available, the use of passive listening devices, safety zones, sonar power limit requirements, and consideration of bathymetry and oceanographic conditions. These mitigation measures address Recovery Action 7.2, Implement appropriate measures to reduce the exposure of fin whales to human-generated noise judged to be potentially detrimental.

6.7.3 FINAL RECOVERY PLAN FOR THE HUMPBACK WHALE (*MEGAPTERA NOVAEANGLIAE*)—(1991)

Although not explicitly identified in Section C - Collisions with Ships (p. 26), Navy ships should be included as part of the overall level of vessel traffic in Hawaiian waters which is identified as a potential impact.

In Section D. Acoustic Disturbance, 1. Noise from ships, boats and aircraft, Noise in general was identified as a potential adverse impact on humpback whales. At the time it was speculated that different vessel types and sizes had different acoustic effects depending on their signatures. In addition noise from military airplanes and other exercises were identified as possible sources of disturbance. The following statements from the Plan are provided for historical context (military activities from Barbers Point and Kahoolawe have ceased) but are provided for historical context. “In Hawaii, aerial exercises are executed from Hickam Air Force Base, Kaneohe Marine Corps Air Station, and Barbers Point Naval Air Station on Oahu. The major impact of tactical military aircraft is their use of Kahoolawe Island as a target. Concerns about the effect of military activities on humpback whales were addressed in a consultation between the Navy and NMFS regarding the use of Kahoolawe as a target island in 1979.” Kahoolawe has not been used as a target island since 1990. “Herman et al. (1980) suggested that humpback whales arriving in Hawaiian waters may be disturbed by military aircraft flying low over portions of the Auau Channel between the Islands of Hawaii and Maui. Other ordnance ranges in humpback wintering areas are Kaula Island, Hawaii; Vieques, Puerto Rico; and Farallon de Medinilla, Commonwealth of the Northern Mariana Islands.” While there may have been some impact from the cumulative noise sources of vessels and aircraft the effect seems to have been minimal given the current recovery of the Hawaiian population of humpback whales and their growth in numbers over the past 30 years.

Mitigation Measures—Ship strike was identified as a potential threat, but ship strike mitigation was not explicitly noted in the Plan. For activities covered by this EIS/OEIS, potential ship strikes would be mitigated by the use of lookouts aboard ASW platforms, vessels associated with SINKEX, and vessels used for mine countermeasures and demolition training and observers aboard aircraft when available. With respect to underwater noise (Recovery Objective 1.31 11 Reduce disturbance from human-produced underwater noise in Hawaiian waters and in other important habitats when humpback whales are present), the use of tactical active sonars within the HRC would be governed by the mitigation measures outlined in Section 6.1. These include the requirement for lookouts, aircraft surveillance when available, the use of passive listening devices, safety zones, sonar power limit requirements, and consideration of bathymetry and oceanographic conditions. In addition, activities involving explosives or live fire will require lookouts aboard weapons platforms, vessels associated with SINKEX, and vessels used for mine countermeasures and demolition training and observers aboard aircraft when available. Consideration of bottom topography, oceanographic conditions, and species habitat preferences will also be considered.

6.7.4 DRAFT RECOVERY PLAN FOR THE SPERM WHALE (*PHYSETER MACROCEPHALUS*)—(2006)

Potential threats identified in Sections G.2. and G.8. discussed anthropogenic sounds and in particular pingers, sonars, and vessel noise (cavitation).

Section G.2. Anthropogenic Noise (p. I-26) "…Sperm whales are known to respond, often dramatically, to unfamiliar noise. Whales exposed to the sounds of pingers used in calibration systems to locate hydrophone arrays temporarily fell silent (Watkins and Schevill, 1975). This response to sounds in the frequency range of 6-13 kHz was interpreted as one of listening, rather than of fear.

The plan further characterizes that, "A stronger response was observed in sperm whales exposed to the intense sonar signaling and ship propeller noise from military activities in the Caribbean Sea during the U.S. invasion of Grenada in 1983. The whales fell silent, changed their activities, scattered, and moved away from the sound sources (Watkins et al., 1985)". To clarify, however, while sperm whales were observed to interrupt their activities by stopping echolocation and leaving the area in the presence of underwater sounds the authors only surmised that the sounds may have originated from submarine sonar given that they saw no vessels (Watkins and Schevill, 1975; Watkins et al., 1985). The authors did not report received levels from these exposures, and also got a similar reaction from artificial noise they generated by banging on their boat hull. It was unclear if the sperm whales were reacting to possible sonar signals or to a potentially new unknown sound in general.

There is currently no evidence of long-term changes in behavior or distribution as a result of occasional exposure to pulsed acoustic stimuli.

6.7.4.1 G.8 MILITARY OPERATIONS (P.I-32)

"…Sperm whales are potentially affected by military operations in a number of ways. They can be struck by vessels and disturbed by sonar and other anthropogenic noise. In addition, their deep diving and large size make sperm whales potential false targets in submarine warfare (or target practice). Evidence suggests that strandings of another deep-diving, pelagic toothed whale, Cuvier's beaked whale (*Ziphius cavirostris*) is related to tests of Navy mid-range sonar and possibly LFA sonar in Greece, the Bahamas, and the Canary Islands (Frantizis, 1998; Anon., 2001; Jepson et al., 2003; U.S. Department of the Navy and U.S. Department of Commerce, 2001; Freitas, 2004; Fernandez, 2004; Fernandez et al., 2005). The extremely loud signals (maximum output 230 decibels re 1 micropascal [μPa]) are in the frequency range of 250-3,000 hertz (Frantzis, 1998), which is well within the likely range of sperm whale hearing.

Similarly, MFA sonar (e.g., U.S. Navy 53C) can produce equally loud sounds at frequencies of 2,000-8,000 hertz (Evans and England 2001), which are also likely to be heard by sperm whales. Clicks produced by sperm whales (and presumably heard by them) are in the range of < 100 hertz to as high as 30 kHz, often with most of the energy in the 2 to 4 kHz range (Watkins 1980). There have been no sperm whale strandings attributed to Navy sonar. However, the large scale and diverse nature of military activities in large ocean basins indicates that there is always potential for disturbing, injuring, or killing these and other whales."

The applicable recovery action is found under Recovery Actions 7.0. Determine and Minimize Any Detrimental Effects of Anthropogenic Noise in the Oceans (p. IV-2).

> 7.1 Support ongoing and additional studies to evaluate the effects of sound on sperm whales.
>
> 7.2 Implement appropriate regulations on sound-production activities which are found to be potentially detrimental to sperm whales, until otherwise demonstrated.

Mitigation Measures—would be implemented as listed in Section 6.1 to mitigate the use of tactical active sonars within the HRC. These include the requirement for lookouts, aircraft surveillance when available, the use of passive listening devices, safety zones, sonar power limit requirements, and consideration of bathymetry and oceanographic conditions. In addition, activities involving explosives or live fire will require lookouts aboard weapons platforms, vessels associated with SINKEX, and vessels used for mine countermeasures and demolition training and observers aboard aircraft when available. For SINKEX and Air-to-Surface Missile Exercises (A-S MISSILEX), an exclusion zone of 1.0 nm and an additional safety zone of 0.5 nm would be required. Consideration of bottom topography, oceanographic conditions, and species habitat preferences will also be considered.

These mitigation measures will further the recovery goals of this Plan even though no specific actions were identified in the Plan.

The Navy has and will continue to support research that will help evaluate the effects of sound on sperm whales. The Navy has complied with applicable laws and regulations regarding sound in the oceans to the extent practicable and in compliance with national defense requirements.

6.7.5 RECOVERY PLAN FOR THE HAWAIIAN MONK SEAL (*MONACHUS SCHAUINSLANDI*)—(DRAFT REVISION 2005)

No specific threats to monk seals from activities associated with the HRC were identified in the Hawaiian Monk Seal Recovery Plan.

Mitigation Measures—would be implemented as listed in Section 6.1 to mitigate the use of tactical active sonars within the HRC. These include the requirement for lookouts, aircraft surveillance when available, the use of passive listening devices, safety zones, sonar power limit requirements, and consideration of bathymetry and oceanographic conditions. In addition, activities involving explosives or live fire will require lookouts aboard weapons platforms, vessels associated with SINKEX, and vessels used for mine countermeasures and demolition training and observers aboard aircraft when available. For SINKEX and A-S MISSILEX an exclusion zone of 1.0 nm and an additional safety zone of 0.5 nm would be required. Consideration of bottom topography, oceanographic conditions, and species habitat preferences will also be considered.

These mitigation measures will assist in furthering the monk seal recovery goals even though these specific actions were not identified in the Hawaiian Monk Seal Recovery Plan.

6.7.6 RECOVERY PLAN FOR THE U.S. PACIFIC POPULATIONS OF THE GREEN TURTLE (*CHELONIA MYDAS*)—(1998)

Construction Blasting (p. 45) was identified as a threat to sea turtles, but not as a current threat in Hawaii. The following narrative did not explicitly identify Navy activities associated with the HRC as having a potential effect.

“Blasting can injure or kill sea turtles in the immediate area. The use of dynamite to construct or maintain harbors, break up reef and rock formations for improved offshore access, etc. can decimate coral reefs, eliminating food and refuge for sea turtles. Some types of dynamiting have minimal impact on marine life, such as placing explosive in pre-drilled holes (drilling and shooting) prior to detonation. This is the standard practice to secure armor rock. (see Recovery – Section 2.2.7)”

In Section 2.2.7 under Recovery, the following actions were identified:

“Prevent the degradation or destruction of reefs by dynamite fishing and construction blasting. Blasting of any nature physically damages reefs and may kill turtles. It must be monitored and/or restricted.”

<u>Mitigation Measures</u>—Mitigation measures for sea turtles from underwater demolitions are listed in Section 6.2, Underwater Detonations. In general during underwater explosives training and Mining Operations, the surveillance area must be determined to be clear of marine mammals and sea turtles prior to detonation. For demolition and ship mine countermeasures operations charge size is limited to 20 lb and exclusion zones are established to prevent physical and/or acoustic effects. Pre exercise surveys are conducted by surface vessels, divers, and aircraft (when available) to alert operators of any protected species within the exclusion zone. If a sea turtle or marine mammal is observed, the exercise is postponed until the animal voluntarily leaves the area. Bottom topography is selected to minimize any potential damage to reef structures or other hard substrate that include turtle resting habitat or foraging areas (e.g. patches of sandy bottom substrate away from coral reef structures).

In addition, activities involving explosives or live fire will require lookouts aboard weapons platforms, vessels associated with SINKEX, and vessels used for mine countermeasures and demolition training and observers aboard aircraft when available. For SINKEX and A-S

MISSILEX, an exclusion zone of 1.0 nm and an additional safety zone of 0.5 nm would be required.

The mitigation measures outlined in Section 6.1, include the requirement for lookouts, aircraft surveillance when available, the use of passive listening devices, safety zones, sonar power limit requirements, and consideration of bathymetry and oceanographic conditions. These measures would minimize any potential auditory effects on green turtles that may be found within the surveillance areas from MFA/HFA sonar use.

These mitigation measures address Recovery Section 2.2.7 and the Implementation Schedule on p. 83.

6.7.7 RECOVERY PLAN FOR U.S. PACIFIC POPULATIONS OF THE HAWKSBILL TURTLE (*ERETMOCHELYS IMBRICATA*)—(1998)

No specific threats or applicable recovery actions were identified for the Navy with respect to activities described in this EIS/OEIS.

Mitigation Measures—Although no specific threats or recovery actions were ascribed to Navy activities within the HRC in the Recovery Plan the following measures further the recovery goals of the Plan. In the event that hawksbill turtles are observed within the SURVEILLANCE AREA the use of tactical active sonars within the HRC would be governed by the mitigation measures outlined in Section 6.1, which include the requirement for lookouts, aircraft surveillance when available, the use of passive listening devices, safety zones, sonar power limit requirements, and consideration of bathymetry and oceanographic conditions. These measures would minimize any potential auditory effects on hawksbill turtles that may be found within the surveillance area.

In addition, activities involving explosives or live fire will require lookouts aboard weapons platforms, vessels associated with SINKEX, and vessels used for mine countermeasures and demolition training and observers aboard aircraft when available. For SINKEX and A-S MISSILEX, an exclusion zone of 1.0 nm and an additional safety zone of 0.5 nm would be required.

6.7.8 RECOVERY PLAN FOR U.S. PACIFIC POPULATIONS OF THE LOGGERHEAD TURTLE (*CARETTA CARETTA*)—(1998)

There is no known nesting of loggerhead turtles in Hawaii according to the Recovery Plan. Nearly all observations of loggerheads now come from incidental catch records associated with pelagic longline fishing originating from Hawaiian ports. No specific threats or applicable recovery actions were identified for the Navy with respect to activities described in this EIS/OEIS.

Mitigation Measures—Although no specific threats or recovery actions were ascribed to Navy activities within the HRC in the Recovery Plan the following measures further the recovery goals of the Plan. In the event that loggerhead turtles are observed within the surveillance area the use of tactical active sonars within the HRC would be governed by the mitigation measures outlined in Section 6.1, which include the requirement for lookouts, aircraft surveillance when available, the use of passive listening devices, safety zones, sonar power limit requirements, and consideration of bathymetry and oceanographic conditions. These measures would minimize any potential auditory effects on loggerhead turtles that may be found within the surveillance area.

In addition, activities involving explosives or live fire will require lookouts aboard weapons platforms, vessels associated with SINKEX, and vessels used for mine countermeasures and demolition training and observers aboard aircraft when available. For SINKEX and A-S MISSILEX, an exclusion zone of 1.0 nm and an additional safety zone of 0.5 nm would be required.

6.7.9 RECOVERY PLAN FOR U.S. PACIFIC POPULATIONS OF THE OLIVE RIDLEY TURTLE (*LEPIDOCHELYS OLIVACEA*)—(1998)

No specific threats or applicable recovery actions were identified for the Navy with respect to activities described in this EIS/OEIS.

In the Hawaiian Islands, a single nesting was recorded along Paia Bay, Maui in September 1985; however, there was no successful hatching associated with this event (Balazs and Hau, 1986; National Ocean Service, 2001). Since there are no other known nesting records for the central Pacific Ocean, the above nesting attempt should be considered an anomaly (National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998d). Olive ridleys are frequently captured by pelagic longline fishermen in deep, offshore waters of the HRC, especially during spring and summer. Inside the 55-fathom isobath, olive ridley occurrence in the HRC is rare year round.

Mitigation Measures—Although no specific threats or recovery actions were ascribed to Navy activities within the HRC in the Recovery Plan the following measures further the recovery goals of the Plan. In the event that olive ridley turtles are observed within the surveillance area the use of tactical active sonars within the HRC would be governed by the mitigation measures outlined in Chapter 6.1 which include the requirement for lookouts, aircraft surveillance when available, the use of passive listening devices, safety zones, sonar power limit requirements, and consideration of bathymetry and oceanographic conditions. These measures would minimize any potential auditory effects on olive ridley turtles that may be found within the surveillance areas.

In addition, activities involving explosives or live fire will require lookouts aboard weapons platforms, vessels associated with SINKEX, and vessels used for mine countermeasures and demolition training and observers aboard aircraft when available. For SINKEX and A-S MISSILEX, an exclusion zone of 1.0 nm and an additional safety zone of 0.5 nm would be required.

6.7.10 RECOVERY PLAN FOR U.S. POPULATIONS OF THE LEATHERBACK TURTLE (*DERMOCHELYS CORIACEA*)—(1998)

No specific threats or applicable recovery actions were identified for the Navy with respect to activities described in this EIS/OEIS.

Satellite-tracking studies, a lack of Hawaiian stranding records, and occasional incidental captures of the species in the Hawaii-based longline fishery indicate that deep, oceanic waters are the most preferred habitats of leatherback turtles in the central Pacific Ocean. As a result, the area of year-round primary occurrence for the leatherback turtle encompasses all HRC waters beyond the 55-fathom isobath. Inshore of the 55-fathom isobath is the area of rare leatherback occurrence. This area is also the same year round. Leatherbacks were not sighted during any of the aerial surveys for which data were collected, all of which took place over waters lying close to the Hawaiian shoreline.

Mitigation Measures—Although no specific threats or recovery actions were ascribed to Navy activities within the HRC in the Recovery Plan the following measures further the recovery goals of the Plan. In the event that leatherback turtles are observed within the surveillance area, the use of tactical active sonars would be governed by the mitigation measures outlined in Section 6.1, which include the requirement for lookouts, aircraft surveillance when available, the use of passive listening devices, safety zones, sonar power limit requirements, and consideration of bathymetry and oceanographic conditions. These measures would minimize any potential auditory effects on leatherback turtles that may be found within the surveillance areas.

In addition, activities involving explosives or live fire will require lookouts aboard weapons platforms, vessels associated with SINKEX, and vessels used for mine countermeasures and demolition training and observers aboard aircraft when available. For SINKEX and A-S MISSILEX, an exclusion zone of 1.0 nm and an additional safety zone of 0.5 nm would be required.

6.7.11 ADDITIONAL MARINE MAMMAL RESEARCH SOURCES

There are other potential marine mammal data providers in addition to the Navy that will be investigated for collaboration with this Exercise Marine Monitoring Plan. The goal is to leverage ongoing NMFS permitted studies, academic research and surveys, and new Navy detection technologies that may be of use as data augments to this plan.

Regional and Academic Research Programs

Within the HRC and Southern California (SOCAL), NMFS permitted marine mammal surveys, acoustic monitoring, and animal tagging is being conducted or planned for the next 2 years.

Tagging, for instance, is an important research tool for directly determining marine mammal movement, diving behavior, swim parameters (velocity, direction of travel, foraging depth), as well as potentially recording anthropogenic sound level exposure for an animal. Tagging typically allows for longer-term monitoring of individuals than visual and acoustic monitoring can provide.

In conjunction with other scientists and NMFS, the Navy will explore integrating tagging and additional survey data into HRC monitoring plan if data is available in areas associated with Navy training.

Navy Funded Research and Development Technologies

New research and development technologies in marine mammal research may be considered in the future (late fiscal year [FY] 08 and FY 09), but given the relatively recent nature of some technology, it is unknown at this time what value-added data will be available to supplement monitoring. Information from research and development technologies may, however, generate relevant biological information about marine mammal distribution and by inference impacts, or lack of impacts, from MFA sonar operations. Examples include developing the capability to detect and localize vocalizing marine mammals using the installed range hydrophones. Based on the current status of acoustic monitoring science, it is not yet possible to use installed systems as mitigation tools.

The Navy is also actively engaged in acoustic monitoring research involving a variety of methodologies (e.g., underwater gliders, surface radar detection of marine mammals, etc.); to date, none of the methodologies have been developed to the point where they could be used as an actual mitigation tool. The Navy will continue to coordinate passive monitoring and detection research specific to the proposed use of active sonar. As technology and methodologies become available, their applicability and viability will be evaluated for incorporation into the Navy's monitoring program.

6.8 HAWAII RANGE COMPLEX MONITORING PLAN

The Hawaii Range Complex Monitoring Plan (Monitoring Plan) is being developed in cooperation with NMFS Office of Protected Resources to provide marine mammal and sea turtle monitoring as required under the MMPA and the Endangered Species Act (ESA). When finalized, the Monitoring Plan is expected to contain the framework for research on the effectiveness of the Navy's suite of mitigation measures and analyze behavioral responses of marine mammals to MFA sonar and explosives. The Monitoring Plan is expected to utilize vessel, aerial and shore-based surveys, along with passive acoustics to accomplish its goals.

6.8.1 INTEGRATED COMPREHENSIVE MONITORING PROGRAM

The Navy is currently developing an Integrated Comprehensive Monitoring Program (ICMP) which will provide the overarching structure and coordination for Navy monitoring. The ICMP will, over time, compile analyzed data from all range specific monitoring plans (e.g. HRC monitoring plan) and Navy funded research and development studies. The primary objectives of the ICMP are to:

- To monitor Navy training events, particularly those involving mid-frequency sonar and underwater detonations, for compliance with the terms and conditions of ESA Section 7 consultations or MMPA authorizations;
- To collect data to support estimating the number of individuals exposed to sound levels above current regulatory thresholds;
- To assess the efficacy of the Navy's current marine species mitigation;
- To add to the knowledge base on potential behavioral and physiological effects to marine species from MFA sonar and underwater detonations; and,
- To assess the practicality and effectiveness of a number of mitigation tools and techniques.

The analysis protocols that will be used for the ICMP are still in the development phase at this time (2008). However, data collection methods will be standardized to allow for comparison from range-specific monitoring plans. The sampling scheme for the program will be developed so that the results are scientifically defensible (e.g. statistically significant). A data management system will be developed to assure that standardized, quality data are collected towards meeting of the goals. The ICMP will be evaluated yearly by the Navy to provide a matrix for research progress and goals for the following year. The ICMP reports and the range specific monitoring plan reports will be used by Navy and NMFS for refinement and analysis of the monitoring methods, which can be used in annual LOA applications.

6.9 NAVY-FUNDED RESEARCH

The Navy provides a significant amount of funding and support to marine research. The agency provided 26.4 million dollars in 2008 to universities, research institutions, Federal laboratories, private companies, and independent researchers around the world to study marine mammals. The Navy sponsors 70 percent of all U.S. research concerning the effects of human-generated sound on marine mammals and 50 percent of such research conducted worldwide. Major topics of Navy-supported research include the following:

- Better understanding of marine species distribution and important habitat areas,
- Developing methods to detect and monitor marine species before ,during and after training,
- Understanding the effects of sound on marine mammals, sea turtles, fish, and birds, and
- Developing tools to model and estimate potential effects of sound.

This research is directly applicable to Navy training activities, particularly with respect to the investigations of the potential effects of underwater noise sources on marine mammals and other protected species. Proposed training activities employ sonar and underwater explosives, which introduce sound into the marine environment.

The Marine Life Sciences Division of the Office of Naval Research currently coordinates six programs that examine the marine environment and are devoted solely to studying the effects of noise and/or the implementation of technology tools that will assist the Navy in studying and tracking marine mammals. The six programs are as follows:

1. Environmental Consequences of Underwater Sound,
2. Non-Auditory Biological Effects of Sound on Marine Mammals,
3. Effects of Sound on the Marine Environment,
4. Sensors and Models for Marine Environmental Monitoring,
5. Effects of Sound on Hearing of Marine Animals, and
6. Passive Acoustic Detection, Classification, and Tracking of Marine Mammals.

The Navy has also developed the technical reports referenced within this document, which include the Marine Resources Assessment for the Hawaiian Islands. Furthermore, research cruises by NMFS and by academic institutions have received funding from the Navy. For instance, the Navy funded a marine mammal survey in the Mariana Islands to gather information to support an environmental study in that region given there had been no effort undertaken by NMFS. All of this research helps in understanding the marine environment and aids in determining if there are effects that result from Navy training in the Pacific.

The Navy has sponsored several workshops to evaluate the current state of knowledge and potential for future acoustic monitoring of marine mammals. The workshops brought together acoustic experts and marine biologists from the Navy and other research organizations to present data and information on current acoustic monitoring research efforts and to evaluate the potential for incorporating similar technology and methods on instrumented ranges. However, acoustic detection, identification, localization, and tracking of individual animals still requires a significant amount of research effort to be considered a reliable method for marine mammal monitoring. The Navy supports research efforts on acoustic monitoring and will continue to investigate the feasibility of passive acoustics as a potential mitigation and monitoring tool.

Overall, the Navy will continue to fund ongoing marine mammal research, and is planning to coordinate long-term monitoring/studies of marine mammals on various established ranges, range complexes, and OPAREAs. The Navy will continue to research and contribute to university/external research to improve the state of the science regarding marine species biology and acoustic effects. These efforts include mitigation and monitoring programs; data sharing with NMFS and via the literature for research and development efforts; and future research as described previously.

6.10 KAUAI

The following sections provide mitigation measures to minimize the potential for impacts on onshore species.

6.10.1 AIRSPACE

Aircraft transiting the Open Ocean Area region of influence on one of the low-altitude airways and/or high-altitude jet routes that will be affected by flight test activities within the PMRF/Main

Base region of influence will be notified of any necessary rerouting before departing their originating airport and will therefore be able to take on additional fuel before takeoff. The establishment of laser range operational procedures, including horizontal and vertical buffers, would minimize potential impacts to aircraft. Coordination with the Federal Aviation Administration (FAA) would occur well in advance of the Major Exercise.

6.10.2 BIOLOGICAL RESOURCES

In accordance with the mitigation measures adopted for PMRF's Enhanced Capability EIS (U.S. Department of the Navy, 1998a), night lighting is shielded to the extent practical to minimize its potential effect on night-flying birds (Newell's shearwater and petrels) and Hawaiian hoary bats.

Measures were suggested in the PMRF Enhanced Capability EIS to further reduce possible environmental impacts. The installation of a portable blast deflector on the launch pad could protect the vegetation on the adjacent sand dunes. The potential for starting a fire would be further reduced by clearing dry vegetation from around the launch pad. Spraying the vegetation adjacent to the launch pad with water just before launch would reduce the risk of ignition. Emergency fire crews would be available during launches to quickly extinguish any fire and minimize its effects. An open (spray) nozzle will be used, when possible, rather than a directed stream when extinguishing fires, to avoid erosion damage to the sand dunes and to prevent possible destruction of cultural resources.

The Kauai Island Utility Cooperative has shielded all streetlights on utility poles along county and state highways to reduce light-attraction impacts. The Cooperative has also placed power line marker balls in areas of concentrated seabird flight paths. These measures could also be used by the Navy for the proposed installation of additional poles and cable between PMRF and Kokee.

If avoidance of activities during bird fallout season is not practicable, monitoring for downed birds near the new towers or antennas would be conducted as appropriate.

The main beam of the Terminal High Altitude Area Defense radar or other ground-based radar system during missile flight tests will not be directed toward the ground and will have a lower limit of 4 to 5 degrees above horizontal, which would preclude electromagnetic radiation impacts to green turtles or monk seals on the beach.

Landing routes and beach areas are surveyed for the presence of sensitive wildlife. If any marine mammals, sea turtles, or nesting seabirds are found to be present on the beach, training is delayed until the animals leave the area.

Mitigation measures to minimize the potential for introductions of seed or other plant parts (propagules) of exotic species include:

- Minimizing the amount of seed or propagules of non-native plant species introduced to the islands through continued efforts to remove seed and soil from all vehicles (including contractor vehicles) coming to the island by pressure washing on the mainland, and stepped up efforts to ensure that imported construction materials such as sand, gravel, aggregate, or road base material are weed free.

- Regular monitoring and treatment to detect and eliminate establishing exotic species, focusing on areas where equipment and construction materials come ashore and areas within which there is movement of equipment and personnel and soil disturbance which favor the spread and establishment of invasive species (e.g., along roadsides, and disturbed areas).
- Effective measures to foster the reestablishment of native vegetation in areas where non-native vegetation is present.
- Prohibiting living plant materials to be brought to the islands from the mainland (in order to avoid introduction of inappropriate genetic strains of native plants or exotic species, including weeds, insects and invertebrates).

Various instructions, as well as exercise-specific orders such as the Exercise RIMPAC Operations Order, advise commanding officers of requirements regarding the protection of Hawaii from the immigration of additional alien or invasive species. Introduction of any plant or animal into Hawaii without permission of the State of Hawaii Department of Agriculture is prohibited. All ship commanding officers and aircraft are required by the Defense Transportation Regulation, DoD 4500.9-R, to conduct inspections of equipment, cargo, supplies and waste prior to entering their first port of entry into the U.S. Office of the Chief of Naval Operations Instruction (OPNAVINST) 6210.2, Quarantine Regulations of the Navy, is intended to prevent the introduction and dissemination, domestically or internationally originated, of diseases affecting humans, plants, and animals; prohibited or illegally taken wildlife; arthropod vectors; and pests of health and agricultural importance. See Appendix C for the specific requirements of OPNAVINST 5090.1B, Chapter 19, and the Exercise RIMPAC Operations Order.

Pacific Missile Range Facility Enhanced Capability Biological Assessment

The following recommendations were established in 1998 after an informal consultation with NMFS on the enhanced capabilities of PMRF (U.S. Department of the Navy, 1998a):

- If whales or monk seals are observed during prelaunch safety clearance activities, the launch should be delayed until monk seals and whales are clear of the launch safety zones.
- Surveys should be conducted of beach areas on PMRF/Main Base and on Niihau for sea turtle nests prior to amphibious landings and other activities that may affect sandy beaches. This will allow locational shifts in the landings to reduce the potential for effects on Hawaiian monk seals and green turtles.
- There is little data on monk seal abundance and distribution at Niihau. PMRF should work with the owners of Niihau Ranch to develop Hawaiian monk seal and green turtle monitoring programs so that appropriate management measures can be implemented by the owners and residents if necessary. Training on census techniques and provision of data forms for participants could be provided by the NMFS. Contingent on approval from the land owners, NMFS could also provide analysis and interpretations of the census and observational data for the owners and residents.

- Studies to investigate the behavioral and physiological responses of large whales and listed sea turtles to high intensity sound of all frequencies should be sponsored and/or funded by the Navy, possibly through the office of Naval Research. This will provide better information on which to evaluate this and future projects.

Pursuant to a previous Section 7 Consultation and Biological Opinion (National Oceanic and Atmospheric Administration, 2007), the Navy agreed to mitigations that reduce or eliminate any potential impacts to humpback whales. No explosive rounds are currently used. Mitigations agreed to include seasonal use during periods when humpback whales are not present, surveying the waters off Kaula to ensure that no whales are present, and limiting the impact area to the southern tip of the island. These mitigation measures are also used for other marine species including Hawaiian monk seals and sea turtles.

6.10.3 CULTURAL RESOURCES

Mitigation measures to reduce and/or eliminate any potential adverse effects on known or unidentified historic properties from ongoing and future missile activities have been developed and are presented in the PMRF Integrated Cultural Resources Management Plan (International Archaeological Resources Institute, Inc., 2005). These include:

- Avoiding training and construction in areas where cultural resources are known to exist
- Monitoring all ground-disturbing activities and construction in medium- and high-sensitivity archaeological areas
- Briefing personnel working in culturally sensitive areas, including providing information on Federal laws protecting cultural resources
- Spraying water on vegetation within the immediate area of the launch vehicle prior to launch. In the event that vegetation ignites as a result of launches, fire suppression personnel are instructed to use an open spray nozzle whenever possible to minimize erosion damage (such as to sand dunes) and prevent destruction of cultural resources.
- If extensive burning of dune vegetation occurs, conducting post-burn archaeological surveys in consultation with the Hawaii State Historic Preservation Office and Navy archaeologist
- Implementing data recovery/research and documentation program if cultural resources are discovered as a result of normal training and base operations activities.

Training and RDT&E activity plans direct that If unanticipated cultural resources are encountered (particularly human remains) during any activity, all activities will cease in the immediate vicinity of the find and procedures outlined in the PMRF ICRMP.

6.10.4 GEOLOGY AND SOILS

New construction would follow standard methods to control erosion during construction. Base personnel would exercise best management practices to reduce soil erosion.

6.10.5 HAZARDOUS MATERIALS AND WASTE

No solid propellant missile launches will occur during rainy conditions, and the launch system will not use a water deluge system for cooling and noise suppression (a deluge system could increase the potential for ground deposition).

The PMRF Fire Department and Spill Response Team are trained in the appropriate procedures to handle materials associated with launches if a mishap occurs. All personnel involved in this training will wear protective clothing and receive specialized training in spill containment and cleanup.

6.10.6 HEALTH AND SAFETY

Mitigation measures to be used during GUNEX, Swimmer Insertion/Extraction, and Expeditionary Assault training events include the use of clearance zones, restricting landings to specific areas of the beach, publication of training overlays that identify the landing routes and any restricted areas, and designating a lookout to watch for other vessels. Every reasonable precaution is taken to prevent injury to human life or property.

The primary issue for and health and safety at PMRF is missile launch safety and emergency response. Appendix K provides details of these procedures. In general to protect both Navy personnel and the general public from injury from either launches or launch accidents, two primary mitigation measures are in place: flight termination and clearance of specified regions. The Range Safety Officer monitors the launch and trajectory of the missile against a planned flight path. If the missile deviates from this flight path, the Range Safety Officer terminates the flight to minimize risk to the public and the environment. Clearance areas include the Ground Hazard Area for land areas, Ship Exclusion Zones for ocean areas, and Restricted Airspace and Altitude Reservations for airspace. In addition, launch times and trajectories are cleared with United States Space Command to prevent impacts upon satellites (both manned and unmanned); this process is called Collision Avoidance.

Missile launches by their very nature involve some degree of risk, and it is for this reason that DoD and PMRF have specific launch and range safety policies and procedures to assure that any potential risk to the public and government assets (launch support facilities) are minimized. Many procedures are in place to mitigate the potential hazards of an accident during the flight of one of these missiles. The PMRF Flight Safety Office prepares a Range Safety Operational Procedure (RSOP) for each mission that involves missiles, supersonic targets, or rockets. The development of the RSOP also considers the hazards from debris of hit-to-kill intercept tests where an interceptor missile impacts a target missile. The Commanding Officer of PMRF approves each RSOP, which includes specific requirements and mission rules. The Flight Safety Office has extensive experience in analyzing the risks posed by such activities. In spite of the developmental nature of missile activities (which leads to a significant probability of mission failure), the United States has an unblemished record of public safety during missile and rocket launches.

To protect people from injury from either nominal launches or accidents, two primary mitigation measures are in place: flight termination and clearance of specified regions. Clearance areas include the ground hazard area for land areas, Ship Exclusion Zones for ocean areas, and Restricted Airspace and Altitude Reservations for airspace. In addition, launch times and trajectories are cleared with United States Space Command (USSPACECOM) to prevent impacts upon satellites (both manned and unmanned); this process is called Collision Avoidance. A flight termination system consists of several components. The ground unit contains a transmitter, which can send simple tones on a mission-specific radio frequency. On the vehicle there is a radio receiver and a termination system. The termination system may either be a non-destructive thrust-termination action or a destruct charge that breaks apart the vehicle. The choice of the system depends on mission, vehicle, and safety constraints. For some missions when the vehicle properties are such that all potential debris from accidents is contained within the hazard area, no flight termination system is needed.

Flight termination is performed by the Missile Flight Safety Officer if a missile malfunctions and leaves a predefined region or violates other predefined mission rules. The acceptable flight region is bounded by Destruct Limits, which are defined to make impact of potentially hazardous debris on populated areas highly unlikely. The Missile Flight Safety Officer terminates flight if the Instantaneous Impact Point of a vehicle crosses a Destruct Limit. The range safety system includes highly-reliable in-flight tracking and command destruction systems. The Missile Flight Safety Officer monitors in real-time missile performance and evaluates flight termination criteria. The flight termination system provides a mechanism to protect the public with very high reliability, even in the unlikely case of a missile malfunction.

The high-energy laser program office would be responsible for providing all necessary documentation to PMRF prior to issuance of the Range Safety Approval. These include:

- Letter of Approval or a Letter of No Concern from the FAA for the use of the laser within Honolulu FAA airspace,
- Letter of Approval or a Letter of No Concern for the use of their laser if it will or has the potential of lasing above the horizon from USSPACECOM as well as clearance from USSPACECOM for each intended laser firing,
- Letter of Approval from the Laser Safety Review Board at Dahlgren for the use for their laser on Navy Ranges (includes a survey and certification of the laser), and Range Safety Laser Data Package.

6.10.7 NOISE

To minimize noise level impacts, personnel or contractors involved in the proposed construction activities would be required to wear hearing protection in areas where noise levels would exceed limits set by the Occupational Safety and Health Administration.

6.10.8 KAULA

Pursuant to a previous Section 7 Consultation and Biological Opinion (National Oceanic and Atmospheric Administration, 2007), the Navy agreed to mitigations that reduce or eliminate any potential impacts to humpback whales. No explosive rounds are currently used. Mitigations agreed to include seasonal use during periods when humpback whales are not present, surveying the waters off Kaula to ensure that no whales are present, and limiting the impact area to the southern tip of the island. These mitigation measures are also used for other marine species including Hawaiian monk seals and sea turtles.

6.10.9 NIIHAU

6.10.9.1 BIOLOGICAL RESOURCES

Special Warfare Operations (SPECWAROPS) training on Niihau uses existing openings, trails, and roads and thus avoid areas that contain threatened or endangered plants. Helicopter landings are in areas designated as suitable and absent of listed biological resources.

Target drones are flown along the east coast of the island away from inhabited areas. There is the potential for a drone to crash and start a brush fire on the island. However, during activities that present the potential for fires, a ground fire-fighting crew and helicopters with water buckets are airborne to minimize any fire hazard.

HRC training will comply with relevant Navy and USFWS policies and procedures (e.g., blow/wash down of vehicles and equipment) during these training events and Major Exercises, which should limit the potential for introduction of invasive plant species.

However, all ocean vessel landings are first checked to ensure the sites are clear of monk seals. Also, training will avoid any beach area with green turtle nests, as they occasionally nest on Niihau beaches.

6.10.9.2 HAZARDOUS MATERIALS AND WASTE

The PMRF Hazardous Material Spill Response Team will be dispatched to the crash site of any mishap to ensure proper removal of all hazardous material/hazardous waste.

6.10.9.3 HEALTH AND SAFETY

During activities that present the potential for fires, a ground fire-fighting crew and helicopters with water buckets are airborne to minimize any fire hazard.

6.11 OAHU

Oahu Army Training Lands (Makua Military Reservation, Kahuku Training Area, Dillingham Military Reservation)

Many critically endangered plants with very low numbers remaining in the wild occur on Army training lands. Large-scale ecosystem protection is mainly done by fencing and invasive plant control in Management Units. Management includes extensive consultation with U.S. Fish and Wildlife Service and ongoing surveys to determine current status. Mitigation measures include:

- Controlling threats
- Improving conditions for recruitment
- Propagation
- Reintroduction
- Development of Implementation Plans that outline required mitigations to offset training risks and to stabilize the targeted plant and animal populations
- Preparation and implementation of a Wildland Fire Management Plan

Table 6.11-1 provides a list of training guidelines that are applicable to all Oahu Training Areas.

6.11.1 PUULOA UNDERWATER RANGE

6.11.1.1 AIRSPACE

The Navy would begin early coordination with regulatory agencies as applicable to reduce environmental impacts and to assist with the development of any required mitigative measures.

6.11.1.2 BIOLOGICAL RESOURCES

Explosive charges, in less than 40 feet of water, would be placed/neutralized only in sandy areas to avoid/minimize potential impacts on coral. Prior to actual detonation, the area is determined to be clear of marine mammals and sea turtles.

During amphibious inserts the crews follow established procedures, such as having designated lookouts watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The troops review training overlays that identify the insertion points and any nearby restricted areas. Sensitive biological and cultural resource areas are avoided by the SPECWAROPS troops.

6.11.1.3 HEALTH AND SAFETY

Demolition activities will be conducted in accordance with Commander, Naval Surface Force (COMNAVSURFPAC), U.S. Pacific Fleet Instruction 3120.8F (U.S. Department of the Navy, 1993), which specifies detonation procedures for underwater ordnance to avoid endangering the public or impacting other non-military activities, such as shipping, recreational boaters, divers, and commercial or recreational fishermen.

Table 6.11-1. Training Guidelines for Resource Protection—All Oahu Training Areas

APPLIES TO	
The following list of actions and limitations applies to all Oahu training areas. Additional limitations are imposed in the Sensitive Ecological and Cultural Resource Areas.	
AUTHORITY	
Enforcement of the following rules is under the authority of the Directorate of Plans, Training, Mobilization and Security, Range and Training Support Division.	
REQUIRED ACTIONS	
Access	Before entering a training area, troops must clean all vehicles, equipment, personal gear, shoes, and clothing.
Fire	All fires must be reported immediately.
	In case of fire, troops will stop training and begin fighting the fire.
	Troops will continue to fight the fire until released by the Fire Department.
Water	All aviation or other training area fuels or chemicals and other potentially toxic and polluting substances must be handled and stored to avoid spills and fires.
LIMITATIONS FOR SENSITIVE ECOLOGICAL AND CULTURAL RESOURCE AREAS	
Access	No troops may go beyond signs or fences marking the presence of rare or endangered plants and animals or archaeological sites.
Bivouacking	No bivouacking within 3,280 feet of posted signs marking the presence of rare or endangered native plants and animals or restoration projects.
	No training units larger than platoon size (more than 30 troops) may bivouac outside of reusable bivouac sites provided with portable or fixed latrines.
	No open fires.
	No burying or leaving trash.
	No food preparation.
	No refueling operations.
	No cutting, clearing, or disturbing of vegetation. This includes mosses, grasses, shrubs, bushes, and trees.
Maneuvers	No vehicle traffic off existing roads.
	No use of rocks from rock piles or walls for training purposes.
	No establishment or new vehicle tracks.
	No digging, including entrenchment and foxholes, except in areas specifically designated by Range Control.
	Dillingham Military Reservation and Kahuku Training Area: No pyrotechnic or incendiary training devices except during the wet season (October to April) OR outside areas designed to control fire.
	No new placement of barbed wire or concertina wire near signs marking the presence of sensitive ecological areas or fences.
	Dillingham Military Reservation and Kahuku Training Area: No use of explosive rounds or tracer ammunition.
	No road, trail, or firebreak clearing without permission form Range Control.
	No grading or construction of buildings or other permanent structures without permission from Range Control.

Source: U.S. Department of the Navy, 2002a

6.11.2 NAVAL DEFENSIVE SEA AREA

6.11.2.1 BIOLOGICAL RESOURCES

The Navy requests that multinational participants purge bilge/ballasts tanks in their ships prior to entering U.S. territorial waters.

Prior to the sinking of any vessels or deployment of steel frames for Naval Special Warfare Exercises, environmental documents would be developed and reviewed as appropriate. The Navy would begin early coordination regulatory agencies as applicable to reduce environmental impacts and to assist with the development of any required mitigative measures.

6.11.2.2 HEALTH AND SAFETY

Existing Navy safety protocols will ensure that no non-participants will be in the area during training. The Coast Guard is notified of each planned training event.

6.11.3 PEARL HARBOR

During amphibious inserts, the troops review training overlays that identify the insertion points and any nearby restricted areas. Sensitive biological resource areas are avoided by the SPECWAROPS troops.

6.11.4 FORD ISLAND

Guidance in the Pearl Harbor ICRMP will be followed and coordination with the Navy Region Hawaii's designated cultural resources coordinator would be required.

6.11.5 EXPLOSIVE ORDNANCE DISPOSAL LAND RANGE

The restriction on the maximum net explosive weight of ordnance detonated at the Land Range, 2.5 pounds, will apply to all users of the Land Range.

6.11.6 LIMA LANDING

6.11.6.1 BIOLOGICAL RESOURCES

Prior to actual detonation, the area will be determined to be clear of marine mammals. Training follows the relevant Navy policies and procedures to minimize impacts on biological resources. After training involving underwater detonations, the area will be searched for injured animals.

During amphibious inserts the crews follow established procedures, such as having designated lookouts watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The troops review training overlays that identify the insertion points and any nearby restricted areas. Sensitive biological and cultural resource areas are avoided by the SPECWAROPS troops.

6.11.6.2 HEALTH AND SAFETY

Existing Navy safety protocols for the use of explosives would ensure that no non-participants would be in the area during training. Demolition activities will be conducted in accordance with COMNAVSURFPAC Instruction 3120.8F (U.S. Department of the Navy, 1993), which specifies detonation procedures for underwater ordnance to avoid endangering the public or impacting other non-military activities, such as shipping, recreational boaters, divers, and commercial or recreational fishermen.

6.11.7 MARINE CORPS BASE HAWAII

6.11.7.1 AIRSPACE

Coordination with the FAA will occur well in advance of the 3- or 4-day Major Exercise. FAA coordination would include discussions regarding the anticipated number of aircraft including FCLP activities.

6.11.7.2 BIOLOGICAL RESOURCES

The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Marine Corps regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

Any potential impacts to listed bird species, such as the koloa maoli (Hawaiian duck), `alae ke`oke`o (Hawaiian coot), `alae `ula (Hawaiian common moorhen) and ae`o (Hawaiian stilt), would be addressed through coordination/consultation with the USFWS.

The beach and offshore waters would continue to be monitored for the presence of marine mammals and sea turtles 1 hour before and during training. If any are seen, then the training event would be delayed until the animals leave the area.

6.11.7.3 CULTURAL RESOURCES

Training overlays that identify the transit route, camp location, and any nearby restricted areas or sensitive biological and cultural resource areas are used by participants.

Any required road grading will not exceed the existing road width or alignment.

In the event unanticipated cultural remains are identified (particularly human remains), all training will cease in the immediate vicinity and the Hawaii SHPO will be immediately notified in accordance with the Programmatic Agreement.

6.11.8 MARINE CORPS TRAINING AREA/BELLOWS

6.11.8.1 BIOLOGICAL RESOURCES

Any potential impacts to listed bird species would be addressed through coordination/consultation with the USFWS.

To further minimize potential impacts on biological resources, instructions to Service elements engaged in Swimmer Insertion/Extraction, Expeditionary Assault, Humanitarian Assistance/Non-combatant Evacuation Operations (HAO/NEO), Humanitarian Assistance/Disaster Relief Operations (HA/DR), and Mine Countermeasures activities will include:

- Conducting surveys prior to use of amphibious launch vehicles to ensure that humpback whales are not disturbed.
- Establishing buffer zones in locations where green turtles are known to feed so that amphibious training events do not disturb these areas.
- Marking and monitoring green turtle nests discovered on beaches so they are not affected by training.

6.11.8.2 CULTURAL RESOURCES

Measures identified to mitigate impacts to cultural resources from training events include having proper documents in place in advance, crossing streams only at pre-selected locations, restricting vehicle crossings to existing bridges or pre-selected fords with no sensitive resources, and selecting stream crossings to avoid known cultural deposits. In the event unanticipated cultural remains are identified (particularly human remains), all training will cease in the immediate vicinity and the Bellows Air Force Station designated cultural resources coordinator will be notified.

6.11.9 HICKAM AIR FORCE BASE

6.11.9.1 AIRSPACE

Aircraft Support Operations would require coordination with the Air Force.

6.11.9.2 BIOLOGICAL RESOURCES

The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Air Force regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

Any potential impacts to listed bird species such as the ae`o (Hawaiian stilt) would be addressed through coordination with the USFWS.

6.11.10 WHEELER ARMY AIRFIELD

6.11.10.1 AIRSPACE

Aircraft Support Operations will require coordination with the Army and advanced planning and coordination with the FAA.

6.11.10.2 BIOLOGICAL RESOURCES

The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

6.11.11 MAKUA MILITARY RESERVATION

6.11.11.1 BIOLOGICAL RESOURCES

The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

6.11.11.2 CULTURAL RESOURCES

Any training proposed for Makua Military Reservation is reviewed by the Army before training is conducted. Extensive planning for training is required and includes coordination meetings 8 weeks and 10 days before the training event, a written plan of maneuver and fire support, and a risk assessment of the training event.

In the event cultural materials of any type are unexpectedly encountered during Live Fire Exercises (LFX) (particularly human remains), all training in the immediate vicinity of the find will cease and the Schofield Barracks Cultural Resources Manager will be notified.

6.11.11.3 HEALTH AND SAFETY

Specific safety plans have been developed to ensure that each training event is in compliance with applicable policy and requirements, and to ensure that the general public and range personnel and assets are provided an acceptable level of safety.

Navy activities would also follow mitigations from the Makua EIS as applicable, including:

- Habitat restoration following a fire. Efforts would be focused on the native forest edges to ensure that the area does not recede after each fire. Revegetation efforts would be implemented in any sensitive habitat destroyed by fire to ensure no net loss of sensitive species or habitat.
- Requiring Soldiers to clean their boots and equipment directly prior to troop marches to eliminate nonnative species.

- Surveying for weeds along roads and landing zones to evaluate the degree of threat and to prioritize control efforts and regularly implementing manual, mechanical, and chemical treatment programs.
- Limiting marches at Ka`ena Point during the Laysan Albatross breeding season (November to July) to at most one march per month and conducting monitoring at the beginning of the wedge-tailed shearwater breeding season (April to June) to determine whether burrows are present along the trail.
- Best Management Practices, such as no lights, cadence, or smoking within the marked areas of the trails
- Continuing to implement land management practices and procedures to reduce erosion impacts on soils from live-fire training.
- Cultural resource avoidance training and site protection, including but not limited to installing fencing or other types of buffering. Provisions in the training PA, including site protection, such as sand bagging, have proven effective in site preservation. In addition, firing points and paths would continue to be aligned to avoid shooting over cultural resources.
- Relocating any targets or training activities that could disturb or damage known cultural resources.
- Continuing to identify Native Hawaiian organizations, groups, families, and individuals that may ascribe traditional religious and cultural importance to areas, landscapes, or historic properties at Makua Military Reservation.

6.11.12 KAHUKU TRAINING AREA

6.11.12.1 BIOLOGICAL RESOURCES

The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

Any potential impacts to listed bird species such as the Oahu `elepaio or `Alauahio (Oahu creeper) would be addressed through coordination with the USFWS.

6.11.12.2 CULTURAL RESOURCES

Training events use an existing training trail and access road that will be graded before the training event (if required). However, in accordance with standard operating procedures, grading will not exceed the road width or alignment. Training overlays that identify the transit route, camp location, and any nearby restricted areas or sensitive biological and cultural resource areas will be used by all participants.

In the event cultural materials are unexpectedly encountered during the course of Expeditionary Assault, HAO/NEO, or HA/DR events (particularly human remains), all training will cease in the immediate vicinity of the find and the Schofield Barracks Cultural Resources Manager will be notified.

6.11.13 DILLINGHAM MILITARY RESERVATION

6.11.13.1 BIOLOGICAL RESOURCES

The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

Any potential impacts to listed bird species, such as the endangered `alae ke`oke`o (Hawaiian coot), `alae`ula (Hawaiian moorhen), koloa maoli (Hawaiian duck), and nene (Hawaiian goose), would be addressed through coordination with the USFWS.

The beach and offshore waters are monitored for the presence of marine mammals and sea turtles 1 hour before and during Major Exercises. If any are seen, the training event is delayed until the animals leave the area.

6.11.13.2 CULTURAL RESOURCES

All personnel entering the Dillingham Military Reservation will adhere to training guidelines regarding cultural resources.

In the event cultural materials are unexpectedly encountered during SPECWAROPS activities (particularly human remains), training in the vicinity of the find will cease and personnel will follow the appropriate military branch protocols. If the find is made by Marine Corps or Navy personnel, the Hawaii SHPO will be immediately notified in accordance with the Programmatic Agreement (see Appendix H). If the find is unexpectedly encountered during Army activities, the Schofield Barracks Cultural Resources Manager will be immediately notified.

6.12 MAUI

Analysis of the program training and research, development, test, and evaluation (RDT&E) activities presented in Section 4.5 indicates there would be no impacts from training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Maui Offshore resources.

Submarine events occur in the training areas within the 100-fathom isobath contour between the islands of Kahoolawe, Maui, Lanai, and Molokai and in the Penguin Bank area. The Navy has conducted these submarine operations in the Hawaiian Islands for decades, and no harmful effects on these species have been observed to date.

Personnel are aware that they are not to harm or harass whales, Hawaiian monk seals, or sea turtles. Commander, Navy Region Hawaii issues an annual Navy message when the humpback whales return to Hawaiian waters as a means to emphasize and increase awareness seasonally.

Aircrews participating in events are trained to visually scan the surface of the water for anomalies. Due in part to this additional emphasis on visual scanning and the availability of extra crew members to conduct such searches, it is unlikely that whales, monk seals, or sea turtles would be undetected when the aircraft are flying at lower altitudes. If animals are detected, the submarine's path can be adjusted. Submarine events, including those in existing underwater training areas between the islands of Kahoolawe, Maui, Lanai, and Molokai, follow established clearance procedures to ensure the activity will not adversely impact marine mammals and sea turtles. The potential to harm whales, monk seals, or sea turtles from the firing and tracking of non-explosive torpedoes in these training areas, as part of the various Major Exercises, is remote.

Analysis of the program training and RDT&E activities presented in Section 4.5.2 indicates there would be no impacts from training and RDT&E activities under the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3 for Maui Onshore.

6.13 HAWAII

6.13.1 KAWAIHAE PIER

The Navy will work with the current land owner for activities that may not be covered under existing consultation or regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

Expeditionary Assault landing personnel are briefed on existing procedures for entering the harbor and unloading equipment and supplies at the boat ramp. These procedures include inspections by appropriate Federal and/or State agencies of vehicles and equipment from foreign countries to prevent the introduction of invasive or alien species. A recycling wash rack is used to clean foreign country vehicles and equipment prior to back-loading to control the spread of alien species.

Within 1 hour of initiation of the Expeditionary Assault landing events, the landing routes and beach areas are determined to be clear of marine mammals and sea turtles. If any are seen, the training event will be delayed until the animals leave the area. During the landing the crews follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles.

6.13.2 POHAKULOA TRAINING AREA

6.13.2.1 AIRSPACE

For training that includes 10 or more aircraft, the Bradshaw Army Airfield manager submits a Notice to Airmen (NOTAM) to Honolulu Flight Service Station to be published as a Honolulu Local NOTAM and as a Class D NOTAM.
Coordination with the FAA will occur well in advance of each 3- or 4-day Major Exercise

6.13.2.2 BIOLOGICAL RESOURCES

The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

The following restrictions from the Pohakuloa Training Area (PTA) External Standard Operating Procedures are applicable to all training areas on the installation:

- All off-road driving is prohibited
- All fenced areas are off-limits
- All lava tubes and sinkholes are off-limits
- Digging is only permitted in previously disturbed areas

Potential impacts to listed bird species, such as the `io (Hawaiian hawk) and nene, which are the only endangered forest birds seen on PTA, would be addressed through coordination with the USFWS.

Soldiers will be briefed prior to training about fire prevention, and cultural and natural resource protection. The fire prevention briefing ensures that important information is provided to using individuals that may start wildfires.

According to the *Rare Plants of Pohakuloa Training Area Hawaii* (Shaw, 1997)*,* military activities, other than fire, have little impact on the rare plants on the installation. Occasionally, a rare plant might be crushed by foot or vehicle. Dust created by traffic could negatively impact a rare species if it is growing near a road. Also, only about 4 percent of the installation outside of the impact area had been disturbed by military activities. Most of the disturbance occurs in fixed artillery firing points, bivouac sites, and firing ranges. Many of the rare species inhabit remote areas of Pohakuloa Training Area with little or no chance of being disturbed by military training. Reducing the risk of military impacts on the rare plants can be accomplished easily by locating training away from areas with sensitive species, fencing to enclose sensitive species for protection from ungulates, fire and fuel corridors, fire breaks, additional surveys for threatened and endangered species, and continued sensitive plant propagation efforts.

The following restrictions from the Pohakuloa Training Area External Standard Operating Procedures are applicable to all training areas on the installation:

- All off-road driving is prohibited.
- All fenced areas are off-limits.
- All lava tubes and sinkholes are off-limits.
- Digging is only permitted in previously disturbed areas.

6.13.2.3 CULTURAL RESOURCES

Personnel review training overlays that identify insertion points and nearby restricted areas and sensitive biological and cultural resource areas are avoided. In the event unexpected cultural materials are encountered (particularly human remains) during LFX, activities in the immediate vicinity of the find will cease and the Schofield Barracks Cultural Resources Manager will be contacted. In addition, if the alignment of trails requires alteration or grading, or other ground disturbing activities are required, coordination with the Schofield Barracks Cultural Resources Manager would be required.

The Army will continue to provide Native Hawaiians with access to traditional religious and cultural properties, in accordance with the American Indian Religious Freedom Act and Executive Order 13007, on a case-by-case basis.

6.13.2.4 HEALTH AND SAFETY

Safety and health precautions are covered in external Standard Operating Procedures and are briefed by the PTA Operations Center.

6.13.3 BRADSHAW ARMY AIRFIELD

6.13.3.1 AIRSPACE

The advanced planning and coordination with the FAA and Bradshaw Army Airfield regarding scheduling of special use airspace and coordination of Navy training

6.13.3.2 BIOLOGICAL RESOURCES

The Navy will work with the current DoD land owner for activities that may not be covered under existing consultation or Army regulations. Proposed activities would not be implemented until appropriate coordination and/or consultation with applicable agencies has been completed.

All personnel entering Bradshaw Army Airfield will be briefed on the guidelines set forth in the PTA Ecosystem Management Plan.

6.14 GENERAL OFFSHORE AREAS

The Navy considered whether seasonal, or problematic complex/steep bathymetry or habitat avoidance could be a potential measure based on supporting science, likely effectiveness in avoiding harm to marine mammals, the extent to which it would impact military readiness training and personnel safety, practicality of implementation, and impact on the effectiveness of military readiness training. Measures such as these were not adopted for a variety of reasons. First, habitat requirements for most of the marine mammals in the Hawaiian Islands are unknown or that physical predictor variables that have been used in the Atlantic and Mediterranean Sea do not appear to apply in the Pacific (see Barlow and Gentry, 2004; Ferguson et al., 2006). Thus, there is little information to allow for a possible alternative exercise location in the Hawaiian Islands that is known to be less important to marine mammals. The choices for exercise locations are predicated on training requirements and the ability of ships, aircraft, and submarines to operate safely. This includes avoiding to the maximum extent practicable, shipping and commercial air routes between the islands and locations beyond Hawaii.

Avoiding seamounts in general is impracticable, since there are over 300 potential features that could be considered seamounts in the HRC. This suggested mitigation is based on the untested assumption that seamounts are more important to marine mammals than other parts of the HRC. However, there are no biologically defined criteria for the bathymetric or environmental parameters that would make a seamount critical to marine mammals (such as critical depth from the surface) and fail to define what would constitute a buffer that would constitute “avoiding” these areas. If the Navy were required to avoid all the sea mounts in the Hawaiian waters to some degree, then essentially it would render a large portion of the Hawaii Range Complex OPAREA off-limits to ASW training. This is simply too restrictive and is based only on speculation that seamounts may have a greater density of marine mammals present based on vocalizations. Further, ASW operators need to train with varying conditions so they can deal with using MFA sonar in water density changes based on temperature, salinity, currents, varying weather conditions, and varying profiles of ocean bottoms, which all affect how sound propagates in the water. Areas where there is significant bathymetric change (such as seamounts or undersea ridges) are the same areas where submarines are likely to hide. ASW operators need to be familiar with these areas to understand how to operate and detect potential adversary submarines in those conditions. Recommendations to “avoid steep bathymetry” fail to define the parameters of that “steep” bathymetry, fail to identify why this would be biologically important in the Hawaiian context, and seemingly fail to recognize that all the Hawaiian Islands rise from the ocean floor in what could be considered a steep bathymetric rise.

“Seasonal” restrictions fail to take into account that mitigation measures already in place avoid all detected marine mammals no matter the season. Commander Navy Region Hawaii does issue a Navy message annually when the humpback whales return to Hawaiian waters (based on actual sightings) as a means to increase awareness seasonally. Beyond this, making a restriction based otherwise on a calendar date fails to account for the variation in the arrival and departures of animals seasonally present in Hawaii. A seasonal restriction would not meet Navy training requirements, which are tied to deployments that are often dictated by real world events. Furthermore, forcing all training to occur in the “off” season would result in an increased training intensity rather than having training events distributed over the entire year.

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Dedicated to the memory of Tom Peeling

"Hana like e ho`omalu a malama i ka po`ai ola"
Working together to protect and preserve our environment.

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8.0 Glossary of Terms

8.0 GLOSSARY OF TERMS

Access—the right to transit to and from and to make use of an area.

Accretion—growth by gradual external addition.

Activity—an individual scheduled training function or action such as missile launching, bombardment, vehicle driving, or Field Carrier Landing Practice.

Advisory Council on Historic Preservation—a 19-member body appointed, in part, by the President of the United States to advise the President and Congress and to coordinate the actions of Federal agencies on matters relating to historic preservation, to comment on the effects of such actions on historic and archaeological cultural resources, and to perform other duties as required by law (Public Law 89-655; 16 United States Code 470).

Aeronautical Chart—a map used in air navigation containing all or part of the following: topographic features, hazards and obstructions, navigation aids, navigation routes, designated airspace, and airports.

Aesthetic—a pleasing appearance, effect, or quality that allows appreciation of character-defining features, such as of the landscape.

Air Basin—a region within which the air quality is determined by the meteorology and emissions within it with minimal influence on and impact by contiguous regions.

Air Defense Identification Zone—the area of airspace over land or water, extending upward from the surface, within which the ready identification, the location, and the control of aircraft are required in the interest of national security.

Air Route Traffic Control Center (ARTCC)—a facility established to provide air traffic control service to aircraft operating on Instrument Flight Rules flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to aircraft operating under Visual Flight Rules.

Air Traffic Control—a service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic.

Air Traffic Control Assigned Airspace (ATCAA)—Federal Aviation Administration-defined airspace not over an Operating Area (OPAREA) within which specified activities, such as military flight training, are segregated from other Instrument Flight Rules air traffic.

Airfield—usually an active and/or inactive airfield, or infrequently used landing strip, with or without a hard surface, without Federal Aviation Administration-approved instrument approach procedures. An airfield has no control tower and is usually private.

Airport—usually an active airport with hard-surface runways of 3,000 feet or more, with Federal Aviation Administration approved instrument approach procedures regardless of runway length or composition. An airport may or may not have a control tower. Airports may be public or private.

Airspace, Controlled—airspace of defined dimensions within which air traffic control service is provided to Instrument Flight Rules flights and to Visual Flight Rules flights in accordance with the airspace classification. Controlled airspace is divided into five classes, dependent upon location, use, and degree of control: Class A, B, C, D, and E.

Airspace, Special Use—airspace of defined dimensions identified by an area on the surface of the earth wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon non-participating aircraft.

Airspace, Uncontrolled—uncontrolled airspace, or Class G airspace, has no specific definition but generally refers to airspace not otherwise designated and activities below 1,200 feet above ground level. No air traffic control service to either Instrument Flight Rules or Visual Flight Rules aircraft is provided other than possible traffic advisories when the air traffic control workload permits and radio communications can be established.

Airspace—the space lying above the earth or above a certain land or water area (such as the Pacific Ocean); more specifically, the space lying above a nation and coming under its jurisdiction.

Airway—Class E airspace established in the form of a corridor, the centerline of which is defined by radio navigational aids.

Alert Area—a designated airspace in which flights are not restricted but there is concentrated student training or other unusual area activity of significance.

Alkaline—basic, having a pH greater than 7.

Alluvium—a general term for clay, silt, sand, gravel, or similar unconsolidated material deposited during comparatively recent geologic time by a stream or other body of running water as a sorted or semi-sorted sediment in the bed of the stream or on its floodplain or delta, or as a cone or fan at the base of a maintained slope.

Altitude Reservation—altitude reservation procedures are used as authorization by the Central Altitude Reservation Function, an air traffic service facility, or appropriate air route traffic control center, under certain circumstances, for airspace utilization under prescribed conditions.

Aluminum Oxide (Al_2O_3)—a common chemical component of missile exhaust. Under natural conditions, the chemical is not a source of toxic aluminum; the U.S. Environmental Protection Agency has determined that nonfibrous Al_2O_3, as found in solid rocket motor exhaust, is nontoxic.

Ambient Air Quality Standards—legal limitations on pollutant concentration levels allowed to occur in the ambient air established by the U.S. Environmental Protection Agency or state agencies. Primary ambient air quality standards are designed to protect public health with an adequate margin of safety. Secondary ambient air quality standards are designed to protect public welfare-related values including property, materials, and plant and animal life.

Ambient Air—that portion of the encompassing atmosphere, external to buildings, to which the general public has access.

Amplitude—the maximum departure of the value of a sound wave from the average value.

Annual Average Daily Traffic (AADT)—the total volume passing a point or segment of a highway facility in both directions for 1 year divided by the number of days in the year.

Anthropogenic—human-related.

Aquaculture—the cultivation of the natural produce of water, such as fish or shellfish.

Aquifer—a subsurface formation, group of formations, or part of a formation (e.g., a huge, underground reservoir) that contains sufficient saturated permeable material to conduct groundwater and yield economical quantities of water to wells and springs.

Archaeology—a scientific approach to the study of human ecology, cultural history, prehistory and cultural processes, emphasizing systematic interpretation of material remains.

Archipelago—an expanse of water with many scattered islands; a group of islands.

Area of Potential Effect—the geographic area within which direct and indirect impacts generated by the Proposed Action and alternatives could reasonably be expected to occur and thus cause a change in historic, architectural, archaeological, or cultural qualities possessed by the property.

Artifact—any thing or item that owes its shape, form, or placement to human activity. In archaeological studies, the term is applied to portable objects (e.g., tools and the by-products of their manufacture).

Artisanal—non-industrialized.

Asbestos—a carcinogenic substance formerly used widely as an insulation material by the construction industry; often found in older buildings.

Asbestos-containing Material—any material containing more than 1 percent asbestos.

Atoll—a coral island consisting of a reef surrounding a lagoon.

Attainment Area—an air quality control region that has been designated by the U.S. Environmental Protection Agency and the appropriate state air quality agency as having ambient air quality levels as good as or better than the standards set forth by the National Ambient Air Quality Standards, as defined in the Clean Air Act. A single geographic area may have acceptable levels of one criteria air pollutant, but unacceptable levels of another; thus, an area can be in attainment and non-attainment status simultaneously.

Average Daily Traffic (ADT)—the total volume of traffic passing a given point or segment of a roadway in both directions divided by a set number of days.

A-weighted Sound Level—a number representing the sound level which is frequency-weighted according to a prescribed frequency response established by the American National Standards Institute (ANS1.4-19711) and accounts for the response of the human ear.

Azimuth—a distance in angular degrees in a clockwise direction from the north point.

Backyard Range—a range within a radius of one hour's drive (50-65 miles) of a unit, such that training there can be considered non-deployed for personnel tempo (PERSTEMPO) purposes.

Basement Rock—rock generally with complex structure beneath the dominantly sedimentary rocks.

Bedrock—the solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Benthic Communities—of or having to do with populations of bottom-dwelling flora or fauna of oceans, seas, or the deepest parts of a large body of water.

Benthopelagic—living and feeding near the sea floor as well as in midwaters or near the surface.

Benthos—the sea floor.

Bioaccumulation—building up of a substance, such as PCBs, in the systems of living organisms (and thus, a food web) due to ready solubility in living tissues.

Biological Diversity—the complexity and stability of an ecosystem, described in terms of species richness, species evenness, and the direct interaction between species such as competition and predation.

Biological Resources—a collective term for native or naturalized vegetation, wildlife, and the habitats in which they occur.

Booster—an auxiliary or initial propulsion system that travels with a missile or aircraft and that may not separate from the parent craft when its impulse has been delivered; may consist of one or more units.

Brackish—slightly salty; applicable to waters whose saline content is intermediate between that of streams and sea water.

Calcareous—containing calcium carbonate.

Candidate Species—a species of plant or animal for which there is sufficient information to indicate biological vulnerability and threat, and for which proposing to list as “threatened” or “endangered” is or may be appropriate.

Caprock—a natural overlying rock layer that is usually hard to penetrate.

Carbon Dioxide—a colorless, odorless, incombustible gas which is a product of respiration, combustion, fermentation, decomposition and other processes, and is always present in the atmosphere.

Carbon Monoxide—a colorless, odorless, poisonous gas produced by incomplete fossil-fuel combustion; it is one of the six pollutants for which there is a national ambient standard (see Criteria Pollutants).

Cetacean—an order of aquatic, mostly marine, animals including the whales, dolphins, porpoise, and related forms with large head, fishlike nearly hairless body, and paddle-shaped forelimbs.

Class A Airspace (also Positive Controlled Area)—airspace designated in Federal Aviation Administration Regulation Part 71 within which there is positive control of aircraft.

Coastal Zone—a region beyond the littoral zone occupying the area near the coastline in depths of water less than 538.2 feet. The coastal zone typically extends from the high tide mark on the land to the gently sloping, relatively shallow edge of the continental shelf. The sharp increase in water depth at the edge of the continental shelf separates the coastal zone from the offshore zone. Although comprising less than 10 percent of the ocean’s area, this zone contains 90 percent of all marine species and is the site of most large commercial marine fisheries. This may differ from the way the term “coastal zone” is defined in the State Coastal Zone Management Program (Hawaii Revised Statutes Chapter 205 A).

Community—an ecological collection of different plant and animal populations within a given area or zone.

Component (Cultural Resources)—a location or element within a settlement or subsistence system. Archaeological sites may contain several components that reflect the use of the locality by different groups in different time periods.

Continental Shelf—a shallow submarine plain of varying width forming a border to a continent and typically ending in a steep slope to the oceanic abyss.

Continental Slope—the steep slope that starts at the shelf break about 492 to 656 feet and extends down to the continental rise of the deep ocean floor.

Continental United States (CONUS)—the United States and its territorial waters between Mexico and Canada, but excluding overseas states.

Control Area (CTA)—a controlled airspace extending upwards from a specified limit above the earth.

Controlled Access—area where public access is prohibited or limited due to periodic training or sensitive natural or cultural resources.

Controlled Airspace—airspace of defined dimensions within which air traffic control service is provided to Instrument Flight Rules flights and to Visual Flight Rules flights in accordance with the airspace classification. Controlled airspace is divided into five classes, dependent upon location, use, and degree of control: Class A, B, C, D, and E.

Controlled Firing Area (CFA)—airspace wherein activities are conducted under conditions so controlled as to eliminate hazards to non-participating aircraft and to ensure the safety of persons and property on the ground.

Copepod—a small, shrimp-like crustacean.

Coral Reef—a calcareous organic area composed of solid coral and coral sand.

Cosmology—a branch of metaphysics that deals with the nature, or natural order, of the universe.

Council on Environmental Quality (CEQ)—established by the National Environmental Policy Act, the CEQ consists of three members appointed by the President. A CEQ regulation (Title 40 Code of Federal Regulations 1500-1508, as of July 1, 1986) describes the process for implementing the National Environmental Policy Act, including preparation of environmental assessments and environmental impact statements, and the timing and extent of public participation.

Co-Use—Scheduled uses that safely allow other units to transit the area or conduct activities.

Criteria Pollutants—pollutants identified by the U.S. Environmental Protection Agency (required by the Clean Air Act to set air quality standards for common and widespread pollutants); also established under state ambient air quality standards. There are standards in effect for six criteria pollutants: sulfur dioxide, carbon monoxide, particulate matter, nitrogen dioxide, ozone, and lead.

Cultural Resources—prehistoric and/or historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered of importance to a culture, subculture, or community for scientific, traditional, religious, or any other reason.

Culture—a group of people who share standards of behavior and have common ways of interpreting the circumstances of their lives.

Cumulative Impact—the impact of the environment which results from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Current—a horizontal movement of water or air.

C-weighted—utilized to determine effects of high-intensity impulsive sound on human populations, a scale providing unweighted sound levels over a frequency range of maximum human sensitivity.

Danger Area—(1) In air traffic control, an airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times; (2) (DoD only) A specified area above, below, or within which there may be potential danger.

Danger Zone—at the Pacific Missile Range Facility (PMRF), an offshore area to protect submerged cables that is designated in accordance with U.S. Army Corps of Engineers regulations into which entry by any craft is prohibited except with the permission of the Commanding Officer, PMRF. See Code of Federal Regulations, Title 33, Parts 204 to 225a.

Decibel (dB)—the accepted standard unit of measure for sound pressure levels. Due to the extremely large range of measurable sound pressures, decibels are expressed in a logarithmic scale.

Degradation—the process by which a system will no longer deliver acceptable performance.

Demersal—living close to the seafloor.

Direct Effects—immediate consequences of program activities.

Direct Impact—effects resulting solely from program implementation.

District—National Register of Historic Places designation of a geographically defined area (urban or rural) possessing a significant concentration, linkage, or continuity of sites, structures, or objects united by past events (theme) or aesthetically by plan of physical development.

Diurnal—active during the daytime.

Dunes—hills and ridges of sand-size particles (derived predominantly from coral and seashells) drifted and piled by the wind. These dunes are actively shifting or are so recently fixed or stabilized that no soil horizons develop; their surface typically consists of loose sand.

Easement—a right of privilege (agreement) that a person or organization may have over another's property; an interest in land owned by another that entitles the holder of the easement to a specific limited use; a recorded right of use by the United States over property of the State of Hawaii to limit exposure to safety hazards.

Ecosystem—all the living organisms in a given environment with the associated non-living factors.

Effects—a change in an attribute, which can be caused by a variety of events, including those that result from program attributes acting on the resource attribute (direct effect); those that do not result directly from the action or from the attributes of other resources acting on the attribute being studied (indirect effect); those that result from attributes of other programs or other attributes that change because of other programs (cumulative effects); and those that result from natural causes (for example, seasonal change).

Effluent—an outflowing branch of a main stream or lake; waste material (such as smoke, liquid industrial refuse, or sewage) discharged into the environment.

Electromagnetic Radiation (EMR)—waves of energy with both electric and magnetic components at right angles to one another.

Electronic Countermeasures (ECM)—includes both active jamming and passive techniques. Active jamming includes noise jamming to suppress hostile radars and radios, and deception jamming, intended to mislead enemy radars. Passive ECM includes the use of chaff to mask targets with multiple false echoes, as well as the reduction of radar signatures through the use of radar-absorbent materials and other stealth technologies.

En Route Airways—a low-altitude (up to, but not including 5,486.4 meters [18,000 feet] mean sea level) airway based on a center line that extends from one navigational aid or intersection to another navigational aid (or through several navigational aids and intersections) specified for that airway.

En Route Jet Routes—high altitude (above 18,000 feet mean sea level) airway based on a center line that extends from one navigational aid or intersection to another navigational aid (or through several navigational aids and intersections) specified for that airway.

Encroachment—the placement of an unauthorized structure or facility on someone's property or the unauthorized use of property.

Endangered Species—a plant or animal species that is threatened with extinction throughout all or a significant portion of its range.

Endemic—plants or animals that are native to an area or limited to a certain region.

Environmental Justice—an identification of potential disproportionately high and adverse impacts on low-income and/or minority populations that may result from proposed Federal actions (required by Executive Order 12898).

Epibenthic—living on the ocean floor.

Epipelagic—living in the ocean zone from the surface to 109 fathoms (656 feet).

Erosion—the wearing away of a land surface by water, wind, ice, or other geologic agents.

Estuary—a water passage where the tide meets a river current; an arm of the sea at the lower end of a river; characterized by brackish water.

Event—a significant period of time during which training is accomplished. “Event” is a Navy approved employment schedule term.

Exclusive Use—scheduled solely for the assigned unit for safety reasons.

Exotic—not native to an area.

Explosive Ordnance Disposal (EOD)—the process of recovering and neutralizing domestic and foreign conventional, nuclear and chemical/biological ordnance and improvised explosive devices; a procedure in Explosive Ordnance Management.

Explosive Safety Quantity-Distance (ESQD)—the quantity of explosive material and distance separation relationships providing defined types of protection based on levels of risk considered acceptable.

Facilities—physical elements that can include roads, buildings, structures, and utilities. These elements are generally permanent or, if temporary, have been placed in one location for an extended period of time.

Fathom—a unit of length equal to 6 feet; used to measure the depth of water.

Feature—in archaeology, a non-portable portion of an archaeological site, including such facilities as fire pits, storage pits, stone circles, or foundations.

Federal Candidate Species—taxa for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species.

Fee Simple Land—land held absolute and clear of any condition or restriction, and where the owner has unconditional power of disposition.

Feral—having escaped from domestication and become wild.

Fleet Area Control and Surveillance Facility (FACSFAC)—Navy facility that provides air traffic control services and controls and manages Navy-controlled off-shore operating areas and instrumented ranges.

Fleet Response Training Plan (FRTP)—the 27-month cycle that replaces the Interdeployment Training Cycle. The FRTP includes four phases prior to deployment: Maintenance, Unit-Level Training, Integrated Training, and Sustainment.

Fleet Response Plan/Fleet Readiness Program (FRP)—the Fleet Response Plan was the Navy’s response to the 2002/2003 international situations in Afghanistan and Iraq. The Fleet Readiness Program was later developed by the Fleet commanders. The FRP is designed to more rapidly develop and then sustain readiness in ships and squadrons so that, in a national crisis or contingency operation, the Navy can quickly surge significant combat power to the scene.

Flight Information Region (FIR)—an airspace of defined dimensions within which flight information service and alerting service are provided. Flight information service is provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights, and alerting service is provided to notify appropriate organizations regarding aircraft in need of search and rescue aid and to assist such organizations as required.

Flight Level—a level of constant atmospheric pressure related to a reference datum of 29.92 inches of mercury stated in three digits that represent hundreds of feet. For example, flight level 250 represents a barometric altimeter indication of 25,000 feet; flight level 255 represents an indication of 25,500 feet.

Flight Termination—action taken in certain post-launch situations, such as a missile veering off of its predicted flight corridor; accomplished by stopping the propulsive thrust of a rocket motor via explosive charge. At this point, the missile continues along its current path, falling to earth under gravitational influence.

Floodplain—the lowland and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands; includes, at a minimum, that area subject to a 1 percent or greater chance of flooding in any given year (100-year floodplain).

Free Flight—a joint initiative of the aviation industry and the Federal Aviation Administration to allow aircraft to take advantage of advanced satellite voice and data communication to provide faster and more reliable transmission to enable reductions in vertical, lateral, and longitudinal separation of aircraft, more direct flights and tracts, and faster altitude clearance. It will allow pilots, whenever practicable, to choose their own route and file a flight plan that follows the most efficient and economical route, rather than following the published preferred instrument flight rules routes.

Frequency (as it applies to proposed activities)—the number of training events in a given time period.

Frequency—description of the rate of disturbance, or vibration, measured in cycles per second. Cycles per second are usually referred to as the unit of measure of hertz (Hz). In acoustics, frequency is characterized in general terms as low, mid, or high. The Navy categorizes these as follows:

- **Low-frequency (LF)** sound is below 1,000 Hz.
- **Mid-frequency (MF)** sound is between 1 and 10 kHz.
- **High-frequency (HF)** sound is above 10 kHz.

Frequent User—a unit that conducts training and exercises in the training areas on a regular basis but does not maintain a permanent presence.

Fugitive Dust—any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of man. Fugitive dust may include emissions from haul roads, wind erosion of exposed soil surfaces, and other activities in which soil is either removed or redistributed.

Great Mahele (1848)—The Hawaiian land distribution act proposed by King Kamehameha III in the 1830s and enacted in 1848.

Ground Hazard Area—the land area contained in an arc within which all debris from a terminated launch will fall. For example, the arc for a Strategic Target System launch is described such that the radius is approximately 10,000 feet to the northeast, 9,100 feet to the east, and 9,000 feet to the south of the launch point. For the Vandal launch, the arc is 6,000 feet.

Groundwater Table—the highest part of the soil or underlying rock material that is wholly saturated with water.

Groundwater—water within the earth that supplies wells and springs; specifically, water in the zone of saturation where all openings in rocks and soil are filled, the upper surface of which forms the water table.

Habitat—the area or type of environment in which a species or ecological community normally occurs.

Hazardous Air Pollutants—other pollutants, in addition to those addressed by the NAAQS, that present the threat of adverse effects on human health or to the environment as covered by Title III of the Clean Air Act. Incorporates, but is not limited to, the pollutants controlled by the National Emissions Standards for Hazardous Air Pollutants program.

Hazardous Material—generally, a substance or mixture of substances capable of either causing or significantly contributing to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness; it may pose a threat or a substantial present or potential risk to human health or the environment. Hazardous materials use is regulated by the U.S. Department of Transportation, the Occupational Safety and Health Administration, and the Emergency Right-to-Know Act.

Hazardous Waste—a waste, or combination of wastes, which, because of its quantity, concentration, or physical, chemical, or infectious characteristics, may either cause or significantly contribute to an increase in mortality or an increase in serious irreversible illness or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Heiaus—the temple platforms, shrines, and enclosures that Hawaiians constructed for purposes of worship. Built on carefully fitted stones and considered sacred ground, heiaus contained assorted buildings for various religious rites practiced by the various kahuna (sacred priests and priestesses). Most heiaus were damaged in 1819 with the overthrow of the ancient religion and kapu system; however, several have been restored.

Hertz (Hz)—the standard radio equivalent of frequency in cycles per second of an electromagnetic wave. Kilohertz (kHz) is a frequency of 1,000 cycles per second. Megahertz (MHz) is a frequency of 1 million cycles per second.

Historic Properties—under the National Historic Preservation Act, these are properties of national, state, or local significance in American history, architecture, archaeology, engineering, or culture, and worthy of preservation.

Home Lands—as required by the Hawaiian Homes Commission Act (passed by Congress in 1921), areas set aside for the state to lease residential, farm, and pastoral homestead lots for $1 per year to native Hawaiians.

Host—the Facilities Host holds plant account of all Class I (Land) and most Class II (Buildings) property. The Host determines and executes policy for the range/range complex.

Hydraulic Conductivity—the rate in gallons per day water flow through a cross section of one square foot under a unit hydraulic gradient, at the prevailing temperature.

Hydrocarbons—any of a vast family of compounds containing hydrogen and carbon, including fossil fuels.

Hydrochloric Acid—a common chemical component of missile exhaust believed to injure plant leaves and affect wildlife.

Hydrology—the science dealing with the properties, distribution, and circulation of water on the face of the land (surface water) and in the soil and underlying rocks (groundwater).

Hydrophone—an instrument for listening to sound transmitted through water.

Impact Area—the identified area within a range intended to capture or contain ammunition, munitions, or explosives and resulting debris, fragments, and components from various weapon system employments.

Impacts (effects)—an assessment of the meaning of changes in all attributes being studied for a given resource; an aggregation of all the adverse effects, usually measured using a qualitative and nominally subjective technique. In this Environmental Impact Statement, as well as in the Council on Environmental Quality regulations, the word impact is used synonymously with the word effect.

Indurated—rendered hard, as in dunes where surface sand is loose, but subsurface areas become increasingly compact (see lithified).

Infrastructure—the system of public works of a country, state, or region, such as utilities or communication systems; physical support systems and basic installations needed to operate a particular area or facility.

Inhibited Red Fuming Nitric Acid (IRFNA)—a liquid hypergolic propellant utilized as an oxidizer (as in the Lance). This reddish-brown acid is highly corrosive, spontaneously reacting with UDMH and certain other organic substances. It also dissolves in water, and care must be taken regarding its induced boiling effects. Its highly toxic, characteristically pungent vapors irritate skin and eyes.

Instrument Flight Rules (IFR)—rules governing the procedures for conducting instrument flight; it is a term used by pilots and controllers to indicate type of flight plan.

Interdeployment Readiness Cycle—the period by which Naval units progress through maintenance/unit-level training, integrated training, and sustainment training stages prior to being deployed with the Fleet.

Intermittent User—a unit that conducts training and exercises in the training areas throughout the year, but not on a regularly scheduled basis, and does not maintain a permanent presence.

International Waters—sea areas beyond 12 nautical miles (nm) of the U.S. shoreline.

Interpretive Trail—a guided or self-guided nature walk, designed to attract interest and communicate an understanding of the environment in which it is located (including, where appropriate, the effects of human activity).

Intertidal Zone—occupies the space between high and low tide, also referred to as the littoral zone; found closest to the coastal fringe and thus only occurring in shallow depths.

Ionizing Radiation—particles or photons that have sufficient energy to produce direct ionization in their passage through a substance. X-rays, gamma rays, and cosmic rays are forms of ionizing radiation.

Isobath—the line on a marine map or chart joining points of equal depth, usually in fathoms below mean sea level.

JATO Bottle—Jet-Assisted Takeoff. These are bottle rockets, generally weighing from about 70 to about 165 pounds, that can be attached to various types of aerial targets or aircraft to assist their takeoffs.

Jet Routes—a route designed to serve aircraft operating from 5,486 meters (18,000 feet) up to and including flight level 450, referred to as J routes with numbering to identify the designated route.

Land/Sea Use—the exclusive or prioritized commitment of a land/sea area, and any targets, systems, and facilities therein, to a continuing purpose that could include a grouping of training events, buffer zone, environmental mitigation, etc. The land/sea area may consist of a range/range complex, grouping of similar facilities, or natural resource-based area with no facilities.

Lead—a heavy metal which can accumulate in the body and cause a variety of negative effects; one of the six pollutants for which there is a national ambient air quality standard (see Criteria Pollutants).

Lead-based Paint—paint on surfaces with lead in excess of 1.0 milligram per square centimeter as measured by X-ray fluorescence detector, or 0.5 percent lead by weight.

Leina-a-ka-uhane—as identified in traditional Hawaiian religious cosmology, a place (generally cliffs or seacoast promontories) from which the spirits of the dead plunge into eternity and are divided into one of three spiritual realms: the realm of the wandering spirits; the realm of the ancestral spirits; or the realm of the endless night.

Leptocephalic—small, elongate, transparent, planktonic.

Level of Service (LOS)—describes operational conditions within a traffic stream and how they are perceived by motorists and/or passengers; a monitor of highway congestion that takes into account the average annual daily traffic, the specified road segment's number of lanes, peak hour volume by direction, and the estimated peak hour capacity by a roadway's functional classification, area type, and signal spacing.

Lithified—the conversion of a newly deposited sediment into an indurated rock.

Littoral—species found in tide pools and near-shore surge channels.

Loam—a loose soil composed of a mixture of clay, silt, sand, and organic matter.

Long-Term Sustainability of Department of Defense Ranges—the ability to indefinitely support national security objectives and the operational readiness of the Armed Forces, while still protecting human health and the environment.

Major Exercise—a period of time during which significant operational employment of live, virtual, and/or constructive forces training is accomplished. A Major Exercise includes multiple training objectives, usually occurring over an extended period of days or weeks.

Maneuver Area—range used for maneuver element training.

Maneuver Element—basic element of a larger force independently capable of maneuver. Normally, a Marine Division recognizes its infantry battalions, tank battalion, and light armored reconnaissance (LAR) battalion as maneuver elements. A rifle (or tank/LAR) battalion would recognize its companies as maneuver elements. A rifle (or tank/LAR) company would recognize its platoons as maneuver elements. Maneuver below the platoon level is not normally possible since fire and movement can be combined only at the platoon level or higher. The Army and National Guard recognize a squad and platoon as maneuver elements.

Maneuver—employment of forces on the battlefield through movement in combination with fire, or fire potential, to achieve a position of advantage with respect to the enemy in order to accomplish the mission.

Marine Corps Ground Unit—Marine Expeditionary Unit Ground Combat Element, or Battalion Landing Team, composed of an infantry battalion of about 1,200 personnel reinforced with artillery, amphibious assault vehicles, light armored reconnaissance assets and other units as the mission and circumstances require. (The analysis will scale units of different size or composition from this Battalion Landing Team standard unit to include a 12-person Special Operations platoon.)

Maritime—of, relating to, or bordering on the sea.

Material Safety Data Sheet—presents information, required under Occupational Safety and Health Act standards, on a chemical's physical properties, health effects, and use precautions.

Medical Evacuation—emergency services, typically aerial, designed to remove the wounded or severely ill to medical facilities.

Mesopelagic—the oceanic zone from 109 to 547 fathoms (656 to 3,280 feet).

Migration—repeated departure and return of individuals and their offspring to and from an area.

Migratory Birds—avians characterized by their practice of passing, usually periodically, from one region or climate to another.

Military Operating Area—airspace below 18,000 feet used to separate or segregate certain non-hazardous military flight activities from Instrument Flight Rules traffic and to identify for Visual Flight Rules traffic where these activities are conducted.

Military Training Route—an airspace corridor established for military flight training at airspeeds in excess of 250 nautical miles/hour.

Minority—minority populations, as reported by the 2000 Census of Population and Housing, includes Black, American Indian, Eskimo or Aleut, Asian or Pacific Islander, Hispanic, or other.

Mitigation—a method or action to reduce or eliminate adverse environmental impacts. Such measures may avoid impacts by not taking a certain action or parts of an action; minimize impacts by limiting the magnitude of an action; rectify impacts by restoration measures; reduce or eliminate impacts over time by preservation or maintenance measures during the action; or compensate for impacts by replacing or providing substitute resources or environments.

Mobile Sources—any movable source that emits any regulated air pollutant.

Mortality—the number of deaths in a given time or place.

Munitions Constituents—any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.

National Airspace System—the common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, and manpower and material. Included are system components shared jointly with the military.

National Ambient Air Quality Standards (NAAQS)—as set by the Environmental Protection Agency under Section 109 of the Clean Air Act, nationwide standards for limiting concentrations of certain widespread airborne pollutants to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility and materials (secondary standards). Currently, six pollutants are regulated by primary and secondary NAAQS: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide (see Criteria Pollutants).

National Environmental Policy Act (NEPA)—Public Law 91-190, passed by Congress in 1969. The Act established a national policy designed to encourage consideration of the influences of human activities, such as population growth, high-density urbanization, or industrial development, on the natural environment. The National Environmental Policy Act procedures require that environmental information be made available to the public before decisions are made. Information contained in the National Environmental Policy Act documents must focus on the relevant issues in order to facilitate the decision-making process.

National Register of Historic Places Eligible Property—property that has been determined eligible for the National Register of Historic Places listing by the Secretary of the Interior, or one that has not yet gone through the formal eligibility determination process but which meets the National Register of Historic Places criteria for section review purposes; eligible properties are treated as if they were already listed.

National Register of Historic Places—a register of districts, sites, buildings, structures, and objects important in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior under authority of Section 2 (b) of the Historic Sites Act of 1935 and Section 101 (a)(1) of the National Historic Preservation Act of 1966, as amended.

National Wildlife Refuge—a part of the national network of refuges and wetlands managed by the U.S. Fish and Wildlife Service in order to provide, preserve, and restore lands and waters sufficient in size, diversity and location to meet society's needs for areas where the widest possible spectrum of benefits associated with wildlife and wildlands is enhanced and made available. This includes 504 wildlife refuges nationwide encompassing 92 million acres and ranging in size from one-half acre to thousands of square miles. Dedicated to protecting wildlife and their habitat, U.S. refuges encompass numerous ecosystems and are home to a wide variety of fauna, including large numbers of migratory birds and some 215 threatened or endangered species.

Native Americans—used in a collective sense to refer to individuals, bands, or tribes who trace their ancestry to indigenous populations of North America prior to Euro-American contact.

Native Species—plants or animals living or growing naturally in a given region and often referred to as indigenous.

Native Vegetation—often referred to as indigenous, these are plants living or growing naturally in a given region without agricultural or cultivational efforts.

Navigational Aid—any visual or electronic device, airborne or on the surface, which provides point-to-point guidance information or position data to aircraft in flight.

Neritic—relating to the shallow ocean waters, usually no deeper than 109 fathoms (656 feet).

Nitrogen Dioxide—gas formed primarily from atmospheric nitrogen and oxygen when combustion takes place at high temperatures.

Nitrogen Oxides—gases formed primarily by fuel combustion and which contribute to the formation of acid rain. In the presence of sunlight, hydrocarbons and nitrogen oxides combine to form ozone, a major constituent of photochemical smog.

Nitrogen Tetroxide—a dark brown, fuming liquid or gas with a pungent, acrid odor, utilized in rocket fuels.

Nonattainment Area—an area that has been designated by the U.S. Environmental Protection Agency or the appropriate state air quality agency as exceeding one or more of the national or state ambient air quality standards.

Non-directional Radio Beacon—a radio beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine the aircraft's bearing to or from the radio beacon and “home” on or track to or from the station.

Non-ionizing Radiation—electromagnetic radiation at wavelengths whose corresponding photon energy is not high enough to ionize an absorbing molecule. All radio frequency, infrared, visible, and near ultraviolet radiation are non-ionizing.

Non-Point Source Pollution—diffuse pollution; that is, from a combination of sources; typically originates from rain and melted snow flowing over the land (runoff). As runoff contacts the land's surface, it picks up many pollutants in its path: sediment, oil and grease, road salt, fertilizers, pesticides, nutrients, toxics, and other contaminants. Runoff also originates from irrigation water used in agriculture and on landscapes. Other types of non-point pollution include changes to the natural flow of water in stream channels or wetlands.

Notice to Airmen (NOTAM)—a notice containing information, not known sufficiently in advance to publicize by other means, the establishment, condition, or change in any component (facility, service, or procedure of, or hazard in the National Airspace System), the timely knowledge of which is essential to personnel concerned with flight operations.

Notice to Mariners (NOTMAR)—a periodic notice regarding changes in aids to navigation, dangers to navigation and other information essential to mariners.

Operating Area (OPAREA)—ocean area not part of a range used by military personnel or equipment for training and weapons system Research, Development, Test & Evaluation (RDT&E).

Operational Range—a range that is under the jurisdiction, custody, or control of the Secretary of Defense and is used for range activities; or although not currently being used for range activities, that is still considered by the Secretary to be a range and has not been put to a new use that is incompatible with range activities.

Ordnance—military supplies including weapons, ammunition, combat vehicles, and maintenance equipment.

OTTO Fuel—a torpedo fuel.

Ozone (O_3)—a highly reactive form of oxygen that is the predominant component of photochemical smog and an irritating agent to the respiratory system. Ozone is not emitted directly into the atmosphere but results from a series of chemical reactions between oxidant precursors (nitrogen oxides and volatile organic compounds) in the presence of sunlight.

Ozone Layer—a naturally occurring layer of ozone 7 to 30 miles above the earth's surface (in the stratosphere) which filters out the sun's harmful ultraviolet radiation. It is not affected by photochemical smog found in the lower atmosphere, nor is there any mixing between ground level ozone and ozone in the upper atmosphere.

Paleontological Resources—fossilized organic remains from past geological periods.

Paleontology—the study of life in the past geologic time, based on fossil plants and animals.

Participant—an individual ship, aircraft, submarine, amphibious vehicle, or ground unit.

Particulate Matter, Fine Respirable—finely divided solids or liquids less than 10 microns in diameter which, when inhaled, remain lodged in the lungs and contribute to adverse health effects.

Particulate Matter, Total Suspended—finely divided solids or liquids ranging from about 0.1 to 50 microns in diameter which comprise the bulk of the particulate matter mass in the atmosphere.

Particulate Matter—particles small enough to be airborne, such as dust or smoke (see Criteria Pollutants).

Payload—any non-nuclear and possibly propulsive object or objects, weighing up to 272.2 kilograms (600 pounds), which are carried on a missile.

Pelagic Zone—commonly referred to as the open ocean.

Pelagic—of the ocean waters.

Peninsula—a portion of land nearly surrounded by water and generally connected with a larger body by an isthmus, although the isthmus is not always well defined.

Per Capita—per unit of population; by or for each person.

Permeability—a quality that enables water to penetrate.

Pesticide—any substance, organic, or inorganic, used to destroy or inhibit the action of plant or animal pests; the term thus includes insecticides, herbicides, fungicides, rodenticides, miticides, fumigants, and repellents. All pesticides are toxic to humans to a greater or lesser degree. Pesticides vary in biodegradability.

pH—a measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity.

Photosynthesis—the plant process by which water and carbon dioxide are used to manufacture energy-rich organic compounds in the presence of chlorophyll and energy from sunlight.

Physiography—geography dealing with the exterior physical features and changes of the earth (also known as physical geography).

Phytoplankton—plant-like organisms that drift with the ocean currents, with little ability to move through the water on their own. Predominately one-celled, phytoplankton float in the photic zone (sunlit surface waters of the ocean, which extends to only about 100 meters (330 feet) below the surface), where they obtain sunlight and nutrients, and serve as food for zooplankton and certain larger marine animals.

Pinniped—having finlike feet or flippers, such as a seal or walrus.

Plankton—free-floating, usually minute, organisms of the sea; includes larvae of benthic species.

Pliocene—of, relating to, or being the latest epoch of the Tertiary Period or the corresponding system of rocks; following the Pleistocene and prior to the Miocene.

PM-2.5 and PM-10—standards for measuring the amount of solid or liquid matter suspended in the atmosphere; refers to the amount of particulate matter less than or equal to 2.5 and 10 micrometers in diameter, respectively. The PM-2.5 and PM-10 particles penetrate to the deeper portions of the lungs, affecting sensitive population groups such as children and people with respiratory or cardiac diseases.

Point Source—a distinct and identifiable source, such as a sewer or industrial outfall pipe, from which a pollutant is discharged.

Population Density—the average number of individuals or organisms per unit of space or area.

Potable Water—water that is safe to drink.

Potentially Hazardous Debris—inert debris impacting the earth with a kinetic energy equal to or greater than 11 foot-pounds.

Prehistoric—literally, "before history," or before the advent of written records. In the old world writing first occurred about 5400 years ago (the Sumerians). Generally, in North America and the Pacific region, the prehistoric era ended when European explorers and mariners made written accounts of what they encountered. This time will vary from place to place.

Prohibited Area—designated airspace where aircraft are prohibited, except by special permission. Can also apply to surface craft.

Radar—a radio device or system for locating an object by means of radio waves reflected from the object and received, observed, and analyzed by the receiving part of the device in such a way that characteristics (such as distance and direction) of the object may be determined.

Range—a land or sea area designated and equipped for any or all of the following reasons:

Range Activity—an individual training or test function performed on a range or in an Operating Area. Examples include missile launching, bombardment, and vehicle driving. Individual RDT&E functions are also included in this category.

Range Complex—a geographically integrated set of ranges and associated special use airspace, designated and equipped with a command and control system and supporting infrastructure for freedom of maneuver and practice in munitions firing and live ordnance use against scored and/or tactical targets and/or Electronic Warfare tactical combat training environment.

Range Safety Zone—area around air-to-ground ranges designed to provide safety of flight and personnel safety relative to dropped ordnance and crash sites. Land use restrictions can vary depending on the degree of safety hazard, usually decreasing in magnitude from the weapons impact area (including potential ricochet) to the area of armed over flight and aircraft maneuvering.

Readiness—the ability of forces, units, weapon systems, or equipment to deliver the outputs for which they were designed (includes the ability to deploy and employ without unacceptable delays).

Region of Influence—the geographical region that would be expected to be affected in some way by the Proposed Action and alternatives.

Relative Humidity—the ratio of the amount of water vapor actually present in the air to the greatest amount possible at the same temperature.

Relief—the difference in elevation between the tops of hills and the bottoms of valleys.

Remediation—all necessary actions to investigate and clean up any known or suspected discharge or threatened discharge of contaminants, including without limitation: preliminary assessment, site investigations, remedial investigations, remedial alternative analyses and remedial actions.

Restricted Area—a designated airspace in which flights are prohibited during published periods of use unless permission is obtained from the controlling authority.

Ruderal Vegetation—weedy and commonly introduced flora growing where natural vegetational cover has been interrupted or disturbed by humans.

Runoff—the portion of precipitation on land that ultimately reaches streams, often with dissolved or suspended materials.

Safety Zone—administratively designated/implied areas designated to limit hazards to personnel and the public, and resolve conflicts between events. Can include range safety zones, ESQDs, surface danger zones, special use airspace, Hazard of Electromagnetic Radiation to Ordnance/Hazard of Electromagnetic Radiation to Personnel (HERO/HERP) areas, etc.

Saline—consisting of or containing salt.

Sampling—the selection of a portion of a study area or population, the analysis of which is intended to permit generalization of the entire population. In archaeology, samples are often used to reduce the amount of land area covered in a survey or the number of artifacts analyzed from a site. Statistical sampling is generally preferred since it is possible to specify the bias or probability of error in the results, but judgmental or intuitive samples are sometimes used.

Scoping—a process initiated early during preparation of an Environmental Impact Statement to identify the scope of issues to be addressed, including the significant issues related to the Proposed Action. During scoping, input is solicited from affected agencies as well as the interested public.

Seamount—a peaked, underwater mountain that rises at least 3,281 feet above the ocean floor.

Seawall—a wall or embankment to protect the shore from erosion or to act as a breakwater.

Security Zone—area where public or non-operational support access is prohibited due to training operations of a classified or hazardous nature.

Sensitive Habitats—areas of special importance to regional wildlife populations or protected species that have other important biological characteristics (for example, wintering habitats, nesting areas, and wetlands).

Sensitive Receptor—an organism or population of organisms sensitive to alterations of some environmental factor (such as air quality or sound waves) that undergo specific effects when exposed to such alteration.

Shield Volcano—a broad, gently sloping volcanic cone of flat domicil shape, usually several tens of hundreds of square miles in extent, built chiefly of overlapping and interfingering basaltic lava flows.

Short-Term Public Exposure Guidance Level—an acceptable concentration for unpredicted, single, short-term, emergency exposure of the general public, as published by the National Research Council.

Site—in archaeology, any location where human beings have altered the terrain or have discarded artifacts.

Solid Waste—municipal waste products and construction and demolition materials; includes non-recyclable materials with the exception of yard waste.

Sonar—Sound Navigation and Ranging. Sonar includes any system that uses underwater sound, or acoustics, for observations and communications. The two broad types of sonar are:

- **Passive sonar** detects the sound created by an object (source) in the water. This is a one-way transmission of sound waves traveling through the water from the source to the receiver.
- **Active sonar** detects objects by creating a sound pulse, or ping, that transmits through the water and reflects off the target, returning in the form of an echo. This is a two-way transmission (source to reflector to receiver) and is a form of echolocation.

Sonobuoy—hydrophones, or floating sensors, which acoustically score bomb drops during a training event from the sound where a bomb impacts the surface of the ocean.

Sortie—a single training event or RDT&E activity conducted by one aircraft tin a range or operating area. A single aircraft sortie is one complete flight (i.e., one take-off and one final landing).

Special Use Airspace—consists of several types of airspace used by the military to meet its particular needs. Special use airspace consists of that airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of these activities, or both. Special use airspace, except for Control Firing Areas, are chartered on instrument flight rules or visual flight rules charts and include hours of operation, altitudes, and the controlling agency.

Species—a taxonomic category ranking immediately below a genus and including closely related, morphologically similar individuals which actually or potentially interbreed.

Specific Absorption Rate—the time rate at which radio frequency energy is absorbed per unit mass of material, usually measured in watts per kilogram (W/kg).

Stakeholder—those people or organizations that are affected by or have the ability to influence the outcome of an issue. In general this includes regulators, the regulated entity, and the public. It also includes those individuals who meet the above criteria and do not have a formal or statutorily defined decision-making role.

State Historic Preservation Officer (SHPO)—the official within each state, authorized by the state at the request of the Secretary of the Interior, to act as liaison for purposes of implementing the National Historic Preservation Act.

State Jurisdictional Waters—sea areas within 3 nm of a state's continental and island shoreline.

Stationary Source—any building, structure, facility, installation, or other fixed source that emits any regulated air pollutant.

Stormwater—runoff produced during storms, generally diverted by rain spouts and stormwater sewerage systems. Stormwater has the potential to be polluted by such sources as yard trimmings and pesticides. A stormwater outfall refers to the mouth of a drain or sewer that channels this runoff.

Subsistence—the traditional harvesting of natural resources for food, clothing, fuel, transportation, construction, art, crafts, sharing, and customary trade.

Subsistence Economy—a community, usually based on farming and/or fishing, that provides all or most of the basic goods required by its members for survival, usually without any significant surplus for sale.

Subspecies—a geographically defined grouping of local populations which differs taxonomically from similar subdivisions of species.

Substrate—the layer of soil beneath the surface soil; the base upon which an organism lives.

Sulfur Dioxide—a toxic gas that is produced when fossil fuels, such as coal and oil, are burned.

Sustainable Range Management—management of an operational range in a manner that supports national security objectives, maintains the operational readiness of the Armed Forces, and ensures the long-term viability of operational ranges while protecting human health and the environment.

Sustaining the Capability—maintaining necessary skills, readiness and abilities.

Symbiotic—living in or on the host.

System of Systems—all communications, electronic warfare, instrumentation, and systems linkage supporting the range/range complex.

Taking—to harass, harm, pursue, hunt, shout, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Taking can involve harming the habitat of an endangered species.

Talus—rock debris at the base of a cliff.

Targets—earthwork, materials, actual or simulated weapons platforms (tanks, aircraft, electronic warfare systems, vehicles, ships, etc.) comprising tactical target scenarios within the range/range complex impact areas. .

Tempo—as it applies to proposed activities, the intensity. This could include more forces or shorter/longer duration of activities.

Tenant—a unit that has an Inter-Service Support Agreement with the host for use of the training areas and that maintains a permanent presence.

Thermocline—a thin, narrow region in a thermally stratified body of water which separates warmer, oxygen-rich surface water from cold, oxygen-poor deep water and in which temperature decreases rapidly with depth. In tropical latitudes, the thermocline is present as a permanent feature and is located 200 to 1,000 feet below the surface.

Threatened Species—a plant or animal species likely to become endangered in the foreseeable future.

Topography—the configuration of a surface including its relief and the position of its natural and man-made features.

Trade Winds—winds blowing almost constantly in one direction. Especially a wind blowing almost continually from the equator from the northeast in the belt between the northern horse latitudes and the doldrums and from the southeast in the belt between the southern horse latitudes and the doldrums.

Traditional Resources—prehistoric sites and artifacts, historic areas of occupation and events, historic and contemporary sacred areas, material used to produce implements and sacred objects, hunting and gathering areas, and other botanical, biological, and geographical resources of importance to contemporary groups.

Transient—remaining a short time in a particular area.

Troposphere—the atmosphere from ground level to an altitude of 6.2 to 9.3 miles (see stratosphere).

Tsunami—a great sea wave produced by a submarine earthquake or volcanic eruption. Commonly misnamed tidal wave.

Turbid—the condition of being thick, cloudy, or opaque as if with roiled sediment; muddy.

Uncontrolled Airspace—airspace of defined dimensions in which no air traffic control services to either instrument flight rules or visual flight rules aircraft will be provided, other than possible traffic advisories when the air traffic control workload permits and radio communications can be established.

Understory—a vegetal layer growing near the ground and beneath the canopy of a taller layer.

Unique and Sensitive Habitats—areas of special importance to regional wildlife populations or protected species that have other important biological characteristics (for example, wintering habitats, nesting areas, and wetlands).

Unsymmetrical Dimethyl Hydrazine (UDMH)—a liquid hypergolic propellant utilized as a missile fuel (as in the Lance); clear and colorless, UDMH has a sharp ammonia-like or fishy odor, is toxic when inhaled, absorbed through the skin, or taken internally. It is dissolvable in water, but not sensitive to shock or friction; however, when in contact with IRFNA, or any other oxidizing material, spontaneous ignition occurs. In addition, UDMH vapors greater than 2 percent in air can be detonated by electric spark or open flame.

Upland—an area of land of higher elevation.

Upwelling—the replenishing process of upward movement to the surface of marine often nutrient-rich lower waters (a boon to plankton growth), especially along some shores due to the offshore drift of surface water as from the action of winds and the Coriolis force.

U.S. Territorial Waters—sea areas within 12 nm of the U.S. continental and island shoreline.

Viewshed—total area seen within the cone of vision from a single observer position, or vantage point; a collection of viewpoints with optimal linear paths of visibility.

Vista—a distant view through or along an avenue or opening.

Visual Flight Rules (VFR)—rules that govern the procedures for conducting flight under visual conditions; used by pilots and controllers to indicate type of flight plan.

Volatile Organic Compound (VOC)—one of a group of chemicals that react in the atmosphere with nitrogen oxides in the presence of heat and sunlight to form ozone; it does not include methane and other compounds determined by the Environmental Protection Agency to have negligible photochemical reactivity. Examples of volatile organic compounds include gasoline fumes and oil-based paints.

Warning Area—a designated airspace in which flights are not restricted but avoidance is advised during published times of use.

Wastewater—water that has been previously utilized; sewage.

Wetlands—lands or areas that either contain much soil moisture or are inundated by surface or groundwater with a frequency sufficient to support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include such areas as bogs, marshes, mud and tidal flats, sloughs, river overflows, seeps, springs, or swamps.

Yearly Average Day-Night Sound Level (DNL or L_{dn})—utilized in evaluating long-term environmental impacts from noise, this is an annual mean of the day-night sound level.

Zoning—the division of a municipality (or county) into districts for the purpose of regulating land use, types of buildings, required yards, necessary off-street parking, and other prerequisites to development. Zones are generally shown on a map, and the text of the zoning ordinance specifies requirements for each zoning category.

Zooplankton—animals that drift with the ocean currents, with little ability to move through the water on their own, ranging from one-celled organisms to jellyfish up to 1.8 meters (6 feet) wide. Zooplankton live in both surface and deep waters of the ocean; crustaceans make up about 70 percent. While some float about freely throughout their lives, many spend only the early part of their lives as plankton.

9.0 References

9.0 REFERENCES

Abbott, R., and E. Bing-Sawyer. 2002. *Assessment of Pile-Driving Impacts on the Sacramento Blackfish (Othodon microlepidotus).* Draft report prepared for the California Department of Transportation, District 4. [For Official Use Only]

Abbott R, J. Reyff, and G. Marty, 2005. Monitoring *the effects of conventional pile driving on three species of fish.* Final report prepared by Strategic Environmental Consulting, Inc. for Manson Construction Company, Richmond, California.

Aburto, A., D.J. Rountry, and J.L. Danzer, 1997. "Behavioral response of blue whales to active signals," *Technical Report 1746*. San Diego: Naval Command, Control and Ocean Surveillance Center, RDT&E Division, June.

Advisory Committee on Acoustic Impacts on Marine Mammals, 2006. Report to the Marine Mammal Commission. Marine Mammal Commission; Bethesda, Maryland. February.

Aerospace Corporation, 1998. Impact of the Titan IVB Launch Failure on Ocean Environment.

Aguirre, A.A., and P.L. Lutz, 2004. "Marine turtles as sentinels of ecosystem health: Is fibropapillomatosis an indicator?" *EcoHealth,* 1:275–283.

Air Force Aerospace Medical Research Laboratory, 1990. Armstrong Aerospace Medical Research Laboratory (AAMRL), Air Force Procedure for Predicting Aircraft Noise Around Airbases: Noise Exposure Model (NOISEMAP) Users Manual. Human Systems Division, Air Force Systems Command. Wright-Patterson AFB, OH.

Air Force Center for Environmental Excellence Environmental Services Office, 2003. U.S. Air Force 15th Airlift Wing Installation Restoration Program Final Decision to Support No Further Response Action Planned for AOC EA02 (Radar Shaft) Kokee Air Force Station Kauai, Hawaii, 31 July.

Aki, K., R. Brock, J. Miller, J.R. Mobley, P.J. Rappa, D. Tarnas, M. Yuen, and K. Des Rochers, 1994. A site characterization study for the Hawaiian Islands Humpback Whale National Marine Sanctuary, HAWAU-T-94-001, University of Hawaii Sea Grant Program, 119 pp.

Alexander, J.W., Solangi, M.A., and Riegel, L.S., 1989. "Vertebral osteomyelitis and suspected diskospondylitis in an Atlantic bottlenose dolphin (*Tursiops truncatus*)," *Journal of Wildlife Diseases* 25(1), 118-121.

Alpin, J.A., 1947. "The effect of explosives on marine life," *California Fish and Game,* 33: 23-30.

Amano, M., and M. Yoshioka, 2003. "Sperm whale diving behavior monitored using a suction-cup attached TDR tag," *Marine Ecology Progress Series*, 258:291-295.

Amemiya, T., 1981. “Qualitative response models: a survey,” *Journal of Economic Literature*, 19: 1483-1536.

American Dream Realty, 2006. Oahu, Kaneohe Real Estate-Jeff Manson's Team. [Online]. Available: http://www.adrhi.com/kaneoherealestate.asp

American Institute of Aeronautics and Astronautics, 1993. Environmental Monitoring of Space Shuttle Launches at Kennedy Space Center: The First Ten Years. 31st Aerospace Science Meeting and Exhibit, July 11-14, 1993, Reno NV.

Amoser, S., and F. Ladich, 2003. “Diversity in noise-induced temporary hearing loss in otophysine fishes,” *Journal of the Acoustical Society of America,* 113(4): 2170-2179, part 1: April.

Amoser, S. and F. Ladich, 2005. “Are hearing sensitivities of freshwater fish adapted to the ambient noise in their habitats?” *Journal of Experimental Biology,* 208: 3533-3542.

Anderson, L., 1998. *Final report: Cultural Resources Management Plan Report Oahu Training Ranges and Areas, Island of Oahu, Hawaii.* Prepared for the U.S. Army Engineer District, Honolulu, Fort Shafter, Hawai`i. Ogden Environmental and Energy Services Company, Inc., August.

Anderson, L., and S. Williams, 1998. *Historic Preservation Plan for the Kahuku Training Area, O`ahu, Hawai`i.* Prepared for the US Army Engineer District, Honolulu, Fort Shafter, Hawai`i, Ogden Environmental Energy Services Company, Inc., Honolulu.

André, M., M. Terada, and Y. Watanabe, 1997. ”Sperm Whale (*Physeter macrocephalus*) Behavioral Response After the Playback of Artificial Sounds,” *Reports of the International Whaling Commission*, 47:499-504.

Andrew, R.K., B.M. Howe, J.A. Mercer, and M.A. Dzieciuch, 2002. “Ocean ambient sound: Comparing the 1960’s with the 1990’s for a receiver off the California coast,” *Acoustic Research Letters Online*, 3(2): 65-70. April.

Andrews, K.R., L. Karczmarski, W.W.L. Au, S.H. Rickards, C.A. Vanderlip, and R.J. Toonen, 2006. “Patterns of genetic diversity of the Hawaiian spinner dolphin (*Stenella longirostris*),” *Atoll Research Bulletin*, 543:65-73.

Anon., 2001. “Act Now for Ocean Natives, “Anon.org [Online]. Available: http://www.anon.org/lfas_news.jsp.

Anonymous, 2002. “Baffling boing identified,” *Science,* 298:2125. ScienceNow (1209):2.

Anonymous, 2005. “Monk seal snoozes in Kaaawa,” *Honolulu Star-Bulletin News*, 6 January [Online]. Available: http://starbulletin.com/2005/01/06/news/briefs.html, [10 June 2005].

Antonelis, G.A. and C.H. Fiscus, 1980. "The pinnipeds of the California Current," *CalCOFI Reports, 21:68-78*.

Aquaculture in Hawaii, 2006. "Aquaculture in Hawai`i," [Online]. Available: http://www.oceanicinstitute.org/_oldsite/aboutus/aquahawaiian.html

Archer, F.I., II, and W.F. Perrin, 1999. "*Stenella coeruleoalba," Mammalian Species,* 603:1-9.

Arruda, J., A. Costidis, S. Cramer, D.R. Ketten, W. McLellan, E.W. Montie, M. Moore, and S. Rommel, 2007. "Odontocete Salvage, Necropsy, Ear Extraction, and Imaging Protocols," edited by N. M. Young (Ocean Research, Conservation and Solutions (ORCAS) and ONR), pp. 1-171.

Arveson, P.T. and D.J. Vendittis, 2000. "Radiated noise characteristics of a modern cargo ship," *Journal of the Acoustic Society of America,* 107(1):118-129.

Astrup, J., 1999. "Ultrasound detection in fish - a parallel to the sonar-mediated detection of bats by ultrasound-sensitive insects?" *Comparative Biochemistry and Physiology, Part A,* 124:19-27*.*

Astrup, J. and Møhl, B., 1993. "Detection of intense ultrasound by the cod *Gadus morhua," Journal of Experimental Biology,* 182: 71-80.

Atema, J., R.R. Fay, A.N. Popper, and W.N. Tavolga eds., 1988. Sensory Biology of Aquatic Animals. New York: Springer Verlag.Au, W.W.L., 1993. "The sonar of dolphins," *Springer-Verlag,* New York, 277 pp.

Au, W.W.L., and M. Green, 2000. "Acoustic interaction of humpback whales and whale-watching boats," *Marine Environment Research*, 49(5):469-481June 2000.

Au, W.L., J. Mobley, W. Burgess, M. Lammers, 2000. "Seasonal and diurnal trends of chorusing humpback whales wintering in waters of western Maui," Marine *Mammal Science*, 16(3):530-544, July.

Au, W.W.L., and D. Herzing, 2003. "Echolocation signals of wild Atlantic spotted dolphin (*Stenella frontalis*)," *Journal of the Acoustical Society of America*, *113(1): 598-604*.

Au, W.W.L., J. Darling, and K. Andrews, 2001. "High-frequency harmonics and source level of humpback whale songs," In Abstract: *Journal of the Acoustical Society of America, 110(5) part 2:2770-Contributed Paper 5aAB3 (9:15)*.

Au, W.W.L., J.K.B. Ford, J.K. Horne, K.A. Newman Allman, 2004. "Echolocation signals of free-ranging killer whales (*Orcinus orca*) and modeling of foraging for Chinook salmon (*Oncorhynchust shawytscha*)," *Journal of the Acoustical Society of America, 115(2):901-909*.

Au, W.W.L., Pack, A.A., Lammers, M.O., Herman, L.M., Deakos, M. and Andrews, K., 2006. "Acoustic properties of humpback whale song," Journal *of the Acoustical Society of America*, 120(2):1103-1110.

Audubon, 2006. "The 2002 Audubon WatchList" [Online]. Available: http://audubon2.org/webapp/watchlist/viewWatchlist.jsp [15 June].

Aviation Supplies and Academics, Inc., 1996. Federal Aviation Regulations and Aeronautical Information Manual, Newcastle, WA.

Bain, D.E., J.C. Smith, R. Williams, and D. Lusseau, 2006. "Effects of vessels on behavior of southern resident killer whales (*Orcinus* spp)". NMFS Contract Report No. AB133F03SE0959 and AB133F04CN0040, March.

Baird, R.W. 2002. "Killer whales of the world: natural history and conservation". *Voyageur Press, Stillwater, MN* 132 pp.

Baird, R.W., 2005a. Personal communication via email between Dr. Robin Baird, Cascadia Research Collective, Olympia, Washington and Ms. Dagmar Fertl, Geo-Marine, Inc., Plano, Texas, 16 June and 11 July.

Baird, R.W., 2005b. "Sightings of dwarf *(Kogia sima*) and pygmy (*K. breviceps*) sperm whales from the main Hawaiian Islands," *Pacific Science,* 59(3):461-466*.*

Baird, R.W., and A.M. Gorgone, 2005. "False killer whale dorsal fin disfigurements as a possible indicator of long-line fishery interactions in Hawaiian waters," *Pacific Science,* 59(4):593-601*.*

Baird, R.W., D. Nelson, J. Lien, and D.W. Nagorsen, 1996. "The status of the pygmy sperm whale, *Kogia breviceps*, in Canada. *Canadian Field-Naturalist,* 110:525-532.

Baird, R.W., A.D. Ligon, and S.K. Hooker, 2000. "Sub-surface and night-time behavior of humpback whales off Maui, Hawaii*: A preliminary report,"* Report prepared for the Hawaii Wildlife Fund, Paia, Hawaii. August.

Baird, R.W., A.M. Gorgone, A.D. Ligon, and S.K. Hooker, 2001. "Mark-recapture abundance estimate of bottlenose dolphins (*Tursiops truncatus*) around Maui and Lanai, Hawaii, during the winter of 2000/2001," Report prepared under Contract #40JGNFO-00262 for the National Marine Fisheries Service, La Jolla, California, August.

Baird, R.W., A.M. Gorgone, and D.L. Webster, 2002. "An examination of movements of bottlenose dolphins between islands in the Hawaiian Island chain," Report for contract 40JGNF11070 for the National Marine Fisheries Service, La Jolla, California, July.

Baird, R.W., D.J. McSweeney, D.L. Webster, A.M. Gorgone, and A.D. Ligon, 2003. "Studies of odontocete population structure in Hawaiian waters: Results of a survey through the main Hawaiian Islands in May and June 2003," Report prepared for the National Marine Fisheries Service, National Marine Mammal Laboratory, Seattle, Washington, October.

Baird, R. W., D.J. McSweeney, A.D. Ligon and G.S. Schorr, 2005. "Diving behavior and ecology of Cuvier's (*Ziphius cavirostris*) and Blainville's beaked whales (*Mesoplodon densirostris*) in Hawai`i," Report prepared under Order No. AB133F-04-RQ-0928 to Cascadia Research Collective, Olympia, WA from the Southwest Fisheries Science Center, National Marine Fisheries Service La Jolla, CA 92037 USA, 24 pp.

Baird, R.W., G.S. Schorr, D.L. Webster, S.D. Mahaffy, A.B. Douglas, A.M. Gorgone, and D.J. McSweeney, 2006a. "A survey for odontocete cetaceans off Kaua`i and Ni`ihau, Hawai`i, During October and November 2005: Evidence for population structure and site fidelity," Report to Pacific Islands Fisheries Science Center, NOAA Fisheries [Online]. Available: http://www.cascadiaresearch.org/robin/ Bairdetal2006odontocetesurvey.pdf.

Baird, R.W., D.L. Webster, D.J. McSweeney, A.D. Lignon, G.S. Schorr, and J. Barlow, 2006b. "Diving behaviour of Cuvier's (*Ziphius cavirostris*) and Blainville's (*Mesoplodon densirostris*) beaked whales in Hawai`i," *Canadian Journal of Zoology,* 84:1120-1128.

Baird, R., L. Antoine, C. Bane, J. Barlow, R. LeDuc, D. McSweeney, and D. Webster. 2006c."Killer whales in Hawaiian waters: Information on population identity and feeding habits," *Pacific Science*, 60(4):523-530 Baker, C.S., and L.M. Herman, 1981. "Migration and local movement of humpback whales (*Megaptera novaeangliae*) through Hawaiian waters," *Canadian Journal of Zoology,* 59:460-469.

Baker, J.D., and T.C. Johanos, 2004. "Abundance of the Hawaiian monk seal in the main Hawaiian Islands," *Biological Conservation,* 116:103-110.

Balazs, G.H., 1976. "Green turtle migrations in the Hawaiian archipelago," *Biological Conservation,* 9:125-140.

Balazs, G.H., 1983. "Recovery records of adult green turtles observed or originally tagged at French Frigate Shoals, Northwestern Hawaiian Islands." NOAA Technical Memorandum NMFS. NOAATM-NMFS-SWFC-36:1-42.

Balazs, G.H., 1995. "Status of sea turtles in the central Pacific Ocean," pp. 243-252 In: K.A. Bjorndal, ed. *Biology and Conservation of Sea Turtles*. Rev. ed. Washington, D.C.: Smithsonian Institution Press.

Balazs, G.H., 1998. "Sea turtles," p. 115. In: S.P. Juvik and J.O. Juvik, eds. *Atlas of Hawaii*. Honolulu: University of Hawaii Press.

Balazs, G.H., and M. Chaloupka, 2004. "Thirty-year recovery trend in the once depleted Hawaiian green sea turtle stock," *Biological Conservation,* 117:491–498.

Balazs, G.H. and D.M. Ellis, 1998. “Satellite telemetry of migrant male and female green turtles breeding in the Hawaiian Islands,” pp. 281-283. In: F.A. Abreu-Grobois, R. Briseño-Dueñas, R. Márquez and L. Sarti, eds, *Proceedings of the Eighteenth International Sea Turtle Symposium,* NOAA Technical Memorandum NMFS-SEFSC-436*,* March.

Balazs, G.H., and S. Hau, 1986. “*Lepidochelys olivacea* (Pacific ridley) U.S.A.: Hawaii,” *Herpetological Review,* 17:51 6*.*

Balazs, G.H., P. Craig, B.R. Winton, and R.K. Miya, 1994. “Satellite telemetry of green turtles nesting at French Frigate Shoals, Hawaii, and Rose Atoll, American Samoa,” pp. 184-187. In: K.A. Bjorndal, A.B. Bolten, D.A. Johnson, and P.J. Eliazar, eds. Proceedings of the Fourteenth Annual Symposium on Sea Turtle Biology and Conservation, NOAA Technical Memorandum NMFS-SEFSC-351, March.

Balcomb, K.C, 1987. “The whales of Hawaii, including all species of marine mammals in Hawaiian and adjacent waters,” *San Francisco: Marine Mammal Fund*.

Balcomb, K.C., 1989. “Baird’s beaked whale *Berardius bairdii* Stejneger, 1883: Arnoux’s beaked whale *Berardius arnuxii* Duvernoy, 1851,” pp. 261-288. In: S.H. Ridgway and R. Harrison*,* eds. *Handbook of marine mammals, Volume 4: River dolphins and the larger toothed whales*, London: Academic Press.

Ballance, L.T., R.L. Pitman, and P.C. Fiedler, 2006. “Oceanographic influences on seabirds and cetaceans of the eastern tropical Pacific: a review,” Progress *in Oceanography*, 69:360-390.

Ballistic Missile Defense System Command, 1977. Environment Assessment Missile Impacts, Illeginni Island, at the Kwajalein Missile Range, Kwajalein Atoll, December.

Banner A, and M. Hyatt, 1973. “Effects of noise on eggs and larvae of two estuarine fishes,” *Transactions of the American Fisheries Society*, 102(1):134-136.

Baraff, L.S. and M.T. Weinrich, 1994. “Separation of humpback whale mothers and calves on a feeding ground in early autumn.” *Marine Mammal Science*, 9:431-434.

Barlow, J., 1999. “Trackline detection probability for long-diving whales,” pp. 209-221. In: G.W. Garner, S.C. Amstrup, J.L. Laake, B.F.J. Manly, L.L. McDonald, and D.G. Robertson, eds. *Marine mammal survey and assessment methods*, Brookfield, Vermont: A.A. Balkema.

Barlow, J., 2003. “Cetacean abundance in Hawaiian waters during summer/fall of 2002,” *Southwest Fisheries Science Center Administrative Report LJ-03-13*, La Jolla, California: National Marine Fisheries Service, December.

Barlow J., 2006. “Cetacean abundance in Hawaiian waters estimated from a summer/fall survey of 2002,” *Marine Mammal Science, 22(2):446-464*.

Barlow, J., and B.L. Taylor, 2005. “Estimates of sperm whale abundance in the northeastern temperate Pacific from a combined acoustic and visual survey,” *Marine Mammal Science*, 21(3):429-445.

Barlow, J. and R. Gentry, 2004. Report of the NOAA Workshop on Anthropogenic Sound and Marine Mammals, 19-20 February. pp. 17-18. NOAA-TM-NMFS-SWFSC-361.

Barlow, J. and R. Gisiner, 2006. “Mitigation, monitoring and assessing the effects of anthropogenic sound on beaked whales,” *Journal of Cetacean Research And Management, 7(3):239-249.*

Barlow, J., S. Rankin, E. Zele, and J. Appler, 2004. “Marine mammal data collected during the Hawaiian Islands cetacean and ecosystem assessment survey (HICEAS) conducted aboard the NOAA ships McArthur and David Starr Jordan, July–December 2002,” NOAA Technical Memorandum NMFS-SWFSC-362, Southwest Fisheries Science Center, National Marine Fisheries Service, La Jolla, CA, 39 pp. June

Barlow, J. and K.A. Forney. 2007. “Abundance and population density of cetaceans in the California Current ecosystem,” Fisheries *Bulletin*, 105:509–526.

Bartholomew, G.A., and N.E. Collias, 1962. “The role of vocalization in the social behavior of the northern elephant seal,” *Animal Behaviour*, 10:7-14.

Bartholomew, G.A. and C.L. Hubbs, 1960. “Population growth and seasonal movements of the northern elephant seal, *Mirounga angustirostris* (1),” *Journal Mammalia,* 24:313-324.

Bartol, S.M., J.A. Musick, and M.L. Lenhardt, 1999. “Auditory evoked potentials of the loggerhead sea turtle (*Caretta caretta*),” *Copeia,* 3:836-840.

Bass, A., M.Marchaterre and R. Baker, 1994. “Vocal-Acoustic Pathways in a Teleost Fish,” *Journal of Neuroscience,* 14(7):4025-4039.

Bauer, G., M. Fuller, A. Perry, J.R. Dunn, and J. Zoeger, 1985. “Magnetoreception and biomineralization of magnetite in cetaceans,” pp. 489-507.In: Magnetite Biomineralization and Magnetoreception in Organisms: A New Biomagnetism edited by J.L. Kirschvink, D.S. Jones, and B.J. MacFadden (Plenum Press, New York).

Baumgartner, M.F. and B.R. Mate, 2003. “Summertime foraging ecology of North Atlantic right whales,” *Marine Ecology Progress Series,* 264:123-135.

Baumgartner, M.F., K.D. Mullin, L.N. May, and T.D. Leming, 2001. “Cetacean habitats in the northern Gulf of Mexico,” *Fishery Bulletin,* 99:219-239.

Baxter, L. II, E.E. Hays, G.R. Hampson, and R.H. Backus, 1982. “Mortality of fish subjected to explosive shock as applied to oil well severance on Georges Bank.” Woods Hole Oceanographic Institution Report WHO-82-54.

Bazua-Duran and W.W.L. Au, 2002. "The whistles of Hawaiian spinner dolphins," *Journal of the Acoustical Society of America,* 112:3064-3072.

Bazua-Durana, C. and W.W.L. Au. 2004. "Geographic variations in the whistles of spinner dolphins (*Stenella longirostris*) of the Main Hawaiian Islands," *Journal of the Acoustical Society of America,* 116(6):3757-3769.

Beamish, P. and E. Mitchell, 1973. "Short pulse length audio frequency sounds recorded in the presence of a minke whale (*Balaenoptera acutorostrata*)," *Deep-Sea Research,* 20:375-386.

Bejder, L., Samuels, A., Whitehead, H., Gales, N., Mann, J., Connor, R., Heithaus, M., Watson-Capps, J., Flaherty, C and Kruetzen, M. 2006. "Decline in relative abundance of bottlenose dolphins (Tursiops sp) exposed to long-term disturbance." *Conservation Biology*, 20 (6): 1791–1798.

Belt Collins Hawaii, 1994. Assessment of Lead (Pb) and Water Quality in the Nearshore Marine Environments Off the Pacific Missile Range Facility Kauai, Hawaii, 23 July.

Bennett, D.H, C.M. Falter, S.R. Chipps, K. Niemela, and J. Kinney, 1994. "Effects of underwater sound stimulating the intermediate scale measurement system on fish and zooplankton of Lake Pend Oreille, Idaho." Research Report prepared by College of Forestry, Wildlife and Range Sciences, University of Idaho for Office of Naval Research, Arlington Virginia, Contract N00014-92-J-4106.

Benoit-Bird, K.J., 2004. "Prey caloric value and predator energy needs: foraging predictions for wild spinner dolphins," *Marine Biology,* 45:435–444.

Benoit-Bird, K.J., W.W.L. Au, R.E. Brainard, and M.O. Lammers, 2001. "Diel horizontal migration of the Hawaiian mesopelagic boundary community observed acoustically," *Marine Ecology Progress Series,* 217:1-14.

Benoit-Bird, K.J. and W.W.L. Au, 2004. "Diel migration dynamics of an island-associated sound-scattering layer," *Deep-Sea Research I,* 51:707-719.

Benson, L.K. and J.M. Fitzsimons, 2002. "Life history of the Hawaiian fish *Kuhlia sandvicensis* as inferred from daily growth rings of otoliths," Environmental *Biology of Fishes,* 65:131-137.Bernard, H.J., and S.B. Reilly, 1999. "Pilot whales *Globicephala* Lesson, 1828," pp. 245-279. In: S.H. Ridgway and R. Harrison, eds. *Handbook of marine mammals. Volume 6: The second book of dolphins and the porpoises,* San Diego: Academic Press.

Best, P.B., D.S. Butterworth, and L.H. Rickett, 1984. "An assessment cruise for the South African inshore stock of Bryde's whales (*Balaenoptera edeni*)," *Reports of the International Whaling Commission,* 34:403-423.

Best, P.B. 1994. "Seasonality of reproduction and the length of gestation in southern right whales *Eubalaena australis*," *Journal of Zoology, London*, 232:175-189.

Bjørge, A., 2002. "How persistent are marine mammal habitats in an ocean of variability?" pp. 63-91. In: P.G.H. Evans and J.A. Raga, eds. *Marine mammals: Biology and conservation,* New York: Kluwer Academic/Plenum Publishers.

Bjorndal, K., 1997. "Foraging ecology and nutrition of sea turtles," pp. 199-231. In: P.L. Lutz and J.A. Musick, eds. *The biology of sea turtles,* Boca Raton, Florida: CRC Press.

Bjorndal, K.A., A.B. Bolten, and H.R. Martins, 2000. "Somatic growth model of juvenile loggerhead sea turtles *Caretta caretta*: Duration of pelagic stage," *Marine Ecology Progress Series,* 202:265-272.

Blaxter J.H.S., E.J. Denton, J.A.B. Gray, 1981. "The auditory bullae-swimbladder system in late stage herring larvae," *Journal of the Marine Biological Association of the United Kingdom,* 61:315–326.

Booman, C., H. Dalen, H. Heivestad, A. Levsen, T. van der Meeren, and K. Toklum, 1996. "Effekter av luftkanonskyting pa egg, larver og ynell," *Havforskningsinstituttet, Issn* 0071-5638.

Borggaard, D., J. Lien, and P. Stevick, 1999. "Assessing the effects of industrial activity on large cetaceans in Trinity Bay, Newfoundland (1992-1995)," *Aquatic Mammals,* 25:149-161.

Borell, A., 1993. "PCB and DDTs in blubber of cetaceans from the northeastern north Atlantic," Marine *Pollution Bulletin,* 26: 146–151.

Bowen, B.W., F.A. Abreu-Grobois, G.H. Balazs, N. Kamezaki, C.J. Limpus, and R.J. Ferl, 1995. "Trans-Pacific migrations of the loggerhead turtle (*Caretta caretta*) demonstrated with mitochondria DNA markers," *Proceedings of the National Academy of Sciences USA,* 92:3,731-3,734.

Bowen, W.D., C.A. Beck, and D.A. Austin, 2002. "Pinniped ecology," pp. 911-921. In: W.F. Perrin, B. Würsig, and J.G.M. Thewissen, eds. *Encyclopedia of marine mammals*, San Diego: Academic Press.

Brabyn, M., and R.V.C. Frew, 1994. "New Zealand herd stranding sites do not relate to geomagnetic topography," *Marine Mammal Science*, 10:195-207.

Brabyn, M.W., and I.G. McLean, 1992. "Oceanography and coastal topography of herd-stranding sites for whales in New Zealand," *Journal of Mammology*, 73, 469-476.

Bradshaw, C.J.A., K. Evans, and M.K A. Hindell. 2005. "Mass Cetacean Strandings—a Plea for Empiricism," Conservation *Biology*, 20:584–586.

Bradshaw, C.J.A., K., Evans, and M.A. Hindell, 2006. "Mass Cetacean Strandings – a Plea for Empiricism," *Conservation Biology*, 20:584-586.

Braun, R.C., 2005. Personal communication via email between Dr. Robert Braun, National Marine Fisheries Service, Pacific Island Fisheries Science Center, Honolulu, Hawaii, and Mr. Conrad Erkelens, U.S. Pacific Fleet, Fleet Environmental Office, Pearl Harbor Hawaii, 1 September.

Broadcast Engineering Services of Bonny Doon, 2007. *Mt. Kahili Electronic Site - KAQA 91.9 FM* [Online]. Available: http://www.well.com/~dmsml/kahili.html.

Brodie, E.C., F.M.D. Gulland, D.J. Greig, M. Hunter, J. Jaakola, J.S. Leger, T.A. Leighfield, and F.M.V. Dolah, 2006. "Domoic acid causes reproductive failure in California sea lions (*Zalophus californianus*)," *Marine Mammal Science*, 22:700–707.

Brownell, Jr., R.L., P.J. Clapham, T. Miyashita, and T. Kasuya, 2001. "Conservation status of North Pacific right whales," *Journal of Cetacean Research and Management, Special Issue*, 2:269-286.

Brownell, R.L., T. Yamada, J.G. Mead, and A.L. van Helden, 2004. Mass strandings of Cuvier's beaked whales in Japan: U.S. Naval acoustic link Paper SC/56/E37 presented to the IWC Scientific Committee (unpublished). 10pp. [Available from the Office of the Journal of Cetacean Research and Management.]

Brownell, R.L., T. Yamada, J.G. Mead, and B.M. Allen, 2006. "Mass strandings of melon-headed Whale *(Peponacephala electra):* a worldwide review,*" Paper* presented to the Scientific Committee of the International Whaling Commission, SC/58/SM8.

Buck, J.R. and P.L. Tyack, 2000. "Response of gray whales to low-frequency sounds," In Abstract: *Journal of the Acoustic Society of America*, 107(5) part 2: 2774.

Buckstaff, K.C., 2004. "Effects of watercraft noise on the acoustic behavior of bottlenose dolphins, *Tursiops truncates*, in Sarasota Bay, Florida," Marine *Mammal Science*, 20(4):709-725

Buerkle, U., 1968. "Relation of pure tone thresholds to background noise level in the Atlantic cod (*Gadus morhua*)," *Journal of the Fisheries Research Board of Canada*, 25: 1155 1160.

Buerkle, U., 1969. "Auditory masking and the critical band in Atlantic cod (*Gadus morhua*)," *Journal of the Fisheries Research Board of Canada*, 26:1113 1119.

Burger, 2006. Comments on the HRC DEIS/OEIS received from John Burger, Pacific Missile Range Facility, regarding hazardous materials and waste at Pacific Missile Range Facility.

Burger, J., 2007a. Comments on the HRC DEIS/OEIS received from John Burger, Pacific Missile Range Facility, regarding albatross egg re-location practices at Pacific Missile Range Facility, January.

Burger, J., 2007b. Personal communication via email: Information received from John Burger, Pacific Missile Range Facility, regarding green sea turtles on Pacific Missile Range Facility, 24 January.

Burger, J., 2007c. Personal communication via email: Information received from John Burger, Pacific Missile Range Facility, regarding invasive species protocols, 30 January.

Burger, J., 2007d. Personal communication via email: Information received from John Burger, Pacific Missile Range Facility, regarding the number of missile launches occurring at PMRF during the past several years, 24 October.

Burger, J., 2007e. Information received from John Burger, Pacific Missile Range Facility, regarding the number of Laysan albatross eggs placed with surrogate parents during the 2007 season, 19 December.

Burger, J. and T. Nizo, 2007. Personal communication via email between John Burger, CIV PMRF, and Thomas Nizo, CIV NAVFAC HI, 30 January.

Burgess, W.C., P.L. Tyack, B.J. Le Boeuf, and D.P. Costa, 1998. "A programmable acoustic recording tag and first results from free-ranging northern elephant seals," *Deep-Sea Research II,* 45:1327-1351.

Burtenshaw, J.C., E.M. Oleson, J.A. Hildebrand, M.A. McDonald, R.K. Andrew, B.M. Howe, and J.A. Mercer, 2004. "Acoustic and satellite remote sensing of blue whale seasonality and habitat in the northeast Pacific," *Deep Sea Research II,* 15:967-986.

Cairns, S.D., 1994. "Scleractinia of the temperate North Pacific," *Smithsonian Contributions to Zoology,* 557:1-150.

Calambokidis, J., G.H. Steiger, J.M. Straley, T.J. Quinn II, L.M. Herman, S. Cerchio, D.R. Salden, M. Yamaguchi, F. Sato, J. Urban R., J.K. Jacobsen, O. Von Ziegesar, K.C. Balcomb, C.M. Gabrielle, M.E. Dahlheim, N. Higahsi, S. Uchida, J.K.B. Ford, Y. Miyamura, P.L. de Guevara P., S.A. Mizroch, L. Schlender, and K. Rasmussen, 1997. "Final Report - Abundance and population structure of humpback whales in the North Pacific basin," Unpublished contract report to the National Marine Fisheries Service, La Jolla, California.

Calambokidis, J., G.H. Steiger, J.M. Straley, L.M. Herman, S. Cerchio, D.R. Salden,., R.J. Urbán, J.K. Jacobson, O, vonZiegesar, K.C. Balcomb, C.M. Gabrielle, M.E. Dahlheim, S. Uchida, G. Ellis, Y. Miyamura, P., Ladrón de Guevara, M. Yamaguchi, F. Sato, S.A. Mizroch, L. Schlender, K. Rasmussen, J. Barlow, J. and T.J. Quinn II, 2001. "Movements and population structure of humpback whales in the North Pacific," *Marine. Mammal Science,* 17 (4):769-794.

Calambokidis, J., E. Oleson, M. McDonald, B. Burgess, J. Francis, G. Marshall, M. Bakhtiari, and J. Hildebrand, 2003. "Feeding and vocal behavior of blue whales determined through simultaneous visual-acoustic monitoring and deployment of suction-cap attached tags," p. 27. In *Abstracts: Fifteenth Biennial Conference on the Biology of Marine Mammals. 14–19 December 2003*, Greensboro, North Carolina.

Caldwell, D.K., and M.C. Caldwell, 1989. "Pygmy sperm whale *Kogia breviceps* (de Blainville, 1838): Dwarf sperm whale *Kogia simus* Owen, 1866," pp. 253-260. In: S.H. Ridgway and R. Harrison, eds. *Handbook of marine mammals, Volume 4: River dolphins and the larger toothed whales*. London: Academic Press.

California Department of Public Health, 2007. Perchlorate in Drinking Water: California MCL Status. [Online]. Available: http://www.cdph.ca.gov/certlic/drinkingwater/Pages/Perchlorate.aspx.

California Marine Mammal Stranding Network Database, 2006. Southwest Regional Stranding Coordinator National Marine Fisheries Service 501 West Ocean Blvd, Suite 4200 Long Beach, CA 90802-4213562-980-4017 [Online]. Available: http://www.nmfs.noaa.gov/pr/health/networks.htm

Caltrans, 2001. "Pile Installation Demonstration Project, Fisheries Impact Assessment." PIDP EA 012081, Caltrans Contract 04A0148. San Francisco - Oakland Bay Bridge East Span Seismic Safety Project.

Caltrans, 2004. "Fisheries and Hydroacoustic Monitoring Program Compliance Report for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project." Prepared by Strategic Environmental Consulting, Inc. and Illingworth & Rodkin, Inc. June.

Campagna, C., V. Falabella, M. Lewis, 2007. "Entanglement of southern elephant seals in squid fishing gear," *Marine Mammal Science,* 23(2):414-418.

Caribbean Conservation Corporation and Sea Turtle Survival League, 2003. "Flatback Sea Turtle Information & Map," [On-line]. Available: http://www.cccturtle.org/flatback.htm

Carlson, H.W., 1978. "Simplified sonic-boom prediction." NASA TP-1122.

Carr, A., 1987. "New perspectives on the pelagic stage of sea turtle development," *Conservation Biology,* 1:103-121.

Carr, A., 1995. "Notes on the behavioral ecology of sea turtles," pp. 19-26. In: K.A. Bjorndal, ed. *Biology and conservation of sea turtles*, Rev. ed. Washington, D.C.: Smithsonian Institution Press.

Carretta, J.V., J. Barlow, K.A. Forney, M.M. Muto, and J. Baker, 2001. U.S. Pacific marine mammal stock assessments: 2001. NOAA Technical Memorandum, NOAA-TM-NMFS-SWFSC-317

Carretta JV, Forney KA, Muto MM, Barlow J, Baker J, Lowry M. 2004. U.S. Pacific marine mammal stock assessments: 2003. NOAA Technical Memorandum NMFS-SWFSC-358. Southwest Fisheries Science Center, National Marine Fisheries Service, La Jolla, CA.

Carretta, J.V., K.A. Forney, M.M. Muto, J. Barlow, J. Baker, B. Hanson, and M. Lowry, 2005. “U.S. Pacific marine mammal stock assessments: 2004,” NOAA Technical Memorandum NMFS-SWFSC-375:1-31 6.

Carretta, J.V., K.A. Forney, M.M. Muto, J. Barlow, J. Baker, B. Hanson, and M.S. Lowry, 2006. U.S. Pacific Marine Mammal Stock Assessments: 2005. U.S. Department of Commerce, NOAA-TM-NMFS-SWFSC–388.

Carretta, J.V., K.A. Forney, M.M. Muto, J. Barlow, J. Baker, B. Hanson, and M.S. Lowry, 2007. “U.S. Pacific Marine Mammal Stock Assessments: 2006,” (NOAA-TM-NMFS-SWFSC-398, National Marine Fisheries Service, Southwest Fisheries Science Center), pp. 321.

Casper, B.M. and D.A. Mann, 2006. “Evoked potential audiograms of the nurse shark (*Ginglymostoma cirratum*) and the yellow stingray (*Urobatis jamaicensis*),” *Environmental Biology of Fishes*, 76:101–108.

Casper, B.M., P.S. Lobel, and H.Y. Yan, 2003. “The hearing sensitivity of the little skate, *Raja erinacea*: A comparison of two methods,” *Environmental Biology of Fishes* 68: 371-379.

Cato, D.H., 1978. “Marine biological choruses observed in tropical waters near Australia,” *Journal of the Acoustical Society of America,* 64(3), 736-743*.*

Center for Coastal Monitoring and Assessment, 2006. “Benthic Habitats of the Main Hawaiian Islands—2003,” last updated on August 29, 2006, [Online]. Available: http://ccma.nos.noaa.gov/products/biogeography/benthic/htm/uchan.htm.

Centers for Disease Control and Prevention, 2003. Sixteenth Meeting of the Advisory Board on Radiation and Worker Health May 19-20, 2003. Oak Ridge, Tennessee.

Center for Plant Conservation, 2006. “Center for Plant Conservation – National Collection of Endangered Plants,” [Online]. Available: http://www.centerforplantconservation.org/ASP/CPC_ViewProfile.asp?CPCNum=4421 [2 August 2006].

Cetacean and Turtle Assessment Program, 1982. “Characterization of marine mammals and turtles in the mid- and North Atlantic areas of the U.S. outer continental shelf,” *Final Report to the U.S. Bureau of Land Management, Washington, D.C., from the Graduate School of Oceanography, University of Rhode Island, Kingston,* NTIS PB83-215855.

Chaloupka, M. and G. Balazs, 2005. “Modeling the effect of fibropapilloma disease on the somatic growth dynamics of Hawaiian green sea turtles,” *Marine Biology,* 147:1251–1260.

Chaloupka, M.Y., and J.A. Musick, 1997. "Age, growth, and population dynamics," pp. 233-276. In: P.L. Lutz and J.A. Musick, eds. *The biology of sea turtles,* Boca Raton, Florida: CRC Press.

Chaloupka, T. Work, G. Balazs, S. Murakawa and R. Morris, 2003. "Cause-specific temporal and spatial trends in green sea turtle standings in the Hawaiian Archipelago (1982-2003)". Unpublished.

Chambers, S., and R.N. James, 2005. "Sonar termination as a cause of mass cetacean strandings in Geographe Bay, south-western Australia," In: *Acoustics 2005*, *Acoustics in a Changing Environment* (Busselton, Western Australia).

Chambers, M.D., D.K. Garcelon, and C.A. Schwemm, 2005. "Drift card simulation of larval dispersal from San Nicolas Island, CA during black abalone spawning season." Proceedings of the 6th CA Islands Symposium, Dec. 2003, Ventura, CA, USA.

Chamber of Commerce of Hawaii, Military Affairs Council, 2006. "Hawaii-Based Armed Forces Benefit All of US," (Brochure) January 2006 [Online]. Available: http://www.hawaii.gov/dbedt/info/economic/data_reports/federal/

Chamber of Commerce of Hawaii, Military Affairs Council, 2007. "Profile of Hawaii-Based Armed Forces," (Brochure) January 2007, [Online]. Available: http://www.hawaii.gov/dbedt/info/economic/data_reports/federal/DBEDT_Armed_Forces_2007-01.pdf

Chapman, C.J. 1973. "Field studies of hearing in teleost fish," *Helgoländer wissenschaftliche Meeresuntersuchungen,* 24:371-390.

Chapman, C.J. and A.D. Hawkins, 1969. "The importance of sound in fish behaviour in relation to capture by trawls," *FAO Fisheries Report,* 62(3): 717-729.

Chapman C.J, and A.D. Hawkins, 1973. "A field study of hearing in the cod, *Gadus morhua*," *Journal of Comparative Physiology*, 85:147 167.

Charif, R.A., D.K. Mellinger, K.J. Dunsmore, K.M. Fristrup, and C.W. Clark, 2002. "Estimated source levels of fin whale (*Balaenoptera physalus*) vocalizations: Adjustments for surface interference," *Marine Mammal Science,* 18:81-98.

Chave, E.H., and A. Malahoff, 1998. "In deeper waters: Photographic studies of Hawaiian deepsea habitats and life-forms," Honolulu: University of Hawai`i Press.

Chivers, S.J., R.G. LeDuc, and R.W. Baird, 2003. "Hawaiian island populations of false killer whales and short-finned pilot whales revealed by genetic analysis," p. 32. In *Abstracts: Fifteenth Biennial Conference on the Biology of Marine Mammals, 14-1 9* December 2003. Greensboro, North Carolina.

Clapham, P.J. and J.G. Mead, 1999. "*Megaptera novaeangliae," Mammalian Species,* 604:1-9.

Clapham, P. J., S. Leatherwood, I. Szczepaniak, and R.L. Brownell, 1997. "Catches of humpback and other whales from shore stations at Moss Landing and Trinidad, California, 1919-1926," *Marine Mammal Science,* 13:368-394.

Clapham, P.J., C. Good, S.E. Quinn, R.R. Reeves, J.E. Scarff, and R.L. Brownell, 2004. "Distribution of North Pacific right whales (*Eubalaena japonica*) as shown by 19th and 20th century whaling catch and sighting records," *Journal of Cetacean Research and Management,* 6:1-6.

Clark, C.W. and K.M. Fristrup, 1997. "Whales '95: A combined visual and acoustic survey of blue and fin whales off southern California," *Reports of the International Whaling Commission,* 47:583-600.

Clark, C.W. and P.J. Clapham, 2004. "Acoustic monitoring on a humpback whale (*Megaptera novaeangliae*) feeding ground shows continual singing into late spring," *Proceedings of the Royal Society of London, Part B*, 271:1051-1057.

Clarke, M.R., 1996. "Cephalopods as prey,". III. Cetaceans, *Philosophical Transactions of the Royal Society, B*., 351:1053-1065.

Cleghorn, Paul, 1987. *Prehistoric Cultural Resources and Management Plan for Nihoa and Necker Island, Hawai`i*. Bishop Museum Press, Honolulu, Hawaii. [Online]. Available: http://www2.bishopmuseum.org/noaanwhi/results.asp

Cleghorn, Paul, 1988. The *Settlement and Abandonment of Two Hawaiian Outposts: Nihoa and Necker Islands*. Bishop Museum Occasional Papers, Vol. 28.

Clifton, K., D.O. Cornejo, and R.S. Felger, 1995. "Sea turtles of the Pacific coast of Mexico," pp. 199-209. In: K.A. Bjorndal, ed. *Biology and conservation of sea turtles, revised edition.* Washington, D.C.: Smithsonian Institution Press.

Clyne, H., 1999. Computer simulations of interactions between the North Atlantic Right Whale (*Eubaleana glacialis*) and shipping.

Cockcroft, V.G., G. Cliff, and G.J.B. Ross, 1989. "Shark predation on Indian Ocean bottlenose dolphins *Tursiops truncatus* off Natal, South Africa," South African Journal of Zoology 24, 305-310.

Coker, C.M. and E.H. Hollis, 1950. "Fish mortality caused by a series of heavy explosions in Chesapeake Bay," *Journal of Wildlife Management*, 14(4): 435-445.

Coles, W.C., and J.A. Musick, 2000. "Satellite sea surface temperature analysis and correlation with sea turtle distribution off North Carolina," *Copeia,* 2:551-554.

Collin, S.P., and N.J. Marshall, 2003. Sensory Processing in Aquatic Environments. New York: Springer-Verlag.

Colorado State University, 2002. *Analysis of Fire History and Management Concerns at Pohakuloa Training Area* [Online]. Available: http://www.cemml.colostate.edu/files/tps02-02.pdf [April].

Columbia Gazetteer of North America, 2000. "Kaula," [Online], Available: http://www.bartleby.com/69/1/K02401

Commander, U.S. Fleet Forces Command, 2006. "Fleet Response Plan (FRP) Implementation Message, 231400Z May 03," May.

Commander- in-Chief Pacific Fleet, 2001. *Ehime Maru Environmental Assessment,* 15 June.

Commander, Navy Region Hawaii, 2007. *Survey of Marine and Fishery Resources for An Integrated Natural Resources Management Plan (INRMP) for the Pacific Missile Range Facility (PMRF) Barking Sands (BS),* Kauai, Hawaii – Phase II-2006, October: Revised June 2007.

Commander, Submarine Force U.S. Pacific Fleet, 1997. Environmental Assessment for a Hawaiian Area Shallow-Water Minefield Sonar Training Area, July.

Commerce Business Daily, 2000. *"Utility Systems: conveyance Authority"* [Online], Available: http://frwebgate1.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=357466283058+12+0+0&WAISaction=retrieve [15 September 2006].

Compagno, L.J.V. and J.A. Musick, 2000. *Pseudocharcharias kamoharai*. In: 2004 IUCN red list of threatened species, [Online]. Available: http://www.redlist.org

Conner, R.C., 2000. "Group living in whales and dolphins," pp. 199-218. In: *Cetacean Societies*: In: *Field Studies of Dolphins and Whales*, edited by J. Mann, R. C. Conner, P. L. Tyack, and H. Whitehead (University of Chicago Press, Chicago).

Constantine, R., I. Visser, D. Buurman, R. Buurman, and B. McFadden, 1998. "Killer whale (*Orcinus orca*) predation on dusky dolphins (*Lagenorhynchus obscurus*) in Kaikoura, New Zealand," *Marine Mammal Science, 14:324-330*.

Cook, Richard K., 1969. "Subsonic Atmospheric Oscillation," *Proceedings of the Symposium on Acoustic-Gravity Waves in the Atmosphere, Boulder, Colorado, July 16-1* 7, *1968,* ESSA and Advanced Research Projects Agency, Boulder, 1968, pp. 209-213.

Cook, D.S. and E. Spillman, 2000. Military training ranges as a source of environmental contamination. Federal Facilities Environmental Journal. Summer 27-37, 2000.

Cook, M.L.H., R.A. Varela, J.D. Goldstein, S.D. McCulloch, G.D. Bossart, J.J. Finneran, D. Houser, and D.A. Mann, 2006. "Beaked whale auditory evoked potential hearing measurements," *Journal of Comparative Physiology- A,* 192: 489–495.

Coombs, S. and A.N. Popper, 1979. "Hearing differences among Hawaiian squirrelfish (family Holicentridae) related to differences in the peripheral auditory system." *Journal of Comparative Physiology- A,* 132:203-207.

Collin, S.P. and N.J. Marshall, eds. 2003. Sensory Processing in Aquatic Environments. New York: Springer-Verlag.

Coral Reef Information System, 2003. "Deep water corals," [Online]. Available: http://www.coris.noaa.gov/about/deep/deep.html [21 January 2004].

Coral Reef Information System, 2007. Northwestern Hawaiian Islands – Cultural History of the NWHI, Early Settlers; Geography and History; and Archaeology [Online]. Available*:* http://www.coris.noaa.gov/about/eco_essays/nwhi/history.html. [23 January]

Corkeron, P.J. and R.C. Connor, 1999. "Why do baleen whales migrate?," *Marine Mammal Science,* 15:1228-1245.

Corkeron, P.J., and S.M. Van Parijs, 2001. "Vocalizations of eastern Australian Risso's dolphins, *Grampus griseus*," *Canadian Journal of Zoology,* 79:160-164.

Corwin J.T., 1981. "Audition in elasmobranchs," pp. 81-105. In: *Hearing and Sound Communication in Fishes*, eds. W.N. Tavolga, A.N. Popper, and R.R. Fay, New York: Springer Verlag.

Corwin J.T., 1989. "Functional anatomy of the auditory system in sharks and rays," *Journal of Experimental Zoology, Supplement*, 2:62-74.

Cottingham, D., 1989. Persistent Marine Debris; Part 1: The Threat, Part 2: The Solution. Mariners Weather Log, National Oceanographic Data Center.

Council on Environmental Quality, 1997. Environmental Justice Guidance Under the National Environmental Policy Act. December [Online]. Available: http://www.whitehouse.gov/CEQ/

County of Kaua`i, Department of Water, 2006. "*Water Quality Report – Covering the period of January 1, 2006 to December 31, 2006*, Kauai Department of Water, Kekaha-Waimea Water System, 2007.

Cowan, J., 1994. *Handbook of Environmental Acoustics*. Van Nostrand Reinhold: New York.

Cox, T.M., T.J. Ragen, A.J. Read, E. Vos, R.W. Baird, K. Balcomb, J. Barlow, J. Caldwell, T. Cranford, L. Crum, A. D'Amico, G.D. Spain, A. Fernandez, J. Finneran, R. Gentry, W. Gerth, F. Gulland, J. Hilderbrand, D. Houser, T. Hullar, P.D. Jepson, D. Ketten, C.D. MacLeod, P. Miller, S. Moore, D.C. Mountain, D. Palka, P. Ponganis, S. Rommel, T. Rowles, B. Taylor, P. Tyack, D. Wartzok, R. Gisiner, J. Mead,and L. Benner, 2006. "Understanding the impacts of anthropogenic sound on beaked whales," *Journal of Cetacean Research Management,* 7:177-187.

Crocker, D.E., D.P. Costa, B.J. Le Boeuf, P.M. Webb, and D.S. Houser, 2006. "Impacts of El Niño on the foraging behavior of female northern elephant seals," *Marine Ecolology. ProgramSeries* 309.

Croll, D.A., A. Acevedo-Gutiérrez, B.R. Tershy, and J. Urbán-Ramírez, 2001. "The diving behavior of blue and fin whales: Is dive duration shorter than expected based on oxygen stores?," *Comparative Biochemistry and Physiology Part A,* 129:797-809.

Croll, D.A., C.W. Clark, A. Acevedo, B. Tershy, S. Flores, J. Gedamke, and J. Urban, 2002. "Only male fin whales sing loud songs," *Nature,* 417:809.

Crum, L.A., and Y. Mao, 1996. "Acoustically enhanced bubble growth at low frequencies and its implications for human diver and marine mammal safety," *Journal of the Acoustical Society of America,* 99:2898-2907.

Crum, L.A., M.R. Bailey, G. Jingfeng, P.R. Hilmo, S.G. Kargl, and T.J. Matula, 2005. "Monitoring bubble growth in supersaturated blood and tissue ex vivo and the relevance to marine mammal bioeffects," *Acoustic Research Letters Online* 6:214-220.

Cudahy, E., and W.T. Ellison, 2001. "A review of the potential for in vivo tissue damage by exposure to underwater sound." Unpublished report prepared for National Marine Fisheries Service, Office of Protected Resources. Silver Spring, Maryland.

Culik, B.M., S. Koschinski, N. Tregenza, and G.M. Ellis, 2001. "Reactions of harbour porpoises (*Phocoena phocoena*) and herring (*Clupea harengus*) to acoustic alarms," *Marine Ecology Progress Series,* 211:255-260.

Culik, B.M., 2002. "Review on Small Cetaceans: Distribution, Behaviour, Migration and Threats," in United Nations Environment Programme, Convention on Migratory Species (Marine Mammal Action Plan/Regional Seas Reports and Studies No. 177), p. 343. [Online]. Available: http://www.unep.org/regionalseas/News/Review_of_Small_Cetaceans/default.asp

Cummings, W.C., 1985. "Bryde's whale *Balaenoptera edeni* Anderson, 1878," pp. 137-154, In: S.H. Ridgway and R. Harrison, eds. *Handbook of marine mammals. Volume 3: The sirenians and baleen whales*. San Diego: Academic Press.

Curl, H.C. and K. O'Donnell, 1977. Chemical and Physical Properties of Refined Petroleum Products. NOAA Technical Memorandum ERL MESA-17. NTIS PC A03/MF A01 2001 May 13.

Currents, 2007. "Navy offers sanctuary to migratory birds," [Online]. Available: http://www.p2pays.org/ref/41/40529.pdf

Curry, B.E., 1999. "Stress in mammals: The potential influence of fishery-induced stress on dolphins in the eastern tropical Pacific Ocean," NOAA Technical Memorandum NOAA-TMNMFS-SWFSC-260: 1-121.

D'Amico, A., and W. Verboom, 1998. "Report of the Bioacoustics Panel, NATO/SACLANT," pp. 2-1-2-60.

D'Spain, G.L., A. D'Amico, and D.M. Fromm, 2006. "Properties of the underwater sound fields during some well documented beaked whale mass stranding events," *Journal of Cetacean Research and Management,* 7(3):223-238.

D'Vincent, C.G., R.M. Nilson, and R.E. Hanna, 1985. "Vocalization and coordinated feeding behavior of the humpback whale in southeastern Alaska," *Scientific Reports of the Whales Research Institute,* 36:41-47.

Dahlheim, M.E., and J.E. Heyning, 1999. "Killer whale *Orcinus orca* (Linnaeus, 1758)," pp. 281-322. In S.H. Ridgway and R. Harrison, eds. *Handbook of marine mammals. Volume 6: The second book of dolphins and the porpoises*. San Diego: Academic Press.

Dahlheim, M.E., S. Leatherwood, and W.F. Perrin, 1982. "Distribution of killer whales in the warm temperate and tropical eastern Pacific," *Reports of the International Whaling Commission,* 32:647-653.

Dailey, M., and W.A. Walker, 1978. "Parasitism as a factor (?) in single strandings of southern California cetaceans," *Journal of Parasitology* 64:593-596.

Dailey, M., M. Walsh, D. Odell, and T. Campbell, 1991. "Evidence of prenatal infection in the bottlenose dolphin (*Tursiops truncatus*) with the lungworm *Halocercus lagenorhynchi* (Nematoda: Pseudaliidae)," *Journal of Wildife Diseases* 27:164-165.

Dalen, J. and G.M. Knutsen, 1986. "Scaring effects in fish and harmful effects on eggs, larvae and fry by offshore seismic exploration," pp. 93-102. In: Merklinger, H.M. (Ed.), *Progress in Underwater Acoustics*. Plenum Press, New York.

Dalen J, and A. Raknes, 1985. "Scaring effects on fish from three-dimensional seismic surveys" *Report No. FO 8504*. Institute of Marine Research. Bergen, Norway.

Darling, J. D., and S. Cerchio, 1993. "Movement of a humpback whale (*Megaptera novaeangliae*) between Japan and Hawaii," *Marine Mammal Science,* 1:84-89.

Davenport, J., 1997. “Temperature and the life-history strategies of sea turtles,” *Journal of Thermal Biology,* 22:479-488.

Davis, B., 1981. “*Archaeological Reconnaissance Survey of Hawaiian Wind Farm Project Area at Kahuku, O`ahu, Hawai’i,” Ms. 060481*. Prepared for Bechtel Power Corporation, Los Angeles, Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawaii.

Davis, R.W., G.S. Fargion, N. May, T.D. Leming, M. Baumgartner, W.E. Evans, L.J. Hansen, and K. Mullin, 1998. “Physical habitat of cetaceans along the continental slope in the north-central and western Gulf of Mexico,” *Marine Mammal Science,* 14:490-507.

Deecke, V. B., J. K. B. Ford, and P. J. B. Slater, 2005. “The vocal behaviour of mammal-eating killer whales: Communicating with costly calls,” *Animal Behaviour* , 69:395-405.

Defense Environmental Network and Information eXchange, 1999. “Natural Resources Conservation (FY 1998) Marine Corps Base Hawaii,” [Online]. Available: https://www.denix.osd.mil/denix/Public/News/Earthday99/Awards99/MChinrsm/nrawd98.html.

Defense Environmental Network and Information eXchange, 2001. “Natural Resources Conservation (FY99—FY01) Marine Corps Base Hawaii,” [Online]. Available: https://www.denix.osd.mil/denix/Public/News/OSD/SecDef01/NRC/nrc_si_hawaii.pdf.

Defense Environmental Network and Information eXchange, 2005. “Introduction and Background,” [Online]. Available: https://www.denix.osd.mil/denix/Public/News/OSD/SecDef05/NRC/NRC_Inst_Hawaii.pdf

DeLong, R.L., G.L. Kooyman, W.G. Gilmartin, and T.R. Loughlin, 1984. “Hawaiian monk seal diving behavior,” *Acta Zoological Fennica,* 172:129-1 31.

Department of Energy, 1991. *Kauai Test Facility (KTF) Environmental Assessment*, Sandia National Laboratories, March.

Department of Health, 2001. Final Environmental Impact Statement, Outfall Replacement for Wastewater Treatment Plant at Fort Kamehameha, Navy Public Works Center, Pearl Harbor, Hawaii, March.

Department of Health and Human Services, Agency for Toxic Substances and Disease Registry. 2003. *Petitioned Public Health Assessment, Soil Pathway Evaluation, Isla de Vieques Bombing Range, Vieques, Puerto Rico*. [Online] Available; http://www.atsdr.cdc.gov/HAC/PHA/isladevieques/idv_toc.html#abb

Department of Labor and Industrial Relations, 2006. ”Honolulu MSA Industry Employment Trends”, Hawaii Workforce Informer, [Online], Available: http://www.hiwi.org/admin/uploadedPublications/1582_LTproj2002-12-HON.pdf, [31 October].

Department of Planning and Permitting, 2006. *"*Annual Report on The Status of Land Use on Oahu, Fiscal Year 2005*,"* Mufi Hannemann, Mayor, City and County of Honolulu, Henry Eng, FAICP, Director, Department of Planning and Permitting, Honolulu, Hawaii, April 2006. [On-line], Available: http://honoluludpp.org/planning/dpar2/dpar2005.pdf

De Stephanis, R. and E. Urquiola, 2006. 'Collisions between ships and cetaceans in Spain,' Report to the Scientific Committee, *International Whaling Commission* SC/58/BC5.

De Swart, R.L., T.C. Harder, P.S. Ross, H.W. Vos, and A.D.M.E. Osterhaus, 1995. "Morbilliviruses and morbillivirus diseases of marine mammals," *Infectious Agents and Disease*, 4:125-130.

Desilets, Michael E., 2002. Archaeological Monitoring at AOC-18 Landfill, Bellows Air Force Station, Waimanalo, O`ahu, Hawai`i (TMK:4-1-15). T.S. Dye & Colleagues, Archaeologists, Inc. June.

Di Guardo, G., and G. Marruchella, 2005. Sonars, Gas Bubbles, and Cetacean Deaths, "Letters to the Editor," *Veterinary Pathology*, 42:517-518, 2005.

Dierauf, L.A., and F.M.D. Gulland, 2001. "Marine Mammal Unusual Mortality Events," pp. 69-81. In: *Marine Mammal Medicine*, edited by L. A. Dierauf, and F. M. D. Gulland (CRC Press, Boca Raton).

Dietz, R., J. Teilmann, M.-P.H. Jørgensen, and M.V. Jensen, 2002. "Satellite tracking of humpback whales in West Greenland," *National Environmental Research Institute Technical Report 411:1-38*. Copenhagen, Denmark: National Environmental Research Institute.

Dijkgraaf S. 1952. "Uber die Schallwahrnehmung bei Meeresfischen," *Zeitschrift verglishende Phyiologie,* 34:104-122.

Division of Economics, U.S. Fish and Wildlife Service, 2002. "Draft Economic Analysis Of Proposed Critical Habitat Designations For Threatened And Endangered Plants On Kaua`i And Ni`ihau Hawai`i Revised Determination," Draft, April.

Dobson, A.J., 2002. *An introduction to generalized linear models*. Second Edition. Chapman and Hall, CRC Press, Boca Raton, Florida.

Dodd, C.K., 1988. "Synopsis of the biological data on the loggerhead sea turtle *Caretta caretta* (Linnaeus 1758)," *U.S. Fish and Wildlife Service Biological Report,* 88:1-110.

Dollar, S. and R. Grigg, 2003. "Anthropogenic and natural stresses on selected coral reefs in Hawaii: A multi-decade synthesis of impact and recovery," *Pacific Science*, (in press).

Dolphin, W.F., 1987. "Ventilation and dive patterns of humpback whales, *Megaptera novaeangliae*, on their Alaskan feeding grounds," *Canadian Journal of Zoology, 65:83-90*.

Domingo, M., J. Visa, M. Pumarola, A.J. Marco, L. Ferrer, R. Rabanal, and S. Kennedy, 1992. “Pathologic and immunocytochemical studies of morbillibirus infection in striped dolphins (*Stenella coeruleoalba*),” *Veterinary Pathology*, 29:1-10.

Domjan, M.,1998. *The principles of learning and behavior* (4th ed.). New York: Brooks/Cole.

Donovan, G.P., 1991. “A review of IWC stock boundaries,” *Reports of the International Whaling Commission, Special Issue,* 13:39-68.

Dorne, J.L. C.M., and A.G. Renwick, 2005. “The refinement of uncertainty/safety factors in risk assessment by the incorporation of data on toxicokinetic variability in humans,” *Toxicological Sciences*, 86:20-26.

Dorsey, E.M., 1983. “Exclusive adjoining ranges in individually identified minke whales (*Balaenoptera acutorostrata*) in Washington state,” *Canadian Journal of Zoology,* 61:174-181.

Drolet, R., 2000. *Archaeological Inventory Survey of Area A1, Kahuku Training Area, O`ahu Island, Hawai`i*. Prepared for the US Army Corps of Engineers, Pacific Ocean Division, Fort Shafter, Hawai`i. Scientific Consultant Services/Cultural Resource Management Services (SCS/CRMS), Honolulu, Hawai`i.

Drolet, R., A.K. Yoklavich, and J. Landrum, 1996. Cultural Resources Management Overview Survey Pacific Missile Range Facility, Hawaiian Area Kaua`i, Hawai`i in Conjunction with Department of Defense Legacy Resource Management Program Project No. 70. Prepared for the Department of the Navy, Naval Facilities Engineering Command. Ogden Environmental and Energy Services Co., Inc., Honolulu. [For Official Use Only]

Dudok van Heel, W.H., 1966. “Navigation in cetacea,” pp. 597-606. In: Whales, Dolphins, and Porpoises, edited by K. S. Norris (University of California Press, Berkeley).

Dunn, J.L., J.D. Buck, and T.R. Robeck. 2001. “Bacterial diseases of cetaceans and pinnipeds,” pp. 309-336. In: L.A. Dierauf and F.M.D. Gulland, eds. *CRC Handbook of Marine Mammal Medicine*. CRC Press, Boca Raton, FL.

Dunning, J.B., B.J. Danielson, and H.R. Pulliam, 1992. “Ecological processes that affect populations in complex landscapes,” *Oikos,* 65:169-175.

DuPont, 1980. Blaster’s Handbook-16th edition. Explosives Products Division, E.I. DuPont de Nemours and Company, Wilmington, Delaware. 494 pp.

Dwyer , W.P., W. Fredenberg, and D.A. Erdahl, 1993. “Influence of electroshock and mechanical shock on survival of trout eggs,” *North American Journal of Fisheries Management* , 13:839-843.

Eckert, K.L., 1987. “Environmental unpredictability and leatherback sea turtle (*Demochelys coriacea*) nest loss,” *Herpetologica,* 43:315-323.

Eckert, K.L., 1993. "The biology and population status of marine turtles in the North Pacific Ocean," NOAA Technical Memorandum NMFS-SWFSC-186:1-156.

Eckert, K.L., 1995. "Anthropogenic threats to sea turtles," pp. 611-612. In: K.A. Bjorndal, ed. *Biology and conservation of sea turtles*, Washington, D.C.: Smithsonian Institution Press.

Eckert, K.L., and C. Luginbuhl, 1988. "Death of a giant," *Marine Turtle Newsletter,* 43:2-3.

EDAW, 2005. Electromagnetic Railgun Environmental Assessment Meeting Minutes, PMRF Alternative, May.

Edds, P.L. and J.A.F. Macfarlane, 1987. "Occurrence and general behavior of balaenopterid cetaceans summering in the St. Lawrence Estuary," *Canada Journal of Zoology, 65(6)-1363-1376.*

Edds-Walton, P.L., 2000. "Vocalizations of minke whales *Balaenoptera acutorostrata* in the St. Lawrence Estuary," *12 Bioacoustics,* 11:31-50.

Edds-Walton, P.L. and J.J. Finneran, 2006. "Evaluation of evidence for altered behavior and auditory deficits in fishes due to human-generated noise sources." SPAWAR Technical Report 1939, 50 pp.

Egner, S.A. and D.A. Mann, 2005. Auditory sensitivity of sergeant major damselfish *Abudefduf saxatilis* from post-settlement juvenile to adult. *Marine Ecology Progress Series* 285: 213–222.

Ehrhart, L.M., 1995. "A review of sea turtle reproduction," pp. 29-38, In: K.A. Bjorndal, ed. *Biology and conservation of sea turtles, Rev. ed*. Washington, D.C.: Smithsonian Institution Press.

Ek, H., G. Dave, E. Nilsson, J. Sturve, and G. Birgersson, 2006. "Fate and Effects of 2,4,6-Trinitrotoluene (TNT) from dumped ammunition in a field study with fish and invertebrates," *Archives of Environmental Contamination and Chemistry,* 51:244-252.

Elbert, S.H., 1959. *Selections from Fornander's Hawaiian Antiquities and Folklore*. S. Elbert (editor). The University Press of Hawai`i, Honolulu.

Emory, K.P., 1928. *Archaeology of Nihoa and Necker Islands.* Bernice P. Bishop Museum, Bulletin 53. Tanager Expedition, Publication Number 5. Honolulu, Hawaii.

Engas, A. and S. Lokkeborg, 2002. "Effects of seismic shooting and vessel generated noise on fish behaviour and catch rates," *Bioacoustics*, 12:313-315.

Engas, A., S. Lokkeborg, E. Ona, and A.V. and Soldal, 1996. "Effects of seismic shooting on local abundance and catch rates of cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*)," *Canadian Journal of Fisheries Aquatic Science,* 53: 2238-2249. (2)

Enger, P.S., 1967. "Hearing in herring," *Comparative Biochemistry and Physiology,* 22:527 538.

Enger, P.S., 1981. "Frequency discrimination in teleosts-central or peripheral?" pp. 243-255. In: *Hearing and Sound Communication in Fishes*, eds. W.N. Tavolga, A.N. Popper, and R.R. Fay. New York: Springer-Verlag.

Enterprise Honolulu, 2007. "Military Employment," [Online]. Available: http://www.enterprisehonolulu.com/html/display.cfm?sid=131

Epperly, S.P., J. Braun, A.J. Chester, F.A. Cross, J.V. Merriner, and P.A. Tester, 1995. "Winter distribution of sea turtles in the vicinity of Cape Hatteras and their interactions with the summer flounder trawl fishery," *Bulletin of Marine Science,* 56:547-568.

Erbe, C., 2002. "Underwater noise of whale-watching boats and potential effects on killer whales (*Orcinus orca*), based on an acoustic impact model," Marine Mammal Science, 18(2): 394-418.

Ernst, C.H., R.W. Barbour, and J.E. Lovich, 1994*. Turtles of the United States and Canada,* Washington, D.C.: Smithsonian Institution Press.

Etnoyer, P., D. Canny, B. Mate, L. Morgan, J. Ortega-Otiz and W. Nichols. 2006. "Sea-surface temperature gradients across blue whale and sea turtle foraging trajectories off the Baja California Peninsula, Mexico," *Deep-Sea Research II*, 43: 340-358.

Evans, D.L., 2002. "Report of the Workshop on Acoustic Resonance as a Source of Tissue Trauma in Cetaceans, April 24 & 25, 2002.Silver Spring, MD." National Marine and Fisheries Service, November.

Evans, D.L. and G.R. England, 2001. *Joint Interim Report; Bahamas Marine Mammal Stranding Event of 15-16 March 2000,* National Oceanic and Atmospheric Administration [Online]. Available: http://www.nmfs.noaa.gov/pr/pdfs/health/stranding_bahamas2000.pdf

Evans, P.G.H. and L.A. Miller, 2003. "Proceedings of the Workshop on Active Sonar and Cetaceans, Las Palmas, Gran Canaria, 8 March 2003," *European Cetaceans Society Newsletter 42* (Special Issue)*:*78 pp.

Evans, E.C.I., N.L. Buske, J.G. Grovhoug, E.B. Guinther, P.L. Jokiel, D.T.O. Kam, E.A. Kay, T.J. Peeling, and S.V. Smith, 1974. "A proximate biological survey of Pearl Harbor," as cited In: U.S. Department of the Navy, 1997, *Biodiversity of Marine Communities in Pearl Harbor, Oahu, Hawaii with Observations on Introduced Exotic Species*, August, Bishop Museum Technical Report Number 10 [Online]. Available: http://hbs.bishopmuseum.org/pdf/PHReport.pdf

Evans, K., M.A. Hindell, D. Thiele, 2003. “Body fat and condition in sperm whales, *Physeter macrocephalus*, from southern Australian waters,” *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology,* 134A(4):847-862.

Evans, K., R. Thresher, R.M. Warneke, C.J.A. Bradshaw, M. Pook, D. Thiele, and M. Hindell, M.A., 2005. “Periodic variability in cetacean strandings: links to large-scale climate events,” *Biology Letters,* 1:147-150.

Fahlman, A., A. Olszowka, B. Bostrom and D.R. Jones, 2006. “Deep diving mammal: Dive behavior and circulatory adjustments contribute to bends avoidance,” *Respiratory Physiology and Neurobiology,* 153:66-77.

Fair, P.A., and P.R. Becker, 2000. “Review of stress in marine mammals,” *Journal of Aquatic Ecosystem Stress and Recovery* 7:335-354.

Farris, T., 2004. Hawaiian Melon-headed Whale *(Peponacephala electra)*Mass Stranding Event of July 3-4, 2004. NOAA Technical Memorandum NMFS-OPR-31, April 2006.

Fay, R.R., 1988. *Hearing in vertebrates: a psychophysics data book*. Hill-Fay Associates, Winnetka, Illinois. 630 pp.

Fay, R.R., 2005. “Sound source localization by fishes,” pp 36-66. In: *Sound Source Localization*, eds. A.N. Popper and R.R. Fay. New York: Springer Science + Business Media, LLC.

Fay, R.R., Megela-Simmons A. 1999. “The sense of hearing in fishes and amphibians,” pp. 269-318. In: *Comparative Hearing: Fish and Amphibians*, eds. R.R. Fay and A.N. Popper. New York: Springer-Verlag.

Federal Aviation Administration, 1985. *Aviation Noise Effects*. U.S. Department of Transportation, Federal Aviation Administration, Office of Environment and Energy. Washington, D.C.

Federal Aviation Administration, 1996. “Environmental Assessment of the Kodiak Launch Complex, Kodiak Island, Alaska,” June.

Federal Interagency Committee on Noise (FICON), 1992. *Federal Agency Review of Selected Airport Noise Analysis Issues*, August.

Federal Interagency Committee on Urban Noise (FICUN), 1980. *Guidelines for Considering Noise in Land Use Planning and Control.* U.S. Government Printing Office Report #1981-337-066/8071. Washington, D.C.

Fedstats, 2007. Honolulu County, Hawaii. [Online] Available: http://www.fedstats.gov/qf/states/15/15003.html, [February 8, 2007].

Feller, W., 1968. An Introduction to Probability Theory and Its Application, Vol. 1, 3rd ed. New York: Wiley.

Ferguson, M.C., 2005. "Cetacean population density in the eastern Pacific Ocean: Analyzing patterns with predictive spatial models," Ph.D. dissertation, University of California, San Diego.

Ferguson, M.C., and J. Barlow, 2001. "Spatial distribution and density of cetaceans in the eastern tropical Pacific Ocean based on summer/fall research vessel surveys in 1986-1996," *Southwest Fisheries Science Center Administrative Report LJ-01-04*. La Jolla, California: National Marine Fisheries Service.

Ferguson, Megan C., J. Barlow, S.B. Reilly, and T. Gerrodette, 2006. "Predicting Cuvier's (*Ziphius cavirostris*) and *Mesoplodon* beaked whale population density from habitat characteristics in the eastern tropical Pacific Ocean." *Journal of Cetacean Research Management*, 7(3):287-299.

Fergusson, I., L.A. Compagno, and M. Marks, 2000. *Carcharodon carcharias*. In: 2004 IUCN red list of threatened species [Online]. Available: http://www.redlist.org

Fernandez, A., 2004. "Pathological findings in stranded beaked whales during the naval military manoeuvres near the Canary Islands," *European Cetacean Society Newsletter,* pp. 37-40.

Fernandez, A., J.F. Edwards, F. Rodriguez, A. Espinosa de los Monteros, P. Herraez, P. Castro, J.R. Jaber, V. Martin, and M. Arbelo, 2005. "Gas and fat embolic syndrome Involving a mass stranding of beaked whales (Family Ziphiidae) exposed to anthropogenic sonar signals," *Veterinary Pathology*, 42:446-457.

Finneran, J.J., C.E. Schlundt, D.A. Carder, J.A. Clark, J.A. Young, J.B. Gaspin, and S.H. Ridgway, 2000. "Auditory and behavioral responses of bottlenose dolphins (*Tursiops truncatus*) and a beluga whale (*Delphinapterus leucas*) to impulsive sounds resembling distant signatures of underwater explosions," *Journal of the Acoustical Society of America,* 108:417-431.

Finneran, J.J., D.A. Carder, and S.H. Ridgway, 2001. "Temporary threshold shift (TTS) in bottlenose dolphins (*Tursiops truncatus*) exposed to tonal signals," *Journal of the Acoustical Society of America, 110(5), 2749(A)*, 142nd Meeting of the Acoustical Society of America, Fort Lauderdale, FL, December 2001.

Finneran, J.J., C.E. Schlundt, D.A. Carder, and S.H. Ridgway, 2002a "Auditory filter shapes for the bottlenose dolphin (*Tursiops truncatus*) and the white whale (*Delphinapterus leucas*) derived with notched noise," *Journal of the Acoustical Society of America*, 112:7.

Finneran, J.J., C.E. Schlundt, D.A. Carder, and S.H. Ridgway, 2002b. “Temporary shift in masked hearing thresholds (MTTS) in odontocetes after exposure to single underwater impulses from seismic watergun,” *Journal of Acoustical Society of America,* 111:2929-2940.

Finneran, J.J., D.A. Carder, and S.H. Ridgway, 2003. “Temporary threshold shift measurements in bottlenose dolphins *Tursiops truncatus*, belugas *Delphinapterus leucas*, and California sea lions *Zalophus californianus*, Environmental Consequences of Underwater Sound (ECOUS) Symposium, San Antonio, TX, 12-16 May 2003.

Finneran, J.J., D.A. Carder, C.E. Schlundt, and S.H. Ridgway, 2005. “Temporary threshold shift in bottlenose dolphins (*Tursiops truncatus*) exposed to mid-frequency tones,” *Journal of Acoustical Society of America,* 118:2696-2705.

Finneran, J.J., and C.E. Schlundt, 2004. “Effects of intense pure tones on the behavior of trained odontocetes,” Space and Naval Warfare Systems Center, San Diego, Technical Report 1913, EDO Dynamic Systems, February.

Finneran, J. J., C. E. Schlundt, B. Branstetter, and R. L. Dear. 2007. “Assessing temporary threshold shift in a bottlenose dolphin (*Tursiops truncates*) using multiple simultaneous auditory evoked potentials,” *Journal of the Acoustic Society of America*, 122:1249–1264.

Fishbase, 2008. Froese, R. and D. Pauly. Editors. [Online]. Available: http://www.fishbase.org/search.php.

Fish, J.F. and C.W. Turl, 1976. “Acoustic source levels of four species of small whales,” *Naval Undersea Center Report, NUC-TP 547*

Fish, J.F., and G.C. Offutt, 1972. “Hearing thresholds from toadfish, *Opsanus tau,* measured in the laboratory and field,” *Journal of the Acoustic Society of America*, 51:1318-1321.

Flecther, S., B.J. LeBoeuf, D.P. Costa, P.L. Tyack, and S.B. Blackwell. 1996. “Onboard acoustic recording from diving northern seals,” *Journal of the Acoustical Society of America*, 100(4):2531-2539.

Flewelling, L.J., J.P. Naar, J.P. Abbott, D.G. Baden, N.B. Barros, G.D. Bossart, M.Y. Bottein, D.G. Hammond, E.M. Haubold, C.A. Heil, M.S. Henry, H.M. Jacocks, T.A. Leighfield, R.H. Pierce, T.D. Pitchford, S.A. Rommel, P.S. Scott, K.A. Steidinger, E.W. Truby, F.M.V. Dolah, and J.H. Landsberg, 2005. “Brevetoxicosis: Red tides and marine mammal mortalities,” *Nature,* 435:755-756.

Flores, K.E., and A.G. Kaohi, 1993. *Hawaiian cultural and historical survey of Nohili and Mānā areas, Kona District, Island of Kaua`i, State of Hawai`i.* Unpublished MS on file with USASDC, Environmental Office, Huntsville, Alabama and Hawai`i State Historic Preservation Officer, Honolulu, Hawai`i.

Foote, A.D., R.W. Osborne, and A.R. Hoelzel, 2004. "Environment: Whale-call response to masking boat noise," *Nature Brief Communications*, 428, 29 April.

Forcada, J., 2002. "Distribution," pp. 327-333. In: W.F. Perrin, B. Würsig, and J.G.M. Thewissen, eds. *Encyclopedia of marine mammals*. San Diego: Academic Press.

Ford, J.K.B., 2002. "Killer whale *Orcinus orca,"* pp. 669-676. In: W.F. Perrin, B. Würsig, and J.G.M. Thewissen, eds. *Encyclopedia of marine mammals*, San Diego: Academic Press.

Fornander, A., 1917. *The Hawaiian Account of the Formation of their Islands and Origin of their Race with the Traditions of their Migrations, etc., as gathered from original sources.* Fornander Collection of Hawaiian Antiquities and Folklore, Memoirs of the Bernice Pl Bishop Museum, Volume 4, Part 2, Bishop Museum Press, Honolulu.

Forney, K.A., 2004. "Estimates of cetacean mortality and injury in two U.S. Pacific longline fisheries, 1994- 2002," *Southwest Fisheries Science Center Administrative Report LJ-04-07,* La Jolla, California: National Marine Fisheries Service.

Forney, K.A., St. Aubin, D.J., and Chivers, S.J., 2002. *Chase Encirclement Stress Studies on dolphins involved in eastern tropical Pacific Ocean purse-seine operations during 2001,* Administrative Report No. LJ-02-32, National Marine Fisheries Service, Southwest Fisheries Science Center, California.

Frankel, A.S., C.W. Clark, L.M. Herman, & C.M. Gabriele, 1995. "Spatial distribution, habitat utilization, and social interactions of humpback whales, *Megaptera novaeangliae*, off Hawai'i, determined using acoustic and visual techniques," *Canadian Journal of Zoology,73 :*1134-1146

Frantzis, A., 1998. "Does acoustic testing strand whales?," *Nature*, 392:29.

Frantzis, A., 2004. "The first mass stranding that was associated with the use of active sonar (Kyparissiakos Gulf, Greece, 1996)," In: Proceedings of the workshop. Active sonar and cetaceans. 8 March 2003, Las Palmas, Gran Canaria. *European Cetacean Society Newsletter* 42 (Special Issue):14–20.

Frazer, N.B., 1986. "Survival from egg to adulthood in a declining population of loggerhead turtles, *Caretta caretta," Herpetologica,* 42:47-55.

Frazier, J.G., 2001. "General natural history of marine turtles," pp. 3-174.In: K.L. Eckert and F.A. Abreu-Grobois, eds. Proceedings of the regional meeting: *Marine turtle conservation in the wider Caribbean region: a dialogue for effective regional management,* Santo Domingo, Dominican Republic: WIDECAST, IUCN-MTSG, WWF, and UNEP-CEP.

Freiwald, A., J.H. Fossa, A. Grehan, T. Koslow, and J.M. Roberts, 2004. *Cold-water coral reefs,* Cambridge, U.K.: UNEP-WCMC, 84 pp.

Freitas, L., 2004. The stranding of three Cuvier's beaked whales *Ziphius caviostris* in Madeira archipelago – May 2000. *European Cetacean Society Newsletter 42* (Special Issue):28–32.

Friedlander, A., R. Aeby, R. Brainard, E. Brown, A. Clark, S. Coles, E. Demartini, S. Dollar, S. Goodwin, C. Hunter, P. Jokiel, J. Kenyon, R. Kosaki, J. Maragos, P. Vroom, B. Walsh, I. Williams, and W. Wiltse, 2004. "Status of the coral reefs in the Hawaiian Archipelago, In C. Wilkinson, ed. *Status of coral reefs of the world. Volume 2,* Townsville, Queensland: Australian Institute of Marine Science, pp. 411-430.

Fromm, D., 2004a. "Acoustic Modeling Results of the Haro Strait For 5 May 2003." Naval Research Laboratory, Office of Naval Research, 30 January 2004.

Fromm, D., 2004b. "EEEL Analysis of Shoup Transmissions in the Haro Strait on 5 May 2003," Naval Research Laboratory briefing of 2 September 2004.

Fujimori, L., 2002. "Elephant seal visits Hawaii shores: The young male is the first of its kind to be seen in the islands," *Honolulu Star-Bulletin News*, 18 January.

Fujimori, L., 2005. "Seal steals the show on busy Waikiki Beach," *Honolulu Star-Bulletin News*, 22 January.

Gabriele, C.M., J.M. Straley, S.A. Mizroch, C.S. Baker, A.S. Craig, L.H. Herman, D. Glockner-Ferrari, M.J.Ferrari, S. Cerchio, O. von Ziegesar, J. Darling, D. McSweeney, T.J. Quinn, and J. K. Jacobsen. 2001. "Estimating the mortality rate of humpback whale calves in the central North Pacific Ocean." *Canadian Journal of Zoology*, 79:589-600.

GANDA [Garcia and Associates], 2003. End of field letter for SBCT surveys of Kahuku Training Area. December 2003.

Gannier, A., 2000. "Distribution of cetaceans off the Society Islands (French Polynesia) as obtained from dedicated surveys," *Aquatic Mammals,* 26:111-126.

Gannier and Petiau, 2007. "Environmental Variables Affecting the Residence of Spinner Dolphins (*Stenella longirostris*) in a Bay of Tahiti (French Polynesia)," *Aquatic Mammals,* 32: 202-211.

Gannon, D.P., N.B. Barros, D.P. Nowacek, A.J. Read, D.M. Waples, and R.S. Wells, , 2005. "Prey detection by bottlenose dolphins, *Tursiops truncatus*: an experimental test of the passive listening hypothesis," *Animal Behavior,* 69:709-720.

Gaspin, J.B., 1975. "Experimental investigations of the effects of underwater explosions on swimbladder fish, I: 1973 Chesapeake Bay tests." Naval Surface Weapons Center Report NSWC/WOL/TR 75-58.

Gass, S.E., 2003. *Conservation of deep-sea corals in Atlantic Canada,* World Wildlife Fund-Canada (WWF-Canada).

Gausland, I., 2003. “Seismic survey impact on fish and fisheries.” Report prepared by Stavanger for Norwegian Oil Industry Association, March.

Gearin, P.J., M.E. Gosho, J.L. Laake, L. Cooke, R.L. DeLong, and K.M. Hughes, 2000. “Experimental testing of acoustic alarms (Pingers) to reduce bycatch of harbour porpoise, *Phocoena phocoena*, in the State of Washington,” *Journal of Cetacean Research and Management, 2:1-9*.

Gedamke, J., D.P. Costa, and A. Dunstan, 2001. “Localization and visual verification of a complex minke whale vocalization,” *Journal of the Acoustical Society of America,* 109:3038-3047.

Geraci, J.R., 1989. “Clinical investigation of the 1987-88 mass mortality of bottlenose dolphins along the U.S. central and south Atlantic coast,” (Final report to the National Marine Fisheries Service, U.S. Navy, Office of Naval Research, and Marine Mammal Commission), pp. 1-63.

Geraci, J.R. and V.J. Lounsbury, 1993. *Marine mammals ashore: a field guide for strandings.* Texas A&M University Sea Grant College Program, Publication TAMU-SG-93-601, Galveston, TX., 305 pp.

Geraci, J.R., and D.J. St. Aubin, 1987. “Effects of parasites on marine mammals,” International *Journal of Parasitology* 17:407-414.

Geraci, J.R., and V.J. Lounsbury, 2005. *Marine Mammals Ashore: A Field Guide for Strandings*, Second Edition. National Aquarium in Baltimore, Baltimore, MD.

Geraci, J.R., J. Harwood, and V.J. Lounsbury, 1999. “Marine Mammal Die-Offs – Causes, Investigations, and Issues” *Conservation and Management of Marine Mammals* (ed. J.R. Twiss Jr. and R.R. Reeves), pp. 367-395.

Gillespie, D., and R. Leaper, 2001. “Right whale acoustics: Practical applications in conservations,” Workshop report. Yarmouth Port, Massachusetts: International Fund for Animal Welfare.

Gilmartin, M., and N. Revelante, 1974. “The ‘island mass’ effect on the phytoplankton and primary production of the Hawaiian Islands,” *Journal of Experimental Marine Biology and Ecology,* 16:181-204.

Gilmartin, William G., and J. Forcada, 2002. “Monk Seals,” pp. 756-759.In: *Encyclopedia of Marine Mammals*, eds. Perrin, William F., Bernd Würsig, and J. G. M. Thewissen. Academic Press. San Diego, CA.

Godby, W., 2007. Personal communication between William Godby, Cultural Resources Manager, Pohakuloa Training Area (PTA), and Paige Peyton, Cultural Resources Manager, KAYA Associates, Inc., regarding the status of the architectural survey conducted by Kenneth Hays in 2002. Information acquired during an April 11, 2007 site visit to PTA.

Goertner, J.F., 1982. "Prediction of underwater explosion safe ranges for sea mammals," *NSWC/WOL TR-82-188*. Naval Surface Weapons Center, White Oak Laboratory, Silver Spring, MD, 25 pp.

Goertner, J.F., M.L. Wiley, G.A. Young, and W.W. McDonald, 1994. "Effects of underwater explosions on fish without swimbladders." Naval Surface Warfare Center Report NSWC TR88-114. 113 pp.

Goldbogen, J.A., J. Calambokidis, R.E. Shadwick, E.M. Oleson, M.A. McDonald, and J.A. Hildebrand, 2006. "Kinematics of foraging dives and lunge-feeding in fin whales," *Journal of Experimental Biology,* 209: 1231-1244.

Golden, J., R.P. Ouellette, S. Saari, P. Cheremisinoff, 1980. *Environmental Impact Data Book*, Ann Arbor Science Publishers, Inc., Ann Arbor, MI.

Goldman, K.J. and B. Human, 2000. "*Lamna ditropis,"* In: 2004 *IUCN red list of threatened species* [Online]. Available: http://www.redlist.org

Goldman, K.J. and members of the Shark Specialist Group (as cited on the IUCN website), 2001. "*Alopias vulpinus,"* In: 2004 *IUCN red list of threatened species* [Online]. Available: http://www.redlist.org

Goodman-Lowe, G.D, 1998. "Diet of the Hawaiian monk seal (*Monachus schauinslandi*) from the Northwestern Hawaiian Islands during 1991-1994," *Marine Biology, 132:535-546*.

Govoni, J.J., L.R. Settle, M.A. and West, 2003. "Trauma to juvenile pinfish and spot inflicted by submarine detonations," *Journal of Aquatic Animal Health*. 15:111-119.

Grachev, M.A., V.P. Kumarev, L.V. Mamaev, V.L. Zorin, L.V. Baranova, N.N. Denikina, S.I. Belkov, E.A. Petrov, and V.S. Kolesnik, 1989. "Distemper virus in Baikal seals," *Nature* 338:209-210.

Gregory, J. and Clabburn, P.A.T., 2003. "Avoidance behaviour of *Alosa fallax* to pulsed ultrasound and its potential as a technique for monitoring clupeid spawning migration in a shallow river," *Aquatic Living Resources*, 16:313-316.

Greig, D.J., F.M.D. Gulland, and C. Kreuder, 2005. "A decade of live California sea lion (*Zalophus californianus*) strandings along the central California coast: Causes and trends, 1991-2000," Aquatic Mammals 31:11-22.

Grigg, R.W., 1988. "Paleoceanography of coral reefs in the Hawaiian-Emperor chain," *Science,* 240:1737-1743.

Grigg, Richard W., 1993. "Precious Coral Fisheries of Hawaii and the U.S. Pacific Islands. (Fisheries of Hawaii and U.S.-Associated Pacific Islands)," *Marine Fisheries Review* Date: 3/22/1993 [Online]. Available: http://www.encyclopedia.com/doc/1G1-15462284.html.

Grigg, R.W., 1997a. "Hawaii's coral reefs: Status and health in 1997, The International Year of the Reef," pp. 61-72. In: R.W. Grigg and C. Birkeland, eds. *Status of coral reefs in the Pacific*. Sea Grant College Program, School of Ocean and Earth Science and Technology, University of Hawaii.

Grigg, R.W., 1997b. "Paleoceanography of coral reefs in the Hawaiian-Emperor chain – Revisited," pp. 117-121. In: Proceedings of the Eighth Helfman, G.S., B.B. Collette, and D.E. Facey. 1999. *The diversity of fishes. 4th ed*. Malden, Massachusetts: Blackwell Science.

Grovhoug, J.G., 1992. *Evaluation of Sediment Contamination in Pearl Harbor.* Naval Command, Control and Ocean Surveillance Center Technical Report TR-1502. San Diego, CA. 70 pp.

Guinet, C., L.G. Barrett-Lennard, and B. Loyer, 2000. "Co-ordinated attack behavior and prey sharing by killer whales at Crozet Archipelago: strategies for feeding on negatively-buoyant prey," *Marine Mammal Science,* 16:829-834.

Gulland, F.M.D., M. Koski, L.J. Lowenstine, A. Colagross, L. Morgan, and T. Spraker, 1996. "Leptospirosis in California sea lions (*Zalophus califorianus*) stranded along the central California coast, 1981-1994," *Journal of Wildlife Diseases,* 32:572-580.

Gulland, F.M.D. and A.J. Hall, 2005. "The role of infectious disease in influencing status and Trends," pp. 47-61.In: *Marine Mammal Research*, edited by J.E. Reynolds, W.F. Perrin, R.R. Reeves, S. Montgomery, and T.J. Ragen (John Hopkins University Press, Baltimore).

Gulland, F.M.D., 2006. "Review of the Marine Mammal Unusual Mortality Event Response Program of the National Marine Fisheries Service," (Report to the Office of Protected Resources, NOAA/National Marine Fisheries Service, Silver Springs, MD), p. 32.

Gulland, F.M.D. and A.J. Hall, 2007. "Is marine mammal health deteriorating? Trends in global reporting of marine mammal disease," *EcoHealth* 4:135-150.

Gunther, E.R., 1949. "The habits of fin whales," *Discovery Reports,* 24:115-141.

Halvorsen, M.B., L.E. Wysocki, and A.N. Popper , 2006. "Effects of high-intensity sonar on fish," *Journal of the Acoustical Society of America,* 119:3283.

Han, T., S. Collins, S. Clark, and A. Garland, 1986. *Moe Kau A Ho`Oilo: Hawaiian Mortuary Practices at Keopu, Kona, Hawai`i.* Department of Anthropology, Department Report Series: Report 86-1, Bishop Museum Press, Honolulu.

Hanson, M.T., and R.H. Defran, 1993. "The behavior and feeding ecology of the Pacific coast bottlenose dolphin, *Tursiops truncatus," Aquatic Mammals,* 19:127-142.

Harris, C.M., editor., 1979. *Handbook of Noise Control*. 2nd Edition. McGraw Hill, New York.

Harwood, J., 2002. "Mass Die-offs," pp. 724-726. In *Encyclopedia of Marine Mammals*, edited by W.F. Perrin, B. Würsig, and J.G.M. Thewissen (Academic Press, San Diego).

Hastings, M.C. and A.N. Popper, 2005. "Effects of sound on fish." Technical report for Jones and Stokes to California Department of Transportation, Sacramento, CA. [Online]. Available: http://www.dot.ca.gov/hq/env/bio/files/Effects_of_Sound_on_Fish23Aug05.pdf

Hastings, M.C., A.N. Popper, J.J. Finneran, and P.J. Lanford, 1996. "Effects of low-frequency underwater sound on hair cells of the inner ear and lateral line of the teleost fish (*Astronotus ocellatus*)," *Journal of the Acoustical Society of America,* 99:1759-1766.

Hawaii Coral Reef Assessment and Monitoring Program, 2006. "Coral Reef Assessment and Monitoring Program Long Term Monitoring Study Sites: Kauai," [Online]. Available: http://cramp.hawaii.edu/LT_Monitoring_files/lt_study_sites_Kauai.htm [28 August].

Hawaii Department of Health, 2003. Covered Source Permit Review CSP No. 0110-01-C (USN PMR-Barking Sands) Application for Renewal No. 0110-03, June.

Hawaii Department of Land and Natural Resources, 1981. "Rules regulating wildlife sanctuaries," *Title 13 Department of Land and Natural Resources, Subtitle 5 Forestry and Wildlife Part 2 Wildlife Chapter 125* [Online]. Available: http://www.state.hi.us/dlnr/dofaw/rules/Chap125.pdf

Hawaii Department of Land and Natural Resources, 2002. "Application for an individual incidental take permit pursuant to the Endangered Species Act of 1973 for listed sea turtles in inshore marine fisheries in the main Hawaiian Islands managed by the State of Hawaii," Honolulu: Division of Aquatic Resources.

Hawaii Department of Land and Natural Resources, 2006. "Alulu, Olulu *Brighamia insignis,"* [Online]. Available: http://www.state.hi.us/dlnr/dofaw/cwcs/files/Flora%20fact%20sheets/Bri_ins%20plant%20NTBG_OK.pdf

Hawaii Department of Land and Natural Resources, no date [a]. *Forest Bird and Related Projects*, "Newell's Shearwater Project," [Online]. Available: http://www.dofaw.net/fbrp/projects.php?id=00064 [29 August].

Hawaii Department of Land and Natural Resources, no date [b]. "The Northwestern Hawaiian Islands," [Online]. Available: http://www.hawaii.gov/dlnr/exhibits/nwhi/NWHI_1.htm

Hawaii Department of Land and Natural Resources, no date [c]. "Lo`ulu *Pritchardia aylmer-robinsonii*" [Online]. Available: http://www.state.hi.us/dlnr/dofaw/cwcs/files /Flora%20fact%20sheets/Pri_ayl%20plant%20NTBG_W.pdf.

Hawaii Department of Transportation, 2005. "Highway Division – Station Description: Waialo Rd. ID NO: 130054100101 – 10/19/2005-Kauai-DIR 2-To Kaumualli Hwy," The Traffic Group, Inc.

Hawaii Institute of Marine Biology, 2006. "Coral Reef Assessment and Monitoring Program Hawaii, "[Online]. Available: http://cramp.wcc.hawaii.edu/LT_Montoring_files/lt_study_site_Niihau.htm [28 August].

Hawaii Revised Statutes, 2007. Hawaii Revised Statutes- HRS § 205A-43 – Establishment of shoreline and duties and powers of the department.

Hawaii State Department of Health, Clean Air Branch, 2005. 2005 Annual Summary—Hawaii Air Quality Data. 50 pp.

Hawaii State Historic Preservation Office, 2006. State Historical Preservation Division-Inventory Of Historic Properties. [Online]. Available: http://www.state.hi.us/dlnr/hpd/hpgreeting.html

Hawaii Visitors Bureau, 1993. "Average Daily Visitor Statistics Kaua`i and State of Hawai`i." Online: [Avaiable]http://www.hawaii-county.com/databook_98/Table%207/7.3.pdf

Hawaii, State of, 2004. "Kauai Island Plan," Department of Hawaiian Home Lands, May.

Hawaii, State of, 2005a. *"Kauai County,"* Hawaii Workforce Informer (HIWI), [Online]. Available: http://www.hiwi.org, 2005.

Hawaii, State of, 2005b. The State of Hawaii Data Book 2005.

Hawkins, A.D. and A.D.F. Johnstone, 1978. The hearing of the Atlantic salmon, *Salmo salar*. Journal of Fish Biology 13: 655-673.

Hays G.C., 2002. "Behavioural plasticity in a large marine herbivore: Contrasting patterns of depth utilisation between two green turtle (*Chelonia mydas*) populations," *Marine Biology,* 141:985–990.

Hays, K., 2002. *Architectural Survey and Evaluation of the Cantonment at the Pohakuloa Training Area*, September. 206 pp.

Heezen, B.C., 1957. "Whales entangled in deep sea cables," *Deep Sea Research,* 4:105-115.

Heimlich, S.L., D.K. Mellinger, S.L. Nieukirk, and C.G. Fox, 2005. "Types, distribution, and seasonal occurrence of sounds attributed to Bryde's whales (*Balaenoptera edeni*) recorded in the eastern tropical Pacific, 1999-2001," *Journal of the Acoustical Society of America,* 118:1830-1837.

Heithaus, M.R., 2001. "Shark attacks on bottlenose dolphins (*Tursiops aduncus*) in Shark Bay, Western Australia: Attack rate, bite scar frequencies and attack seasonality," *Marine Mammal Science* 17:526-539.

Heitmeyer, R.M., S.C. Wales, and L.A. Pflug, 2004. "Shipping noise predictions: capabilities and limitations," *Marine Technology Society,* 37: 54-65.

Helfman, O.S., B.S. Collette, and D.E. Facey, 1997. *The diversity of fishes.* Malden Massachusetts: Blackwell Science.

Helweg, D.A., A.S. Frankel, J.R. Mobley, and L.H. Herman, 1992. "Humpback whale song: Our current understanding," pp. 459-483. In: J.A. Thomas, R.A. Kastelein and Y.A. Supin (eds.), Marine mammal sensory systems. Plenum, New York, NY, 773 pp.

Herbst, L.H. 1994. "Fibropapillomatosis of marine turtles," *Annual Review of Fish Diseases*. 4:389–425.

Herbst, L.H., E.R. Jacobson, R. Moretti, T. Brown, J.P. Sundberg, and P.A. Klein. 1995. "Experimental transmission of green turtle fibropapillomatosis using cell-free tumor extracts," *Diseases of Aquatic Organisms*, 22:1–12.

Herman, L.M., and R.C. Antinoja, 1977. "Humpback whales in Hawaiian waters: Population and pod characteristics," *Scientific Report of the Whales Research Institute,* 29:59-85.

Herman, L.M., C.S. Baker, P.H. Forestell, and R.C. Antinoja, 1980. "Right whale *Balaena glacialis* sightings near Hawaii: A clue to the wintering grounds?," *Marine Ecology Progress Series,* 2: 271-275.

Heyning, J.E., and J.G. Mead, 1996. "Suction feeding in beaked whales: Morphological and observational evidence," *Contributions in Science, Natural History Museum of Los Angeles County,* 464:1-12.

Heyning, J.E., and T.D. Lewis, 1990. "Fisheries interactions involving baleen whales off southern California," *Report of the International Whaling Commission*, 40:427-431.

Hickie, B.E., R.W. Macdonald, J.K.B. Ford and P.S. Ross, 2007. "Killer whales (*Orcinus orca*) face protracted health risks associated with lifetime exposure to PCBs," *Environmental Science and Technology,41(18):6613-9.*

Higgs, D.M., Plachta, D.T.T., Rollo, A.K., Singheiser, M., Hastings, M.C. & Popper, A.N. 2004. "Development of ultrasound detection in American shad (*Alosa sapidissima*),"*Journal of Experimental Biology,* 207, 155–163.

Higgs, D.M., 2005. "Auditory cues as ecological signals for marine fishes," In: Weissburg MJ, Browman HI (eds) "Sensory biology: linking the internal and external ecologies of marine organisms," *Marine Ecology Program Seried*, 287:278–307.

Hildebrand, J., 2004. Sources of Anthropogenic Sound in the Marine Environment. Report to the Policy on Sound and Marine Mammals: An International Workshop. U.S. Marine Mammal Commission and Joint Nature Conservation Committee, UK. London, England. Online. [Available]: http://www.mmc.gov/sound/internationalwrkshp/pdf/hildebrand.pdf

Hirth, H.F., 1997. "Synopsis of the biological data on the green turtle *Chelonia mydas* (Linnaeus 1758)," *U.S. Fish and Wildlife Service Biological Report,* 97:1-120.

Hiruki, L.M., M.K. Schwartz, and P.L. Boveng, 1999. "Hunting and social behaviour of leopard seals (*Hydrurga leptonyx*) at Seal Island, South Shetland Islands, Antarctica," *Journal of Zoology* 249:97-109.

Hoelzel, A.R., E.M. Dorsey, and S.J. Stern, 1989. "The foraging specializations of individual minke whales," *Animal Behaviour,* 38:786-794.

Hoelzel, A. R., 2003. Marine Mammal Biology: An Evolutionary Approach (Blackwell Publishing, Malden MA).

Hoffman, D.J., B.A. Rattner, G.A. Burton, Jr., and J. Cairns, Jr., 1995. *Handbook of Ecotoxicology*. CRC Press, Inc. Boca Raton, Florida. 755 pp.

Hoffman, J. P. 2004. *Generalized linear models. An applied approach*. Pearson Education, Inc., Boston, Massachusetts. 200 pp.

Hohn, A.A., D.S. Rotstein, C.A. Harms, and B.L. Southall, 2006. "Report on marine mammal unusual mortality event UMESE0501Sp: Multispecies mass stranding of pilot whales (*Globicephala macrorhynchus*), minke whale (*Balaenoptera acutorostrata*), and dwarf sperm whales (*Kogia sima*) in North Carolina on 15-16 January 2005," NOAA Technical Memorandum NMFS-SEFSC-537, 222 pp.

Honolulu Advertiser, 2004. "Kaua`i looks to increase landfill's height". [Online]. Available: http://the.honoluluadvertiser.com/article/2004/jul/28/ln/ln31a.html [15 September 2006].

Honolulu Advertiser 2006. Economic Impact of the Military in Hawaii, [Online]. Available: http://military.honoluluadvertiser.com/mil/2006/4, [26 October].

Honolulu Board of Realtors, 2006a. "Oahu Housing Market Continues to Stabilize", [On-line]. Available: http://www.hicenteral.com/press/pr092006.htm, [25 October].

Honolulu Board of Realtors, 2006b. Kaneohe Real Estate, 2006 [Online]. Available: http://www.realestate-oahu.com/kaneohe-real-estate-home-for-sale.php

Horwood, J., 1987. *The sei whale: Population biology, ecology and management*, London: Croom Helm. 369 pp.

Horwood, J., 1990. *Biology and exploitation of the minke whale,* Boca Raton, FL: CRC Press. 231 pp.

Houghton, J.P. and D.R. Mundy, 1987. "Effects of linear explosive seismic energy releases on fish in Alaska's transition zones." Report 06793-004-020 to Alaska Oil and Gas Association.

Houser, D.S., D.A. Helweg, and P.W.B. Moore, 2001. "A bandpass filter-bank model of auditory sensitivity in the humpback whale," *Aquatic Mammals,* 27:82–91.

Huber, H.R., A.C. Rovetta, L.A. Fry, and S. Johnston, 1991. "Age-specific natality of northern elephant seals at the South Farallon Islands, California," *Journal of Mammalogy*, 72:525-534.

Inouye, D., 2004 (U.S. Senator from Hawaii). Dan Inouye. U.S. Senator from Hawaii. July 16, 2004 [Online]. Available: http://www.senate.gov/~inouye/04pr/20040716.htnml [2 January 2007].

International Archaeological Resources Institute,, 2005. Integrated *Cultural Resources Management Plan for the Pacific Missile Range Facility (PMRF), Island of Kauai, State* Prepared by M.J. Tomonari-Tuggle and A. Yoklavich, Mason Architects, Inc. Prepared for Commander Navy Region Hawaii. April.

International Atomic Energy Agency, 2003. *Features: Depleted Uranium*, [Online]. Available: http://www.iaea.org/NewsCenter/Features/DU/du_qaa.shtml#q3, [25 October 2007].

International Civil Aviation Organization, 1996. *Procedures for Air Navigation Services Rules of the Air and Air Traffic Services* 13th Edition, November.

International Civil Aviation Organization, 1997. *Amendment to the Procedures for Air Navigation Services Rules of the Air and Air Traffic Services* 13th Edition, November.

International Council for the Exploration of the Sea, 2005a. *Report for the Ad-hoc Group on Impacts of Sonar on Cetaceans.* (AGISC) ACE:01 50 pp.

International Council for the Exploration of the Sea (ICES), 2005b. *Report of the Ad-hoc Group on the Impacts of Sonar on Cetaceans and Fish*—2nd edition. International Council for the Exploration of the Sea. ICES AGISC CM 2005/ACE:06. 61 pp.

International Council for the Exploration of the Sea (ICES), 2005c. *Answer to DG Environment request on scientific information concerning impact of sonar activities on cetacean populations.* International Council for the Exploration of the Sea. 6 pp.

International Whaling Commission, 2001. "Report on the Workshop on the Comprehensive Assessment of Right Whales: A worldwide comparison," *Journal of Cetacean Research and Management, Special Issue,* 2:1-60.

International Whaling Commission), 2005. Classification of the Order Cetacea (whales, dolphins and porpoises). *Journal of Cetacean Research and Management,* 7(1):xi-xii.

International Whaling Commission, 2007. Classification of the Order Cetacea (whales, dolphins and porpoises). *Journal of Cetacean Research and Management*, 9(1):v-xii.

International Whaling Commission, 2008. Scientific Permit Whaling – "Information on scientific permits, review procedure guidelines and current permits in effect." [Online]. Available. http://www.iwcoffice.org/conservation/permits.htm

Itano, D.G., and K.N. Holland, 2000. "Movement and vulnerability of bigeye (*Thunnus obesus*) and yellowfin tuna (*T. albacares*) in relation to FADs and natural aggregation points," *Aquatic Living Resources*, 13:213-223.

Iversen, R.T.B., 1967. "Response of the yellowfin tuna (*Thunnus albacares*) to underwater sound," pp. 105-121. In: W.N. Tavolga (editor), *Marine Bio-Acoustics II*. Pergamon Press, New York.

Iversen, R.T.B., 1969. Auditory thresholds of the scombrid fish *Euthynnus affinis*, with comments on the use of sound in tuna fishing. Proceedings of the FAO Conference on Fish Behaviour in Relation to Fishing Techniques and Tactics, October 1967. *FAO Fisheries Reports* No. 62 Vol. 3. FRm/R62.3.

Jane's, Information Group, 2005. Ammunition Handbook: 5-inch, 54-caliber naval gun ammunition.

Jane's Information Group, 2006. Jane's Air-Launched Weapons: MK-80 Series General Purpose Bombs.

Jansen, G., 1998. "Physiological effects of noise," In: *Handbook of Acoustical Measurements and Noise Control, 3rd Edition,* New York: Acoustical Society of America.

Jaquet, N., S. Dawson, and E. Slooten, 2000. "Seasonal distribution and diving behaviour of male sperm whales off Kaikoura: Foraging implications," *Canadian Journal of Zoology,* 78:407-419.

Jasny, M., J. Reynolds, C. Horowitz, and A. Wetzler, 2005. *Sounding the depths II: The rising toll of sonar, shipping and industrial ocean noise on marine life*. Natural Resources Defense Council Report, New York, New York. 84 pp.

Jefferson, T.A., S. Leatherwood and M.A. Webber. 1994. Marine Mammals of the World. Food and Agriculture Organization of the United Nations and United Nations Environment Programme, Rome.

Jefferson, T.A., S. Leatherwood, and M.A. Webber, 1993. *FAO species identification guide, Marine mammals of the world*. Rome: Food and Agriculture Organization of the United Nations.

Jefferson, T.A., D. Fertl, M. Michael, and T.D. Fagin, 2006. "An unusual encounter with a mixed school of melon-headed whales (*Peponocephala electra*) and rough-toothed dolphins (*Steno bredanensis*) at Rota, Northern Marianas Islands," *Micronesia, 38(2):*239-244.Jerkø, H., I. Turunen-Risel, P.S. Enger P.S., and O. Sand, 1989. "Hearing in the eel (*Anguilla anguilla*)," *Journal of Comparative Physiology* , 165:455-459.

Jensen, J.O.T., and D.F. Alderdice, 1983. "Changes in mechanical shock sensitivity of coho salmon (*Oncorhyncuus kisutch*) eggs during incubation," *Aquaculture,* 32:303-312.

Jensen, J.O.T., and D.F. Alderdice, 1989. "Comparison of mechanical shock sensitivity of eggs of five Pacific salmon (Oncorhyncus) species and steelhead trout (*Salmo gairdneri*)," *Aquaculture,* 78:163-181.

Jensen, A.S. and G.K. Silber, 2003. "Large Whale Ship Strike Database," U.S. Department of Commerce, NOAA Technical Memorandum NMFS-OPR-25.

Jensen, Peter M. and James Head, 1997. *Archaeological Reconnaissance Survey, Naval Magazine Lualualei, NAVMAG-West Loch*. Prepared for Department of the Navy, Pacific Division Naval Facilities Engineering Command.

Jepson, P.D., M. Arbelo, R. Deaville, I.A.P. Patterson, P. Gastro, J.R. Baker, E. Degollada, H.M. Ross, P. Herraez, A.M. Pockett, F.Rodriquez, F.E. Howie, A. Espinosa, R.J. Reid, J.R. Jabert. V.Martin, A.A. Cunningham, and A. Fernandez, 2003. "Gas-bubble lesions in stranded cetaceans," *Nature,* 425:575.

Jepson, P.D., R. Deaville, I.A.P. Patterson, A.M. Pocknell, H.M. Ross, J.R. Baker, F.E. Howie, R.J. Reid, A. Colloff, and A.A. Cunningham, 2005. "Acute and chronic gas bubble lesions in cetaceans stranded in the United Kingdom," *Veterinary Pathology,* 42:291-305.

Jessop, T.S., Knapp, R., Limpus, C.J., Whittier, J.M., 2002. "Dynamic endocrine responses to stress: evidence for energetic constraints and status dependence of breeding in male green turtles," *Generaland Comparative. Endocrinology*, 126:59–67.

Johanos, T. C., and J. D. Baker (eds.), 2005. The Hawaiian monk seal in the Northwestern Hawaiian Islands, 2002. United States Department of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS PIFSC-5, 154 pp.

Johanos TC, B.L. Becker , TJ. Ragen. 1994. "Annual reproductive cycle of the female Hawaiian monk seal (*Monachus schauinslandi*)," *Marine Mammal Science*, 10:13-30

Johnson, M., P.T. Madsen, W.M.X. Zimmer, N. Aguilar de Soto, and P.L. Tyack, 2004. "Beaked whales echolocate on prey," *Proceedings of the Royal Society of London, Part B* 271:S383-S386.

Johnston, R.K., W.J. Wild, K.E. Richter, D. Lapota, P.M. Stang, and T.H. Flor, 1989. *Navy Aquatic Hazardous Waste Sites: The Problem and Possible Solutions.* Naval Ocean Systems Center Technical Report TR-1308. San Diego, CA. 50 pp.

Johnston, D.W., and T.H. Woodley, 1998. "A survey of acoustic harassment device (AHD) use in the Bay of Fundy, NB, Canada," *Aquatic Mammals*, 24: 51–61.

Johnston, Paul F., 2005. Beneath The Seven Seas, Adventures with the Institute of Nautical Archaeology. Revised Edition. Thames & Hudson Ltd., London.

Joint Venture Education Forum, 2005. "*Joint Venture Education Forum, Executive Summary"* [Online]. Available: http://www.pacom.mil/jvef, [26 October].

Jokiel, P.L., E.K. Brown, A. Friedlander, S.K. Rodgers, and W.R. Smith, 2001. "Hawaii coral reef initiative, coral reef assessment and monitoring program (CRAMP) Final Report 1999-2000," Silver Spring, Maryland: National Oceanic and Atmospheric Administration, National Ocean Service, 66 pp.

Jokiel, P.L., E.K. Brown, A. Friedlander, S.K. Rodgers, and W.R. Smith, 2004. "Hawaii coral reef assessment and monitoring program: Spatial patterns and temporal dynamics in reef coral communities," *Pacific Science*, 58:159-174.

Jones, D.M., and D.E. Broadbent, 1998. "Chapter 24-Human performance and noise," pp..21-24. In: C. M. Harris (ed.). *Handbook of acoustical measurements and noise control*. Acoustical Society of America, Woodbury, New York.

Jørgensen, R., N.O. Handegard, H. Gjøsæter, and A. Slotte, 2004. "Possible vessel avoidance behaviour of capelin in a feeding area and on a spawning ground." *Fisheries Research* 69: 251-261.

Jorgensen, R, K.K. Olsen, I-B Falk-Petersen, and P. Kanapthippilai, 2005. "Investigations of potential effects of low frequency sonar signals on survival, development and behaviour of fish larvae and juveniles," Norwegian College of Fishery Science, University of Tromso, N-9037, Norway.

Kalmijn A.J., 1988. "Hydrodynamic and acoustic field detection," pp. 83-130. In: *Sensory Biology of Aquatic Animals*, eds. A. Atema, R.R. Fay, A.N. Popper, and W.N. Tavolga, New York: Springer-Verlag.

Kalmijn A.J., 1989. "Functional evolution of lateral line and inner ear sensory systems," pp. 187-215. In: The mechanosensory lateral line - Neurobiology and evolution, eds. S. Coombs, P. Görner, and M. Münz, . Berlin: Springer Verlag.

Kamakau, S.M., 1992. *Ruling Chiefs of Hawai*i. Revised Edition. Kamehameha Schools Press, Honolulu, Hawai`i.

Kamezaki, N., K. Matsuzawa, O. Abe, H. Asakawa, T. Fujii, and K. Goto, 2003. "Loggerhead turtles nesting in Japan," pp. 210-217. In: *Loggerhead Sea Turtles* (eds Bolten, A.B. & Witherington, B.E.). Smithsonian Institution Press, Washington, DC. .

Karlsen, H.E., 1992. "Infrasound sensitivity in the plaice (*Pleuronectes plattessa*)," *Journal of Experimental Biology*, 171:173-187.

Kastak, D., and R.J. Schusterman, 1996. "Temporary threshold shift in a harbor seal (*Phoca vitulina*)," *Journal of the Acoustical Society of America*, 100(3):1905-1908.

Kastak, D., and R.J. Schusterman, 1998. "Low-frequency amphibious hearing in pinnipeds: methods, measurements, noise, and ecology," *Journal of the Acoustical Society of America,* 103(4):2216-2228.

Kastak, D., and R.J. Schusterman, 1999. "In-air and underwater hearing sensitivity of a northern elephant seal (*Mirounga angustirostris*)," *Canadian Journal of Zoology,* 77:1751-1758.

Kastak, D., B.L. Southall, R.J. Schusterman, and C.J. Reichmuth, 1999a. "Temporary threshold shift in pinnipeds induced by octave-band noise in water," In Abstract: *Journal of the Acoustical Society of America,* 106,No 4, Pt. 2:2251 (4aUW6).

Kastak, D., R.J. Schusterman, B.L. Southall, and C.J. Reichmuth, 1999b. "Underwater temporary threshold shift induced by octave-band noise in three species of pinniped," *Journal of the Acoustical Society of America,* 106(2):1142-1148.

Kastak D., B.L. Southall, R.J. Schusterman, and C.R. Kastak. 2005. "Underwater temporary threshold shift in pinnipeds: Effects of noise level and duration," *Journal of the Acoustical Society of America*, 118:3154–3163.

Kastelein, R., M. Hagedoorn, W.W.L. Au, and D. De Haan, 2003. "Audiogram of a striped dolphin (*Stenella coeruleoalba*)," *Journal of the Acoustical Society of America,* 113:1130-1137.

Kasuya, T., 1975. "Past occurrence of *Globicephala melaena* in the western North Pacific," *Scientific Reports of the Whales Research Institute Tokyo*, 27:95-110.

Kasuya, T., 2002. "Giant beaked whales *Berardius bairdii* and *B. arnuxii,"* pp. 519-522 In W.F. Perrin, B. Würsig, and J.G.M. Thewissen, eds. *Encyclopedia of Marine Mammals*. San Diego: Academic Press.

Kasuya, O., T. Miyashita, and F. Kasamatsu, 1988. "Segregation of two forms of short-finned pilot whales off the Pacific coast of Japan," *Scientific Reports of the Whales Research Institute Tokyo,* 39:77-90.

Kato, H., 2002. "Bryde's whales *Balaenoptera edeni* and *B. brydei,"* pp. 171-177 In W.F. Perrin, B. Wursig, and J.G.M. Thewissen, eds. *Encyclopedia of Marine Mammals*. San Diego: Academic Press.

Katona, S.K., and S.D. Kraus, 1999. "Efforts to conserve the North Atlantic right whale." In: *Conservation and Management of Marine Mammals*, eds. J.R. Twiss, Jr. and R.R. Reeves, 311–331. Washington, DC: Smithsonian Institution Press.

Kauai, County of 2005. *Kauai General Plan*, Planning Department, "Preserving Kauai's Rural Character." [Online]. Available: http://www.kauai.gov/Portals/0/planning/Ch5.PDF

Kauai Island Utility Cooperative, 2006a. *KIUC Current*, "Kakaha Potential". October 2006, p. 5, [Online]. Available: http://www.kiuc.coop/pdf/currents/CurrentsOct06.pdf

Kauai Island Utility Cooperative, 2006b. *KIUC Currents*, "Saving Our Shearwaters," August [Online]. Available: http://www.kiuc.coop/pdf/currents/CurrentsAugust06.pdf

Kaua`i Monk Seal Watch Program, 2003. "Fall 2003 Newsletter," October, [Online]. Available: http://www.kauaimonkseal.com/News/OCT03NL.htm

Kearns, R.K., and F.C. Boyd, 1965. "The effect of a marine seismic exploration on fish populations in British Columbia coastal waters." *Candian Journal of Exploration Geophygsics,* Vol 1:83-106 (reprinted in 1965 by CSEG from Canadian Fish Culturist 34, 3-26).

Keeler, J.S., 1976. "Models for noise-induced hearing loss," pp. 361-381. In: *Effects of Noise on Hearing*, ed. Henderson et al., New York: Raven Press.

Keevin, T.M., G.L. Hempen, and D.J. Schaeffer, 1997. "Use of a bubble curtain to reduce fish mortality during explosive demolition of Locks and Dam 26, Mississippi River," pp. 197-206. In: *Proceedings of the Twenty-third Annual Conference on Explosives and Blasting Technique,* Las Vegas, Nevada, International Society of Explosive Engineers, Cleveland, Ohio.

Kelleher, J.D., 2002. Explosives Residue: Origin and Distribution. Explosives Residue: Origin and Distribution (Forensic Science Communications). 11 pp. [Online]. Available: http://www.fbi.gov/hq/lab/fsc/backissu/april2002/kelleher.htm 2/

Kelly, J.C. and D.R. Nelson, 1975. "Hearing thresholds of the horn shark, *Heterodontus francisci,*" *Journal of the Acoustical Society of America 58:905–909*.

Kemp, N.J., 1996. "Habitat Loss and Degradation," pp. 263-280 In M.P. Simmonds and J.D. Hutchinson (eds.) *The Conservation of Whales and Dolphins*, John Wiley & Sons Ltd, Chicester.

Kennedy, S., T. Kuiken, P.D. Jepson, R. Deaville, M. Forsyth, T. Barrett, M.W.G.v. Bildt, A.D.M.E. Osterhaus, T. Eybatov, C. Duck, A. Kydyrmanov, I. Mitrofanov, and S. Wilson, 2000. "Mass die-off of Caspian seals caused by canine distemper virus," *Emerging Infectious Diseases,* 6:637-639.

Kennett, J.P., 1982. *Marine geology*. Englewood Cliffs, New Jersey: Prentice-Hall, Inc. 813 pp.

Kenyon, T.N.,1996. "Ontogenetic changes in the auditory sensitivity of damselfishes (Pomacentridae)," *Jounal of Comparative Physioogyl A*, 179:553–561.

Ketten, D.R., 1992. "The marine mammal ear: Specializations for aquatic audition and echolocation," pp. 717-750. In D. Webster, R. Fay, and A. Popper, eds. *The evolutionary biology of hearing,* Berlin: Springer-Verlag.

Ketten, D.R., 1997. "Structure and functions in whale ears," *Bioacoustics,* 8:103-135.

Ketten, D.R., 1998. "Marine mammal auditory systems: A summary of audiometric and anatomical data and its implications for underwater acoustic impacts," *NOAA-TM-NMFS-SWFSC-256*, Department of Commerce.

Ketten, D.R., 2004. *Marine Mammal Auditory Systems: A Summary of Audiometric And Anatomical Data And Its Implications For Underwater Acoustic Impacts. Online Report, 24 pp.* [Online]. Available: http://www.solcomhouse.com/auditory.htm

Ketten, D.R., 2005. Models of Beaked Whale Hearing and Responses to Underwater Noise. Environmental Consequences of Underwater Sound(ECOUS) Workshop, Arlington, VA. Final Report N0001140410651, 21 pp.

Ketten, D.R., 2006. Personal Communication: Copy of a letter submitted to Ranger Rick Magazine, National Wildlife Foundation from Dr. Darlene R. Ketten, Senior Scientist Department – Biology-Woods Hole Oceanographic Institution. 3pp.

Kikuchi, W.K., 1987. *Archaeological surface survey of proposed helicopter landing site*: Lehua Landing and Keanahaki, Island of Ni`ihau, February. 7 pp.

Kinsler L.E., A.R. Frey, A.B. Coppens, and J.V. Sanders, 1982. *Fundamentals of acoustics*. 3rd edition, John Wiley and Sons, New York.

Kirschvink, J.L., A.E. Dizon, and J.A. Westphal, 1986. "Evidence from strandings for geomagnetic sensitivity in cetaceans," *Journal of Experimental Biology*, 120:1-24.

Kirschvink, J.L., 1990. "Geomagnetic sensitivity in cetaceans: an update with live stranding records in the United States," pp. 639-649. In: *Sensory Abilities of Cetaceans: Laboratory and Field Evidence* (ed. J.A. Thomas and R.A. Kastelain), New York: Plenum Press.

Kishiro, T., 1996. "Movements of marked Bryde's whales in the western North Pacific," *Reports of the International Whaling Commission,* 46:421-428, 29.

Kiyota, M., N. Baba, and M. Mouri,1992. "Occurrence of an elephant seal in Japan," *Marine Mammal Science,* 8(4):433 (Letter).

Klinowska, M., 1985. "Cetacean stranding sites relate to geomagnetic topography," Aquatic Mammals, 1:27-32.

Klinowska, M. 1986. "Cetacean live stranding dates relate to geomagnetic disturbances," *Aquatic Mammals* 11:109-119.

Knowlton, A.R., F.T. Korsmeyer, J.E. Kerwin, H.Y. Wu, and B. Hynes, 1995. *The hydrodynamic effects of large vessels on right whales.* NMFS Contract No. 40EANFF400534.

Knowlton, A.R. and S.D. Kraus, 2001. "Mortality and serious injury of northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean," *Journal of Cetacean Research and Management (Special Issue), 2:193-208*.

Knowlton, A.R., C.W. Clark, and S.D. Kruse, 1991. "Sounds recorded in the presence of sei whales, *Balaenoptera borealis,"* In Abstract: Ninth Biennial Conference on the Biology of Marine Mammals, Chicago, IL, pp. 76.

Knowlton, A.R., M. Marx, H. Pettis, P. Hamilton. and S. D. Kraus,, 2005. Analysis of scarring on North Atlantic right whales (*Eubalaeba glacialis*): Monitoring rates of entanglement interaction: 1980-2002. Final Report to the National Marine Fisheries Service. 20 pp.

Knudsen, F.R., P.S. Enger, and O. Sand, 1992. "Awareness reactions and avoidance responses to sound in juvenile Atlantic salmon, *Salmo salar L.,*" *Journal of Fish Biology,* 40:523-534.

Knudsen F.R., P.S. Enger, and O. Sand, 1994. "Avoidance responses to low frequency sound in downstream migrating Atlantic salmon smolt, *Salmo salar L," Journal of Fish Biology,* 45:227-233.

Kobayashi, D.R., and J.J. Polovina, 2005. "Evaluation of time-area closures to reduce incidental sea turtle take in the Hawaii-based longline fishery: Generalized additive model (GAM) development and retrospective examination," NOAA Technical Memorandum NMFS-PIFSC-4: 1-39.

Kompanje, E.J.O., 1995. "On the occurrence of spondylosis deformans in white-beaked dolphins *Lagenorhynchus albirostris* (Gray, 1846) stranded on the Dutch coast," *Zooligische Mededekingen Leiden,* 69:231-250.

Kona Blue Water Farms, 2003. *Final environmental assessment for an offshore open ocean fish farm project off Unualoha Point, Kona, Hawaii*, Prepared for Department of Land and Natural Resources by Kona Blue Water Farms, Holualoa, Hawaii.

Kooyman, G.L., D.D. Hammond, and J.P. Schroeder, 1970. "Bronchograms and tracheograms of seals under pressure," *Science,* 169:82-84.

Kooyman, G.L. and F. Trillmich. 1984. "Diving behavior of Galapagos fur seals," pp. 186-195. In: R.L. Gentry and G.L. Kooyman ed*., Fur seals: Maternal strategies on land and at sea*," Princeton University Press, NJ.

Kooyman, G.L. R.W. Davis and J.P. Croxall. 1984. "Diving behavior of Antarctic fur seals," pp. 115-125. In: R.L. Gentry and G.L. Kooyman ed., *Fur seals: Maternal strategies on land and at sea*," Princeton University Press, NJ.

Kopelman, A.H., and S.S. Sadove, 1995. "Ventilatory rate differences between surface-feeding and nonsurface-feeding fin whales (*Balaenoptera physalus*) in the waters off eastern Long Island, New York, U.S.A., 1981-1987," *Marine Mammal Science,* 11:200-208.

Kostyuchenko, L.P., 1973. "Effects of elastic waves generated in marine seismic prospecting on fish eggs in the Black Sea." *Hydrobiologia*, 9:45-46.

Krahn, M.M., D.P. Herman, D.P., C.O., Matkin, J.W. Durban, L. Barrett-Lennard, D.G. Burrows, M.E. Dahlheim, N. Black, N., R.G. LeDuc, and P.R. Wade, 2007. "Use of chemical tracers in assessing the dietand foraging regions of eastern North Pacific killer whales," *Marine Environmental Research*, 63, 91–114.

Krausman, P.R., L.K. Harris, C.L. Blasch, K.K.G. Koenen, and J. Francine, 2004. "Effects of military operations on behavior and hearing of endangered Sonoran pronghorn," *Wildlife Monographs*, 1-41.

Krewski, D., C. Brown, and D. Murdoch, 1984. "Determining "safe" levels of exposure: safety factors or mathematical models?" *Toxicological Sciences*, 4:383-394.

Kritzler, H. and Wood, L., 1961. "Provisional Audiogram for the Shark, *Carcharhinus leucas,"* *Science*, 133:1480-14482.

Kruse, S., D.K. Caldwell, and M.C. Caldwell, 1999. “Risso’s dolphin *Grampus griseus* (G. Cuvier, 1812),” pp. 183-212. In S.H. Ridgway and R. Harrison, eds. *Handbook of marine mammals. Volume 6: The second book of dolphins and the porpoises,* San Diego: Academic Press.

Kryter, K.D. W.D. Ward, J.D. Miller, and D.H. Eldredge, 1966. “Hazardous exposure to intermittent and steady-state noise,” *Journal of the Acoustical Society of America,* 39:451-464.

Kubota, G., 2004. “Sealing the attention*,” Honolulu Star-Bulletin News, 28 December* [Online]. Available: http://starbulletin.com/2004/12/28/news/wild.html [10 June 2005].

Kvadsheim, PH and E.M. Sevaldsen, 2005. The potential impact of 1 – 8 kHz active sonar on stocks of juvenile fish during sonar exercises. Forsvarets Forskningsinstitutt, PO Box 25, NO-2027, Kjeller, Norway (FFI/Rapport-2005/01027).

Ladich, F., and A.N. Popper, 2004. “Parallel evolution in fish hearing organs,” pp. 95-127. In: Manley, G.A., A.N. Popper, and R.R. Fay (eds), *Evolution of the Vertebrate Auditory System.* Springer Handbook of Auditory Research. Springer-Verlag, New York.

Laist, D.W., A.R. Knowlton, G.M. Mead, A.S. Collet, and M. Podesta, 2001. “Collisions between ships and whales,” *Marine Mammal Science*, 17(1):35-75 (January 2001).

Lafortuna, C.L., M. Jahoda, A. Azzellino, F. Saibene, and A. Colombini, 2003. “Locomotor behaviours and respiratory pattern of the Mediterranean fin whale (*Balaenoptera physalus*),” *European Journal of Applied Physiology, 90:387-395*.

Lagerquist, B.A., K.M. Stafford, and B.R. Mate, 2000. “Dive characteristics of satellite-monitored blue whales (*Balaenoptera musculus*) off the central California coast,” *Marine Mammal Science, 16:375-391*.

Lammers, M.O., 2004. “Occurrence and behavior of Hawaiian spinner dolphins (*Stenella longirostris*) along Oahu's leeward and south shores,” *Aquatic Mammals, 30:237-250*.

Lammers, M.O., W.W.L. Au, and D.L. Herzing. 2003. “The broadband social signaling behavior of spinner and spotted dolphins,” *Journal of the Acoustical Society of America* 114(3):1629-1639.

Land Study Bureau, 1997. *Detailed Land Classification - Island of Kauai, L.S.B. Bulletin No. 9*, University of Hawaii, Honolulu, December.

Langlas, C. Wolforth, T.J. Head, and P. Jensen, 1997. *Archaeological Inventory Survey and Historic and Traditional Cultural Assessment for the Hawai`i Defense Access Road A-AD-6(1) and Saddle Road (SR 200) Project, Districts of South Kōhala, Hāmākua, North Hilo, and South Hilo, Island of Hawaii.* Paul H. Rosendahl Ph.D., Inc., Hilo, Hawaii.

Larkin, R., 1996. "Effects of military noise on wildlife": A Literature Review, Center for Wildlife Ecology, Illinois Natural History Survey January.

Laurinolli, M.H., A.E. Hay, F. Desharnais, and C.T. Taggart, 2003. "Localization of North Atlantic right whale sounds in the Bay of Fundy using a sonobuoy array," *Marine Mammal Science,* 19:708-723.

Learmonth, J.A., C.D. Macleod, M.B. Santos, G.J. Pierce, H.Q.P. Crick, and R.A. Robinson, 2006. "Potential effects of climate change on marine mammals," *Oceanography and Marine Biology: an Annual Review* 44:431-464.

Leatherwood, S., R.R. Reeves, W.F. Perrin, and W.E. Evans, 1982. "Whales, dolphins and porpoises of the eastern north Pacific and adjacent Arctic waters. A guide to their identification," NOAA Technical Memorandum Report, National Marine Fisheries Service Circular 444, 245 pp.

Leatherwood, S., T.A. Jefferson, J.C. Norris, W.E. Stevens, L.J. Hansen, and K.D. Mullin, 1993. "Occurrence and sounds of Fraser's dolphin (*Lagenodelphis hosei*) in the Gulf of Mexico," *Texas Journal of Science,* 45:349-354.

Le Boeuf, B.J., and L.F. Petrinovich, 1974. "Elephant seals: Interspecific comparisons of vocal and reproductive behavior," *Mammalia* (Paris) 38: 16–32.

Le Boeuf, B.J., R.J. Whiting, and R.F. Gannt, 1972. "Perinatal behavior of northern elephant seal females and their young," *Behaviour,* 43:121-156.

Le Boeuf, B.J., Y. Naito, A.C. Huntley, and T. Asaga, 1989. "Prolonged, continuous, deep diving by northern elephant seals," *Canadian Journal of Zoology,* 67:2514-2519.

Le Boeuf, B.J., and J. Reiter, 1991. "Biological effects associated with El Nino Southern Oscillation, 1982-83m on northern elephant seals breeding at Ano Nuevo, California," pp. 206-218. In: *Pinnipeds and El Nino: Responses to Environmental Stress*, edited by F. Trillmich, and K. A. Ono (Springer-Verlag, Berlin.

Le Boeuf, B.J., P.A. Morris, S.B. Blackwell, D.E. Crocker, and D.P. Costa, 1996. "Diving behaviour of juvenile northern elephant seals," *Canadian Journal of Zoology,* 74:1632-1644.

Le Boeuf, B.J., D.E. Crocker, D.P. Costa, S.B. Blackwell, P.M. Webb, and D.S. Houser, 2000. "Foraging ecology of northern elephant seals," *Ecological Monographs,* 70:353-382.

LeDuc, R.G., W.L. Perryman, J.W. Gilpatrick, J. Hyde, C. Stinchcomb, J.V. Carretta, and R.L. Brownell, 2001. "A note on recent surveys for right whales in the southeastern Bering Sea," *Journal of Cetacean Research and Management, Special Issue,* 2:287-289, Lee, R. and M. Downing, 1996. "Boom Events Analyzer Recorder: Unmanned Sonic Boom Monitor," *Journal of Aircraft*, 33(1):171-175.

Lee, T., 1993. "Summary of cetacean survey data collected between the years of 1974 and 1985," NOAA Technical Memorandum NMFS-SWFSC-181:I -1 85.

Lenhardt, M.L., 1994. "Seismic and very low frequency sound induced behaviors in captive loggerhead marine turtles (*Caretta caretta*)," Proceedings, Fourteenth Annual Symposium on Sea Turtle Biology and Conservation, *National Oceanic and Atmospheric Administration Technical Memorandum NMFS-SEFSC-351,* Marine Fisheries Service, Southeast Fisheries Science Center, Miami, Florida, pp. 238-241, 32.

Lenhardt, M.L., S. Bellmund, R.A. Byles, S.W. Harkins, and J.A. Musick, 1983. "Marine turtle reception of bone-conducted sound," *Journal of Auditory Research,* 23:119-125.

Leone, D., 2004. "Familiar turtle back on Maui: The green sea turtle dubbed "Maui Girl" became known for her prolific nesting activity," *Honolulu Star-Bulletin News,* 8 June.

Levine, H., L. Bildsten, M. Brenner, C. Calan, S. Flatte´, J. Goodman, J. Gregg, M. Gregg, J. Katz, W. Munk, and P. Weinberger, 2004. "Active Sonar Waveform" *JSR-03-200*. JASON-The MITRE Cooperation, McLean, VA, June.

Liao, T.F., 1994. *Interpreting probability models. Logit, probit, and other generalized linear models*. SAGE Publications, Inc., Newbury Park, California. 88 pp.

Littnan, C.L., B.S. Stewart, P. K. Yochem, and R. Braun, 2006. "Survey of selected pathogens and evaluations of Disease Risk factors for endangered Hawaiian monk seals in the main Hawaiian Islands," *EcoHealth*, 3(4):232-244.

Lombarte ,A., and A.N.Popper , 1994. "Quantitative analyses of postembryonic hair cell addition in the otolithic endorgans of the inner ear of the European hake, *Merluccius merluccius* (Gadiformes, Teleostei)," *Journal of Comparative Neurology*, 345:419-428.

Lombarte, A, H.Y. Yan, A.N. Popper A.N., J.C. Chang, and C. Platt, 1993. "Damage and regeneration of hair cell ciliary bundles in a fish ear following treatment with gentamicin," *Hearing Research*, 66:166-174.

Lohmann, K.J., B.E. Witherington, C.M.F. Lohmann, and M. Salmon, 1997. "Orientation, navigation, and natal beach homing in sea turtles," pp. 107-136. In: P.L. Lutz and J.A. Musick, eds. *The biology of sea turtles*, Boca Raton, Florida: CRC Press.

Lovell, J.M., M.M. Findlay, R.M. Moate, and D.A. Pilgrim, 2005. The polarization of inner ear ciliary bundles from a scorpaeniform fish. Journal of Fish Biology 66: 836–846.

Lotufo, G.R. and M.J. Ludy, 2005. "Comparative toxicokinetics of explosive compounds in Sheepshead minnows," *Archives of Environmental Contamination and Toxicology* 49:206-214.

Løvik, A. and J.M. Hovem, 1979. “An experimental investigation of swimbladder resonance in fishes,” *Journal of the Acoustical Society of America*, 66: 850-854.

Luczkovich, J.J., Daniel, H.J., III, Hutchinson, M., Jenkins, T., Johnson, S.E., Pullinger, R.C. & Sprague, M.W. 2000. “Sounds of sex and death in the sea: bottlenose dolphin whistles suppress mating choruses of silver perch,” *Bioacoustics,* 10:323–334.

Lusseau, D. Slooten, L. and Currey, R.J.C., 2007. “Unsustainable dolphin-watching tourism in Fiordland, New Zealand”. Tourism in Marine Environments, in press. [Online]. Available: http://whitelab.biology.dal.ca/dl/LusseauSlootenCurrey%20TiME%20preprint.pdf

Lutcavage, M.E., and P.L. Lutz, 1997. “Diving physiology,” pp. 277-296. In: P.L. Lutz and J.A. Musick, eds. *The biology of sea turtles,* Boca Raton, Florida: CRC Press.

MacCaughey, V., 1916. “The Seaweeds of Hawaii,” *American Journal of Botany*, 3(8):474-479.

MacFarlane, J.A.F., 1981. “Reactions of whales to boat traffic in the area of the confluence of the Saguenay and St. Lawrence rivers, Quebec,” Manuscript cited In: Richardson et al. 1995, *Marine mammals and noise,* Chapter 9, pp. 252-275.

MacLeod, C.D., 1999. “A review of beaked whale acoustics, with inferences on potential interactions with military activities,” *European Research on Cetaceans,* 13:35-38.

MacLeod, C.D., 2000. “Review of the distribution of *Mesoplodon* species (Order Cetacea, Family Ziphiidae) in the North Atlantic,” *Mammal Review,* 30:1-8.

MacLeod, C.D., N. Hauser, and H. Peckham, 2004. “Diversity, relative density and structure of the cetacean community in summer months east of Great Abaco, Bahamas,” *Journal of the Marine Biological Association of the United Kingdom,* 84:469-474.

Madsen, P.T., D.A. Carder, W.W.L. Au, P.E. Nachtigall, B. Møhl, and S.H. Ridgway, 2003. “Sound production in neonate sperm whales (L),” *Journal of the Acoustical Society of America 113:2988-2991*.

Madsen, P.T., I. Kerr, and R. Payne, 2004. “Source parameter estimates of echolocation clicks from wild pygmy killer whales (*Feresa attenuata*),” *Journal of the Acoustical Society of America, 116(4)1909-1912*.

Madsen, P.T., M.A. Johnson, P.J. Miller, A.N. Soto, J. Lynch, and P.L. Tyack, 2006. Quantitative measures of air-gun pulses recorded on sperm whales (*Physeter macrocephalus*) using acoustic tags during controlled exposure experiments. *Journal of the Acoustic Society of America* 120(4):2366-2379.

Maintenance Logs and Records, 2007. Personal communication via email between Greg Hayashi, S CIV NAVFAC HI OPBP6, and Randall Young, CIV NAVFAC PAC, 18 January.

Maldini, D., 2003. "Abundance and distribution patterns of Hawaiian odontocetes: Focus on Oahu," Ph.D dissertation, University of Hawaii, Manoa.

Maldini, D., L. Mazzuca, and S. Atkinson, 2005. "Odontocete stranding patterns in the main Hawaiian Islands (1937-2002): How do they compare with live animal surveys?," *Pacific Science,* 59(1):55-67.

Mallinckrodt Baker, Inc., 2007. *Material Safety Data Sheet Ethylene Glycol* [Online]. Available: http://www.jtbaker.com/msds/englishhtml/E5125.htm

Malme, C.I., P.R. Miles, C.W. Clark, P. Tyack, and J.E. Bird, 1983. "Investigations of the potential effects of underwater noise from petroleum industry activities on migrating gray whale behavior." Unpublished. Report from Bolt Beranek and Newman, Inc., Cambridge, Massachusetts, for U.S. Minerals Management Service, Reston, Virginia. Variously paginated. Available from Minerals Management Service, Alaska Outer Continental Shelf Region, 949 East 36th Avenue, Room 110, Anchorage, Alaska 99508-4302, U.S.A.

Malme, C.I., P.R. Miles, C.W. Clark, P. Tyack, and J.E. Bird, 1984. "Investigations of the potential effects of underwater noise from petroleum industry activities on migrating gray whale behavior/Phase II: January 1984 migration." BBN Rep. 5586. Rep. from Bolt Beranek and Newman, Inc., Cambridge, MA, for U.S. Minerals Management Service, Anchorage, Alaska. NTIS PB-218377. Var. p.

Malme, C.I., and P.W. Smith, Jr., 1988. "Analysis of the acoustic environment of pinniped haulout sites in the Alaskan Bering Sea," BBN Tech. Memo No. 1012, BBN Systems and Technology Corp., Cambridge, MA, for LGL Alaska Research Associates, Anchorage, AK. Var. pp.

Malme, C.I., P.R. Miles, G.W. Miller, W.J. Richardson, D.G. Roseneau, D.H. Thomas, and C.R. Green Jr., 1989. Analysis and ranking of the acoustic disturbance potential of petroleum industry activities and other sources of noise in the environment of marine mammals in Alaska. OCS Study MMS 89-0006. Report to U.S. Minerals Management Service, Anchorage, AK.

Maly, K., 1999. "Mauna Kea Science Reserve and Hale Pōhaku Complex: Oral History and Consultation Study, and Archival Literature Research, Ahupua`a of Ka`ohe (Hāmākua District) and Humu`ula (Hilo District), Island of Hawaii," Prepared for Group 70 International, Kumu Pono Associates, Hilo, Hawai`i.

Maly, K. and W. Wulzen, 1997. "Historical Documentary Research," pp. 6-23. In: Wulzen et al., Archaeological Reconnaissance Survey Pacific Missile Range Facility Barking Sands and Makaha Ridge. Land of Waimea, Waimea District, Island of Kauai,. Prepared for Department of the Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Paul H. Rosendahl, Ph.D., Inc., Hilo.

Mann, D.A. and P.S. Lobel, 1997. "Propagation of damselfish (Pomacentridae) courtship sounds," *Journal of the Acoustical Society of America,* 101: 3783–3791,

Mann, D.A., Z. Lu, and A.N. Popper, 1997. "A clupeid fish can detect ultrasound," *Nature,* 389: 341.

Mann, D.A., Z. Lu, M.C. Hastings, A.N. Popper, 1998. "Detection of ultrasonic tones and simulated dolphin echolocation clicks by a teleost fish, the American shad (*Alosa sapidissima)*," *Journal of the Acoustical Society of America,* 104:562-568.

Mann, D.A., D.M. Higgs, W.N. Tavolga, M.J. Souza, and A.N. Popper, 2001. "Ultrasound detection by clupeiform fishes," *Journal of the Acoustical Society of America,* 109:3048-3054.

Mann, M.E., Rutherford, S., Wahl, E., Ammann, C., 2005. "Testing the fidelity of methods used in proxy-based reconstructions of past Climate," *Journal of Climate*, 18"4097-4107.

Maragos, J.E., 1977. "Order Scleractinia - Stony corals," pp. 158-241 In: D.M. Devaney and L.G. Eldredge, eds. *Reef and shore fauna of Hawaii. Section 1: Protozoa through Ctenophora,* Bishop Museum Special Publication 64(1), Honolulu, Hawaii: Bishop Museum Press.

Maragos, J.E., 1998. "Marine ecosystems," pp. 111-120. In: S.P. Juvik and J.O. Juvik, eds. *Atlas of Hawai`i, 3d ed*. Honolulu, Hawaii: University of Hawaii Press.

Maragos, J.E., 2000. "Hawaiian Islands (U.S.A.)," pp. 791-812. In: C.R.C. Sheppard, ed. *Seas at the millennium: An environmental evaluation. Volume 2: Regional chapters: The Indian Ocean to the Pacific,* Amsterdam, Netherlands: Pergamon Press.

Marine Mammal Commission, 2003. 'Workshop on the management of Hawaiian monk seals on beaches in the Main Hawaiian Islands.' Final report of a workshop held 29-31 October in Koloa, Kauai, Hawaii. Bethesda, Maryland: Marine Mammal Commission.

Márquez-M., R., 1990. *Sea turtles of the world. An annotated and illustrated catalogue of sea turtle species known to date,* Rome: Food and Agriculture Organization of the United Nations. *FAO Fisheries Synopsis* No 125, Volume 11, 4pp.

Marten, K., and S. Psarakos, 1999. "Long-term site fidelity and possible long-term associations of wild spinner dolphins (*Stenella longirostris*) seen off Oahu, Hawaii," *Marine Mammal Science,* 15:1329-1336.

Mate, B.R., S.L. Nieukirk, and S.D. Kraus, 1997. "Satellite-monitored movements of the northern right whale," *Journal of Wildlife Management,* 61:1393-1405.

Mate, B.R., R. Gisiner, and J. Mobley, 1998. "Local and migratory movements of Hawaiian humpback whales tracked by satellite telemetry," *Canadian Journal of Zoology,* 76:863–868.

Mate, B.R., B.A. Lagerquist, and J. Calambokidis, 1999. "The Movements of North Pacific blue whales during the feeding season off southern California and their southern fall migration," *Marine Mammal Science,* 15:1246-1257.

Matthews, J.N., S. Brown, D. Gillespie, M. Johnson, R. McLanaghan, A. Moscrop, D. Nowacek, R. Leaper, T. Lewis, and P. Tyack, 2001. "Vocalisation rates of the North Atlantic right whale (*Eubalaena glacialis*)," *Journal of Cetacean Research and Management*, 3:271-281.

Mattila, D.K., L.N. Guinee, and C.A. Mayo, 1987. "Humpback whale songs on a North Atlantic feeding ground," *Journal of Mammalogy,* 68:880-883.

Maybaum, H.L., 1989. "Effects of a 3.3 kHz sonar system on humpback whales, *Megaptera novaeangliae*, in Hawaiian waters." M.S. Thesis, University of Hawaii, Manoa, 112 pp.

Maybaum, H.L., 1993. "Responses of humpback whales to sonar sounds," *Journal of the Acoustical Society of America*, 94:1848-1849.

Mazzuca, L., S. Atkinson, B. Keating, and E. Nitta, 1999. "Cetacean mass strandings in the Hawaiian Archipelago, 1957-1998," *Aquatic* Mammals, 25 (2): 105-114.

McAllister, J. Gilbert., 1933. *Archaeology of O`ahu*. Bernice P. Bishop Museum Bulletin 104. Bishop Museum Press, Honolulu, Hawai`i.

McAlpine, D.F., 2002. "Pygmy and dwarf sperm whales *Kogia breviceps* and *K. sima,"* pp. 1007-1009. In: W.F. Perrin, B. Wursig, and J.G.M. Thewissen, eds. *Encyclopedia of Marine Mammals*, San Diego: Academic Press.

McCartney, B.S., and Stubbs, A.R., 1971. "Measurements of the acoustic target strengths of fish in dorsal aspect, including swimbladder resonance," *Journal of Sound and Vibration*, 15:397-420.

McCauley, R.D., M.-N. Jenner, C. Jenner, K.A. McCabe and J. Murdoch, 1998. "The response of humpback whales (*Megaptera novaeangliae*) to offshore seismic survey noise: preliminary results of observations about a working seismic vessel and experimental exposures," APPEA Journal, 38:692-707.

McCauley, R.D. and D.H. Cato, 2000. "Patterns of fish calling in a nearshore environment in the Great Barrier Reef," In: *Philosophical Transactions of the Royal Society Biological Sciences*, Volume 355, No. 1401/September 20, 2000.

McCauley, R.D., J. Fewtrell and A.N. Popper, 2003. "High intensity anthropogenic sound damages fish ears," *Journal of the Acoustical Society of America,* 113(1):638-642.

McCracken, M.L., 2000. *Estimation of sea turtle take and mortality in the Hawaiian longline fisheries.* SWFSC Administrative Report H-00-06:I-29. 14.

McCulloch, C.E. and S.R. Searle, 2001. *Generalized, linear, and mixed models*. John Wiley and Sons, Inc.; New York, New York. 325 pp.

McCullagh, P. and J.A. Nedler, 1989. *Generalized linear models*. Second Edition. Chapman and Hall; London, United Kingdom. 261 pp.

McDonald, M.A., and C.G. Fox, 1999. "Passive acoustic methods applied to fin whale population density estimation," *Journal of the Acoustical Society of America*, 105:2643-2651.

McDonald, M.A., and S.E. Moore, 2002. "Calls recorded from North Pacific right whales (*Eubalaena japonica*) in the eastern Bering Sea," *Journal of Cetacean Research and Management,* 4:261-266.

McDonald, M.A., J. Calambokidis, A.M. Teranishi, and J.A. Hildebrand, 2001. "The acoustic calls of blue whales off California with gender data," *Journal of the Acoustical Society of America*, 109:1728-1735.

McDonald, M.A., J.A. Hildebrand, S.M. Wiggins, D. Thiele, D. Glasgow, S.E. Moore, 2005. "Sei whale sounds recorded in the Antarctic," *Journal of the Acoustical Society of America*, 118:3941-3945.

McDonald, M.A., J.A Hildebrand, and S.M. Wiggins. 2006. "Increases in deep ocean ambient noise in the Northeast Pacific west of San Nicolas Island, California," *Journal of the Acoustical Society of America*. 120:711-718.

McEldowney, H., 1979. *Archaeological and Historical Literature Search and Research Design: Lava Flow Control Study.* Bishop Museum Ms. 050879.

McEldowney, H., 1982. Report 1. Ethnographic background of the Mauna Kea summit region. In: cultural resources reconnaissance of the Mauna Kea summit region by H. McEldowney and P. McCoy. Report prepared for Group 70, Honolulu, Hawai`i. Prepared by the Department of Anthropology, Bernice P. Bishop Museum, Honolulu, Hawai`i. [For Official Use Only]

McEwen, B.S. and E.A. Lashley, 2002. *The end of stress as we know it*. Washington, DC: Joseph Henry Press. 239 pp.

McGerty, L., and R.L. Spear, 1997. *An inventory survey with oral histories of a parcel of land on the Plain of Mana, west of Kekaha in the Ahupua`a of Waimea, District of Kona, Island of Kaua`i.* Prepared for Controlled Environment Aquaculture Technology, Inc. Scientific Consultant Services, Inc., Honolulu. [For Official Use Only]

Mclean, F.E. and Shrout, B.L., 1966. *Aircraft design to minimize sonic boom pressure field energy*. NASA 66A33023.

McSweeney, D., K.C. Chu, W.F. Dolphin, and Guinee, 1989. "North Pacific humpback whale songs: a comparison of southeast Alaskan feeding ground songs with Hawaiian wintering ground songs," *Marine Mammal Science,* 5:139-148.

McSweeney, D.J., Baird, R.W. and Mahaffy, S.D., 2007. "Site fidelity, associations and movements of Cuvier's (*Ziphius cavirostris*) and Blainville's (*Mesoplodon densirostris*) beaked whales off the island of Hawai'i," *Marine Mammal Science*, 23(3: 666-687.

Mead, J.G., 1989. "Beaked whales of the genus – *Mesoplodon,"* pp. 349-430 In: S.H. Ridgway and R. Harrison, eds. *Handbook of marine mammals*, *Volume 4: River dolphins and the larger toothed whales*. London: Academic Press.

Mead, J.G. and Ch. W. Potter, 1990. "Natural history of bottlenose dolphins along the central Atlantic coast of the United States," pp. 165-195. In: S. Leatherwood and R.R. Reeves (eds.): *The bottlenose dolphin*, Academic Press, Inc., San Diego.

Megyesi, J. and C.R. Griffin, 1996. "Breeding Biology of the Brown Noddy on Tern Island, Hawaii," *Wilson Bulletin., 108(2)*, 1996, pp. 317-334 [Online]. Available: http://elibrary.unm.edu/sora/Wilson/v108n02/p0317-p0334.pdf

Mellinger, D.K., and C.W. Clark, 2003. "Blue whale (*Balaenoptera musculus*) sounds from the North Atlantic," *Journal of the Acoustical Society of America,* 114:1108-1119.

Mellinger, D.K., C.D. Carson, and C.W. Clark, 2000. "Characteristics of minke whale (*Balaenoptera acutorostrata*) pulse trains recorded near Puerto Rico," *Marine Mammal Science,* 16:739-756.

Mellinger, D.K., K.M. Stafford, S.E. Moore, L. Munger, and C.G. Fox, 2004. "Detection of North Pacific right whale (*Eubalaena japonica*) calls in the Gulf of Alaska*," Marine Mammal Science,* 20:872-879.

Mesnick, S.L., B.L. Taylor, B. Nachenberg, A. Rosenberg, S. Peterson, J. Hyde, and A.E. Dizon, 1999. "Genetic relatedness within groups and the definition of sperm whale stock boundaries from the coastal waters off California, Oregon and Washington," *Southwest Fisheries Center Administrative Report LJ-99-12:1-10,* La Jolla, California: National Marine Fisheries Service.

Meylan, A., 1995. "Sea turtle migration - evidence from tag returns," pp. 91-100 In: K.A. Bjorndal, ed. *Biology and conservation of sea turtles*, Rev. ed. Washington, D.C.: Smithsonian Institution Press.

Michel, et al., 2001. Information is as printed In: The National Marine Fishereis Service's biological opinion regarding the effects of the U.S. Navy's proposed 2006 RIMPAC Naval exercise, p. 48, June 27, 2006.

Midson, B.,1999. "NURP research helps manage precious coral harvesting so as to preserve foraging sites used by endangered Hawaiian monk seals,"[Online]. Available: http://www.soest.hawaii.edu/ HURL/precious_corals.html [13 June 2005].

Mignucci-Giannoni, A.A., G.M. Toyos-Gonzalez, J. Perez-Padilla, M.A. Rodriguez-Lopez, and J. Overing, 2000. "Mass stranding of pygmy killer whales (*Feresa attenuata*) in the British Virgin Islands," Journal of. the Marine Biology Associatiom of the United Kingdom 80:759-760.

Miksis J.L., M.D. Grund, D.P. Nowacek, A.R. Solow, R.C. Connor, and P.L. Tyack, 2001. "Cardiac Responses to Acoustic Playback Experiments in the Captive Bottlenose Dolphin, *Tursiops truncatus*," *Journal of Comparative Psychology*, 115:227-232.

Military Affairs Council, 2006. Advantages to Hawaii- The Chamber of Commerce of Hawaii. Hawaii-Based Armed Forces Benefit All of Us – The Bottom Line, Economic Impact of the Military in Hawaii, January.

Miller, E.H. and D.A. Job, 1992. "Airborne acoustic communication in the Hawaiian monk seal, *Monachus schauinslandi*," pp. 485-531. In: J.A. Thomas, R.A. Kastelein and A.Y. Supin, eds. *Marine mammal sensory systems,* New York, New York, Plenum Press.

Miller, J.D., 1974. "Effects of noise on people," *Journal of the Acoustical Society of America,* 56:729–764.

Miller, J.D., 1997. "Reproduction in sea turtles," pp. 51-81. In: P.L. Lutz and J.A. Musick, eds. *The biology of sea turtles,* Boca Raton, Florida: CRC Press.

Miller, J.D., C.S. Watson, and W.P. Covell, 1963. "Deafening effects of noise on the cat," *Acta Oto-Laryngologica Supplement*, 176:1–91.

Miller, P.J.O., N. Biassoni, A. Samuels, and P.L. Tyack, 2000. "Whale songs lengthen in response to sonar," *Nature,* 405:903.

Miller, P.J.O., M.P. Johnson, and P.L. Tyack, 2004. "Sperm whale behaviour indicates the use of echolocation click buzzes 'creaks' in prey capture," *Proceedings of the Royal Society of London, Part B: 271:2239-2247*.

Mills, J.H., R.M. Gilbert, and W.Y. Adkins, 1979. "Temporary threshold shifts in humans exposed to octave bands of noise for 16 to 24 hours," *Journal of the Acoustical Society of America*, 65:1238–1248.

Missile Defense Agency, 2006. Letter to Mr. Patrick Leonard, Field Supervisor, Pacific Islands Office, U.S. Fish and Wildlife Service from Brian Huizenga, Team Lead Missile Defense Agency, regarding the potential for debris striking the Island of Nihoa to cause fires, December 7.

Mitchell, E., 1975. "Report of the meeting on smaller cetaceans, Montreal, April 1-11, 1974. Subcommittee on small cetaceans," Scientific Committee, International Whaling Commission, *Journal of the Fisheries Research Board of Canada,* 32:889-983.

Miyazaki, N. and W.F. Perrin, 1994. "Rough-toothed dolphin–*Steno bredanensis* (Lesson, 1828)," p. 1-21. In: S.H. Ridgway and R. Harrison (eds.), *Handbook of marine mammals. Volume 5: The first book of dolphins*, San Diego, California: Academic Press, 416 pp.

Miyazaki, N., and S. Wada, 1978. "Observation of Cetacea during whale marking cruise in the western tropical Pacific, 1976." *Scientific Reports of the Whales Research Institute,* 30:179-195.

Mizroch, S.A., D.W. Rice, D. Zwiefelhofer, J. Waite, and W.L. Perryman, 1999. "Distribution and movements of fin whales (*Balaenoptera physalus*) in the Pacific Ocean," p. 127. In: *Abstracts, Thirteenth Biennial Conference on the Biology of Marine Mammals, 28 November–3 December 1999,* Wailea, Maui.

Moberg, G.P., 2000. "Biological response to stress: implications for animal welfare," pp. 1 – 21. In: G. P. Moberg, and J. A. Mench, editors, *The Biology of Animal Stress: Basic Principles and Implications for Animal Welfare*. Oxford University Press, Oxford, United Kingdom.

Mobley, J.R., 2002. "Information on humpback whale population—Isle Humpbacks could be jockeying for flipper room" *Star Bulletin*, 17 March 2002, [Online]. Available: http://starbulletin.com/2002/03/17/news/story14.html, [29 April 2002].

Mobley, J.R., 2004. *Results of marine mammal surveys on U.S. Navy underwater ranges in Hawaii and Bahamas*. Final Report to Office of Naval Research, 27 pp.

Mobley, J.R., 2005. "Assessing responses of humpback whales to North Pacific Acoustic Laboratory (NPAL) transmissions: Results of 2001–2003 aerial surveys north of Kauai," *Journal of the Acoustical Society of America,* 117:1666-1673.

Mobley, J.R., 2006a. *Results of 2006 RIMPAC Aerial Surveys of Marine Mammals in Kaulakahi and Alenuihaha Channels,* Final Report Submitted to Environmental Division Commander, U.S. Pacific Fleet, 12 pp.

Mobley, J.R., 2006b. *Results of 2006 Aerial Surveys of Humpback Whales North of Kauai,* Quicklook Report Submitted to North Pacific Acoustic Laboratory (NPAL) Program Scripps Institution of Oceanography, 19 pp.

Mobley, Jr., J.R., M. Smultea, T. Norris, and D. Weller, 1996. "Fin whale sighting north of Kauai, Hawaii," *Pacific Science,* 50:230-233.

Mobley, J.R., G.B. Bauer, and L.M. Herman, 1999. "Changes over a ten-year interval in the distribution and relative abundance of humpback whales (*Megaptera novaeangliae*) wintering in Hawaiian waters," *Aquatic Mammals,* 25:63-72.

Mobley, J.R., S.S. Spitz, K.A. Forney, R. Grotefendt, and P.H. Forestell, 2000. "Distribution and abundance of odontocete species in Hawaiian waters: Preliminary results of 1993-98 aerial surveys," *Southwest Fisheries Science Center Administrative Report LJ-00-14C*, La Jolla, California: National Marine Fisheries Service.

Mobley, J.R., S.S. Spitz, and R. Grotefendt, 2001a. *Abundance of humpback whales in Hawaiian waters: Results of 1993-2000 aerial surveys,* Report prepared for the Hawaii Department of Land and Natural Resources and the Hawaiian Islands Humpback Whale National Marine Sanctuary, NOAA, U.S. Department of Commerce.

Mobley, J.R., L.L. Mazzuca, A.S. Craig, M.W. Newcomer, and S.S. Spitz, 2001b. "Killer whales (*Orcinus orca*) sighted west of Niihau, Hawaii," *Pacific Science,* 55:301-303.

Mobley, J.R., S.W. Martin, D. Fromm, and P. Nachtigall. 2007. "Lunar influences as possible causes for simultaneous aggregations of melon-headed whales in Hanalei Bay, Kauai and Sasanhaya Bay, Rota." Abstract for oral presentation at the Seventeenth Biennial Conference on the Biology of Marine Mammals. Cape Town, South Africa, 29 November–3 December 2007.

Møhl, B., M. Wahlberg, P.T. Madesen, A. Heerfordt, and A. Lund, 2003. "The monopulsed nature of sperm whale clicks," *Journal of the Acoustical Society of America, 114*:1143-1154.

Monterey Bay Area Research Institute, 2002. The MBARI Chemical Sensor Program Periodic Table of Elements in the Ocean. [Online]. Available: www.mbari.org/chemsensor/pteo.htm

Moore, S.E., 2005. "Long-term Environmental Change and Marine Mammals," pp. 137-147. In: *Marine Mammal Research: Conservation Beyond Crisis*, edited by J.E. Reynolds, W.F. Perrin, R.R. Reeves, S. Montgomery, and T.J. Ragen (John Hopkins University Press, Baltimore).

Moore, S.E., J.M. Waite, L.L. Mazzuca, and R.C. Hobbs, 2000. "Mysticete whale abundance and observations of prey associations on the central Bering Sea shelf," *Journal of Cetacean Research and Management,* 2:227-234.

Moore, S. E., W. A. Watkins, M. A. Daher, J. R. Davies, and M. E. Dahlheim, 2002. “Blue whale habitat associations in the Northwest Pacific: Analysis of remotely-sensed data using a Geographic Information System,” *Oceanography*, 15(3):20-25.

Moore, M.J. and G.A. Early, 2004. *Cumulative sperm whale bone damage and the bends*. *Science* 306:2215.

Moore, M.J., B. Rubinstein, S.A. Norman, and T. Lipscomb, 2004. “A note on the most northerly record of Gervais’ beaked whale from the western North Atlantic Ocean,” *Journal of Cetacean Research Management* 6: 279-281.

Morimitsu, T., T. Nagai, M. Ide, H. Kawano, A. Naichuu, M. Koono, and A. Ishii, 1987. "Mass stranding of odontoceti caused by parasitogenic eighth cranial neuropathy," Journal of Wildife Diseases 23, 586-590.

Mossman, V., 2007. Personal communication between Vida Mossman (CTR PMRF) and Karen Barnes on 9 February 2007.

Mrosovsky, N., 1993. World's largest aggregation of sea turtles to be jettisoned. Marine Turtle Newsletter. 63 (Supplement):2-3.

Musick, J.A., and C.J. Limpus, 1997. “Habitat utilization and migration of juvenile sea turtles,” pp. 137-163 In: P.L. Lutz and J.A. Musick, eds. *The biology of sea turtles*, CRC Press, Boca Raton, Florida.

Myrberg, A.A. Jr., 2001. The acoustical biology of elasmobranches. *Environmental Biology of Fishes* 60: 31-45.

Myrberg , A.A., Jr., A. Banner, and J.D. Richard , 1969. “Shark attraction using a video-acoustic system,” *Marine Biology* , 2:264.

Myrberg , A.A., Jr., S.J. Ha, S. Walewski, and J.C. Banbury, 1972. “Effectiveness of acoustic signals in attracting epipelagic sharks to an underwater sound source,” *Bulletin of Marine Science*, 22:926-949.

Myrberg , A.A., Jr., C.R. Gordon, and A.P. Klimley, 1976. “Attraction of free ranging sharks by low frequency sound, with comments on its biological significance,” pp. 205-228. In: *Sound Reception in Fish*, eds. A. Schuijf and A.D. Hawkins, 205-228. Amsterdam: Elsevier.

Myrberg, A.A., Jr. and J.Y. Spires, 1980. “Hearing in damselfishes: an analysis of signal detection among closely related species,” *Journal of Comparative Physiology*, 140:135–144.

Nachtigall, P.E., W.W.L. Au, J. Pawloski, and P.W.B. Moore, 1995. “Risso's dolphin (*Grampus griseus*) hearing thresholds in Kaneohe Bay, Hawaii,” pp. 49-53. In: *Sensory Systems of Aquatic Mammals* (ed. R. A. Kastelein, J. A. Thomas and P. E. Nachtigall), Woerden, The Netherlands: DeSpil.

Nachtigall, P.E., D.W. Lemonds, and H.L. Roitblat, 2000. “Psychoacoustic studies of dolphins and whales,”pp. 330-363. In: *Hearing by Dolphins and Whales*, W.W.L. Au, A.N. Popper, and R.R. Fay, eds. Springer, New York.

Nachtigall, P.E., J.L. Pawloski, and W.W.L. Au, 2003. “Temporary threshold shift and recovery following noise exposure in the Atlantic bottlenosed dolphin (*Tursiops truncates*),” *Journal of the Acoustical Society of America,* 113:3425-3429.

Nachtigall, P.E., A. Supin, J.L. Pawloski, and W.W.L. Au, 2004. “Temporary threshold shift after noise exposure in bottlenosed dolphin (*Tursiops truncates*) measured using evoked auditory potential,” *Marine Mammal Science*, 20:673-687.

Nachtigall, P.E., M.M.L. Yuen, T.A. Mooney, and K.A. Taylor. 2005. “Hearing measurements from a stranded infant Risso’s dolphin, *Grampus griseus*,” Journal of Experimental Biology, 208:4181-4188.

National Aeronautical Charting Office, 2007. Hawaiian Islands Sectional Aeronautical Chart, Hawaiian Islands Sectional Aeronautical Chart. October.

National Aeronautical and Space Administration, 2002. *Final Environmental Assessment for Launch of NASA Routine Payloads on Expendable Launch Vehicles from Cape Canaveral Air Force Station, Florida, and Vandenberg Air Force Base,* California, June.

National Geospatial-Intelligence Agency, 2006.”Aeronautical,” [Online]. Available: http://www.nga.mil/portal/site/nga01, [August 2006].

National Marine Fisheries Service, 1986. Hawaiian monk seal critical habitat (Final Rule). *Federal Register*, Vol 51, No.83, p. 16047.

National Marine Fisheries Service, 1988. “Critical habitat; Hawaiian monk seal; Endangered Species Act,” *Federal Register, Vol,* 53, No. 18, pp. 988-18998, Thursday- [26 May 1988].

National Marine Fisheries Service, 1998*. Recovery plan for the blue whale (Balaenoptera musculus),* Prepared by R.R. Reeves, P.J. Clapham, R.L. Brownell, and G.K. Silber, Silver Spring, Maryland: National Marine Fisheries Service.

National Marine Fisheries Service, 2001a. *Final biological opinion on the U.S. Navy’s North Pacific Acoustic Laboratory Sound Source.* Office of Protected Resources, Endangered Species Division, Silver Spring, Maryland.

National Marine Fisheries Service, 2001b. "Interim Findings on the Stranding of Beaked Whales in the Bahamas – December 20,2001" [Online]. Available: http://www.nmfs.noaa.gov/bahamasbeakedwhales.htm [24 January 2007].

National Marine Fisheries Service, 2002a. "Endangered and threatened species: Determination on a petition to revise critical habitat for northern right whales in the Pacific," *Federal Register, Vol* 67, No. 34, pp. 7660-7665, Wednesday, [20 February].

National Marine Fisheries Service, 2002b. *Annual report to Congress on the Status of U.S. Fisheries—2001,* Silver Spring, Maryland: National Marine Fisheries Service, 142 pp.

National Marine Fisheries Service, 2002c. "Fisheries off west coast states and in the western Pacific; Atlantic highly migratory species; Fisheries of the northeastern United States; Implementation of the shark finning prohibition act--Final rule," *Federal Register,* Vol 67, No.28, pp. 6194-6202.

National Marine Fisheries Service, 2002d. *Final Environmental Assessment, Issuance of Scientific Research Permit #1301 to the National Marine Fisheries Service – Honolulu Laboratory.* February

National Marine Fisheries Service, 2003. *Preliminary Report: Multidisciplinary Investigation of Harbor Porpoises (Phocoena phocoena) stranded in Washington State from 2 May-2 June 2003 coinciding with the Mid-Range Sonar Exercises of the USS Shoup,* February 2004.

National Marine Fisheries Service, 2004a. "Interim Report on the Bottlenose Dolphin *(Tursiops truncates)* Unusual Mortality Event Along the Panhandle of Florida, March-April 2004," pp.1-36.

National Marine Fisheries Service, 2004b. "International Sea Turtle Activities, Research and Training for Mitigation of Sea Turtle Interactions with Fisheries." 3pp. Pacific Island Regional Office, NOAA National Marine Fisheries Service. [Online]. Availiable: http://www.fpir.noaa.gov/IFD/ifd_sea_turtles_indonesia.html 2/

National Marine Fisheries Service, 2004c. *Cause of stranding database for marine turtle strandings in the Hawaiian Islands, 1982 – 2003,* Honolulu, Hawaii: National Marine Fisheries Service-Pacific Islands Fisheries Science Center.

National Marine Fisheries Service, 2004d. "Fisheries off west coast states and in the western Pacific; Western Pacific fisheries; Highly migratory species fisheries; Overfishing determination for bigeye tuna," *Federal Register, Vol* 69, No.250, pp. 78397-78398.

National Marine Fisheries Service, 2005a. *Assessment of Acoustic Exposures on Marine Mammals in Conjunction with USS Shoup Active Sonar Transmissions in the Eastern Strait of Juan de Fuca and Haro Strait, Washington. 5 May 2003.* National Marine Fisheries, Office of Protected Resources. Silver Spring, MD 20910.

National Marine Fisheries Service, 2005b. "Biological opinion on the continued authorization of the Hawaii-based pelagic, deep-set, tuna longline fishery based on the Fishery Management Plan for Pelagic Fisheries in the Western Pacific Ocean," U.S. Department of Commerce, National Oceanic and Atmospheric Administration.

National Marine Fisheries Service, 2005c. *Pygmy Sperm Whale (Kogia breviceps): Western North Atlantic Stock.* Stock Assessment Report. December, 2005.

National Marine Fisheries Service, 2005d. *Long-Finned Pilot Whale (Globicephala melas): Western North Atlantic Stock.* Stock Assessment Report. December, 2005.

National Marine Fisheries Service, 2005e. *False Killer Whale (Pseudorca crassidens): Northern Gulf of Mexico Stock.* Stock Assessment Report. December, 2005.

National Marine Fisheries Service, 2005f. *Dwarf Sperm Whale (Kogia sima): Western North Atlantic Stock*. Stock Assessment Report. December, 2005.

National Marine Fisheries Service, 2005g. *Harbor Porpoise (Phocoena phocoena): Gulf of Maine/Bay of Fundy Stock.* Stock Assessment Report. December, 2005.

National Marine Fisheries Service, 2005h. *Bottlenose Dolphin (Tursiops truncatus): Gulf of Mexico Bay, Sound, and Estuarine Stocks*. Stock Assessment Report. December, 2005.

National Marine Fisheries Service, 2006a. "Endangered and threatened species: Revision of critical habitat for the northern right whale in the Pacific Ocean. Federal Register 71, No. 129, 38277-38297.

National Marine Fisheries Service, 2006b. Final Rule: for Conducting the Precision Strike Weapon (PSW) Testing and Training by Eglin Air Force Base, *Federal Register*, Vol 71, No 226, pp. 67810-67824.

National Marine Fisheries Service, 2006c. "Notices – Marine Mammals- Notice of Availability of new criteria for designation of marine malls Unusual Mortality Events." Federal Register, Vol 71, No 240, p. 75234. Thursday, 14 December.

National Marine Fisheries Service, 2007a. Comments received on the Preliminary Draft Hawaii Range Complex Environmental Impacts Statement/Overseas Environmental Impact Statement, June.

National Marine Fisheries Service, 2007b. "Marine Mammal Stranding Response Fact Sheet," [Online]. Available: http://www.nmfs.noaa.gov/pr/pdfs/health/stranding_fact_sheet.pdf [29 January 2007].

National Marine Fisheries Service, 2007c. "FAQs about Marine Mammal Strandings," [Online]. Available: http://www.nmfs.noaa.gov/pr/health/faq.htm [30 January 2007.

National Marine Fisheries Service, 2007d. “Marine Mammal Health and Stranding Response Program (MMHSRP),” [Online]. Available: http://www.nmfs.noaa.gov/pr/health/ [30 January 2007].

National Marine Fisheries Service, 2007e. “Recovery Plan for the Hawaiian Monk Seal (*Monachus schauinslandi*) Revision,” National Marine Fisheries Service, Silver Spring, MD., 165 pp. [Online]. Available: http://www.nmfs.noaa.gov/pr/pdfs/recovery/hawaiianmonkseal.pdf.

National Marine Fisheries Service, 2007f. “National Marine Mammal Stranding Program,” [Online]. Available: http://seahorse.nmfs.noaa.gov/msdbs/class/seahorse_public.htm [2 February 2007].

National Marine Fisheries Service, 2007g. National Marine Fisheries Service, Office of Protected Resources. “Hawaii Viewing Guidelines” [Online]. Available: http://www.nmfs.noaa.gov/pr/education/hawaii/guidelines.htm [14 February 2007].

National Marine Fisheries Service, 2007h “Marine Mammal Education Web: What do you know about cetacean strandings?” [Online]. Available: http://www.afsc.noaa.gov/NMML/education/cetaceans/cetaceastrand.htm. Accessed 1/31/07.

National Marine Fisheries Service, 2007i. “National Marine Fisheries Service, Office of Protected Resources. 2005 Multispecies Mass Stranding in North Carolina.” [Online]. Available: http://www.nmfs.noaa.gov/pr/health/mmume/event2005jan.htm [16 February 2007].

National Marine Fisheries Service, 2007j. “Multi-species Unusual Mortality Event in North Carolina Fact Sheet.” [Online]. Available: http://www.nmfs.noaa.gov/pr/pdfs/health/ume_jan_2005_fact_sheet.pdf [16 February 2007].

National Marine Fisheries Service, 2007k. “National Marine Fisheries Service, Office of Protected Resources.” July 2004 mass Stranding of Melon-Headed Whales in Hawai’i [Online]. Available: http:www.nmfs.noaa.gov/pr/health/mmume/event2004jul.html [16 February 2007].

National Marine Fisheries Service, 2007l. “July 2004 Mass Stranding of Melon-Headed Whales in Hawai’i Fact Sheet for Final Report.” [Online]. Available: http://www.nmfs.noaa.gov/pr/pdfs/health/stranding_melonheadedwhales_july2004.pdf [16 February 2007].

National Marine Fisheries Service, 2007n. “2004 Bottlenose Dolphin Unusual Mortality Event Along the Florida Panhandle.” [Online]. Available: http://www.nmfs.noaa.gov/pr/health/mmume/event2004.htm [16 February 2007].

National Marine Fisheries Service, 2007o. "Strandings Newsletter of the Southeast United States Marine Mammal Health and Stranding Network." Winter 2006/Spring 2007. NOAA Technical Memorandum NMFS-SEFSC-545 [Online]. Available: http://www.sefsc.noaa.gov/PDFdocs/SNewsletter112806.pdf [16 February 2007].

National Marine Fisheries Service, 2007p. "Draft Programmatic Environmental Impact Statement for the Marine Mammal Health and Stranding Response Program," (National Marine Fisheries Service, Office of Protected Resources), p. 1006.

National Marine Fisheries Service, 2007q. Listing Endangered and Threatened Wildlife and Designating Critical Habitat; 90-day Finding for a Petition to Reclassify the Loggerhead Turtle in the North Pacific Ocean as a Distinct Population Segment with Endangered Status and to Designate Critical Habitat. Federal Register, Vol 72, No 221, pp. 64585-645874. 16 November 2007.

National Marine Fisheries Service, 2007r. National Marine Fisheries Service, Office of Protected Resources. "Loggerhead Sea Turtle (Caretta Caretta) – 5-Year Review: Summary and Evaluation." [Online]. Available: http://www.nmfs.noaa.gov/pr/pdfs/species/loggerhead_5yearreview.pdf August.

National Marine Fisheries Service, 2008. National Marine Fisheries Office of Protected Resources Memorandum to Chief of Naval Operations, Environmental Readiness. In Review, January.

National Marine Fisheries Service, Pacific Islands Region (NMFS-PIR), 2001. "Final Environmental Impact Statement: Fishery management plan, pelagic fisheries of the western Pacific region." Volumes I and II, Prepared for National Marine Fisheries Service-Pacific Islands Region by URS Corporation, Honolulu, HI under contract to Research Corporation of the University of Hawaii, 1163 pp.

National Marine Fisheries Service, Pacific Islands Regional Office (NMFS-PIR), 2007a. "Pacific Island Region Marine Mammal Response Network-Activity Update, 2006 Marine Mammal Strandings", pp. 9-11, January.

National Marine Fisheries Service, Pacific Islands Regional Office (NMFS-PIR), 2007b. "Pacific Island Region Marine Mammal Response Network-Activity Update. This is the 1st and 2nd quarter 2007 combined issue of the Pacific Islands Regional Marine Mammal Response Network Newsletter, July.

National Marine Fisheries Service Southwest Fisheries Science Center, 1999. "Marine Mammals of the Pacific Region and Hawaii, Unit 23" *Our Living Oceans* [Online]. Available: http://spo.nwr.noaa.gov/unit23.pdf.

National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998a. *Recovery plan for U.S. Pacific populations of the green turtle (Chelonia mydas),* Silver Spring, Maryland: National Marine Fisheries Service.

National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998b. *Recovery plan for U.S. Pacific populations of the hawksbill turtle (Eretmochelys imbricata)*, Silver Spring, Maryland: National Marine Fisheries Service.

National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998c. *Recovery plan for U.S. Pacific populations of the leatherback turtle (Dermochelys coriacea)*, Silver Spring, Maryland: National Marine Fisheries Service.

National Marine Fisheries Service and U.S. Fish and Wildlife Service, 1998d. *Recovery plan for U.S. Pacific populations of the olive ridley turtle (Lepidochelys olivacea)*, Silver Spring, Maryland: National Marine Fisheries Service.

National Ocean Service, 2001. Environmental *sensitivity index (ESI) atlas: Hawaii. Volumes 1 and 2*, Seattle, Washington: NOAA.

National Oceanic and Atmospheric Administration, 1979. Formal consultation pursuant to Section 7 of the Endangered Species Act, as amended, regarding the probable impacts of the U.S. Navy use of Kaula and Kahoolawe Target Island on humpback whales that winter in Hawaiian waters. Biological Opinion, September.

National Oceanic and Atmospheric Administration, 2001. "Final Rule for the Shock Trial of the WINSTON S. CHURCHILL (DDG-81), Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Naval Activities" *Federal Register*, Vol 66, No. 87, pp. 22450-22467.

National Oceanic and Atmospheric Administration, 2002a. "Final Rule SURTASS LFA Sonar," *Federal Register*, Department of Commerce; NMFS, *Federal Register,* Vol 67, No. 136, pp. 46712-46789.

National Oceanic and Atmospheric Administration, 2002b. *Report of the workshop on acoustic resonance as a source of tissue trauma in cetaceans.* NOAA Fisheries, Silver Spring, Maryland, April.

National Oceanic and Atmospheric Administration, 2003. "The Cultural Significance of Whales in Hawai`i," Third Printing [Online]. Available: http://hawaiihumpbackwhale.noaa.gov/special_offerings/sp_off/publication_pdfs/Cultural_brochure.pdf.

National Oceanic and Atmospheric Administration, 2004. Endangered Species Act section 7 consultation on proposed regulatory amendments to the FMP for the pelagic fisheries of the western Pacific region. Biological opinion. February 23.

Nation Oceanic and Atmospheric Administration, 2005. "Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Conducting the Precision Strake Weapon (PSW) Testing and Training by Eglin Air Force Base in the Gulf of Mexico," Federal Register, Vol 70, No 160, pp. 48675-48691, Friday, [August 19, 2005]. [Online]. Available: http://a257.g.akamaitech.net/7/257/2422/01jan20051800/edocket.access.gpo.gov/2005/05-16390.html

National Oceanic and Atmospheric Administration, 2006a. National *Marine Fisheries Service Biological Opinion for RIMPAC, 2006.* July.

National Oceanic and Atmospheric Administration, 2006b. "Northwestern Hawaiian Islands Marine National Monument," Federal Register, Vol 71, No. 167, pp. 51134-51142 [Online]. Available: http://hawaiireef.noaa.gov/pdfs/nwhinmn_finalregs.pdf

National Oceanic and Atmospheric Administration, 2006c. *Northwestern Hawaiian Islands Proposed National Marine Sanctuary Draft Environmental Impact Statement and Management Plan*, Vol. II of II, Honolulu, Hawaii, April, [Online]. Available: http://www.hawaiireef.noaa.gov/management/mp.html.

National Oceanic and Atmospheric Administration, 2006d. *Public Draft Environmental Assessment National Oceanic and Atmospheric Administration Pacific Region Center*, March.

National Oceanic and Atmospheric Administration, 2006e. "Pacific Islands Region Marine Mammal Response Network Activity Update, April – June 2006". [Online]. Available: http://www.fpir.noaa.gov/Library/PRD/Marine%20Mammal%20Response/PIR%20hot%20topics%202%20final.pdf.

National Oceanic and Atmospheric Administration, 2006f. "Screening Quick Reference Tables. Screen concentration for inorganic and organic contaminates in various environmental media." November Online: [Available]: http://response.restoration.noaa.gov/book_shelf/122_squirt_cards.pdf

National Oceanic and Atmospheric Administration, 2006g. Marine Mammals Stock Assessment Reports (SARs) by Region- 1995-2006. [Online]. Available http://www.nmfs.noaa.gov/pr/sars/region.htm

National Oceanic and Atmospheric Administration, 2006h. "Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Conducting the Precision Strake Weapon (PSW) Testing and Training by Eglin Air Force Base in the Gulf of Mexico," Federal Register, Vol 71, No 226, pp. 67810-67824, Friday, [November 24, 2006]. [Online]. Available: http://a257.g.akamaitech.net/7/257/2422/01jan20061800/edocket.access.gpo.gov/2006/06-9380.htm

National Oceanic and Atmospheric Administration, 2006i. "Small Takes of Marine Mammals Incidental to Specified Activities; Rim of the Pacific Antisubmarine Warfare Exercise Training Events within the Hawaiian Islands Operating Area." Federal Register, Vol 71, No 130, pp. 38709-38738. 7 July.

National Oceanic and Atmospheric Administration, 2007a. "It's Whale Season in Hawai`i," *Announcements,"* 4 April [Online]. Available: http://hawaiihumpbackwhale.noaa.gov/.

National Oceanic and Atmospheric Administration, 2007b. "Taking and Importing Marine Mammals Incidental to the U.S. Navy Operations of Surveillance Towed Array Sensor System Low Frequency Active Sonar." Federal Register, Vol 72, No 161, pp. 46845-46893. 21 August.

National Oceanic and Atmospheric Administration, 2007c. NOAA's National Weather Services Marine Forecasts. [Online]. Available: http://www.weather.gov/os/marine/cwd.htm.

National Oceanic and Atmospheric Administration, 2008. National Oceanic and Atmospheric Administration Fisheries-Office of Protected Resources – Marine Mammal Protection Act (MMPA) 1972. [Online]. Available: http://www.nmfs.noaa.gov/pr/laws/mmpa/.

National Oceanic and Atmospheric Administration Pacific Islands Region, 2007. Personal communication (Email) received from Hans Van Tilburg, Ph.D., Maritime Heritage Coordinator, National Oceanographic and Atmospheric Administration Pacific Islands Region regarding bottom conditions at proposed Mobile Diving and Salvage Unit training vessel, 19 October.

National Oceanic Atmospheric Administration Fisheries, 2004. *Pacific Islands Region ByCatch Reduction Implementation Plan FY04-FY05*, 21 April.

National Park Service, 2004. *Environmental Assessment, Assessment of Effect Reestablishment of the Historic Scene at Pu`ukohola Heiau National Historic Site Hawai'i County, Hawaii,* April [Online]. Available: http://www.nps.gov/puhe/parkmgmt/upload/Environmental_Assessment_April_2004.pdf.

National Park Service, 2006. "USS Arizona Memorial," [Online]. Available: http://www.nps.gov/usar.

National Research Council, 1985. *Oil in the Sea: Inputs, Fates, and Effects*. National Academy Press.

National Research Council, 1990. *Decline of the sea turtles: Causes and prevention*, National Academy Press, Washington D.C.

National Research Council, 1994. *Low-Frequency Sound and Marine Mammals: Current Knowledge and Research Needs*. National Academy Press, Washington, D.C.

National Research Council, 1997. Information is as printed In: The National Marine Fishereis Service's biological opinion regarding the effects of the U.S. Navy's proposed 2006 RIMPAC Naval exercise, p. 48, June 27, 2006.

National Research Council, 2000. *Marine Mammals and Low-Frequency Sound: Progress since 1994*. National Academy Press, Washington, D.C. pp.

National Research Council, 2003. *Ocean noise and marine mammals*, The National Academic Press, Washington D.C. 208 pp.

National Research Council, 2005. *Marine Mammal Populations and Ocean Noise: Determining When Noise Causes Biologically Significant Effects*. The National Academic Press, Washington D.C. 126 pp.

National Research Council, 2006. *Dynamic Changes in Marine Ecosystems: Fishing, Food Webs, and Future Options, Committee on Ecosystem Effects of Fishing: Phase II - Assessments of the Extent of Change and the Implications for Policy*, National Academes Press, Washington, D.C.

National Wetlands Inventory, 2007. *Providing Wetland Information to the American People* [Online]. Available: http://www.fws.gov/nwi/ [17 October].

Nature Conservancy of Hawaii and Natural Resources Defense Council, 1992. *The Alien Pest Species Invasion in Hawai`i: Background Study and Recommendations for Interagency Planning*, Review draft 3, Honolulu. [Online]. Available: http://www.hear.org/articles/pdfs/nrdctnch1992.pdf.

Naval Facilities Engineering Command, 2003. *MCBH Kaneohe Bay, Air Installations Compatible Use Zones*, February.

Naval Facilities Engineering Command, 2004. *Partnering Agreement – FY06 MCON* p-410 Consolidated Range Ops Complex, PMRF, Hawaiian Area, Kauai, Hawaii. November.

Naval Facilities Engineering Command, 2006. "Cultural Resources Program Archeological Resources" [Online]. Available: https://portal.navfac.navy.mil/portal/page?_pageid=181,3449819,181_3449838:181_3449863&_dad=portal&_schema=PORTAL.

Naval Facilities Engineering Command Hawaii, 2007. "2007 Annual Water Quality Report-Pacific Missile Range Facility Water System, Mana Well Source." [Online]. Available: http://www.hawaii.navy.mil/Environmental/Water_Quality_Reports/Water%20Qual%20PMRF%202007_4May07.pdf

Naval Facilities Engineering Command, Hawaii Public Affairs, 2005. *Green Power on the Garden Isle*. [Online]. Available: https://portal.navfac.navy.mil/portal/page?_ pageid=181,3991235_dad=portal&_schema=PORTAL.

Naval Institute Guide to Ships and Aircraft of the U.S. Fleet, 2001. Navy EOD 60R-2-2-13; Table 1. Technical Description Documents SW515-A5-MMM-010, SW515-AG-OMP-010, SW516-AA-010.

Naval Ocean Systems Center, 1990. *Environmental Assessment Covering OTTO Fuel II for the Torpedo MK46/MK48 Programs,"* Commander, NOSC, San Diego, CA. 28 November 1990. Letter Ser. 614/94. Naval Surface Weapons Center, Indian Head, Maryland (NSWCIH). February 1983.

Naval Undersea Warfare Center Detachment, 1994. *Final Environmental Assessment for Temporary Hawaiian Area Tracking System,* June.

Naval Undersea Warfare Center Division Newport, Rhode Island, 2007. *Environmental Assessment (EA) for MK 48 Mod 6 Torpedo Exercises in Hawaiian Waters*, July.

Nedler, J.A. and T.W.M. Wedderburn, 1972. "Generalized linear models", *Journal of the Royal Statistical Society*, Series A, 135: 370–384.

Nedwell, J.R., B. Edwards, A.W.H. Turnpenny, and J. Gordon, 2004. "Fish and marine mammal audiograms: A summary of available information," *Subacoustech Limited., Report*, Reference 534R0214.

Nedwell J.R., A.W.H. Turnpenny, J. Gordon, and B. Edwards, 2006. Fish and marine mammal audiograms: a summary of available information on their hearing. *Subacoustech Report to the Department of Trade and Industry Reference:* 534R0210 (307 pp., in preparation).

Nelson, D. R., 1967. "Hearing thresholds, frequency discrimination and acoustic orientation in the lemon shark, *Negaprion brevirostris*, (Poey)," *Bulletin of Marine Science.* 17:741-768.

Nelson, D.R., and R.H. Johnson, 1972. "Acoustic attraction of Pacific reef sharks: effect of pulse intermittency and variability,." *Comparative Biochemistry and Physiology-Part A,* 42:85-95.

Nelson M, M. Garron, R.L Merrick, R.M Pace, and T.V.N. Cole. 2007. Mortality and serious injury determinations for baleen whale stocks along the United States eastern seaboard and adjacent Canadian Maritimes, 2001-2005. US Department of Commerce, Northeast Fisheries Science Center Reference Document. 07-05. 18 pp.

Nemoto, T., and A. Kawamura, 1977. "Characteristics of food habits and distribution of baleen whales with special reference to the abundance of North Pacific sei and Bryde's whales," *Reports of the International Whaling Commission, Special Issue,* 1:80-87.

Nestler, J.M., G.R. Ploskey, J. Pickens, J. Menezes, C. Schilt, 1992. "Responses of blueback herring to high-frequency sound and implications for reducing entrainment at hydropower dams," *North American Journal of Fisheries Management.* 12:667–683.

Nestler, J.M., R.A. Goodwin, T.M. Cole, D. Degan, and D. Dennerline, 2002. "Simulating movement patterns of blueback herring in a stratified southern impoundment," *Transactions of the American Fisheries Society,* 131:55–69.

Nicholls B and Racey P.A., 2007. "Bats Avoid Radar Installations: Could Electromagnetic Fields Deter Bats from Colliding with Wind Turbines?" open access freely available online in *PLoS ONE* 2(3): e297. [Online]. Available: www.plosone.org.

Nieri, M., E. Grau, B. Lamarch, and A. Aguilar, 1999. "Mass mortality of Atlantic spotted dolphin (*Stenella frontalis*) caused by a fishing interaction in Mauritania," *Marine Mammal Science*, 15(3):847-854).

Nitta, E.T., and J.R. Henderson, 1993. "A review of interactions between Hawaii's fisheries and protected NMFS species," *Marine Fisheries Review,* 55:83-92.

Norman, S.A., S. Raverty, B. McLellan, A. Pabst, D. Ketten, M. Fleetwood, J.K. Gaydos, B. Norberg, L. Barre, T. Cox, B. Hanson, and S. Jeffries, 2004. "Multidisciplinary investigation of stranded harbor porpoises (*Phocoena phocoena*) in Washington State with an assessment of acoustic trauma as a contributory factor (2 May – 2 June 2003)," U.S. Dep. Commerce, NOAA Technical Memorandum NMFS-NWR-34, 120 pp.

Norman, S.A., and Mead, J.G., 2001. "*Mesoplodon europaeus*," Mammalian Species 688:1- 5.

Norris, K.S., and J.H. Prescott, 1961. "Observations on Pacific cetaceans of Californian and Mexican waters," *University of California Publications in Zoology, 63:291-402*.

Norris, K.S., B. Würsig, R.S. Wells, and M. Wursig, 1994. *The Hawaiian spinner dolphin.* Berkeley: University of California Press.

Norris, T.F., M.A. Smultea, A.M. Zoidis, S. Rankin, C. Loftus, C. Oedekoven, J.L. Hayes, and E. Silva, 2005. "A preliminary acoustic-visual survey of cetaceans in deep waters around Niihau, Kauai, and portions of Oahu, Hawaii from aboard the WV Dariabar, February 2005, Final Technical and Cruise Report July 2005," Prepared for Geo-Marine, Inc., Plano, Texas, and NAVFAC Pacific, Pearl Harbor, Hawaii, by Cetos Research Organization, Bar Harbor, Maine. Contract #2057sa05-F.

North Atlantic Treaty Organization, no date. Part II: *SACLANTCEN marine mammal and human divers risk mitigation rules -planning*. Chapter 2, 9 pp.

Northrop, J., W.C. Cummings, and M.F. Morrison, 1971. "Underwater 20-Hz signals recorded near Midway Island," *Journal of the Acoustical Society of America*, 49:1909-1910.

Northwest and Alaska Fisheries Center, 1978. "Northern elephant seal appears on one of the Northwestern Hawaiian Islands."

Northwestern Hawaiian Islands Multi-Agency Education Project, 2006. “Expeditions,” [Online]. Available: http://www.hawaiianatolls.org/research/index.php

Nowacek, D.P., M.P. Johnson, and P.L. Tyack, 2004. “North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alerting stimuli,” *Proceedings of the Royal Society of London, Part B.,* 271:227-231.

Nowacek, D.P., L.H. Thorne, D.W. Johnston, and P.L. Tyack, 2007. “Responses of cetaceans to anthropogenic noise.” *Mammal Review*, 37(2):81-115.

Nuclear Regulatory Commission, 1997. *Proceedings of a dose-modeling workshop*. November 13–14, 1997. Washington, D.C.

Occupational Safety and Health Administration, 1996a. “Occupational noise exposure in OSHA safety and health standards; miscellaneous minor and technical amendments. 29 CFR 1910.95”. *Federal Register*, Vol 61, No. 46, pp. 9227--9236,

Occupational Safety and Health Administration 1996b. “Occupational Exposure to 1,3-Butadiene; Final Rule.” . *Federal Register*, Vol 61, No. 214, pp. 56746-56795, [Online]. Available: http://frwebgate1.access.gpo.gov/cgi-bin/waisgate.cgi?WAISdocID=486577342323+0+0+0&WAISaction=retrieve

Occupational Safety and Health Administration 2006. “Occupational Exposure to Hexavalent Chromium”, *Federal Register*, Vol 71, No. 39, pp. 10099-10385, [Online]. Available: http://frwebgate.access.gpo.gov/cgi-bin/getpage.cgi?position=all&page=10100&dbname=2006_register

Odell, D.K.,1987. A *Review of the Southeastern United States Marine Mammal Stranding Network: 1978-1987.* NOAA Technical Report NMFS 98. Marine Mammal Strandings in the United States. Proceedings of the Second Marine Mammal Stranding Workshop Miami, Florida December 3-5, 1987.

Odell, D.K., and K.M. McClune, 1999. “False killer whale *Pseudorca crassidens* (Owen, 1846),” pp. 213-243. In: S.H. Ridgway and R. Harrison, eds. *Handbook of marine mammals. Volume 6: The second book of dolphins and the porpoises,* San Diego: Academic Press.

Office of Naval Research, 1999a. *LWAD 99-3 OEA Overseas Environmental Assessment (OEA) for the Littoral Warfare Advanced Development (LWAD) 99-3 Sea Test*, ONR Code 32, 22 July.

Office of Naval Research, 1999b. LWAD 99-2 OEA. *Overseas Environmental Assessment (OEA) for the Littoral Warfare Advanced Development (LWAD) 99-2 Sea Test*. ONR Code 32, 15 April.

Office of Naval Research, 2001. *Final Environmental Impact Statement for the North Pacific Acoustic Laboratory*, Volume I, May.

Offshore Island Restoration Committee, undated. "Hawaiian Islands-Kaula Rock, Niihau," [Online]. Available: http://www.botany.hawaii.edu/gradstud/eijzenga/OIRC/kaula.htm [18 July 2006].

Ogden Environmental, 1997. *Airborne Noise Modeling for the Point Mugu Sea Range Environmental Impact Statement.* Modeling conducted by Ogden Environmental and Energy Services, Inc., Colorado Springs, CO.

O'Hara, T.M., and C. Rice, 1996. "Polychlorinated biphenyls," pp. 71–86. *In: Noninfectious diseases of wildlife,* 2nd edition, A. Fairbrother, L. Locke, and G. Hoff (eds.). Iowa State University Press, Ames, Iowa,.

O'Hara T.M., Krahn, M., Boyd, D., Becker, P. and Philo, M., 1999. "Organochlorine Contaminant Levels in Eskimo Harvested Bowhead Whales of Arctic Alaska," *Journal of Wildlife Diseases,* 35(4):741–752. Wildlife Disease Association,

Ohizumi, H., T. Matsuishi, and H. Kishino, 2002. "Winter sightings of humpback and Bryde's whales in tropical waters of the western and central and North Pacific," *Aquatic Mammals*, 28:73-77.

Ohizumi, H., T. Isoda, T. Kishiro, and H. Kato, 2003. "Feeding habits of Baird's beaked whale *Berardius bairdii*, in the western North Pacific and Sea of Okhotsk off Japan," *Fisheries Science,* 69:11-20.

Okamura, H., K. Matsuoka, T. Hakamada, M. Okazaki, and T. Miyashita, 2001. "Spatial and temporal structure of the western North Pacific minke whale distribution inferred from JARPN sightings data," *Journal of Cetacean Research and Management*, 3:193-200.

O'Keeffe, D. J. and G. A. Young, 1984. *Handbook on the environmental effects of underwater explosions*. Naval Surface Weapons Center, Dahlgren, Virginia 22448. Report No. NSWC TR 83-240.

Oleson, E., J. Barlow, C. Clark, J. Gordon, S. Rankin, and J. Hildebrand, 2003. "Low frequency calls of Bryde's whales," *Marine Mammal Science,* 19:407-419.

Oleson, E.M., J. Calambokidis, J. Barlow, and J. Hildebrand, 2007. "Blue Whale Visual And Acoustic Encounter Rates In The Southern California Bight," *Marine Mammal Science*, 23(3): 574–597. .

Omura, H., S. Ohsumi, T. Nemoto, K. Nasu, and T. Kasuya, 1969. "Black right whales in the North Pacific," *Scientific Reports of the Whales Research Institute,* 21:I-78.

Osborne, R., 2003a. "Historical Information on Porpoise Strandings in San Juan County Relative to the May 5th Navy Sonar Incident". *The Whale Museum News & Events*. [Online], Available: http://www.whale-museum.org/museum/press/archives/hist_strand.html

Osborne, R., 2003b. Statement of R. Osborne of 28 May 2003 provided to NMFS.

O'Shea, T. and Brownell, R.L. 1994. "Organochlorine and metal contaminants in baleen whales: A review and evaluation of conservation implications." *Science of the Total Environment* 154: 179–200.

Östman, J.S.O., 1994. "Social organization and social behavior of Hawaiian spinner dolphins (*Stenella longirostris*)," Ph.D dissertation, University of California at Santa Cruz.

Östman-Lind, J., A.D. Driscoll-Lind, and S.H. Rickards, 2004. "Delphinid abundance, distribution and habitat use off the western coast of the island of Hawaii," *Southwest Fisheries Science Center Administrative Report LJ-04-02C*. La Jolla, California: National Marine Fisheries Service.

Oxman, D.S., R. Barnett-Johnson, M.E. Smith, A.B. Coffin, D.D. Miller, R. Josephson, A.N. Popper, 2007. "The effect of vaterite deposition on otolith morphology, sound reception and inner ear sensory epithelia in hatchery-reared chinook salmon (*Oncorhynchus tshawytscha*)," *Canadian Journal of Fisheries and Aquatic Sciences,* 64:1469-1478.

Pace, R.M. and G.K. Silber, 2005. Simple analyses of ship and large whale collisions: Does speed kill?" Sixteenth Biennial Conference on the Biology of Marine Mammals, San Diego, December 2005.

Pacific Business News, 2002. *"*Co-op closes Kauai Electric purchase*",* [Online], Available: http://pacific.bizjournals.com/pacific/stories/2002/10/28/daily84.html [15 September 2006].

Pacific Missile Range Facility, 1999. "Wildlife Flourishing at PMRF," Release #24-99, [Online]. Available: http://www.pmrf.navy.mil/pr_seals.html, [26 April 2002].

Pacific Missile Range Facility, 2000. *Mountaintop Surveillance Sensor Test Integration Center Facility, Kauai, Hawaii, Final Environmental Assessment,* May.

Pacific Missile Range Facility, 2001. *Integrated Natural Resources Management Plan*, Pacific Missile Range Facility, Hawaii, Final, October.

Pacific Missile Range Facility, 2006a. "Barking Sands Botanical Survey Report," May.

Pacific Missile Range Facility, 2006b. "Pacific Missile Range Bird Surveys, " Results conducted on 13-17 February and 14-20 April.

Pacific Missile Range Facility, 2006c. "Herpetological and Mammal Surveys at Pacific Missile Range Facility," February and April.

Pacific Missile Range Facility, 2006d. "The Status of *Wilkesia hobdyi* (Asteraceae) U.S. Navy Pacific Missile Range Facility Makaha Ridge, Kokjee, Kauai, Hawaii, Prepared for Helber Haster & Fee, Planners, by K.R. Wood/Research Biologist, 17-21 April.

Pacific Missile Range Facility, 2006e. "Kokee Botanical Survey Report," May.

Pacific Missile Range Facility, Barking Sands, Hawaii, 1991. *Fleet Mission Planning Guide, FMPG-91,* 1 April.

Palacios, D.M., and B.R. Mate, 1996. "Attack by false killer whales (*Pseudorca crassidens*) on sperm whales (*Physeter macrocephalus*) in the Galapagos Islands," *Marine Mammal Science,* 12:582-587.

Palka, D. and M. Johnson (eds), 2007. *Cooperative Research to Study Dive Patterns of Sperm Whales in the Atlantic Ocean*. Minerals Management Service, New Orleans, LA. OCS Study MMS2007-033. 49 pp.

Palmer, K.V.W., 1927. "The Veneridae of Eastern America: Cenozoic and Recent," *Palaeontologica Americana,* 1:209–522.

Pampel, F.C., 2000. *Logistic regression. A primer*. SAGE Publications, Inc., Newbury Park, California.

Panigada, S., M. Zanardelli, S. Canese, and M. Jahoda, 1999. "Deep diving performances of Mediterranean fin whales," p. 144. In: *Abstracts, Thirteenth Biennial Conference on the Biology of Marine Mammals. 28 November-3 December 1999,* Wailea, Maui.

Papastamatiou, Y.P, B.M. Wetherbee, C.G. Lowe, and G.L Crow, 2006. "Distribution and diet of four species of carcharhinid shark in the Hawaiian Islands; evidence for resource partitioning and competitive exclusion," *Marine Ecology Progress Series, 320; 239-251,* published 29 August [Online]. Available: http://www.hawaii.edu/HIMB/sharklab/Papastamatiou_MEPS06.pdf

Parente, C.L., J.P. Araujo, and M.E. Araujo, 2007. "Diversity of cetaceans as tool in monitoring environmental impacts of seismic surveys." *Biota Neotrop*ica 7(1):1-7.

Parks, S.E., D.R. Ketten, J. Trehey O'Malley, and J. Arruda, 2004. "Hearing in the North Atlantic right whale: Anatomical predictions," *Journal of the Acoustical Society of America*, 115:2442.

Parks, S.E., D.R. Ketten, J.T. O'Malley, and J. Arruda. 2007. Anatomical predictions of hearing in the North Atlantic Right whale. *The Anatomical Record,* 290:734-744.

Parks, S.E., C.W. Clark, and P.L. Tyack. 2007. “Short- and long-term changes in right whale calling behavior: The potential effects of noise on acoustic communication,” *Journal of the Acoustical Society of America,* 122: 3725–3731.

Parrish, F.A., M.P. Craig, T.J. Regan, G.J. Marshall and B.M. Buhleier, 2000. “Identifying diurnal foraging habitat of endangered Hawaiian monk seals using a seal-mounted video camera,” *Marine Mammal Science,* 16:392-412.

Parrish, F.A., K. Abernathy, G.J. Marshall, and B.M. Buhleier, 2002. “Hawaiian monk seals (*Monachus schauinslandi*) foraging in deep-water coral beds,” *Marine Mammal Science,* 16(2): 392-412.

Parrish, F.A., G.J. Marshall, C.L. Littnan, M. Heithaus, S. Canja, B. Becker, R. Braun, and G.A. Antonelis, 2005. “Foraging of juvenile monk seals at French Frigate Shoals, Hawaii,” *Marine Mammal Science*, 21:93-107.

Paterson, R.A., 1984. “*Spondylitis deformans* in a Bryde’s whale (*Balaenoptera edeni* Anderson) stranded on the southern coast of Queensland,” Journal of Wildife Diseases 20, 250-252.

Payne, K., P. Tyack, and R. Payne, 1983. “Progressive changes in the songs of humpback whales (*Megaptera novaengliae*): A detailed analysis of two seasons in Hawaii,” pp. 9-57. In: R. Payne, ed. *Communication and behavior in whales*, Washington, D.C.: American Association for the Advancement of Science.

Pearson, W.H., J.R. Skalski, and C.I. Malme , 1987. “Effects of sounds from a geophysical survey device on fishing success.” Report prepared by Battelle/Marine Research Laboratory for the Marine Minerals Service, United States Department of the Interior under Contract Number 14-12-0001-30273. June.

Pearson, W.H., Skalski, J. R., and Malme, C.I., 1992. “Effects of sounds from a geophysical survey device on behavior of captive rockfish (*Sebastes* ssp),” Canadian Journal Fisheries. and Aquatic. Science, 49:1343-1356.

Perrin, W.F., and R.L. Brownell, 2002. “Minke whales *Balaenoptera acutorostrata* and *B. bonaerensis,”* pp. 750-754. In: W.F. Perrin, B. Würsig, and J.G.M. Thewissen, eds. *Encyclopedia of marine mammals*, San Diego: Academic Press.

Perrin, W.F. and J.W. Gilpatrick, 1994. “Spinner dolphin, *Stenella longirostris* (Gray, 1828),” pp. 99-128. In: S.H. Ridgway and R. Harrison, eds. *Handbook of marine mammals, Volume 5. The first book of dolphins,* San Diego, Academic Press.

Perrin, W.F., and A.A. Hohn, 1994. “Pantropical spotted dolphin, *Stenella attenuate,”* pp. 71-98. In: S.H. Ridgway and R. Harrison, eds. *Handbook of marine mammals. Volume 5: The first book of dolphins*. San Diego: Academic Press.

Perrin, W.F., C.E. Wilson, and F.I. Archer, 1994a. "Striped dolphin – *Stenella coeruleoalba* (Meyen, 1833)," pp. 129-159In: S.H. Ridgway and R. Harrison, eds. *Handbook of marine mammals. Volume 5: The first book of dolphins.* Academic Press, San Diego, CA.

Perrin W.F., S. Leatherwood, and A. Collet, 1994b. "Fraser's dolphin - *Lagenodelphis hosei* Fraser, 1956," pp. 225-240. In: S.H. Ridgway and R. Harrison, eds. *Handbook of Marine Mammals Volume 5: The first book of dolphins*, Academic Pres, London.

Perrin, W.F., and Geraci, J.R., 2002. "Stranding," pp. 1192-1197.In: *Encyclopedia of Marine Mammals*, edited by W.F. Perrin, B. Wursig, and J.G.M. Thewissen (Academic Press, San Diego),.

Perry, S.L., D.P. DeMaster, and G.K. Silber, 1999. "The great whales: History and status of six species listed as endangered under the U.S. Endangered Species Act of 1973," *Marine Fisheries Review,* 61:1-74.

Perryman, W.L., and T.C. Foster, 1980. "Preliminary report on predation by small whales, mainly the false killer whale, *Pseudorca crassidens*, on dolphins (*Stenella* spp. and *Delphinus delphis*) in the eastern tropical Pacific," *Southwest Fisheries Science Center Administrative Report LJ-80-05*, La Jolla, California: National Marine Fisheries Service.

Perryman, W.L., D.W.K. Au, S. Leatherwood, and T.A. Jefferson, 1994. "Melon-headed whale. *Peponocephala electra* (Gray, 1846)," pp. 363-386. In: S.H. Ridgway and R. Harrison, eds. *Handbook of marine mammals. Volume 5: The first book of dolphins*, San Diego: Academic Press.

Philips, J.D., P.E. Nachtigall, W.W.L. Au, J.L. Pawloski, and H.L. Roitblat, 2003. "Echolocation in the Risso's dolphin, *Grampus griseus," Journal of the Acoustical Society of America,* 113:605-616.

Pianradosi, C.A. and E. D. Thalmann, 2004. "Whales, sonar, and decompression sickness," *Nature,* 1428 (5 April 2004).

Pickering, A.D. 1981. Stress and Fishes. New York: Academic Press.

Pilia`au Range Complex and Makua Military Reservation, 2006, Summary of Archeological Sites. [Online]. Available: http://www.25idl.army.mil/makua/History.asp?HistDispID=14.

Pitman, R.L., L.T. Ballance, S.L. Mesnick, and S.J. Chivers, 2001. "Killer whale predation on sperm whales: Observations and implications," Marine Mammal Science 17:494-507.

Pivorunas, A., 1979. "The feeding mechanisms of baleen whales," *American Scientist,* 67:432-440.

Plachta, D.T.T. and A.N. Popper, 2003. "Evasive responses of American shad (*Alosa sapidissima*) to ultrasonic stimuli," *Acoustic Research Letters Online 4: 25-30, 2003* [Online]. Available: http://scitation.aip.org/getpdf/servlet/GetPDFServlet?filetype=pdf&id=ARLOFJ000004000002000025000001&idtype=cvips&prog=normal.

Plachta, D.T.T., J. Song , M.B. Halvorsen, and A.N. Popper, 2004. "Neuronal encoding of ultrasonic sound by a fish," *Journal of Neurophysiology*, 91:2590-2597.

Plastic Process Equipment, 2007. *Material Safety Data Sheet Propylene Gycol Industrial*, Lyondell [Online]. Available: http://www.ppe.com/msds/Propylene%20Glycol.pdf.

Podestà, M., A. D'amico, G. Pavan, A. Drougas, A. Komnenou, and N. Portunato, 2006. "A review of Cuvier's beaked whale strandings in the Mediterranean Sea," *Journal of Cetacean Research and Management*, 7:251–261.

Polefka, S., 2004. "Anthropogenic Noise and the Channel Islands National Marine Sanctuary How Noise Affects Sanctuary Resources, and What We Can Do About It," September. [Online]. Available: http://channelislands.noaa.gov/sac/pdf/7-12-04.pdf

Polovina, J.J., D.R. Kobayashi, D.M. Parker, M.P. Seki, and G.H. Balazs, 2000. "Turtles on the edge: Movement of loggerhead turtles (*Caretta caretta*) along oceanic fronts, spanning longline fishing grounds in the central North Pacific, 1997-1998," *Fisheries Oceanography,* 9:71-82.

Polovina, J.J., G.H. Balazs, E.A. Howell, D.M. Parker, M.P. Seki, and P.H. Dutton, 2004. "Forage and migration habitat of loggerhead (*Caretta caretta*) and olive ridley (*Lepidochelys olivacea*) sea turtles in the central North Pacific Ocean," *Fisheries Oceanography,* 13:36-51.

Poole, M.M., 1995. "Aspects of the behavioral ecology of spinner dolphins (*Stenella longirostris*) in the nearshore waters of Moorea, French Polynesia,: Ph.D. dissertation., University of California, Santa Cruz.

Pooley, S.G., 1993. "Hawaii Marine Fisheries: Some history, long-term trends, and recent development," *Marine Fisheries Review 55(2):7-19* [Online]. Available: http://www.encyclopedia.com/doc/1G1-15462276.html.

Popper, A.N., 1976. "Ultrastructure of the auditory regions in the inner ear of the lake whitefish," *Science* 192:1020 1023.

Popper, A.N., 1977. "A scanning electron microscopic study of the sacculus and lagena in the ears of fifteen species of teleost fishes," *Journal of Morphology*, 153:397 418.

Popper, A.N.,1980. "Scanning electron microscopic study of the sacculus and lagena in several deep-sea fishes," *American Journal of Anatomy*, 157:115-136.

Popper, A.N., 1981. “Comparative scanning electron microscopic investigations of the sensory epithelia in the teleost,” *Journal of Comparative Neurology*, 200:357-374.

Popper, A.N., 2000. “Hair cell heterogeneity and ultrasonic hearing: recent advances in understanding fish hearing,” *Philosophical Transactions of the Royal Society of Biological Sciences, 29:*355:1277-80.

Popper, A.N., 2003. “Effects of anthropogenic sound on fishes,” *Fisheries,* 28:24-31.

Popper, A.N. and T.J. Carlson, 1998. “Application of sound and other stimuli to control fish behavior,” *Transactions of the American Fisheries Society,* 127(5):673-707.

Popper, A.N., and B. Hoxter, 1984. “Growth of a fish ear: 1. “Quantitative analysis of sensory hair cell and ganglion cell proliferation,” *Hearing Research*, 15:133 142.

Popper, A.N., and B. Hoxter, 1987. “Sensory and nonsensory ciliated cells in the ear of the sea lamprey, Petromyzon marinus,” Brain, Behavior and Evolution, 30:43-61.

Popper, A.N. and R.R. Fay, 1977. “Structure and function of the elasmobranch auditory system,” *American Zoologist,* 17:443-452.

Popper, A.N. and C. Platt, 1993. “Inner ear and lateral line,” pp. 99-136In:: *The Physiology of Fishes*, First Edition, edited by Evans DH. Boca Raton, FL: CRC Press, Inc., 1993.

Popper, A.N. and Z. Lu, 2000. “Structure-function relationships in fish otolith organs,” *Fisheries Research.* 46: 15-25.

Popper A.N., R.R. Fay, C. Platt, and O. Sand, 2003. “Sound detection mechanisms and capabilities of teleost fishes,” pp.3-38. In Sensory Processing in Aquatic Environments, eds. S.P. Collin and N.J. Marshall, New York: Springer-Verlag.

Popper, A.N., J. Fewtrell, M.E. Smith, and R.D. McCauley, 2004. “Anthropogenic sound: Effects on the behavior and physiology of fishes,” *Marine Technology Society Journal.*, 37(4): 35-40.

Popper, A.N., M.E. Smith, P.A. Cott, B.W. Hanna, A.O. MacGillivray, M.E. Austin, and D.A. Mann. 2005. “Effects of exposure to seismic airgun use on hearing of three fish species,” *Journal of the Acoustical Society of America*, 117(6): 3958-3971.

Popper, A.N. and W.N. Tavolga, 1981. “Structure and function of the ear in the marine catfish, *Arius felis*,” *Journal of Comparative Physiology* , 144: 27-34.

Popper, A.N., M.B. Halvorsen, E. Kane, D.D. Miller, M.E. Smith, P. Stein, and L.E. Wysocki. 2007. “The effects of high-intensity, low-frequency active sonar on rainbow trout,” *Journal of the Acoustical Society of America*, 122:623-635.

Popper, A.N., and C.R. Schilt , 2008. "Hearing and acoustic behavior (basic and applied)," In: *Fish Bioacoustics*, eds. J.F. Webb, R.R. Fay, and A.N. Popper. New York: Springer Science + Business Media, LLC.

Presidential Document, 2000. "Executive Order 13178—Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve," *Federal Register*, 65(236):76901- 76910. [Online]. Available: http://www.denix.osd.mil/denix/Public/Legislation/EO/note77.html [1 January 2007].

Presidential Document, 2006.. "Proclamation 8031 of June 15, 2006. Establishment of the Northwestern Hawaiian Islands Marine National Monument," *Federal Register*, 71(122):36441-36475.

Quackenbush, S.L., T.M. Work, G.H. Balazs, R.N. Casey, J. Rovnak, A. Chaves, L. du Toit, J. D. Baines, C.R. Parrish, P.R. Bowser, and J.W. Casey, 1998. "Three closely related herpes viruses are associated with fibropapillomatosis in marine turtles," *Virology,* 246:392–399.

Quaranta, A., P. Portalatini, and D. Henderson, 1998. "Temporary and permanent threshold shift: An overview," *Scandinavian Audiology,* 27:75–86.

Ragen, T.J., and M.A. Finn, 1996. The Hawaiian monk seal on Nihoa and Necker Islands, 1993," pp. 90-94. In: T.C. Johanos and T.J. Ragen, eds. *The Hawaiian monk seal in the Northwestern Hawaiian Islands, 1993,* NOAA Technical Memorandum NMFS-SWFSC 227

Ragen, T.J., and D.M. Lavigne, 1999. "The Hawaiian monk seal: Biology of an endangered species," pp. 224-245. In: J.R. Twiss, Jr. and R.R. Reeves, eds. *Conservation and Management of Marine Mammals,* Washington, D.C.: Smithsonian Institution Press.

Ramcharitar, J. and Popper, A.N., 2004. "Masked auditory thresholds of sciaenid fishes: a comparative study," *Journal of the Acoustical Society of America*, 116:1687-1691.

Ramcharitar, Higgs, D.M. and Popper, 2001. "Sciaenid inner ears: A study in diversity." *Brain, Behavior and Evolution*, 58:152-162. Ramcharitar, J.U., X. Deng, D. Ketten, and A.N. Popper, 2004. "Form and function in the unique inner ear of a teleost fish: The silver perch (*Bairdiella chrysoura*)," *Journal of Comparative Neurolology, 475:531-539*.

Ramcharitar, J., D. Higgs, and A.N. Popper, 2006a. "Audition in sciaenid fishes with different swim bladder-inner ear configurations," *Journal of the Acoustical Society of America*, 119:439-443.

Ramcharitar, J., and D. Gannon, and A.N. Popper A., 2006b. "Bioacoustics of fishes of the Family Sciaenidae (croakers and drums)," *Transactions of the American Fisheries Society,* 135:1409–1431.

Rand Corporation. 2005. Unexploded Ordnance Cleanup Costs: Implications of Alternative Protocols. Published by the *Rand Corporation*, 70 pp.

Randall, J.E., 1995. "Zoogeographic analysis of the inshore Hawaiian fish fauna," pp. 193-203. In: J.E. Maragos, M.N.S. Peterson, L.G. Eldredge, J.E. Bardach and HF. Takeuchi, eds. *Marine and coastal biodiversity in the tropical island Pacific region, Volume 1. Species systematics and information management priorities*, Honolulu. Hawaii: East-West Center.

Randall, J.E., 1998. "Zoogeography of shore fishes of the Indo-Pacific region," *Zoological Studies,* 37:227-268.

Range Commanders Council, Range Safety Group, 2002. "Standard 321-02," *Common Risk Criteria for National Test Ranges, Subtitle: Inert Debris,* June.

Rankin, J.J., 1953. "First record of the rare beaked whale, Mesoplodon europaeus, Gervais, from the West Indies," Nature 172:873-874.

Rankin, S., and J. Barlow, 2003. "Discovery of the minke whale "boing" vocalization, and implications for the seasonal distribution of the North Pacific minke whale," p. 134. In: *Abstracts, Fifteenth Biennial Conference on the Biology of Marine Mammals. 14–19 December 2003*, Greensboro, North Carolina.

Rankin, S. and J. Barlow, 2005. "Source of the North Pacific "boing" sound attributed to minke whales," *Journal of the Acoustical Society of America,* 118(5):3346-3351.

Raytheon, 2007. "The Standard Missile Family," [Online]. Available: http://www.raytheon.com/products/standard_missile/

Read, A.J., P. Drinker, and S. Northridge, 2002. *By-Catches of Marine Mammals in U.S. Fisheries and a First Attempt to Estimate the Magnitude of Global Marine Mammal By-Catch*, World Wildlife Fund Conference Report, January 2002, Annapolis, MD.

Read, A.J., P. Drinker, and S. Northridge, 2006. "Bycatch of Marine Mammals in U.S. and Global Fisheries," *Conservation Biology*, 20:63-169.

Redfern, J.V., M.C. Ferguson, E.A. Becker, K.D. Hyrenbach, C. Good, J. Barlow, K. Kaschner, M.F. Baumgartner, K.A. Forney, L.T. Ballance, P. Fauchald, P. Halpin, T. Hamazaki, A.J. Pershing, S.S. Qian, A. Read, S.B. Reilly, L. Torres, and F. Werner. 2006. "Techniques for cetacean-habitat modeling: A review," *Marine Ecology Progress Series,* 310:271-295.

Rechtman, R., A. Yoklavich, and M. Binder, 1998. *Cultural Resources Management Plan, Pacific Missile Range Facility, Barking Sands, Kauai,* Prepared for the Department of the Navy, Naval Facilities Engineering Command, Paul H. Rosendahl, Ph.D., Inc., Hilo. [For Official Use Only]

Reeves R.R., G.K. Silber, P.M. Payne , 1998. Draft Recovery Plan for the Fin Whale *Balaenoptera physalus* and Sei Whale *Balaenoptera borealis.* Draft Report prepared for the Office of Protected Resources, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Silver Spring, Maryland. Report updated in June 2006.

Reeves, R.R., B.D. Smith, E.A. Crespo, and G. Notarbartolo di Sciara, 2003. *2002-2010 conservation plan for the world's cetaceans: Dolphins, whales, and porpoises*, Gland, Switzerland: IUCN- The World Conservation Union, 147 pp.

Reeves, R.R., B.S. Stewart, P.J. Clapham, and J.A. Powell, 2002. *National Audubon Society guide to marine mammals of the world,* New York: Alfred A. Knopf. 527 pp.

Reeves, R.R., S. Leatherwood, G.S. Stone, and L.G. Eldredge, 1999. *Marine mammals in the area served by the South Pacific Regional Environment Programme (SPREP),* Apia, Samoa: South Pacific Regional Environment Programme.

Reeves, R.R., W.F. Perrin, B.L. Taylor, C.S. Baker, and S.L. Mesnick, 2004. "Report of the Workshop on Shortcomings of Cetacean Taxonomy in Relation to Needs of Conservation and Management, April 30 - May 2, 2004," La Jolla, California, NOAA Technical Memorandum NMFS-SWFSC 363:l- 94.

Reijnders, P.J.H., and A. Aguilar, 2002. "Pollution and marine mammals," pp. 948-957. In: W.F. Perrin, B. Würsig, and J.G.M. Thewissen, eds*. Encyclopedia of marine mammals,* San Diego: Academic Press.

Reilly, S., and V.G. Thayer, 1990. "Blue whale (*Balaenoptera musculus*) distribution in the eastern tropical Pacific," *Marine Mammal Science,* 6:265-277.

Remage-Healey, L. and A.H. Bass, 2006. "From social behavior to neural circuitry: steroid hormones rapidly modulate advertisement calling via a vocal pattern generator," *Hormones Behavior,* 50:432-441.

Rendell, L., and H. Whitehead, 2004. "Do sperm whales share coda vocalizations? Insights into coda usage from acoustic size measurement," *Animal Behaviour,* 67:865-874.

Renner, R.H. and J.M. Short, 1980. *Chemical Products of Underwater Explosions.* Naval Surface Weapons Center, Dahlgren, VA. NSWC/WOL. TR 78-87, February.

Resendiz, A., B. Resendiz, W.J. Nichols, J.A. Seminoff, and N. Kamezaki, 1998. "First confirmed east-west transpacific movement of a loggerhead sea turtle, *Caretta caretta*, released in Baja California, Mexico," *Pacific Science,* 52:151-153.

Resnick, D., and G. Niwayama, 2002. "Ankylosing spondylitis," pp. 1023-1081. In: Diagnosis of bone and joint disorders, edited by D. Resnick (W.B. Saunders Co., Philadelphia),.

Resture, J., 2002. "Welcome, Nihoa Island" [Online]. Available: http://www.janeresture.com/nihoa/ [23 April 2002].

Resture, J., 2004. "Welcome, Necker Island" [Online]. Available: http://www.janeresture.com/necker/index.htm.

Resture, J., 2006. "Welcome, Kaula Island" [Online]. Available: http://www.janeresture.com/kaula/index.htm.

Rice, D.W., 1960. "Distribution of the bottle-nosed dolphin in the Leeward Hawaiian Islands," *Journal of Mammalogy,* 41 :407-408.

Rice, D.W. 1977. "*Synopsis of biological data on the sei whale and Bryde's whale in the eastern North Pacific,." Reports of the International Whaling Commission. Special Issue*, 1:92–97.

Rice, D.W., 1998. "Marine mammals of the world: Systematics and distribution," *Society for Marine Mammalogy Special Publication,* 4:1-231.

Richardson, W.J., C.R. Greene, Jr., C.I. Malme, and D.H. Thompson, 1995a. *Marine mammals and noise,* funded by Minerals Management Service, Office of Naval Research, LGL, Ltd., Greeneride Sciences, Inc., and BBN Systems and Technologies under MMS Contract 14-12-0001-30673. San Diego: Academic Press, Inc.

Richardson, W.J., C.R. Greene, Jr., C.I. Malme, and D.H. Thompson, 1995b. p. 163. In: *Marine mammals and noise,* funded by Minerals Management Service, Office of Naval Research, LGL, Ltd., Greeneride Sciences, Inc., and BBN Systems and Technologies under MMS Contract 14-12-0001-30673. San Diego: Academic Press, Inc.

Richardson, W.J., C.R. Greene, Jr., C.I. Malme, and D.H. Thompson, 1995c. pp. 205-240. In: *Marine mammals and noise,* funded by Minerals Management Service, Office of Naval Research, LGL, Ltd., Greeneride Sciences, Inc., and BBN Systems and Technologies under MMS Contract 14-12-0001-30673. San Diego: Academic Press, Inc.

Ridgway, S.H., and M.D. Dailey, 1972. "Cerebral and cerebellar involvement of trematode parasites in dolphins and their possible role in stranding," Journal of Wildlife Diseases. 8:33-43.

Ridgway, S.H., 2000. "The auditory central nervous system," pp. 273-293. In: W.W.L. Au, A.N. Popper, and R.R. Fay, eds. *Hearing by whales and dolphins,* New York: Springer-Verlag.

Ridgway, S.H., and D.A. Carder, 2001. "Assessing hearing and sound production in cetaceans not available for behavioral audiograms: Experiences with sperm, pygmy sperm, and gray whales," *Aquatic Mammals,* 27:267-276.

Ridgway, S.H., and R. Howard, 1979. "Dolphin lung collapse and intramuscular circulation during free diving: evidence from nitrogen washout," *Science,* 206:1182–1183.

Ridgway, S.H., E.G. Wever, J.G. McCormick, J. Palin and J.H. Anderson, 1969a. "Hearing in the giant sea turtles," *Journal of the Acoustical Society of America,* 59, Suppl. 1. S46.

Ridgway, S.H., B.L. Scronce, and J. Kanwisher, 1969b. "Respiration and deep diving in the bottlenose porpoise," *Science,* 166:1651-1654.

Ridgway, S.H., D.A. Carder, R.R. Smith, T. Kamolnick, C. E. Schlundt, and W.R. Elsberry, 1997. *Behavioral Responses and Temporary Shift in Masked Hearing Threshold of Bottlenose Dolphins, Tursiops truncatus, to 1-second Tones of 141 to 201 dB re 1 μPa.* Technical Report 1751, Revision 1, Naval Command, Control and Ocean Surveillance Center NCCOSC, RDT&E DIV D3503, 49620 Beluga Road, San Diego, CA 92152. September.

Rivers, J.A., 1997. "Blue whale, *Balaenoptera musculus*, vocalizations from the waters off central California,: *Marine Mammal Science,* 13:186-195.

Roberts, S., and M. Hirshfield, 2003. "Deep sea corals: Out of sight, but no longer out of mind," *Frontiers in Ecology & the Environment*, 2(3): 123–130 .18 pp.

Robertson, K.M., and S.J. Chivers, 1997. "Prey occurrence in pantropical spotted dolphins, *Stenella attenuata*, from the eastern tropical Pacific," *Fishery Bulletin,* 95:334-348.

Robinson, S., L. Wynen, and S. Goldsworthy, 1999. "Predation by a Hooker's sea lion (*Phocarctos hookeri*) on a small population of fur seals (*Arctocephalus* spp.) at Macquarie Island," Marine Mammal Science, 15:888-893.

Rogers, A.D., 1994. "The biology of seamounts," pp. 306-350. In: J.H. Blaxter, and A.J. Southward, eds. *Advances in marine biology,* 30: 305-354*,* San Diego: Academic Press.

Rogers P.H., M. Cox. 1988. "Underwater sound as a biological stimulus," pp. 131-149. In: Sensory Biology of Aquatic Animals, eds. A. Atema, R.R. Fay, A.N. Popper, and W.N. Tavolga, New York: Springer-Verlag.

Romano, T.A., J.A. Olschowka, S.Y. Felten, V. Quaranta, S.H. Ridgway, and D.L. Felten, 2002. "*Immune response, stress, and environment: Implications for cetaceans,"* pp. 253-279. In: *Molecular and Cell Biology of Marine Mammals*, C.J. Pfeiffer (ed). Krieger Publishing Co., Inc. .

Romano, T.A., M.J. Keogh, C. Kelly, P. Feng, L. Berk, C.E. Schlundt, D.A. Carder, and J.J. Finneran, 2004. "Anthropogenic sound and marine mammal health: measures of the nervous and immune systems before and after intense sound exposure*," Canadian Journal of Fisheries and Aquatic Science*, 61:1124-1134.

Rommel, S.A., A.M. Costidis, A. Fernández, P.D. Jepson, D.A. Pabst , W.A. Mclellan, D.S. Houser, T.W. Cranford, A.L. Van Helden, D.M. Allen, and N.B. Barros. 2006. "Elements of beaked whale anatomy and diving physiology and some hypothetical causes of sonar-related stranding**,"** *Journal Cetacean of Research and Management,* 7:189–209.

Rosen, G. and G.R. Lotufo, 2005. "Toxicity and fate of two munitions constituents in spiked sediment exposures with the marine amphipod *Eohaustorius estuarius*," Environmental Toxicology and Chemistry 24(11): 2887-2897.

Rosen, G. and G.R. Lotufo, 2007a. "Toxicity of explosive compounds to the marine mussel *Mytilus galloprovincialis*, in aqueous exposures," *Ecotoxicology and Environmental Safety,* 68(2): 228-236.

Rosen, G. and G.R. Lotufo, 2007b. "Bioaccumulation of explosive compounds in the marine mussel *Mytilus galloprovincialis," Ecotoxicology and Environmental Safety,* 68(2): 237-245.

Rosenbaum, H.C., R.L. Brownell, M.W. Brown, C. Schaeff, V. Portway, B.N. Whiate, S. Malik, L.A. Pastene, N.J. Patenaude, C.S. Baker, M. Goto, P.B. Best, P.J. Clapham, P. Hamilton, M. Moore, R. Payne, V. Rowntree, C.T. Tynan, J.L. Bannister, and R. DeSalle, 2000. "World-wide genetic differentiation of *Eubalaena*: Questioning the number of right whale species," *Molecular Ecology, 9:1793-1802*.

Rosendahl, P.H., 1977. *Archaeological Inventory and Evaluation Report for Installation Environmental Impact Statement.* Parts 1 and 2. Report prepared by Department of Anthropology, Bernice P. Bishop Museum, Honolulu for U.S. Army Engineer Division, Pacific Ocean, Honolulu, on file at USACE, Pacific Ocean Division, Fort Shafter.

Rosendahl, P., 2000. *Pearl Harbor Naval Complex Cultural Resources Management Plan*. Contributing authors, Mason Architects, Inc. and Maptech, Inc., August. [For Official Use Only]

Ross, D., 1976. *Mechanics of Underwater Noise*. Pergamon Press, New York, 375pp.

Ross, G.J.B., and S. Leatherwood, 1994. "Pygmy killer whale.*Feresa attenuata* Gray, 1874," pp. 387-404. In: S.H. Ridgway and R. Harrison, eds. *Handbook of marine mammals. Volume 5: The first book of dolphins*, San Diego: Academic Press.

Ross, Q.E., D.J. Dunning, J.K. Menezes, M.J. Kenna Jr., and G. Tiller, 1996. " Reducing impingement of alewives with high-frequency sound at a power plant intake on Lake Ontario," *North American Journal of Fisheries Management,* 16: 548-559.

Ross, Q.E., D.J. Dunning, R. Thorne, J.K. Menezes, G.W. Tiller, and J.K. Watson, 1993. "Response of alewives to high-frequency sound at a power plant intake on Lake Ontario," *North American Journal of Fisheries Management*,13:291-303.

Rowntree, V., J. Darling, G. Silber, and M. Ferrari, 1980. "Rare sighting of a right whale (*Eubalaena glacialis*) in Hawaii," *Canadian Journal of Zoology,* 58:309-312.

Safina, C., 1996. *Xiphias gladius*. In: 2004 IUCN red list of threatened species [Online]. Available: http://www.redlist.org

Salden, D.R., and J. Mickelsen, 1999. "Rare sighting of a North Pacific right whale (*Eubalaena glacialis*) in Hawaii," *Pacific Science,* 53:341-345.

Salden, D.R., L.M. Herman, M. Yamaguchi, and F. Sato, 1999. "Multiple visits of individual humpback whales (*Megaptera novaeangliae*) between the Hawaiian and Japanese winter grounds," *Canadian Journal of Zoology,* 77:504-508.

Sand, O., Enger PS, Karlsen HE, Knudsen FR, Kvernstuen T. 2000. "Avoidance responses to infrasound in downstream migrating European silver eels, *Anguilla Anguilla*," *Environmental Biology of Fishes,* 47:327-336.

Sand ,O., Karlsen HE. 1986. "Detection of infrasound by the Atlantic cod," *Journal of Experimental Biology*, 125:197-204.

Sand , O., Karlsen HE. 2000. "Detection of infrasound and linear acceleration in fish," *Philosophical Transactions of the Royal Society of London B*, 355:1295-1298.

Sandia National Laboratories, 2006. *Annual Site Environmental Report for Tonopah Test Range, Nevada and Kauai Test Facility, Hawaii*, Sandia National Laboratories, September.

Santulli, A., A. Modica, C. Messina, L. Ceffa, A. Curatolo, G. Rivas, G. Fabi, and V. D'Amelio, V. 1999. "Biochemical response of European Sea Bass (*Dicentrarchus labrax* L.) to the stress induced by offshore experimental seismic prospecting," Marine Pollution Bulletin: 38 (12): 1105-1114.

Sanvito, S., and F. Galimberti, 2003. "Source level of male vocalizations in the genus *Mirounga*: Repeatability and correlates," *Bioacoustics,* 14:47-57.

Sapolsky, R.M., 2005. "The influence of social hierarchy on primate health," *Science,* 308: 648-652.

Saunders, J.C., J.H. Mills, and J.D. Miller, 1977. "Threshold shift in the chinchilla from daily exposure to noise for six hours," *Journal of the Acoustical Society of America*, 61:558–570.

Sawyers, K.N., 1968. "Underwater sound pressure from sonic booms," *Journal of the Acoustical Society of America*, 44:523-524.

Scarff, J.E., 1986. "Historic and present distribution of the right whale (*Eubalaena glacialis*) in the eastern North Pacific south of 50°N and east of 180°W," *Reports of the International Whaling Commission, Special Issue 10:43-63*.

Scarff, J.E., 1991. "Historic distribution and abundance of the right whale (*Eubalaena glacialis*) in the north Pacific, Bering Sea, Sea of Okhotsk and Sea of Japan from the Maury whale charts," *Reports of the International Whaling Commission,* 41:467-489.

Schilling, M.R., I. Seipt, M.T. Weinrich, S.E. Frohock, A.E. Kuhlberg, and P.J. Clapham, 1992. "Behavior of individually-identified sei whales *Balaenoptera borealis* during an episodic influx into the southern Gulf of Maine in 1986," *Fishery Bulletin,* 90:749-755.

Schlundt, C.E., J.J. Finneran, D.A. Carder, and S.H. Ridgway, 2000. "Temporary shift in masked hearing thresholds of bottlenose dolphins, *Tursiops truncatus*, and white whales, *Delphinapterous leucas*, after exposure to intense tones," *Journal of the Acoustical Society of America,* 107:3496-3508.

Schoenherr, J.R., 1991. "Blue whales feeding on high concentrations of euphausiids around Monterey Submarine Canyon," *Canadian Journal of Zoology,* 69:583-594.

Scholik, A.R. and H.Y. Yan, 2001. "Effects of underwater noise on auditory sensitivity of a cyprinidfish," *Hearing Research,* 152:1-2:17-24.

Scholik, A.R. and H.Y. Yan, 2002. "The effects of noise on the auditory sensitivity of the bluegill sunfish, *Leptomis macrochirus*. *Comparative Biochemistry", Physiology, A Molecular Integration and Physiology,* 133: 43-52. 34.

Schotten, M., W.W.L. Au, M.O. Lammers, and R. Aubauer, 2004. "Echolocation recordings and localization of wild spinner dolphins (*Stenella longirostris*) and pantropical spotted dolphins (S. *attenuata*) using a four-hydrophone array," pp. 393-400. In: J.A. Thomas, C.F. Moss and M. Vater, eds. *Echolocation in bats and dolphins*, Chicago, Illinois: University of Chicago Press.

Schreck, C.B., 1981. "Stress and compensation in teleostean fishes: response to social and physical factors". pp.295-321. In: *Stress and Fish* (ed. A. D. Pickering), London: Academic Press.

Schreck, C.B., 2000. "Accumulation and long-term effects of stress in fish." pp. 147-158. In: *The Biology of Animal Stress – Basic Principles and Implications for Animal Welfare* (ed. G. P. Moberg and J. A. Mench), New York: CABI Publishing.

Schreer, J.F., K.M. Kovacs, and R.J.O. Hines, 2001. "Comparative diving patterns of pinnipeds and seabirds," *Ecological Monographs,* 71:137-162.

Schwartz, M., A. Hohn, A. Bernard, S. Chivers, and K. Peltier, 1992. "Stomach contents of beach cast cetaceans collected along the San Diego County coast of California, 1972-1991, *Southwest Fisheries Science Center Administrative Report LJ-92-18*, La Jolla, California: National Marine Fisheries Service.

Schwarz, A.L. and G.L. Greer, 1984. "Responses of Pacific herring, *Clupea harengus pallasi*, to some underwater sounds," *Canadian Journal of Fisheries and Aquatic. Science,* 41:1183-1192.

Science Lab.com, 2007. *Material Safety Data Sheet Ethylene Glycol* [Online]. Available: http://www.sciencelab.com/xMSDS-Ethylene_glycol-9927167.

Scott, M.D., and K.L. Cattanach, 1998. "Diel patterns in aggregations of pelagic dolphins and tuna in the eastern Pacific," *Marine Mammal Science,* 14:401-428.

Scott, M.D., A.A. Hohn, A.J. Westgate, J.R. Nicolas, B.R. Whitaker, and W.B. Campbell, 2001. "A note on the release and tracking of a rehabilitated pygmy sperm whale (*Kogia breviceps*)," *Journal of Cetacean Research and Management*, 3:87-94.

Seitz, W. and K. Kagimoto, 2007. *Hawaii Island Hawksbill Turtle Recovery Project-2007 Annual Report.* University of Hawaii at Manoa, Pacific Cooperative Studies Unit.

Selzer, L. A., and P.M. Payne, 1988. "The distribution of white-sided dolphins (*Lagenorhynchus acutus*) and common dolphins (*Delphinus delphis*) vs. environmental features of the continental shelf of the northeastern United States," *Marine Mammal Science* 4:141-153.

Seminoff, J.A., 2004. "Marine Turtle Specialist Group Review: 2004 Global Status Assessment, Green Turtle (*Chelonia mydas*)," The World Conservation Union (IUCN), Species Survival Commission Red List Programme, Marine Turtle Specialist Group, [Online]. Available: http://www.iucnmtsg.org/red_list/cm/MTSG_Chelonia_mydas_ assessment_expanded-format.pdf [June 26, 2005].

Seminoff, J.A., W.J. Nichols, A. Resendiz, and L. Brooks, 2003. "Occurrence of hawksbill turtles, *Eretmochelys imbricata* (Reptilia: Cheloniidae), near the Baja California Peninsula, Mexico," *Pacific Science,* 57:9-16.

Sergeant, D.E., 1982. "Some biological correlates of environmental conditions around Newfoundland during 1970-1979: harp seals, blue whales and fulmar petrels," North Atlantic Fisheries Organization [NAFO] Scientific Council Studies, pp. 107-110.

Sevaldsen, E.M., and Kvadsheim, P.H., 2004. *Active sonar and the marine environment*. Norwegian Defense Research Establishment, Horten, Norway. http://www.mil.no/multimedia/archive/00052/_Active_sonar_and_th_52526a.pdf, 8 pp.

Severns, M., and P. Fiene-Severns, 2002. *Diving Hawaii and Midway*, Singapore: Periplus Editions (HK) Ltd. 250 pp.

Seyle, H., 1950. “Stress and the general adaptation syndrome,” *British Medical Journal*, 1383-1392.

Shallenberger, E.W., 1981. *The status of Hawaiian cetaceans,* Report prepared under Contract #MM7AC028 for the Marine Mammal Commission, Washington, D.C.

Shane, S.H., 1994. “Occurrence and habitat use of marine mammals at Santa Catalina Island, California from 1983-91,” *Bulletin of the Southern California Academy of Sciences,* 93:13-29.

Shane, S.H., and D. McSweeney, 1990. “Using photo-identification to study pilot whale social organization,” *Reports of the International Whaling Commission, Special Issue,* 12:259-263.

Shark Specialist Group, 2000. *Carcharhinus limbatus*. In: 2004 IUCN red list of threatened species [Online]. Available: http://www.redlist.org

Shaw, R., 1997. *Rare Plants of Pohakuloa Training Area Hawaii,* Center for Ecological Management of Military Lands, Department of Forest Sciences, Colorado State University.

Shelden, K.E.W., S.E. Moore, J.M. Waite, P.R. Wade, and D.J. Rugh, 2005. “Historic and current habitat use by North Pacific right whales *Eubalaena japonica* in the Bering Sea and Gulf of Alaska,” *Mammal Review,* 35:129-1 55.

Shineldecker, C.L., 1992. *Handbook of Environmental Contaminants: A Guide for Site Assessment*. Lewis Publishers, Inc. Chelsea, Michigan. 367 pp.

Shipley, C., B.S. Stewart, and J. Bass, 1992. “Seismic communication in northern elephant seals,” pp. 553-562. In: J.A. Thomas, R.A. Kastelein, and A.Y. Supin, eds. *Marine mammal sensory systems*, New York: Plenum Press.

Sierra Club, 2006. “Boots on the Ground, Birds in the Nest,” *Sierra Club Insider* [Online]. Available: http://www.sierraclub.org/insider/insider2006-03-21.asp.

Sierra Club, undated. “Department of Defense Range Tours, A Look at How Military Training Operations Impact Natural Resources and Endangered Species by the Sierra Club's Senior Washington DC Lands Director, Maribeth Oakes,” [Online]. Available: http://www.sierraclub.org/wildlife/species/range_tour/

Silber, G.K., 1986. “The relationship of social vocalizations to surface behavior and aggression in the Hawaiian humpback whale (*Megaptera novaeangliae*),” *Canadian Journal of Zoology,* 64:2075-2080.

Simão, S.M., and S.C. Moreira., 2005. “Vocalizations of a female humpback whale in Arraial do Cabo (RJ, Brazil),” *Marine Mammal Science,* 21:150-153.

Simpson, J.H., P.B. Tett, M.L. Argote-Espinoza, A. Edwards, K.J. Jones, and G. Savidge, 1982. “Mixing and phytoplankton growth around an island in a stratified sea,” *Continental Shelf Research,* 1:15-31.

Simmonds, M.P. and J.D. Hutchinson, 1996. *The Conservation of Whales and Dolphins-Science and Practice*. Edited by M.P. Simmonds and J.D. Hutchinson. John Wiley & Sons.

Simmonds, M.P. and L.F. Lopez-Jurado, 1991. Whales and the military. Nature 351:448.

Simmonds, M.P., and S.J. Mayer, 1997. “An evaluation of environmental and other factors in some recent marine mammal mortalities in Europe: implications for conservation and management,” *Environmental Reviews* 5(2):89-98.

Sisneros J.A., 2007. “Saccular potentials of the vocal plainfin midshipman fish, *Porichthys notatus*,” *Journal of Comparative Physiology A,* 193:413-424.

Sisneros. J.A. and A.H. Bass, 2003. “Seasonal plasticity of peripheral auditory frequency sensitivity,” *Journal of Neuroscience* 23(3): 1049-1058.

Skalski, J.R., W.H. Pearson, and C.I. Malme, 1992. “Effects of sounds from a geophysical survey device on catch-per-unit-effort in a hook-and-line fishery for rockfish (*Sebastes* spp),” *Canadian Journal of Fisheries and Aquatic Science,* 49:1357-1365.

Skillman, R.A., and G.H. Balazs, 1992. “Leatherback turtle captured by ingestion of squid bait on swordfish longline,” *Fishery Bulletin,* 90:807-808.

Skillman, R.A., and P. Kleiber, 1998. “Estimation of sea turtle take and mortality in the Hawaii-based long line fishery, 1994-96,” NOAA Technical Memorandum NMFS-SWFSC-257: 1-52.

Skov, H., T. Gunnlaugsson, W.P. Budgell, J. Horne, L. Nøttestad, E. Olsen, H. Søiland, G. Víkingsson and G. Waring. 2007. “Small-scale spatial variability of sperm and sei whales in relation to oceanographic and topographic features along the Mid-Atlantic Ridge,” Deep Sea Research Part II: Topical Studies in *Oceanography,* 55(1-2):254-268.

Slotte, A., K. Kansen, J. Dalen, E. and Ona, 2004. “Acoustic mapping of pelagic fish distribution and abundance in relation to a seismic shooting area off the Norwegian west coast,” *Fisheries Research,* 67:143-150. (3)

Smale, M.J., 2000. *Carcharhinus longimanus*. In: 2004 IUCN red list of threatened species [Online]. Available: http://www.redlist.org

Smith, G.W.. 1990. Ground surveys for sea turtle nesting sites in Belize, 1990. Annual Report to the U.S. Fish and Wildlife Service, 24 pp.

Smith, S.H., K.J.P. Deslarzes, and R. Brock, 2006. Characterization of Fish and Benthic Communities of Pearl Harbor and Pearl Harbor Entrance Channel, Hawaii. Final Report-December 2006, Contract Number: N62470-02-D-997; Task Order Number: 0069. Funded by: Department of Defense Legal Resource Management Program, Project Number 03-183 – Naval Facilities Engineering Command.

Smith, M.E., A.S. Kane, and A.N. Popper, 2004a. "Noise-induced stress response and hearing loss in goldfish (*Carassius auritus*)," *Journal of Experimental Biology 207:3591-602*.

Smith, M.E., A.S. Kane, and A.N. Popper, 2004b. "Acoustical stress and hearing sensitivity in fishes: does the linear threshold shift hypothesis hold water?" *Journal of Experimental Biology*, 207:3591-602.

Smith, P. W., Jr.. 1974. "Averaged sound transmission in range-dependent channels," *Journal of the Acoustic Society of America*, 55:1197-1204.

Snover, M. 2005. "Population trends and viability analyses for Pacific Marine Turtles," U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, *Pacific Islands Fishery Science Center Internal Report IR-05-008*. Honolulu, Hawaii.

Solis, P., 2004. *Laser Safety Survey Report for the Pacific Missile Range Facility Open Ocean Range*, Naval Surface Warfare Center, Corona Division, July 1, 2004. [For Official Use Only]

Song, J., A. Mathieu, R.F. Soper, and A.N. Popper, 2006. "Structure of the inner ear of bluefin tuna *Thunnus thynnus," Journal of Fish Biology, 68: 1767–1781*.

Soto, N.A., M. Johnson, P.T. Madsen, P.L. Tyack, A. Bocconcelli, J.F. Borsani, 2006. "Does intense ship noise disrupt foraging in deep-diving Cuvier's beaked whales (*Ziphius cavirostris*)," *Marine Mammal Science*, 22(3): 690-699.

Southall, B.L., 2005. *Final Report of the National Oceanic and Atmospheric Administration (NOAA) International Symposium: Shipping Noise and Marine Mammals: A Forum for Science, Management, and Technology, 18-19 May 2004*. Released 27 April 2005.

Southall, B., 2006. Declaration of Brandon L. Southall, Ph.D. Natural Resources Defense Council v Donald C. Winter (RIMPAC), June 30, 2006.

Southall, B.L., R. Braun, F.M.D. Gulland, A.D. Heard, R.W. Baird, S.M. Wilkin, and T.K. Rowles, 2006. "Hawaiian melon-headed whale (*Peponacephala electra*) mass stranding event of July 3-4, 2004," NOAA Technical Memorandum NMFS-OPR-31, 73 pp.

Southall, B., A.E. Bowles, W.T. Ellison, J.J. Finneran, R.L. Gentry, C.R. Green, Jr., D. Kastak, D. Ketten, J. Miller, P. Nachtigall, W.J. Richardson, J. Thomas and P. Tyack, 2007. "Marine Mammals Noise Criteria: Initial Scientific Recommendations," *Aquatic Mammals,* 33(4):411-521

Spitz, W.U., 1993. Spitz and Fisher's Medicolegal Investigation of Death; Guidelines for the Application of Pathology to Crime Investigation. 3rd ed., Springfield: Charles C. Thomas pub., pp. 1-829.Spotila, J.R., M.P. O'Connor, and F.V. Paladino, 1997. "Thermal biology," pp. 297-314. In: P.L. Lutz and J.A. Musick, eds. *The biology of sea turtles,* Boca Raton, Florida: CRC Press.

Stacey, P.J., and R.W. Baird, 1991. "Status of the false killer whale, *Pseudorca crassidens*, in Canada,". *Canadian Field-Naturalist,* 105:189-197.

Stafford, K.M., 2003. "Two types of blue whale calls recorded in the Gulf of Alaska," *Marine Mammal Science*," 19:682-693.

Stafford, K.M., S.L. Nieukirk, and C.G. Fox, 2001. "Geographic and seasonal variation of blue whale calls in the North Pacific." *Journal of Cetacean Research Management,* 3(1):65–76.

Stafford, K.M., S.E. Moore, and C.G. Fox, 2005. "Diel variation in blue whale calls recorded in the eastern tropical Pacific," *Animal Behaviour,* 69:951-958.

Star Bulletin, 2007. "Sales, prices drop for neighbor isle properties," Volume 12, Issue 6 – Saturday, January 6, 2007 [Online]. Available: http://starbulletin.com/2007/01/06/business/story01.html.

State of Hawaii, 1993. *Botanical Database and Reconnaissance Survey of the Polihale Area, Kaua`i,* Division of State Parks, Department of Land and Natural Resources, Honolulu.

State of Hawaii, 2001. *Environmental Impact Statement Preparation Notice for the Proposed Kalaeloa Desalination Facility*, Board of Water Supply, City, and County of Honolulu.

State of Hawaii, 2005a. *Index of /dlnr/dofaw/cwcs/files/NAAT final CWCS/Chapters/Terrestrial Fact Sheets* [Online]. Available: http://www.state.hi.us/dlnr/dofaw/cwcs/files/NAAT%20final%20CWCS/Chapters/Terrestrial%20Fact%20Sheets/

State of Hawaii, 2005b. *Northwestern Hawaiian Islands Passerines* "Nihoa Millerbird *Acrocephalus familiaris*," p. 3-16 [Online]. Available: http://www.state.hi.us/dlnr/dofaw/cwcs/files/NAAT%20final%20CWCS/Chapters/Terrestrial%20Fact%20Sheets/NWHI/Nihoa_Millerbird%20NAAT%20final%20!.pdf

State of Hawaii, 2006. Hawaii Ocean Resources Management Plan Department of Business, Economic Development & Tourism, Office of Planning, December, 2006. 73 pp.

State of Hawaii Department of Business, Economic Development and Tourism, 2006. *“2005 Annual Visitor Research Report,*”

State of Hawaii, Department of Land and Natural Resources, 2005. “Draft Newell’s Shearwater Five-year Work Plan,” Drafted by the NESH Working Group--October 2005 [Online]. Available: http://www.state.hi.us/dlnr/dofaw/fbrp/docs/NESH_5yrPlan_Sept2005.pdf.

State of Hawaii Office of Planning, 2005. “Hawaii Statewide GIS Program,” [Online]. Available: http://www.hawaii.gov/dbed/gis [October 2005].

Stern, J.S., 1992. “Surfacing rates and surfacing patterns of minke whales (*Balaenoptera acutorostrata*) off central California, and the probability of a whale surfacing within visual range,” *Reports of the International Whaling Commission,* 42:379-385.

Stevens, J., 2000. *Isurus oxyrinchus.* In: IUCN 2004 The 2004 IUCN red list of threatened species [Online]. Available: http://www.redlist.org [10 December 2004].

Stevens, J. 2000a. *Lamna nasus* (Northeast Atlantic subpopulation). In: *2003 IUCN Red List of Threatened Species*. [Online]. Available: www.redlist.org

Stevens, J.D., 2000b. “The effects of fishing on sharks, rays, and chimaeras (chondrichthyans), and the implications for marine ecosystems. International Council for the Exploration of the Sea,” *Journal of Marine Science*, 57(3):476-494.

Stevick, P.T., B.J. McConnell, and P.S. Hammond, 2002. “Patterns of movement,” pp. 185-216. In: A.R. Hoelzel, ed. *Marine mammal biology: An evolutionary approach,* Oxford: Blackwell Science.

Stewart, B.S., 1997. “Ontogeny of differential migration and sexual segregation in northern elephant seals,” *Journal of Mammalogy,* 78:1101-1116.

Stewart, B.S., and R.L. DeLong, 1995. “Double migrations of the northern elephant seal, *Mirounga angustirostris,” Journal of Mammalogy,* 76:196-205.

Stewert, B.S. and S. Leatherwood, 1985. Minke whale - *Balaenoptera acutorostrata,* pp. 91-136. *In:* S.H. Ridgway and R. Harrison (eds.). *Handbook of Marine Mammals.* Academic Press, London.

Stewart, B.S., P.K. Yochem, H.R. Huber, R.L. DeLong, R.J. Jameson, W.J. Sydeman, S.G. Allen, and B.J. Le Boeuf, 1994. “History and present status of the northern elephant seal population,” pp. 29-48. In: B.J. Le Boeuf and R.M. Laws, eds. *Elephant seals: Population ecology, behavior, and physiology,* Berkeley: University of California Press.

Stiles, M., 2004. "Effectiveness: Do pingers work?," *Pingers Warning cetaceans away from the nets*, Cetacean Bycatch Resource Center, Reviewed by Dr. Jay Barlow, May. [Online]. Available: http://www.cetaceanbycatch.org/pingers_effectiveness.cfm: Available: http://www.cetaceanbycatch.org/pingers.cfm.

Stockin, K.A., D. Lusseau, V. Binedell, N. Wiseman and M. B. Orams, 2008. "Tourism Affects the Behavioural Budget of the Common Dolphin (Delphinus sp.) in the Hauraki Gulf, New Zealand", *Marine Ecology Progress Series*, 355:287-295.

Stone, C.J. and M.J. Tasker, 2006. "The effects of seismic airguns on cetaceans in U.K. waters," *Journal of Cetacean Research and Management*, 8(3):255-263.

Stone, G.S., S.K. Katona, A. Mainwaring, J.M. Allen, and H.D. Corbett, 1992. "Respiration and surfacing rates for finback whales (*Balaenoptera physalus*) observed from a lighthouse tower," *Reports of the International Whaling Commission,* 42:739-745.

Sullivan, M.J., and R.B. Conolly, 1988. "Dose-response hearing loss for white noise in the Sprague-Dawley rat," *Toxicological Sciences*, 10:109-113.

Suter II, G.W., L.W. Barnthouse, S.M. Bartell, T. Mill, D. Mackay, and S. Paterson, 1993. *Ecological risk assessment*. Lewis Publishers, Boca Raton, Florida.

Sverdrup, A., E. Kjellsby, P.G. Krueger, R. Floysand, F.R. Knudsen, P.S. Enger, G. Serck-Hanssen G, and K.B. Helle, 1994. "Effects of experimental seismic shock on vasoactivity of arteries, integrity of the vascular endothelium and on primary stress hormones of the Atlantic salmon," *Journal of Fish Biology,* 45:973-995.

Swartz, S.L., A. Martinez, J. Stamates, C. Burks, and A.A. Mignucci-Giannoni, 2002. "Acoustic and visual survey of cetaceans in the waters of Puerto Rico and the Virgin islands: February-March 2001," NOAA Technical Memorandum NMFS-SEFSC-463:1-62.

Sweeny, M.M., J.M. Price, G.S. Jones, T.W. French, G.A. Early, and M.J. Moore, 2005. "Spondylitic changes in long-finned pilot whales (*Globicephala melas*) stranded on Cape Cod, Massachusetts, USA, between 1982 and 2000," Journal of Wildlife Diseases 41:717-727.

Szymanski, M.D., D.E. Bain, K. Kiehl, S. Pennington, S. Wong, and K.R. Henry, 1999. "Killer whale (*Orcinus orca*) hearing: auditory brainstem response and behavioral audiograms," *Journal of the Acoustical Society of America,* 106:1134-1141.

Tavolga, W.N. and J. Wodinsky, 1963. "Auditory capacities in fishes. Pure tone thresholds in nine species of marine teleosts," *Bulletin of the American Museum of Natural History,* 126:179-239.

Tavolga, W.N. and J. Wodinsky, 1965. "Auditory capacities in fishes: threshold variability in the blue-striped grunt *Haemulon sciurus*," *Animal Behavior,* 13:301-311.

Tavolga, W.N., 1974a. “Sensory parameters in communication among coral reef fishes,” *Mount Sinai Journal of Medicine,* 41(2):324-340.

Tavolga, W.N., 1974b. “Signal/noise ratio and the critical band in fishes,” *Journal of the Acoustical Society of America,* 55:1323-1333.

Teleki, G.C., and Chamberlain, A.J., 1978. Acute effects of underwater construction blasting on fishes in Long Point Bay, Lake Erie,” *Journal of Fisheries and Research Board of Canada*, 35:1191-1198.

TenBruggencate, J., 2005. “Coral tests could unravel Nihoa’s mysterious past” in the *Honolulu Advertiser.* August 29.

Tetra Tech, 2005. *Noise Monitoring Report, Mākua Military Reservation, Hawai`i*. Prepared by Tetra Tech, Inc., San Francisco, CA, February 22. Prepared for the U.S. Army Corps of Engineers, Honolulu Engineer District in support of the Environmental Impact Statement for the MaKua Military Reservation (MMR), Hawaii.

The Garden Island, 2007. “Kauai Leads State in Coastal Protection.” Wednesday, December 26, 2007. [Online]. Available: http://www.kauaiworld.com/articles/2007/12/20/news/news01.txt

The Onyx Group, 2001. Supplemental Environmental Assessment, *Routine Training at Makua Military Reservation and PFC Pillila`au Range Complex Hawaii,* Prepared for G3 Range Division, 25th Infantry Division (Light) and U.S. Army-Hawaii, May.

Thode, A., D.K. Mellinger, S. Stienessen, A. Martinez, and K. Mullin, 2002. “Depth-dependent acoustic features of diving sperm whales (*Physeter macrocephalus*) in the Gulf of Mexico,” *Journal of the Acoustical Society of America,* 112:308-321.

Thomas, J., N. Chun, W. Au, and K. Pugh, 1988. “Underwater audiogram of a false killer whale (*Pseudorca crassidens*),” *Journal of the Acoustical Society of America,* 84:936-940.

Thomas, J.A., P. Moore, R. Withrow, and M. Stoermer, 1990. “Underwater audiogram of a Hawaiian monk seal (*Monachus schauinslandi*),” *Journal of the Acoustical Society of America,* 87(1): 417-420*.*

Thompson, P.O., and W.A. Friedl, 1982. “A long term study of low frequency sounds from several species of whales off Oahu, Hawaii,” *Cetology,* 45(l): -1 9.

Thompson, R., 2003. “Turtle’s isle journey tracked by satellite,” *Honolulu Star-Bulletin News,* March 28.

Thompson, T.J., H.E. Winn, and P.J. Perkins, 1979. “Mysticete sounds*,” In: Behavior of Marine Animals, Vol 3*, Chapter 12, H.E. Winn and B.L. Olla, (eds.), Plenum, NY, 438 pp.

Thrum, T.G., 1906. “Tales from the Temples,” (Preliminary paper In: the study of the heiaus of Hawai`i, with plans of the principal ones of Kaua`i and O`ahu), *The Hawaiian Annual*, Honolulu, Hawai`i. [For Official Use Only]

Thurman, H.V., 1997. *Introductory oceanography*, Upper Saddle River, New Jersey: Prentice Hall.

Tomich, P.Q., 1986. *Mammals in Hawaii: A synopsis and notational bibliography*, Honolulu: Bishop Museum Press.

Tracey, R., 2000. “Mass false killer whale beaching remains a mystery.” Discovery Channel Canada’s Website [Online]. Available: http://www.exn.ca/Stories/2000/06/05/56.asp [12 February 2007].

Transportation Research Board, 2000. *Highway Capacity Manual* [Online]. Available: http://onlinepubs.trb.org/onlinepubs/circulars/ec018/ec018toc.pdf.

Transportation Research Board, 2006. Highway Capacity Manual [Online]. Available: http://onlinepubs.trb.org/onlinepubs/circulars/ec018/ec018toc.pdf.

Trimper, P.G., N.M. Standen, L.M. Lye, D. Lemon, T.E. Chubbs, and G.W. Humphries, 1998. “Effects of lowlevel jet aircraft noise on the behaviour of nesting osprey,” *Journal of Applied Ecology,* 35:122-130.

Turl, C.W., 1993. “Low-frequency sound detection by a bottlenose dolphin,” *Journal of the Acoustical Society of America,* 94:3006-3008.

Turnpenny , A.W.H., K.P. Thatcher, and J.R. Nedwell, 1994. “The effects on fish and other marine animals of high-level underwater sound.” Report FRR 127/94 prepared by Fawley Aquatic Research Laboratories, Ltd., Southampton, UK.

Tyack., P.L., 1983. “Differential responses of humpback whales, *Megaptera novaeangliae*, to playback of song or social sounds.” *Behavioral Ecology and Sociobiology* 13:49-55.

Tyack, P.L., M. Johnson, N.A. Soto, A. Sturlese, and P.T. Madsen, 2006. “Extreme diving of beaked whales,” *Journal of Experimental Biology*, 209:4238-4253.

Tynan, C.T., D.P. DeMaster, and W.T. Peterson, 2001. “Endangered right whales on the southeastern Bering Sea shelf,” *Science,* 294:1894.

U.S. Air Force, 2005. Air Force Center for Environmental Excellence. *Air Conformity Applicability Model, Version 4.3.3.* Technical Documentation, December.[Online}, Available: #C:\Documents and Settings\john.dixon\Desktop\ACAM\TD Report Ver 4.3.doc.

U.S. Air Force, Air Combat Command, 1997. *Environmental Effects of Self-Protection Chaff and Flares*. Prepared for Headquarters Air Combat Command, Langley Air Force Base, Virginia.

U.S. Air Force 15th Airlift Wing, 2005. "Final Work Plan Feasibility Study at Sites LF01, LF23, LF24, and AOC 18, Bellows AFS and MCTAB," Bellows Air Force Station, Oahu, Hawaii, 4 March.

U.S. Army Center for Health Promotion and Preventive Medicine, 2002. *Depleted Uranium: Sources, Exposure and Health Effects.* [Online]. Available: http://www.who.int/ionizing_radiation/pub_meet/DU_Eng.pdf

U.S. Army Corps of Engineers, 2001. "Training and environment mix in Hawaii," *Engineer Update* [Online]. Available: http://www.hq.usace.army.mil/cepa/pubs/aug01/story17.htm

U.S. Army Corps of Engineers, 2003. *Estimates for Explosives Residue from the Detonation of Army Munitions* [Online]. Available: http://www.crrel.usace.army.mil/techpub/CRREL_Reports/reports/TR03-16.pdf, September.

U.S. Army Corps of Engineers, 2007. Explosives *Residues Resulting from the Detonation of Common Military Munitions, 2002-2006.* Final Report. Prepared for the Strategic Environmental Research and Development Program (SERDP), ERDC/CRREL TR-07-2 . February.

U.S. Army Corps of Engineers, Honolulu Engineer District, 2005. *Integrated Cultural Resources Management Plan (ICRMP) Marine Corps Base Hawai`i, O`ahu, Hawai`i*. Prepared by Wil Chee – Planning, Inc. Subcontractors: Fung Associates (Historic Architecture) and Pacific Legacy, Inc. (Archaeology), February.

U.S. Army Garrison, Hawaii, 1996. "Pohakuloa Training Area (PTA) External Standing Operating Procedures," 1 August.

U.S. Army Garrison Hawaii, 2005. "2005 Status Report Makua Implementation Management Plan, Island of Oahu," [Online]. Available: http://www.botany.hawaii.edu/faculty/duffy/DPW/2005_MIP/TOC.pdf

U.S. Army Garrison Hawaii, 2006. A quarterly publication of the Environmental Division, Directorate of Public Works, U.S. Army Garrison, Hawaii. *Ecosystem Management Program Bulletin*, 35:1-5, May.

U.S. Army Garrison Hawaii and U.S. Army Corps of Engineers, 1997. *Final Endangered Species Management Plan Report for the Oahu Training Areas*, Prepared for U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers. October. 250 pp.

U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, 1998. *Ecosystem Management Plan Report for Pohakuloa Training Area*, U.S. Army Garrison, Hawaii, and U.S. Army Corps of Engineers, Contract #DACA83-92-D-004, Delivery Order No. 0024, March.

U.S. Army, Hawaii and 25th Infantry Division (Light), 2003. *Integrated Wildland Fire Management Plan Oahu and Pohakuloa Training Areas,* [Online]. Available: http://www.25idl.army.mil/sbcteis/documents/FMP/00_Cover.pdf

U.S. Army, Pacific Public Affairs, 2007. "Army Reaffirms Commitment to Hawaii on Depleted Uranium." [Online]. Available: http://www.army.mil/-news/2007/08/30/4671-army-reaffirms-commitment-to-hawaii-on-depleted-uranium, [25 October 2007].

U.S. Army Program Executive Office, 1995. *Final Environmental Assessment Army Mountain Top Experiment*, May.

U.S. Army Space and Missile Defense Command, 2001. *North Pacific Targets Program Environmental Assessment*, April.

U.S. Army Space and Missile Defense Command, 2002. *Theater High Altitude Area Defense (THAAD) – Pacific Test Flights-Environmental Assessment,* Missile Defense Agency, 20 December 2002.

U.S. Army Space and Missile Defense Command, 2003. *Ground-Based Midcourse Defense (GMD) Extended Test Range (ETR) Final Environmental Impact Statement,* July.

U.S. Army Space and Missile Defense Command, 2004. *Use of Tributyl Phosphate (TBP) in the Intercept Debris Measurement Program (IDMP) at White Sands Missile Range (WSMR) Environmental Assessment, April.*

U.S. Army Space and Strategic Defense Command, 1993a. *Final Environmental Impact Statement for the Restrictive Easement, Kauai, Hawaii,* October.

U.S. Army Space and Strategic Defense Command, 1993b. *Programmatic Environmental Assessment, Theater Missile Defense Lethality Program,* August.

U.S. Army Space and Strategic Defense Command, 1993c. *Ground Based Radar (GBR) Family of Strategic and Theater Radars Environmental Assessment,* May.

U.S. Army Space and Strategic Defense Command, 1994. *Final Environmental Impact Statement Theater Missile Defense Extended Test Range,* November.

U.S. Army Space and Strategic Defense Command, 1995. *Theater Missile Defense Flight Test, Supplemental Environmental Assessment*, November.

U.S. Army Strategic Defense Command, 1990. *Exoatmospheric Discrimination Experiment (EDX) Environmental Assessment,* September.

U.S. Army Strategic Defense Command, 1992. *Final Environmental Impact Statement for the Strategic Target System.*

U.S. Census Bureau, 2000a. "Honolulu County, Hawaii*,"* [Online]. Available: http://factfinder.census.gov/servlet/ [30 October 2006].

U.S. Census Bureau, 2000b. "Kauai County, Hawaii*,"* [On-Line]. Available: http://factfinder.census.gov/servlet/, 2 October 2006.

U.S. Census Bureau, 2006a. "American Community Survey, Honolulu County, Hawaii." [Online]. Available: http://factfinder.census.gov/servlet/ACSSAFFFacts?_event=Search&_lang=en&_sse=on&_state=04000US15&_county=Honolulu%20County

U.S. Census Bureau, 2006b. "American Community Survey, Hawaii." [Online]. Available: http://factfinder.census.gov/servlet/ACSSAFFFacts?_event=&geo_id=04000US15&_geoContext=01000US%7C04000US15%7C05000US15003&_street=&_county=Honolulu+County&_cityTown=&_state=04000US15&_zip=&_lang=en&_sse=on&ActiveGeoDiv=&_useEV=&pctxt=fph&pgsl=050&_submenuId=factsheet_1&ds_name=ACS_2006_SAFF&_ci_nbr=null&qr_name=null&reg=null%3Anull&_keyword=&_industry=

U.S. Census Bureau, 2006c. "American Community Survey, Hawaii Selected Housing Characteristics:2006." Online]. Available: http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=04000US15&-qr_name=ACS_2006_EST_G00_DP4&-ds_name=ACS_2006_EST_G00_&-_lang=en&-_sse=on

U.S. Census Bureau, 2006d. "American Community Survey, Hawaii Selected Economic Characteristics: 2006." Online]. Available: http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=04000US15&-qr_name=ACS_2006_EST_G00_DP3&-ds_name=&-_lang=en&-redoLog=false

U.S. Census Bureau, 2006e. "American Community Survey, Honolulu County, Hawaii Selected Economic Characteristics: 2006." [Online]. Available: http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=05000US15003&-qr_name=ACS_2006_EST_G00_DP3&-ds_name=ACS_2006_EST_G00_&-_lang=en&-redoLog=false&-_sse=on

U.S. Census Bureau, 2007a. "State and County QuickFacts - Kauai." Last Revised: Friday, 31-Aug-2007 10:22:39 EDT. [Online]. Available: http://quickfacts.census.gov/qfd/states/15/15007.html

U.S. Census Bureau, 2007b. "Honolulu County QuickFacts from the U.S. Census Bureau; State and County QuickFacts. Last Revised: Friday, 31-Aug-2007 10:22:39 EDT. [Online]. Available: http://quickfacts.census.gov/qfd/states/15/15003.html

U.S. Coast Guard, 1960. *Investigation of acoustic signaling over water in fog.* Prepared by BBN, Rep 674 for the U.S. Coast Guard. Rep. From Bolt Beranek & Newman, Inc., Cambridge, MA. Washington, D.C.

U.S. Department of Agriculture, 1990. *Silvics of North America, Volume 2,* Forest Service [Online]. Available: http://www.na.fs.fed.us/pubs/silvics_manual/table_of_contents.shtm [14 June 2006].

U.S. Department of the Air Force, 1990. *Environmental Assessment, Titan IV Solid Rocket Motor Upgrade Program,* Cape Canaveral Air Force Station, Florida and Vandenberg Air Force Base, California.

U.S. Department of the Air Force, 1997. *Environmental Assessment for atmospheric interceptor technology Program*, Headquarters, Space and Missile Systems Center, Material Command, November [Online]. Available : http://www.globalsecurity.org/space/library/report/enviro/eawthfon.pdf

U.S. Department of the Air Force, 2002. *Development and Demonstration of the Long Range Air Launch Target System Environmental Assessment,* October.

U.S. Department of the Air Force, 15th Airlift Wing, 2003. Final *Decision Document to Support No Further Response Action Planned (NFRAP) for AOC EA03 (Cesspool), Kaena Point Satellite Tracking Station Oahu, Hawaii,* 31 July.

U.S. Department of the Air Force, 2003. *Final Environmental Assessment for the C-17 Globemaster III Beddown, Hickam Air Force Base, Hawaii,* September.

U.S. Department of the Air Force, 2004. *Environmental Assessment for Minutman III Modification*. *Hill Air Force Base*, December.

U.S. Department of the Army, 2004. *Transformation of the 2nd Brigade, 25th Infantry Division (L) to a Stryker Combat Brigade Combat Team in Hawaii Environmental Impact Statement,* May.

U.S. Department of the Army, 2005. 25th Infantry Division (Light) and U.S. Department of the Army Hawaii, *Draft Environmental Impact Statement Military Training activities at Makua Military Reservation, Hawaii*, March.

U.S. Department of the Army, 2006. *Programmatic Environmental Assessment for Construction of Large-Scale Fence Units at Pohakuloa Training Area, Island of Hawaii,* May.

U.S. Department of the Army, 2008. *Permanent Stationing of the 2/25th Stryker Brigade Combat Team Draft Environmental Impact Statement*, February.

U.S. Department of the Army Headquarters, 2006. *Draft Programmatic Environmental Assessment with Anticipated FONSI for the Makua Implementation Plan, Oahu, Hawaii*, 25th Infantry Division and U.S. Department of the Army Hawaii, April.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration and State of Hawaii, Office of Planning, 1997. *Hawaiian Islands Humpback Whale National Marine Sanctuary Final Environmental Impact Statement and Management Plan,* February.

U.S. Department of Commerce, The Under Secretary of Commerce for Oceans and Atmosphere, 2007. Papahanaumokuakea Marine National Monument: Application for Inclusion of a Property in the U.S. World Heritage Tentative List. Friday March 30..

U.S. Department of Defense. 2004. *Strategic Plan for Transforming Training Defense Planning Guidance, FY 2004*.

U.S. Department of Defense, 2005. *Mobile Sensors Environmental Assessment*. Missile Defense Agency, 26 September.

U.S. Department of Defense, 2006. *Joint Hawaii Range Complex Management Plan – Final Draft, April 2006.*

U.S. Department of the Interior, Office of Environmental Policy and Compliance Pacific Southwest Region, 2007. Comments received from U.S. Department of the Interior on the *Hawaii Range Complex Draft Environmental Impact Statement/Overseas Environmental Impact Statement* regarding biological resources.

U.S. Department of the Navy, 1980. *Department of the Navy Environmental Impact Assessment Kaula Island Target Hawaii*, Commander, Naval Air Forces, U.S. Pacific Fleet, 20 February.

U.S. Department of the Navy, 1993. Commander, Surface Forces Pacific (COMSURFPAC) Instruction 3120.8D, *Procedures for Disposal of Explosives at Sea/Firing of Depth Charges and Other Underwater Ordnance.*

U.S. Department of the Navy, 1996a. Draft *Environmental Assessment of the Use of Selected Navy Test Sites for Development Tests and Fleet Training Exercises of the MK-46 and MK 50 Torpedoes.* Program Executive Office Undersea Warfare, Program Manager for Undersea Weapons. CONFIDENTIAL.

U.S. Department of the Navy, 1996b. *Environmental Assessment of the Use of Selected Navy Test Sites for Development Tests and Fleet Training Exercises of the MK 48 Torpedoes. Program Executive Office Undersea Warfare, Program Manager for Undersea Weapons.* [For Official Use Only].

U.S. Department of the Navy, 1998a. *Pacific Missile Range Facility Enhanced Capability Final Environmental Impact Statement Volume 1 of 3,* December.

U.S. Department of the Navy, 1998c. *Point Mugu Sea Range marine mammal technical report. Point Mugu Sea Range Environmental Impact Statement / Overseas Environmental Impact Statement*, Prepared by LGL Limited, Ogden Environmental and Energy Services, Naval Air Warfare Center Weapons Division, and Southwest Division Naval Facilities Engineering Command. 281 pp.

U.S. Department of the Navy, 1998d. *Rim of the Pacific (RIMPAC) 98 Environmental Assessment*, Commander THIRD FLEET, Hawaii, June.

U.S. Department of the Navy, 2000. *Rim of the Pacific (RIMPAC) Environmental Assessment*, Commander THIRD FLEET, Hawaii, May.

U.S. Department of the Navy, 2001a. *Integrated Natural Resources Management Plan: Pacific Missile Range Facility Hawaii,* Final report Prepared for Commander, Navy Region Hawaii, Honolulu, Hawaii by Belt Collins Hawaii Ltd., Honolulu, Hawaii.

U.S. Department of the Navy, 2001b. *Environmental Impact Statement for the Shock Trial of the WINSTON S. CHURCHILL*, (DDG-81), Department of the Navy, February.

U.S. Department of the Navy, 2001c. Final Overseas Environmental Impact Statement and Environmental Impact Statement for Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar. Department of the Navy, Chief of Naval Operations. January 2001.

U.S. Department of the Navy, 2002a. *Rim of the Pacific (RIMPAC) Programmatic Environmental Assessment,* June 2002. Commander, Third Fleet (COMTHIRDFLT) Hawaii.

U.S. Department of the Navy, 2002b. “Record of Decision for Surveillance Towed Array Sensor System Low Frequence Active (SURTASS LFA) Sonar.” Federal Register, Vol 67, No. 141, pp. 48145-48154. 23 July.

U.S. Department of the Navy, 2003a. *Advanced Amphibious Assault Vehicle Environmental Impact Statement.*

U.S. Department of the Navy, 2003b. *Regional Shore Infrastructure Plan, Pacific Missile Range Facility, Barking Sands Activity Overview Plan,* May.

U.S. Department of the Navy, 2004a. *Green turtle and Hawaiian monk seal geodatabase for Pacific Missile Range Facility Barking Sands*, NAVFAC Pacific.

U.S. Department of Navy, 2004b. *Report on the Results of the Inquiry into Allegations of Marine Mammal Impacts Surrounding the Use of Active Sonar by USS SHOUP (DDG 86) in the Haro Strait on or about 5 May 2003.*

U.S. Department of the Navy, 2005a. Draft Overseas Environmental Impact Statement/Environmental Impact Statement – East Coast Underwater Water Training Range.

U.S. Department of the Navy, 2005b. *Marine Resources Assessment for the Hawaiian Islands Operating Area, Final Report*, Prepared for the Department of the Navy, Commander, U.S. Pacific Fleet, December.

U.S. Department of the Navy, 2006a. *Rim of the Pacific Exercise After Action Report: Analysis of Effectiveness of Mitigation and Monitoring Measures as Required Under the Marine Mammals Protection Act (MMPA) Incidental Harassment Authorization and the National Defense Exemption from the Requirements of the MMPA for Mid-Frequency Active Sonar Mitigation Measures.*

U.S. Department of the Navy, 2006b. *Comprehensive Infrastructure Plan, Volume 1 of 2.* Pacific Missile Range Facility, Barking Sands, Kauai, Draft, June.

U.S. Department of the Navy, 2007a. *Draft Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex Environmental Impact Statement/Overseas Environmental Impact Statement,* October

U.S. Department of the Navy, 2007b. *Undersea Warfare Exercise Programmatic Environmental Assessment,* January.

U.S. Department of the Navy, 2007c. *Composite Training Unit Exercise (COMPTUEX) / Joint Task Force Exercise (JTFEX) Environmental Assessment/Overseas Environmental Assessment.*

U.S. Department of the Navy, 2007d. Supplemental Overseas Environmental Impact Statement and Environmental Impact Statement for Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar.

U.S. Department of the Navy, [no date]. San Clemente Island Ordnance Database, Preliminary Environmental Impact Statement.

U.S. Department of the Navy, Commander THIRD Fleet, 2004. *2004 Supplement to the 2002 Programmatic RIMPAC Environmental Assessment.*

U.S. Department of the Navy, Commander THIRD Fleet, 2006. *2006 Supplement to the 2002 Programmatic RIMPAC Environmental Assessment.*

U.S. Department of the Navy, Commander Navy Region Hawaii, 2001a. *Pearl Harbor Naval Complex Integrated Natural Resources Management Plan,* Final report, Prepared for Commander, Navy Region Hawaii, Honolulu, Hawaii by Helber Hastert & Fee, Planners, Honolulu, Hawaii.

U.S. Department of the Navy, Commander Navy Region Hawaii, 2001b. *Naval Magazine Pearl Harbor Integrated Natural Resources Management Plan (INRMP),* November.

U.S. Department of the Navy, Commander Navy Region Hawaii, 2002. *Integrated Cultural Resources Management Plan, Pearl Harbor Naval Complex.* Prepared by Helber Hastert & Fee Planners, March.

U.S. Department of the Navy, Commander, U.S. Atlantic Fleet, 2005. *Draft Overseas Environmental Impact Statement/Environmental Impact Statement (OEIS/EIS) Undersea Warfare Training Range.*

U.S. Department of the Navy, Commander, U.S. Pacific Fleet, 2004. *Report on the Results of the Inquiry into Allegation of Marine Mammal Impacts Surrounding the use of Active Sonar by USS Shoup (DDG 86) in the HARO Strait on or about 5 May 2003.*

U.S. Department of the Navy, Engineering Field Activity Chesapeake, 2006. *Noise and Accident Potential Zone Study for the Pacific Missile Range Facility Barking Sands*, November.

U.S. Department of the Navy, Naval Facilities Engineering Command, Pearl Harbor, 1996. *Environmental Baseline Study, Pacific Missile Range Facility, Second Working Copy*, January [For Official Use Only].

U.S. Department of the Navy, Naval Sea Systems Command, 2005. "Evaluation of Electric Power Supply Alternatives for the MDETC P-419 Electromagnetic Launcher (EML) Railgun Facility" Final Submittal, 26 April 2005.

U.S. Department of the Navy and U.S. Department of Commerce, 2001. *Joint Interim Report, Bahamas Marine Mammal Stranding Event of 15-16 March 2000.* December. [Online]. Available: http://www.nmfs.gov/prot_res/overview/publicat.html

U.S. Department of Transportation, 2001. *Programmatic EIS for Licensing Launches*, May 21. Prepared by ICF Consulting, Inc. Available: http://www.faa.gov/about/office_org/headquarters_offices/ast/licenses_permits/media/Volume1-PEIS.pdf

U.S. Department of Transportation, Federal Aviation Administration, 2002. *Aeronautical Chart User's Guide*, 5th Edition.

U.S. Environmental Protection Agency, 1974. *Information on Levels of Environmental Noise Requisite to Protect Public Health and Warfare with an Adequate Margin of Safety*. Office of Noise Abatement and Control. EPA Report No. 550/9-74-004. Washington, D.C.

U.S. Environmental Protection Agency, 1998. "Guidelines for ecological risk assessment." *Federal Register*, 63:26846 – 26924; *OSHA occupational noise regulations at 29 CFR 1910.95.*

U.S. Environmental Protection Agency, 2000. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California. Federal Register, Vol 65, No 97, p. 31682, 18 May.

U.S. Environmental Protection Agency, 2004. *Preliminary Remediation Goals*, October.

U.S. Environmental Protection Agency, 2005a. *Environmental Compliance History Online.*

U.S. Environmental Protection Agency, 2005b. Environmental Impact Statements: Notice of Availability- Weekly receipt of Environmental Impact Statements Filed 12/19/2005. *Federal Register*, Vol 70, No. 250, pp. 77380-77381, 30 December.

U.S. Environmental Protection Agency, 2006. *National Recommended Water Quality Criteria*.

U.S. Food and Drug Administration, U.S. Department of Agriculture, and Centers for Disease Control and Prevention, 2001. *Draft assessment of the relative risk to public health from foodborne Listeria monocytogenes among selected categories of ready-to-eat foods.* Food and Drug Administration, Center for Food Safety and Applied Nutrition; U.S. Department of Agriculture, Food Safety and Inspection Service; and Centers for Disease Control and Prevention. Rockville, Maryland and Washington, D.C.

U.S. Fish & Wildlife Service, 2000. "Endangered and Threatened Wildlife and Plants: Determination of Whether Designation of Critical Habitat is Prudent for 81 Plants and Proposed Designations for 76 Plants from the Islands of Kauai and Niihau, Hawaii, Proposed Rule," *Federal Register*, Vol 65, No. 216, pp. 66807-66884.

U.S. Fish & Wildlife Service, 2002. "Endangered and Threatened Wildlife and Plants; Revised Determination of Prudency and Proposed Designations of Critical Habitat for Plant Species From the Islands of Kauai and Niihau, Hawaii; *Federal Register*, Proposed Rule," Vol 68, No.18, pp. 3939-4098.

U.S. Fish & Wildlife Service, 2003a. "Endangered and Threatened Wildlife and Plants; Final Designation or Nondesignation of Critical Habitat for 95 Plant Species from the Islands of Kauai and Niihau, HI; *Federal Register*, Final Rule," Vol 68, No. 39, pp. 9115-9479.

U.S. Fish and Wildlife Service, 2003b. "Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Five Plant Species From the Northwestern Hawaiian Islands, Hawaii, Final Rule," 22 May. *Federal Register*, Vol 68, No.99, pp. 28054-28075 [Online]. Available: http://www.fws.gov/pacificislands/CHRules/nwhifinal.pdf.

U.S. Fish & Wildlife Service, 2003c "Endangered and Threatened Wildlife and Plants; Final Designation and Nondesignation of Critical Habitat for 46 Plant Species From the Island of Hawaii, HI; *Federal Register*, Vol 68, No. 127, pp. 39624-39672 [Online]. Available: http://ecos.fws.gov/docs/federal_register/fr4117.pdf.

U.S. Fish and Wildlife Service, 2003d. *Biological Opinion*, “Formal consultation on effects to the Mexican spotted owl,”: p. 3 of the document. [Online].Available: http://www.fws.gov/southwest/es/arizona/Documents/Biol_Opin/99208_MtGrahm_Rockfall.pdf

U.S. Fish and Wildlife Service, 2004. U.S. Fish and Wildlife Service Biological Opinion under section 7 of the Endangered Species Act on the effects of the reopened shallow-set sector of the Hawaii-based longline fishery on the short-tailed albatross *(Phoebastria albatrus),* formal consultation log number 1-2-199-F-02.2 (supplementing 1-2-1999-F-02R), October.

U.S. Fish and Wildlife Service, 2005a. *Draft Revised Recovery Plan for Hawaiian Waterbirds, Second Draft of Second Revision*, May.

U.S. Fish and Wildlife Service, 2005b. “PartnersOutside the Box? Efforts Save Kauai Albatross Chicks,” in *Fish and Wildlife Journal*, 15 March [Online]. Available: http://www.fws.gov/arsnew/regmap.cfm?arskey=15065.

U.S. Fish and Wildlife Service, 2006a. “Welcome to Midway Atoll,” [Online]. Available: http://www.fws.gov/midway/intro/default.

U.S. Fish and Wildlife Service, 2006b. “Listed species (based on published population data) – 328 listings,” USFWS Threatened and Endangered Species System (TESS) [Online]. Available: http://ecos.fws.gov/tess_public/StateListing.do?state=HI&status=listed.

U.S. Fish & Wildlife Service, 2006c. “General Provisions; Revised List of Migratory, Birds, Federal Register, Vol 71, No 164, pp. 50194-50221,Thursday[24 August] [Online]. Available: http://www.epa.gov/fedrgstr/EPA-SPECIES/2006/August/Day-24/e7001.htm.

U.S. Fish and Wildlife Service, 2007a. Species List and Technical Assistance regarding Informal Section 7 Consultation for the Hawaii Range Complex. Letter dated 8 November 2007- Pacific Islands Fish & Wildlife Office, Honolulu, Hawaii.

U.S. Fish & Wildlife Service, 2007b. “Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to List the Black-Footed Albatross (Phoebastria nigripes) as Threatened or Endangered,” Federal Register, Vol 72, No 194, pp. 57278-57283, Tuesday, [9 October]. [Online]. Available: http://www.fws.gov/policy/library/E7-19690.html.

U.S. Fish and Wildlife Service. 2007c. “Papahānaumokuākea Marine National Monument, Hawaii; Monument Management Plan.” Federal Register / Vol. 72, No. 64 , Wednesday, April 4, 2007- p. 16328. [Online]. Available: http://frwebgate.access.gpo.gov/cgi-bin/getpage.cgi?dbname=2007_register&position=all&page=16328.

U.S. Fish and Wildlife Service, Pacific Islands, 2002. “Pacific Islands—National Wildlife Refuges, Pacific/Remote Islands National Wildlife Refuge Complex,” [Online]. Available: http://www.fws.gov/pacificislands/wnwr/pnorthwestnwr.html, [29 October].

U.S. Fish and Wildlife Service, Pacific Islands Fish and Wildlife Office, 2007. Correspondence received from Kevin Foster, Marine Ecologist and Regional Diving Officer, U.S. Fish and Wildlife Service Pacific Islands Fish and Wildlife Office regarding concurrence with no significant impact from Terminal High Altitude Area Defense activities, January 10.

U.S. Fish and Wildlife Service, Pacific Region, 2002. "Critical Habitat for 83 Plant Species from Kauai and Niihau," *News Releases, Pacific Region,* [Online]. Available: http://pacific.fws.gov/news/2002/piea04/faq.pdf, [30 April].

U.S. Fish and Wildlife Service, and Hawaii Department of Land and Natural Resources, Division of Aquatic Resources, 2002. *Coral Reef Ecosystems of the Northwestern Hawaiian Islands: Interim Results Emphasizing the 2000 Surveys,* [Online]. Available: http://www.hawaiianatolls.org/research/NOWRAMP_2000.pdf..

U.S. Forest Service, undated. "*Chenopodium oahuense* (Meyen) Aellen `aheahea" [Online]. Available: http://www.fs.fed.us/global/iitf/pdf/shrubs/Chenopodium%20oahuenseFinalIEd2.pdf.

U.S. Government, The White House. 2006. *Establishment of the Northwestern Hawaiian Islands Marine National Monument, A Proclamation by the President of the United States of America*, [Online]. Available: http://www.whitehouse.gov/news/releases/2006/06/20060615-18.html.

U.S. House of Representatives, 2003. Congressman Ed Case – News Release. [Online] Available: http://wwwc.house.gov/case/press_releases/2003107.html

U.S. Navy NAVFAC Pacific Environmental Planning, 2007. Pacific Missile Range Facility *Wedge-tailed Shearwater Population Survey Project Summary Report.*

U.S. Office of Energy Statistics, Energy Information Administration, 2007. U.S. Carbon Dioxide Emissions By Sector and fuel for 2005 actual and 2030 projected, February, Available: http://www.eia.doe.gov/environment.html.

United Nations Convention On The Law Of The Sea, 1982. Agreement Relating To The Implementation Of Part XI Of The Convention, 10 December.

U.S. Pacific Command, 1995. *Final Hawaii Military Land Use Master Plan*, July 17.

University of Hawaii, undated. ReefWatcher's Field Guide to Alien and Native Hawaiian Marine Algae. [Online]. Available: http://www.hawaii.edu/reefalgae/natives/sgfieldguide.htm.

University of Hawaii Kapiolani Community College, undated. "Naio: Native Hawaiian Plants," Education Media Center [Online]. Available: http://old.kcc.hawaii.edu/campus/tour/plants/pnaio.htm [6 October 2006].

Uozumi, Y., 1996a. *Thunnus alalunga*. In: 2004 IUCN red list of threatened species [Online]. Available: http://www.redlist.org.

Uozumi, Y., 1996b. *Thunnus obesus*. In: 2004 IUCN red list of threatened species [Online]. Available: http://www.redlist.org.

Urick, R.J., 1972. "Noise signature of an aircraft in level flight over a hydrophone in the sea," *Journal of the Acoustical Society of America*, 52 (3,P2):993-999.

Urick, R.J., 1983. *Principles of Underwater Sound*. 3rd Edition, McGraw Hill, New York, 423 pp.

Vanderlaan, A.S.M. and C.T. Taggart, 2007. "Vessel collisions with whales: the probability of lethal injury based on vessel speed," *Marine Mammal Science,* 23(1):144-156.

Vanderlaan, A.S.M., A.E. Hay, and C.T. Taggart, 2003. "Characterization of North Atlantic right-whale (*Eubalaena glacialis*) sounds in the Bay of Fundy," *IEEE Journal of Oceanic Engineering,* 28:164-173.

Van Dolah, F.M. 2005. "Effects of Harmful Algal Blooms," pp. 85-99. In: Marine Mammal Research, edited by J.E. Reynolds, W.F. Perrin, R.R. Reeves, S. Montgomery, and T.J. Ragen (John Hopkins University Press, Baltimore).

Van Dolah, F.M., G.J. Doucette, F.M.D. Gulland, T.L. Rowles, and G.D. Bossart, 2003. "Impacts of algal toxins on marine mammals," pp. 247-269. In: *Toxicology of Marine Mammals*, edited by J.G. Vos, G.D. Bossart, M. Fournier, and T.J. O'Shea (Taylor & Francis, London),.

Vanfossen, L., 2008. Personal communication from Lewis Vanfossen to Gene Nitta regarding "Turtle Bycatch Data,." 6 April 2008.

Veirs, V., 2004. "Source levels of free-ranging killer whale (*Orcinus orca*) social vocalizations," p. 32. In Abstract: *Journal of the Acoustical Society of America,* 116:2615(4pABIO 3:55).

Vidal, O., and Gallo-Reynoso, J.P.,1996. "Die-offs of marine mammals and sea birds in the Gulf of California, Mexico," *Marine Mammal Science*. 12:627-635.

Virginia Tech Conservation Management Institute, 1996. "(DRAFT) – Taxonomy Species Petrel, Dark-Rumped, Hawaiian Species Id ESIS101028," [Online]. Available: http://fwie.fw.vt.edu/WWW/esis/lists/e101028.htm.

Visser, I.K.G., J.S. Teppema, and A.D.M.E. Ostrhaus, 1991. "Virus infections of seals and other Pinnipeds," *Reviews in Medical Microbiology*. 2:105-114.

Visser, I.N. and F.J. Bonoccorso, 2003. "New observations and a review of killer whale (*Orcinus orca*) sightings in Papua New Guinea waters," *Aquatic Mammals* 29:150-172. 6

Von Holt, I., 1985. Stories of Long Ago AHN Ni'ihau, Kauai, Oahu. Report is on file at the Bishop Museum, Honolulu, Hawaii. [For Official Use Only].

Von Saunder, A., and J. Barlow, 1999. "A report of the Oregon, California and Washington line-transect experiment (ORCAWALE) conducted in West Coast waters during Summer/Fall 1996," NOAA Technical Memorandum NMFS-SWFSC-264:1-49.

Wade, L.S., and G.L. Friedrichsen, 1979. "Recent sightings of the blue whale, *Balaenoptera musculus*, in the northeastern tropical Pacific," *Fishery Bulletin,* 76:915-919.

Wade, P.R, and T. Gerrodette, 1993. "Estimates of cetacean abundance and distribution in the eastern tropical Pacific," *Reports of the International Whaling Commission 43:477-493*.

Walker, M.M., J.L. Kirschvink, G. Ahmed, and A.E. Dicton, 1992. "Evidence that fin whales respond to the geomagnetic field during migration," *Journal of Experimental Biology*, 171:67-78.

Walker, W.A., 1981. "Geographical variation in morphology and biology of bottlenose dolphins (*Tursiops*) in the eastern North Pacific," *Southwest Fisheries Science Center Administrative Report LJ-81-03C*, La Jolla, California: National Marine Fisheries Service.

Walker, W.A., J.G. Mead, and R.L. Brownell, 2002. "Diets of Baird's beaked whales *Berardius bairdii*, in the southern Sea of Okhotsk and off the Pacific Coast of Honshu, Japan," *Marine Mammal Science,* 18:902-919.

Walker, R.J., E.O. Keith, A.E. Yankovsky, and D.K. Odell, 2005. "Environmental correlates of cetacean mass stranding sites in Florida," *Marine Mammal Science* 21, 327-335.

Waller, G., 1996. *SeaLife: A Complete Guide to the Marine Environment*. Washington, DC: Smithsonian Institution Press. pp. 485.

Walsh, M.T., R.Y. Ewing, D.K. Odell, and G.D. Bossart, 2001. "Mass Strandings of Cetaceans," pp. 83-96. In: *Marine Mammal Medicine*, edited by L. A. Dierauf, and F. M. D. Gulland (CRC Press, Boca Raton),.

Walsh, W.A., and D.R. Kobayashi, 2004. "A description of the relationships between marine mammals and the Hawaii-based longline fishery from 1994 to 2003," Report prepared by the University of Hawaii and Pacific Islands Fisheries Science Center.

Wang, M.C., W.A. Walker, K.T. Shao, and L.S. Chou, 2002. "Comparative analysis of the diets of pygmy sperm whales and dwarf sperm whales in Taiwanese waters," *Acta Zoological Taiwanica,* 13:53-62.

Ward, W.D., 1960. “Recovery from high values of temporary threshold shift, *Journal of the Acoustical Society of America*,” 32:497–500.

Ward, W.D., 1997. “Effects of high-intensity sound,” In: *Encyclopedia of Acoustics*, ed. M.J. Crocker, 1497-1507. New York: Wiley.

Ward, W.D., A. Glorig, and D.L. Sklar, 1958. “Dependence of temporary threshold shift at 4 kc on intensity and time,” *Journal of the Acoustical Society of America,* 30:944–954.

Ward, W.D., A. Glorig, and D.L. Sklar, 1959. “Temporary threshold shift from octave-band noise: Applications to damage-risk criteria,” *Journal of the Acoustical Society of America,* 31: 522–528.

Wardle, C.S., T.J. Carter, G.G. Urquhart, A.D.F. Johnstone, A.M. Ziolkowski, G. Hampson, D. Mackie, 2001. “Effects of seismic air guns on marine fish,” *Continental Shelf Research,* 21:1005-1027.

Wartzok, D., and D.R. Ketten, 1999. “Marine Mammal Sensory Systems,” pp. 117-175. In: *Biology of Marine Mammals* (ed. J.E. Reynolds III and S.A. Rommel).

Wartzok, D., A.N. Popper, J. Gordon, and J. Merrill, 2003. “Factors affecting the responses of marine mammals to acoustic disturbance,” *Marine Technology Society Journal,* 37(4):6-15.

Watkins, W.A., and W.E. Schevill, 1975. Sperm whales (*Physter catodon*) react to pingers. Deep-Sea Research 22: 123-129.

Watkins, W.A., and W.E. Schevill, 1977. “Sperm whale codas,” *Journal of the Acoustical Society of America,* 62:1485-1490.

Watkins, W.A., 1980. “Acoustics and the behavior of sperm whales,” pp. 283-290. In: R.G. Busnel and J.F. Fish (editors). *Animal Sonar Systems*. Plenum Press; New York, New York.

Watkins, W.A., K.E. Moore, and P. Tyack, 1985. “Sperm whale acoustic behaviors in the southeast Caribbean,” *Cetology*, 49: 1-15.

Watkins, W.A., P. Tyack, K.E. Moore, and J.E. Bird, 1987. “The 20-Hz signals of finback whales (*Balaenoptera physalus*),” *Journal of the Acoustical Society of America,* 82:1901-1912.

Watkins, W.A., M.A. Daher, K.M. Fristrup, and T.J. Howald, 1993. “Sperm whales tagged with transponders and tracked underwater by sonar,” *Marine Mammal Science,* 9:55-67.

Watkins, W.A., M.A. Daher, A. Samuals, and D.P. Gannon, 1997. "Observations of *Peponocephala electra*, the melon-headed whale, in the southeastern Caribbean," *Caribbean Journal of Science,* 33:34-40.

Watkins, W.A., M.A. Daher, N.A. DiMarzio, A. Samuels, D. Wartzok, K.M. Fristrup, P.W. Howey, and R.R. Maiefski, 2002. "Sperm whale dives tracked by radio tag telemetry," *Marine Mammal Science,* 18:55-68.

Watling, L., 2003. "A geographic database of deepwater alcyonaceans of the Northeastern U.S. continental shelf and slope." Version 1.0 CD-ROM. Natl Undersea Res Cent, Connecticut University, Groton.

Webb , J.F., J. Montgomery,and J. Mogdans, 2008. "Bioacoustics and the lateral line of fishes," In: *Fish Bioacoustics*, eds. J.F. Webb, R.R. Fay, and A.N. Popper. New York: Springer Science + Business Media, LLC.

Weilgart, L. and H. Whitehead, 1997. "Group-specific dialects and geographical variation in coda repertoire in South Pacific sperm whales," *Behavior Ecology Sociobiology,* 40:277–285.

Weise, M.J., D.P.Costa, and R.M. Kudela, 2006. "Movement and diving behavior of male California sea lion (*Zalophus californianus*) during anomalous oceanographic conditions of 2005," *Geophysical Research Letters* 33: L22S10. pp. 6

Welch, B.L. and A.S. Welch (eds.), 1970. *Physiological effects of noise*. Plenum Press, New York, NY. pp.

Weller, D.W., B. Würsig, H. Whitehead, J.C. Norris, S.K. Lynn, R.W. Davis, N. Clauss, and P. Brown, 1996. "Observations of an interaction between sperm whales and short-finned pilot whales in the Gulf of Mexico," *Marine Mammal Science,* 12:588-593.

Wells, R.S., D.J. Boness, and G.B. Rathbun, 1999. "Behavior," *Biology of Marine Mammals* (ed. J.E. Reynolds III and S.A. Rommel), pp. 324-422.

Wenz, G., 1962. "Acoustic Ambient Noise" In: the Ocean: Spectra and Sources," *Journal of the Acoustical Society of America*, 34 12:1936-1956.

West, E. and K. Desilets, 2005. *Archaeological Survey and Testing in Support of a Launcher Relocation at Pacific Missile Range Facility (PMRF*), Mana Ahupua`a, Kona District, Kaua`i, Prepared for Commander, Navy Region Hawai`i, Department of the Navy, Naval Facilities Engineering Command, Pacific, October. [For Official Use Only].

Western Pacific Regional Fishery Management Council, 1998. "Magnuson-Stevens Act definitions and required revisions: Amendment 6 to the bottomfish and seamount groundfish fisheries management plan, Amendment 8 to the pelagic fisheries management plan, Amendment 10 to the crustacean fisheries management plan, and Amendment 4 to the precious corals fisheries management plan," Honolulu, Hawaii: Western Pacific Regional Fishery Management Council, 449 pp.

Western Pacific Regional Fishery Management Council, 1999. "The value of the fisheries in the western pacific fishery management council area," July. [Online]. Available: http://www.wpcouncil.org/documents/value.pdf

Western Pacific Regional Fishery Management Council, 2001. *Final Fishery management plan for coral reef ecosystems of the western Pacific region*. Volumes I-Ill including Amendment 7 bottomfish and seamount groundfish fisheries, Amendment 11 crustacean fisheries, Amendment 5 precious corals, fisheries, and Amendment 10 pelagic fisheries. Honolulu, Hawaii: NMFS Southwest Region, Pacific Islands Area Office, 1,221 pp. Online; [Available]: http://www.wpcouncil.org/coralreef.htm.

Western Pacific Regional Fishery Management Council, 2004. EFH/HAPC designations for fishery management units covered under the bottomfish, crustacean, pelagic, precious corals, and coral reef ecosystem fishery management plans. Updated. Honolulu, Hawaii: WPRFMC. 7 pp.

Western Pacific Regional Fishery Management Council, 2005. *Draft Programmatic Environmental Impact Statement Towards an Ecosystem Approach for the Western Pacific Region: From Species-based Fishery Management Plans to Place-based Fishery Ecosystem Plans,* 27 October [Online]. Available: http://www.wpcouncil.org/documents/DPEIS.pdf.

Western Pacific Regional Fishery Management Council, 2006. *2006 Black Coral Science and Management Workshop Report, April 18-19, 2006 Honolulu, Hawaii* [Online]. Available: http://www.wpcouncil.org/precious/Documents/2006%20Black%20Coral%20Science%20and%20Management%20Workshop%20Report-SCANNED%20VERSION.pdf.

Western Pacific Regional Fishery Management Council, National Oceanic and Atmospheric Administration, 2003. "Strategic Plan for the Conservation and Management of Marine Resources in the Pacific Islands Region," p. 5. NOAA-NA04NM4-4410086

Westlake, R.L., and W.G. Gilmartin, 1990. "Hawaiian monk seal pupping locations in the Northwestern Hawaiian Islands," *Pacific Science,* 44:366-383.

Wever, E.G., 1978. *The Reptile Ear: Its Structure and Function*. Princeton University Press, Princeton, NJ. 1,024 pp.

Whitehead, H., 2003. *Sperm whales: Social evolution in the ocean,* Chicago: University of Chicago Press. pp. 417.

Whitehead, H., and L. Weilgart, 1991. "Patterns of visually observable behaviour and vocalizations in groups of female sperm whales," *Behaviour,* 118:275-296.

Whittow, G.C. and G.H. Balazs, 1982. "Basking behavior of the Hawaiian green turtle (*Chelonia mydas*)," *Pacific Science,* 36:129-139.

Wiggins, S.M., M.A. McDonald, L.M. Munger, S.E. Moore, and J.A. Hildebrand, 2004. "Waveguide propagation allows range estimates for North Pacific right whales in the Bering Sea," *Canadian Acoustics,* 32:146-154.

Wiggins S.M., E.M. Oleson, M.A., McDonald, and J.A. Hildebrand, 2005. "Blue whale (*Balaenoptera musculus*) diel call patterns offshore of Southern California," *Aquatic Mammals*, 31:161–168.

Wilkinson, D.M., 1991. Report to the Assistant Administrator for Fisheries, pp. 1-171.In: Program Review of the Marine Mammal Stranding Networks," (U.S. Department of Commerce, NOAA, National Marine Fisheries Service, Silver Springs, MD).,.

Williams, S. and T. Patolo, 1998. *Archaeological Inventory Survey of the Kahuku Training Area and Preparation of a Historic Preservation Plan for the Legacy Resource Management Program, O`ahu Island, Hawai`i.* Prepared for the US Army Corps of Engineers, Corps of Engineers District, Fort Shafter, Hawai`i. Ogden Environmental and Energy Services Company, Inc., Honolulu, Hawai`i.

Williams, S. and T. Patolo, 2000. *Final Report: Intensive Archaeological Survey and Monitoring for Proposed Modifications to the Company Combined Assault Course (CCAAC) and Construction of a Fire Access Trail at the US Army Makua Military Reservation, Makua Valley, Island of Oahu, Hawaii.* Ogden Environmental and Energy Services. [For Official Use Only]

Willis, P.M. and R.W. Baird, 1998. "Status of the dwarf sperm whale, Kogia simus, with special reference to Canada," *Canadian Field-Naturalist,* 112:114-125.

Wilson, B. and L.M. Dill, 2002. "Pacific herring respond to simulated odontocete echolocation calls," *Canadian Journal of Fisheries and Aquatic Science,* 59:542-553.

Wilson, O.B., Jr., S. N. Wolf, and F. Ingenito, 1985. "Measurements of acoustic ambient noise in shallow water due to breaking surf," *Journal of the Acoustical Society of America*, 78:190-195.

Wilson, J., L. Rotterman, and D. Epperson, 2006. "Minerals Management Service Overview of Seismic Survey Mitigation and Monitoring on the U.S. Outer Continental Shelf." Presented to the Scientific Committee of the *International Whaling Commission*, SC/58/E8. 13 pp

Winn, H.E., 1967. "Vocal facilitation and biological significance of toadfish sounds," pp. 283-3036. In: *Marine Bio Acoustics, II*, ed. W.N. Tavolga, Oxford: Pergamon Press.

Winn, H.E., and P.J. Perkins, 1976. "Distribution and sounds of the minke whale, with a review of mysticete sounds," *Cetology,* 19:1-12.

Winn, H.E., J.D. Goodyear, R.D. Kenney, and R.O. Petricig, 1995. "Dive patterns of tagged right whales in the Great South Channel," *Continental Shelf Research,* 15:593-611.

Witherington, B.E., and N.B. Frazer, 2003. "Social and economic aspects of sea turtle conservation," pp. 355-384. In: P.L. Lutz, J.A. Musick and J. Wyneken, eds. *The biology of sea turtles. Volume II*, Boca Raton, Florida: CRC Press.

Witteveen, B.H., J.M. Straley, O. Ziegesar, D. Steel, and C.S. Baker, 2004. "Abundance and mtDNA differentiation of humpback whales (*Megaptera novaeangliae*) in the Shumagin Islands, Alaska," *Canadian Journal of Zoology.*, 82:1352-1359.

Witzell, W.N., 1983. "Synopsis of biological data on the hawksbill turtle *Eretmochelys imbricata* (Linnaeus 1766) FIR/S137," *FAO Fisheries Synopsis,* 137:1-78.

Wolanski, E., R.H. Richmond, G. Davis, E. Deleersnijder, and R.R. Leben, 2003. "Eddies around Guam, an island in the Mariana Islands group," *Continental Shelf Research,* 23:991-1003.

Woodings, S., 1995. "A plausible physical cause for live cetacean mass strandings," B.S. Thesis University of Western Australia, 71 pp.

Woods Hole Oceanographic Institution, 2005. *Beaked Whale Necropsy Findings for Strandings in the Bahamas, Puerto Rico, and Madiera, 1999 – 2002.* Technical Report, WHOI-2005-09.

Woodside, J.M., L. David, A. Frantzis, S.K. Hooker, 2006. "Gouge marks on deep-sea mud volcanoes in the eastern Mediterranean: Caused by Cuvier's beaked whales?,". *Deep-Sea Research I*, 53:1762–1771

World Health Organization, 2001. *Depleted Uranium: Sources, Exposure and Health Effects*. Report No: WHO/SDE/PHE/01.1, April.

Wright, K.J., D.M. Higgs, A.J. Belanger, and J.M. Leis, 2005. "Auditory and olfactory abilities of pre-settlement larvae and post-settlement juveniles of a coral reef damselfish (Pisces:Pomacentridae)," *Marine Biology* 147: 1425-1434.

Wright, K.J., D.M. Higgs, A.J. Belanger , and J.M. Leis , 2007. "Auditory and olfactory abilities of pre-settlement larvae and post-settlement juveniles of a coral reef damselfish (Pisces: Pomacentridae). Erratum." *Marine Biology,* 150:1049-1050.

Würsig, B., S.K. Lynn, T.A. Jefferson, and K.D. Mullin, 1998. “Behaviour of cetaceans in the northern Gulf of Mexico relative to survey ships and aircraft,” *Aquatic Mammals,* 24:41-50.

Wyneken, J., 1997. “Sea turtle locomotion: Mechanics, behavior, and energetics,” pp. 165-198 In: P.L. Lutz and J.A. Musick, eds. *The biology of sea turtles*, Boca Raton, Florida: CRC Press.

Wysocki, L.E. and F. Ladich, 2005. “Hearing in fishes under noise conditions,” *Journal of the Association of Research Otolaryngology*, 6:28-36.

Wysocki, L.E., J.P. Dittami, and F. Ladich. 2006. “Ship noise and cortisol secretion in European freshwater fishers,” Biological Conservation, 128:501-508.

Wysocki, L.E., J.W. III Davidson, M.E. Smith, A.S. Frankel, W.T. Ellison, P.M. Mazik, A.N. Popper , and J. Bebak, 2007. “Effects of aquaculture production noise on hearing, growth, and disease resistance of rainbow trout *Oncorhynchus mykiss*,” *Aquaculture,* 272:687-697.

Yamada, 2002. Personal communication between Ron Yamada, Environmental Protection Specialist, Marine Corps Base Hawaii, and Kenneth Sims, U.S. Army Space and Missile Defense Command, regarding Cultural Resources on Marine Corps Base Hawaii, May 20.

Yasui, M., 1986. “Albacore, *Thunnus alalunga*, pole-and-line fishery around the Emperor Seamounts,” from *Environment and Resources of Seamounts in the North Pacific*. R. Uchida, S. Hayashi, and G. Boehlert, eds. NOAA Technical Report NMFS 43, pp. 37-40.

Yelverton, J.T., D.R. Richmond, W. Hicks, K. Saunders, and E.R. Fletcher, 1975. “The Relationship Between Fish Size and Their Response to Underwater Blast.” Report DNA 3677 T, Director, Defense Nuclear Agency, Washington, DC.

Yelverton, J.T., 1981. “Underwater explosion damage risk criteria for birds, fish and mammals,” Paper presented at the 102nd of the Acoustical Society of America. Miami Beach, FL, pp. 19.

Yochem, P.K., and S. Leatherwood, 1985. “Blue whale-*Balaenoptera musculus*,” pp. 193-240. In: S.H. Ridgway and R. Harrison, eds. *Handbook of Marine Mammals Volume 3: The sirenians and baleen whales*, San Diego: Academic Press.

Yost, W.A. and Nielson, D.W., 1994. *Fundamentals of Hearing: An Introduction*, Chapter 6. Electrophysiology of the Peripheral Auditory Nervous System. San Diego: Academic Press. pp. 66-181.

Yost, W. A., 2000. *Fundamentals of hearing: An introduction* (4th ed.). San Diego: Academic Press, Young, G.A., 1991. "Concise methods for predicting the effects of underwater explosions on marine life," Naval Surface Warfare Center, Silver Springs, Maryland 20903. *NAVSWC MP 91-220*.

Young, R.W., 1973, "Sound pressure in water from a source in air and vice versa," *Journal of the Acoustical Society of America*, 53:1708-1716.

Yu, H-Y., H-K. Mok, R-C. Wei, and L-S., Chou, 2003. "Vocalizations of a rehabilitated rough-toothed dolphin, *Steno bredanensis*," p. 183. In *Abstracts: Fifteenth Biennial Conference on the Biology of Marine Mammals,* 14–19 December 2003. Greensboro, North Carolina.

Yuen, M.E., Nachtigall, P.E., and Supin, A. Ya, 2005. "Behavioral and AEP Audiograms of a false killer whale (*Pseudorca crassidens*)," *Journal of the Acoustical Society of America.* 118: 2688-2695.

Zeeberg, J.A. Corten, and E. de Graaf, 2006. " Bycatch and release of pelagic megafauna in industrial trawler fisheries off Northwest Africa," *Fisheries Research* 78:186-195.

Zelick, R., D. Mann, and A.N. Popper, 1999. "Acoustic communication in fishes and frogs," pp. 363-411. In: *Comparative Hearing: Fish and Amphibians*, eds. R.R. Fay and A.N. Popper, New York: Springer-Verlag.

Zimmer, W.M.X., P.L. Tyack, M.P. Johnson, and P.T. Madsen, 2005. "Three-dimensional beam pattern of regular sperm whale clicks confirms bent-horn hypothesis," *Journal of the Acoustical Society of America,* 117:1473-1485.

Zimmer, W.M.X. and P.L. Tyack, 2007. "Repetitive shallow dives pose decompression risk in deep-diving beaked whales," *Marine Mammal Science*. 23:888-925.

Zimmerman, S., 1991. "A History of Marine Mammal Stranding Networks in Alaska, with Notes on the Distribution of the Most Commonly Stranded Cetacean Species, 1975-1987," *In: Marine Mammal Strandings in the United States*: *proceedings of the Second Marine Mammal Stranding Workshop;* 3-5 December 1987, Miami, Florida (John E. Reynolds III and Daniel K. Odell, Eds.). NOAA Technical Report NMFS 98.

Zoidis, A.M., M.A. Smultea, A.S. Frankel, J.L. Hopkins, A. Day, S. McFarland, A.D. Whitt, and D. Fertl. 2008. "Vocalizations produced by humpback whale (*Megaptera novaeangliae*) calves recorded in Hawaii," *Journal of the Acoustical Society of America*. 123:1737-1746.

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Mr. Jack Flanagan
Council Director
Navy League Honolulu Council
Honolulu, HI

Dr. Chiyome Fukino
Director
Department of Health State of Hawaii
Honolulu, HI

Representative Ken Ito
Chair
Water, Land, and Ocean Resources Committee
Hawaii State Legislature
Honolulu, HI

Mr. Timothy Johns
Board Member
State of Hawaii Department of Land and Natural Resources
Honolulu, HI

Micah Kane
Chair
Department of Hawaiian Home Lands Office of the Chairman
Honolulu, HI

Senator J. Kalani
English Chair
Transportation and International Affairs Committee,
Hawaii State Legislature
Honolulu, HI

Mr. Laurence Lau, Esq.
Director
Hawaii State Department of Health
Environmental Health Administration
Honolulu, HI

Honorable Governor Linda Lingle
State of Hawaii
Honolulu, HI

Major General Robert G.F. Lee
Adjutant General
State of Hawaii Department of Defense
Honolulu, HI

Mr. Theodore Liu
Director
Hawaii Office of Planning
Hawaii Department of Business, Economic Development, and Tourism
Honolulu, HI

Mr. Curtis Martin
Hazard Evaluation and Emergency Response Office
Honolulu, HI

Ms. Naomi McIntosh
Acting Manager
Hawaiian Islands Humpback Whale National Marine Sanctuary Fisheries Service
Honolulu, HI

Senator Clarence Nishihara
Chair
Tourism and Government Operations Committee
Hawaii State Legislature
Honolulu, HI

Mr. Francis Oishi
Recreational Fishing Program Manager
State of Hawaii Department of Land and Natural Resources
Division of Aquatic Resources
Honolulu, HI

Ms. Genevieve Salmonson
Director
State of Hawaii Office of Environmental Quality Control
Honolulu, HI

State Historic Preservation Officer
State of Hawaii Department of Land and Natural Resources
Honolulu, HI

Dr. Jeffery Walters
Co-Manager
Hawaiian Islands Humpback Whale National Marine Sanctuary
Division of Aquatic Resources
Department of Land and Natural Resources
Honolulu, HI

Mr. Peter Yee
Office of Hawaiian Affairs- Nationhood and Native Rights
Honolulu, HI

Mr. Peter Young Chair
State of Hawaii Department of Land and Natural Resources
Honolulu, HI

Mr. Benjamin Lindsey
Burials Program Manager
Hawaiian Islands Burial Council
Kapolei, HI

State of Hawaii
Attorney General
Honolulu, HI

State of Hawaii Department of Health
Clean Air Branch
Honolulu, HI

State of Hawaii Department of Health
Clean Water Branch
Honolulu, HI

State of Hawaii Department of Health
Solid & Hazardous Waste Branch
Honolulu, HI

State of Hawaii Department of Transportation
Honolulu International Airport
Honolulu, HI

State of Hawaii Department of Land and Natural Resources
Boating & Ocean Recreation
Honolulu, HI

State of Hawaii Department of Land and Natural Resources
Engineering Division
Honolulu, HI

Local Agencies

Council Members
County of Hawaii
Hilo, HI

Mayor Harry Kim
County of Hawaii Office of the Mayor
East Hawaii
Hilo, HI

Council Members
County of Maui
Office of Council Services Kalana O Maui Building
Wailuku, HI

Mr. Jeff Hunt
Director
County of Maui Planning Department
Wailuku, HI

Mayor Charmaine Tavares
County of Maui Office of the Mayor
Wailuku, HI

Council Members
County of Kauai Council Services Division
Lihue, HI

Mr. Bill Asing
Chair
County of Kauai Council
Lihue, HI

Mayor Bryan J. Baptiste
County of Kauai Office of the Mayor
Lihue, HI

Mr. Ian Costa
Director
County of Kauai Planning Department
Lihue, HI

Executive Secretary
Oahu Neighborhood Board Neighborhood Commission Office
Honolulu, HI

Councilmember Todd Apo
Honolulu City Council, District 1
Honolulu, HI

Councilmember Romy Cachola
Honolulu City Council, District 7
Honolulu, HI

Mr. Lester Chang
Director
City and County of Honolulu Parks and Recreation Department
Kapolei, HI

Councilmember Donovan Dela Cruz
Honolulu City Council, District 2
Honolulu, HI

Councilmember Charles Djou
Honolulu City Council, District 4
Honolulu, HI

Mr. Harry Eng
Director
City and County of Honolulu Planning and Permitting Department
Honolulu, HI

Councilmember Nestor Garcia
Honolulu City Council, District 9
Honolulu, HI

Mayor Mufi Hannemann
City and County of Honolulu Office of the Mayor
Honolulu, HI

Mr. Wayne Hashiro
Director
City and County of Honolulu Office of the Managing Director
Honolulu, HI

Senator Gary Hooser
7th Senatorial District
Honolulu, HI

Senator Lorraine Inouye
Chair
Intergovernmental and Military Affairs Committee
Hawaii State Legislature
Honolulu, HI

Councilmember Ann Kobayashi
Honolulu City Council, District 5
Honolulu, HI

Councilmember Barbara Marshall
Honolulu City Council, District 3
Honolulu, HI

Senator Ron Menor
Chair Energy and Environment Committee
Hawaii State Legislature
Honolulu, HI

Representative Hermina Morita
14th Representative District
Honolulu, HI

Councilmember Gary Okino
Honolulu City Council, District 8
Honolulu, HI

Representative Roland D. Sagum III
16th Representative District
Honolulu, HI

Senator Norman Sakamoto
Chair
Education Committee
Hawaii State Legislature
Honolulu, HI

Mr. Eric Takamura
Director
City and County of Honolulu
Environmental Services Department
Kapolei, HI

Councilmember Rod Tam
Honolulu City Council, District 6
Honolulu, HI

Libraries

Hilo Public Library
Hilo, HI

Kahului Public Library
Kahului, HI

Wailuku Public Library
Wailuku, HI

Lihue Public Library
Lihue, HI

Princeville Public Library
Princeville, HI

Waimea Public Library
Waimea, HI

Hawaii State Library
Hawaii and Pacific Section Document Unit
Honolulu, HI

University of Hawaii Hamilton Library
Honolulu, HI

Private Citizens

Island of Hawaii

Moanikeala Akaka
Hilo, HI

Bob Deurr
Hilo, HI

Roberta Goodman
Hilo, HI

Cory Harden
Hilo, HI

Colby Kearns
Hilo, HI

Diane Ley
Hilo, HI

John and Ruth Ota
Hilo, HI

Lauren Pagarigan
Hilo, HI

Odette Rickert
Hilo, HI

Craig Severence
Hilo, HI

Peter Sur
Hilo, HI

Randee Tubal
Hilo, HI

F.K. Vesperas
Hilo, HI

Dwight J. Vicente
Hilo, HI

Bonnie Bator
Hilo, HI

Alan McNarie
Hilo, HI

F. K. Vesperas
Hilo, HI

Linda Kroll
Keaau, HI

Danny H. Li
Keaau, HI

James V. Albertini
Kurtistown, HI

Mark Van Doren
Kurtistown, HI

Daryl Berg
Naalehu, HI

Harry Fergerstrom
Pahoa, HI

Raydiance Grace
Pahoa, HI

Leonard J. Horowitz
Pahoa, HI

Michael Hyson
Pahoa, HI

Jim McRae
Pahoa, HI

Star Newland
Pahoa, HI

Jon Olson
Pahoa, HI

Shelly Stephens
Pahoa, HI

Lynn Nakku
Papeekeo, HI

Leayne Patch-Highfill
Volcano, HI

Maui

Melissa Prince
Haiku, HI

Manuel M. Kuloloia
Kahului, HI

David Mattila
Kihei, HI

Vicki Vallis
Kihei, HI

Jan Wine
Kihei, HI

Gary Landis
Kihei, HI

Marilyn H. Parris
Makawao, HI

Kallie and Gil Keith-Agaran
Wailuku, HI

Skippy Hau
Wailuku, HI

Lukas D. Shield
Wailuku, HI

Howard Sharpe
Wailuku, HI

Kauai
Robert Sato
Kalaheo, HI

Rob Dorman – Gabrielle Olivier
Kapaa, HI

Rich Hoeppner
Kapaa, HI

Alan Hoffman
Kapaa, HI

Anne Walton
Kapaa, HI

Brenda Zaun
Kapaa, HI

Rayne Regush
Kealia, HI

Jose Bulatao, Jr.
Kekaha, HI

Robert J. Connelly
Kekaha, HI

Zena Seeley
Kekaha, HI

Carl Berg
Kilauea, HI

Rebecca Deren
Koloa, HI

Chris White
Koloa, HI

Jeff Deren
Lihue, HI

Thomas Kaiakapu
Lihue, HI

Nina Monasevitch
Lihue, HI

Ed Nakaya
Lihue, HI

Jean Russell
Lihue, HI

Jean Souza
Lihue, HI

Barbara Elmore
Lihue, HI

Bruce Pleas
Waimea, HI

Oahu

Paul Achitoff
Honolulu, HI

Sabrina Clark
Honolulu, HI

Rick Cornelius
Honolulu, HI

Joel Fischer
Honolulu, HI

Bill Hollingsworth
Schofield Barracks, HI

Ikailea Hussey
Honolulu, HI

Wayne Johnson
Honolulu, HI

Kyle Kajihiro
Honolulu, HI

Beverly and Deepe Keever
Honolulu, HI

George Krasnick
Honolulu, HI

Charles Ota
Honolulu, HI

Mr. Vincent K. Pollard
Honolulu, HI

Paul Sullivan
Honolulu, HI

Agnes Tauyan
Honolulu, HI

Cherry Torres
Honolulu, HI

Camille Paldi
Honolulu, HI

Earth Justice
Honolulu, HI

Michael Jones
Honolulu, HI

Glenn Metzler
Honolulu, HI

George Balagan
Honolulu, HI

Patty Billington
Kaneohe, HI

Kristen U`ilani Chong
Kaneohe, HI

Donna Camvel
Kaneohe, HI

Deborah Kern
Mililani, HI

Fred Dodge
Waianae, HI

California

Marcie Powers
San Francisco, CA

Cherly Magill
Santa Clara, CA

Natural Resources Defense Council
Santa Monica, CA

Tom Norris
Encinitas, CA

Delaware

Joyce O'Neal
Millsboro, DE

New Mexico

John Geddie
Albuquerque, NM

North Carolina

Heidi Rakotz
Gastonia, NC

Washington

Rick Spaulding
Bainbridge, WA

11.0 Agencies and Individuals Contacted

11.0 AGENCIES AND INDIVIDUALS CONTACTED

The National Environmental Policy Act (NEPA) regulations require that Federal, State, and local agencies with jurisdiction or special expertise regarding environmental impacts be consulted and involved in the NEPA process. Agencies involved include those with authority to issue permits, licenses, and other regulatory approvals. Other agencies include those responsible for protecting significant resources such as endangered species or wetlands. The agencies listed below were contacted during the preparation of this Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS).

Federal

U.S. Army, Corps of Engineers, Regulatory Branch
Honolulu District
Fort Shafter, HI

U.S. Army, IMA Region
Pacific Regional Office
Fort Shafter, HI

U.S. Air Force Pacific
HQ, PACAF/CEVQ
Hickam AFB, HI

Federal Aviation Administration
Honolulu Control Facility
Honolulu, HI

Marine Corps Base Hawaii, Environmental
Honolulu, HI

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Hawaiian Islands Humpback Whale National Marine Sanctuary
Honolulu, HI

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve
Honolulu, HI

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Pacific Islands Regional Office
Honolulu, HI

U.S. Army Garrison, I DPW
Schofield Barracks
Honolulu, HI

U.S. Army Pacific
Honolulu, HI

U.S. Coast Guard, Commanding Officer
Civil Engineering Unit Honolulu
Honolulu, HI

U.S. Department of Transportation
Aliiaimoku Building, Room 509
Honolulu, HI

U.S. EPA Region 9
Pacific Islands Contact Office
Honolulu, HI

U.S. Fish and Wildlife Service
PJKK Federal Bldg.
Honolulu, HI

U.S. Marine Corps
Honolulu, HI

U.S. Navy CNRH-PMRF
Honolulu, HI

Navy Region Hawaii
Pearl Harbor, HI

U.S. Navy, Pacific Fleet
Pearl Harbor, HI

U.S. Army Space and Missile Defense Command/Army Strategic Command
Redstone Arsenal, AL

Council on Environmental Quality
Washington, DC

Missile Defense Agency
Washington, DC

U.S. Department of Energy, NEPA Compliance Officer
Kirtland Area Office
Albuquerque, NM

State

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Hawaiian Islands Humpback Whale National Marine Sanctuary
Department of Land and Natural Resources
Honolulu, HI

State of Hawaii, Attorney General
Honolulu, HI

State of Hawaii, DBED&T
Office of Planning
Honolulu, HI

State of Hawaii
Department Land and Natural Resources
Honolulu, HI

State of Hawaii
Department of Land and Natural Resources
Division of State Parks
Honolulu, HI

State of Hawaii
Department of Land and Natural Resources
Division of Aquatic Resources
Honolulu, HI

State of Hawaii
Department of Defense
Hawaii Army National Guard
Environmental Office
Honolulu, HI

State of Hawaii
Department of Health
Clean Air Branch
Honolulu, HI

State of Hawaii
Department of Health
Clean Water Branch
Honolulu, HI

State of Hawaii
Department of Health
Kinau Hale
Honolulu, HI

State of Hawaii
Department of Health
Solid and Hazardous Waste Branch
Honolulu, HI

State of Hawaii
Department of Transportation
Honolulu International Airport
Honolulu, HI

State of Hawaii
Governor's Office
Honolulu, HI

State of Hawaii
Office of Environmental Quality Control
Honolulu, HI

State of Hawaii
Office of Hawaiian Affairs
Honolulu, HI

State of Hawaii
Recreational Fishing Program
Division of Aquatic Resources
Honolulu, HI

Ms. Laura Thielen
State Historic Preservation Officer
State of Hawaii Department of Land and Natural Resources
Honolulu, HI

Local

Advisory Council on Historic Preservation

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Hawaii Range Complex

Final Environmental Impact Statement/ Overseas Environmental Impact Statement (EIS/OEIS)

Volume 3 of 5: Chapters 12-13

May 2008

Coordinator
Hawaii Range Complex
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kauai, Hawaii 96752-0128

HAWAII RANGE COMPLEX
FINAL ENVIRONMENTAL IMPACT STATEMENT/ OVERSEAS ENVIRONMENTAL IMPACT STATEMENT

Volume 3 of 5

MAY 2008

Coordinator
Hawaii Range Complex
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kauai, Hawaii 96752-0128

COVER SHEET
FINAL ENVIRONMENTAL IMPACT STATEMENT/
OVERSEAS ENVIRONMENTAL IMPACT STATEMENT
HAWAII RANGE COMPLEX (HRC)

Lead Agency for the EIS:	U.S. Department of the Navy
Title of the Proposed Action:	Hawaii Range Complex
Affected Jurisdiction:	Kauai, Honolulu, Maui, and Hawaii Counties
Designation:	Final Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS)

Abstract

This Final EIS/OEIS has been prepared by the U.S. Department of the Navy (Navy) in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code § 4321 et seq.); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] §§ 1500-1508); Navy Procedures for Implementing NEPA (32 CFR § 775); and Executive Order 12114 (EO 12114), *Environmental Effects Abroad of Major Federal Actions*. The Navy has identified the need to support and conduct current, emerging, and future training and research, development, test, and evaluation (RDT&E) activities in the Hawaii Range Complex (HRC). The alternatives—the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3—are analyzed in this Final EIS/OEIS. All alternatives include an analysis of potential environmental impacts associated with the use of mid-frequency active (MFA) and high-frequency active (HFA) sonar. The No-action Alternative stands as no change from current levels of HRC usage and includes HRC training, support, and RDT&E activities, Major Exercises, and maintenance of the technical and logistical facilities that support these activities and exercises. Alternative 1 includes all ongoing training associated with the No-action Alternative, an increased tempo and frequency of such training (including increases in MFA and HFA sonar use), a new training event (Field Carrier Landing Practice), enhanced and future RDT&E activities, enhancements to optimize HRC capabilities, and an increased number of Major Exercises. Alternative 2 includes all of the training associated with Alternative 1 plus additional increases in the tempo and frequency of training (including additional increases in MFA and HFA sonar use), enhanced RDT&E activities, future RDT&E activities, and additional Major Exercises, such as supporting three Strike Groups training at the same time. Alternative 3 would include all of the training and RDT&E activities associated with Alternative 2. The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events, future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Alternative 3 is the Navy's preferred alternative.

This Final EIS/OEIS addresses potential environmental impacts that result from activities that occur under the No-action Alternative and proposed activities that would occur under Alternatives 1, 2, and 3. This EIS/OEIS also addresses changes and associated environmental analyses that were presented in the Supplement to the Draft EIS/OEIS. Environmental resource topics evaluated include air quality, airspace, biological resources (open ocean, offshore, and onshore), cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

Prepared by:	U.S. Department of Defense, Department of the Navy
Point of Contact:	Pacific Missile Range Facility Public Affairs Officer
	P.O. Box 128, Kekaha, Hawaii, 96752, (866) 767-3347

May 2008

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Volume 4

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EXHIBITS

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12.0 Consultation Comments and Responses

12.0 CONSULTATION COMMENTS AND RESPONSES

This chapter includes consultation and coordination letters with various State and Federal agencies. Agency coordination has been accomplished through meetings with various agencies and through distribution of the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) and the Supplement to the Draft EIS/OEIS.

LINDA LINGLE
GOVERNOR OF HAWAII

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
LAND DIVISION
2007 AUG 15 P 2:22
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

July 31, 2007

Additional information enclosed.

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x ~~Engineering~~ Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division – Oahu, Maui, Hawaii & Kauai District

FROM: Russell Y. Tsuji
SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex
LOCATION: Statewide
APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

(X) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed: [signature]
Date: 8/14/07

LINDA LINGLE
GOVERNOR OF HAWAII

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED
'07 AUG 31 P 3:21
'07 AUG 01 PM03:47 ENGINEERING

July 31, 2007

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x ~~Div. of Boating~~ & Ocean Recreation
x Engineering Division
x ~~Div. of Forestry~~ & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division – Oahu, Maui, Hawaii & Kauai District

FROM: Russell Y. Tsuji
SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex
LOCATION: Statewide
APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(X) We have no comments.
( ) Comments are attached.

Signed: [signature]
Date: 8/31/07

Exhibit 12-1. Consultation Comments and Responses

LINDA LINGLE
GOVERNOR OF HAWAII

→ NA – grrordinate DOFAW ~~~~

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 31, 2007

MEMORANDUM

RECEIVED
LAND DIVISION
2007 AUG 29 P 3: 22
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x ~~Engineering Division~~
x Div. of Forestry & Wildlife
~~x Div. of State Parks~~
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division – Oahu, Maui, Hawaii & Kauai District

FROM: Russell Y. Tsuji
SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex
LOCATION: Statewide
APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(X) Comments are attached.

Signed:
Date: AUG 28 2007

LINDA LINGLE
GOVERNOR OF HAWAII

Laura H. Thielen, Acting
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY DIRECTOR - LAND

Ken C. Kawahara
DEPUTY DIRECTOR FOR
THE COMMISSION ON
WATER RESOURCE MANAGEMENT

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND MANAGEMENT
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

August 28, 2007

PMRF Public Affairs Officer
U.S. Department of Defense
Department of Navy
P.O. Box 128
Kekaha, Hawaii 96752

Dear PMRF Public Affairs Officer:

Subject: Draft EIS/ Overseas EIS for Hawaii Range Complex, Hawaii.

We appreciate the opportunity to comment on your subject request. DLNR, Division of Forestry and Wildlife will comment on the environmental impacts of current and emerging training and research operations in the Hawaii Range Complex; moreover, as they relate to the impacts to onshore biological resources at these training areas.

The Division of Forestry and Wildlife appreciate the Navy's position to include internal policies and procedures to minimize impacts on the biological resources and prevent the introduction of invasive species to these training areas. The environmental review process including NEPA, allows further public disclosure to Navy actions that may eventually have a negative impact to onshore biological resources. Since the first publicized INRMP disclosed in 2001, we have worked with the various island Navy complex officials to incorporate collaborative measures aimed at reducing these impacts. Subsequently, DLNR, Division of Forestry and Wildlife, June 29, 2006 letter to Mr. Leighton Wong will remain relevant to our response for the Hawaii Range Complex (attachment). Thank you for allowing us to review your project.

Sincerely yours,

Paul J. Conry
Administrator

Attachment

C: DOFAW Kauai Branch
DOFAW Oahu Branch
DLNR, Land Division

Exhibit 12-1. Consultation Comments and Responses (Continued)

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

June 29, 2006

Mr. Leighton G.M. Wong
Business Line Manager, Environmental
Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive STE. 100
Peal Harbor, Hawaii 96860-3134

Dear Mr. Wong:

Subject: Request for Comments: Commander Navy Region Hawaii INRMP Updates – Oahu Complex and Kauai Pacific Missile Range, State of Hawaii.

We appreciate the opportunity to comment on your subject request. DLNR, Division of Forestry and Wildlife's August 29, 2001 comments (see attachment) 5-years ago remain relevant to this request with the following added recommendations.

General Comments:

- Encourage the Department of Navy to integrate its natural resource management programs with DLNR, Division of Forestry and Wildlife Comprehensive Wildlife Strategic Plan.
- Strongly encourage the integration of statewide response between DLNR and Department of Navy for invasive species, oil spills, stranded wildlife, and avian disease monitoring.
- Maintain and restore cultural resources on Department of Navy lands.
- Provide recreational opportunities and uses on Department of Navy lands.
- Increase fauna and flora T&E populations currently present on Navy lands. In addition, DLNR, Division of Forestry and Wildlife on Kauai are developing a management plan for the Mana Waterbird Sanctuary that may benefit PMRF to protect native resources in the area. Also, DLNR, Division of Forestry and Wildlife encourage Department of Navy to fence portions of Makaha ridge facility on Kauai to maintain the vegetation required for nene habitat and their nesting areas.
- Encourage Department of Navy to acquire lands to buffer impacts to existing resource management programs and areas.
- Encourage the Department of Navy to develop watershed (i.e. develop Waianae watershed partnership alliances) and wetland partnership programs in areas beneficial to all interested cooperating entities.

LINDA LINGLE
GOVERNOR OF HAWAII

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DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

2007 AUG -3 A 10:01

July 31, 2007

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x ~~Office of Conservation & Coastal Lands~~
x Land Division – Oahu, Maui, Hawaii & Kauai District

FROM: Russell Y. Tsuji
SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex
LOCATION: Statewide
APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

(X) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed:
Date: 8/10/07

Exhibit 12-1. Consultation Comments and Responses (Continued)

LINDA LINGLE
GOVERNOR OF HAWAII

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

Department of Land and Natural Resources
State of Hawaii

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 31, 2007

MEMORANDUM

From: ~~TO:~~ **DLNR Agencies:**

x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands

TO: x Land Division – Oahu, Maui, Hawaii & Kauai District

FROM: Russell Y. Tsuji

SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex

LOCATION: Statewide

APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(X) We have no comments.
( ) Comments are attached.

Signed:

Date: 8/3/07

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION

2007 AUG 10 P 2:42

LAURA H. THIELEN
INTERIM CHAIRPERSON

MEREDITH J. CHING
JAMES A. FRAZIER
NEAL S. FUJIWARA
CHIYOME L. FUKINO, M.D.
DONNA FAY K. KIYOSAKI, P.E.
LAWRENCE H. MIIKE, M.D., J.D.

KEN C. KAWAHARA, P.E.
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

August 9, 2007

REF: Navy DEIS.dr

TO: Russell Tsuji, Administrator
Land Division

FROM: Ken C. Kawahara, P.E., Deputy Director
Commission on Water Resource Management

SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex

FILE NO.:

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore, all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at *http://www.hawaii.gov/dlnr/cwrm.*

Our comments related to water resources are checked off below.

☒ 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.

☐ 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

☒ 3. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

Permits required by CWRM: Additional information and forms are available at *www.hawaii.gov/dlnr/cwrm/forms.htm.*

☐ 4. The proposed water supply source for the project is located in a designated ground-water management area, and a Water Use Permit is required prior to use of ground water.

☐ 5. A Well Construction Permit(s) is (are) required before the commencement of any well construction work.

☐ 6. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

DRF-IA 03/02/2006

Exhibit 12-1. Consultation Comments and Responses (Continued)

Russell Tsuji, Administrator
Page 2
August 9, 2007

☐ 7. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

☐ 8. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

☐ 9. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a stream channel.

☐ 10. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.

☐ 11. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

☐ 12. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

☐ 13. We recommend that the report identify feasible alternative non-potable water resources, including reclaimed wastewater.

☒ OTHER:

If the selected alternative(s) results in an increase in water demand or impacts to available water supplies or water resources, we recommend that the project be incorporated in the respective County Water Use and Development Plan

If there are any questions, please contact Lenore Nakama at 587-0218.

DRF-IA 04/15/2005

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
KAPOLEI HALE • 1000 ULUOHIA STREET, SUITE 309 • KAPOLEI, HAWAII 96707
TELEPHONE: (808) 692-5561 • FAX: (808) 692-5131 • INTERNET: www.honolulu.gov

MUFI HANNEMANN
MAYOR

LESTER K.C. CHANG
DIRECTOR

DANA TAKAHARA-DIAS
DEPUTY DIRECTOR

August 15, 2007

Mr. L. M. Foster
Director, Fleet Environmental
Department of the Navy
Commander
United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii 96860

Dear Mr. Foster:

Subject: Draft Environmental Impact Statement/Overseas Environmental Impact Statement (Hawaii Range Complex)

Thank you for the opportunity to review and comment on the subject Draft Environmental Impact Statement.

The Department of Parks and Recreation has no comment and as the proposed action will not impact any program or facility of this department, you are invited to remove us as a consulted party to the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner at 768-3017.

Sincerely,

LESTER K. C. CHANG
Director

LKCC:mk
(220605)

Exhibit 12-1. Consultation Comments and Responses (Continued)

-----Original Message-----
From: Clyde.Fuse
Sent: Thursday, August 23, 2007 4:03 PM
To: Gallien, Randy Mr USASMDC
Cc: Edd Joy; Wes Norris; Neil Sheehan; Diane.Tom ; Debbie.Saito ;
Neal.Kurosaki
Subject: Re: FAA Comments on HRC EIS

Randy
Thanks for calling us back. The comments on the EIS from FAA Air Traffic are:

1. The Special Use Airspace will be undergoing some changes in July 2008. The northern boundary will be "pulled south". to the south, the boundary will be moved north.
2. If lasers are used, the operational data must be forwarded to our Western Service Area specialists for review and NOTAMs issued. Dependent on their assessment, there could be an impact to Air Traffic operations.

Aloha
Clyde

"Gallien, Randy
Mr USASMDC"

To
Clyde Fuse/AWP/FAA@FAA

cc

08/23/2007 10:46
AM
<
<
<

Subject
FAA Comments on HRC EIS

Clyde

You may provide your comments to me at this address. Please copy the guys I have copied to ensure we have them.

Thanks and it was nice talking again,

Randy

From Concept to Combat
Celebrating 50 Years of Excellence in Missile Defense and Space
SMDC/ARSTRAT - 1957-2007

Exhibit 12-1. Consultation Comments and Responses (Continued)

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

August 23, 2007

Public Affairs Officer
Pacific Missile Range Facility
P. O. Box 128
Kekaha, Hawaii 96752-0128

Attention: HRC EIS/OEIS

Gentlemen:

Thank you for the opportunity to provide comments on the Department of Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement to assess the Navy's Hawaii Range Complex (HRC). The Department of Hawaiian Home Lands has no comments.

Should you have any questions, please call the Planning Office at (808) 586-3836.

Aloha and mahalo,

Micah A. Kane, Chairman
Hawaiian Homes Commission

BOB JACOBSON
Councilmember

Chair, Environmental Management Committee
Vice-Chair, Finance Committee

333 Kīlauea Avenue, Second Floor
Ben Franklin Building, Hilo, Hawai'i 96720

Mailing Address: 25 Aupuni Street, Suite 200
Phone: (808) 961-8263
Fax: (808) 961-8912
E-Mail: bjacobson@co.hawaii.hi.us

HAWAI'I COUNTY COUNCIL
County of Hawai'i

August 30, 2007

Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawai'i 96752-0128

Re: Comments in Opposition to Military Activities in the North Hawaiian Islands National Marine Sanctuary

Aloha:

I would like to express my opposition to war games, sonar testing, and any other military activities that will certainly degrade the fragile environment within the Northwestern Hawaiian Islands National Marine Sanctuary. The federal government recognized the importance of protecting the health of the oceans surrounding Hawai'i by establishing the sanctuary. The Navy now proposes to undermine federal and state policy by increasing war games in the area; thus, jeopardizing the welfare of numerous species endemic to the Northwestern Hawaiian Islands and polluting the delicate ecosystem that exists there.

Please consider these comments and the many others you are sure to receive.

Mahalo,

Bob Jacobson, Member
Hawai'i County Council, District 6

BJ/mf

c: Michael Payne, National Marine Fisheries Service

District 6 ~ Upper Puna, Ka'ū, and South Kona
Hawai'i County Is An Equal Opportunity Provider And Employer

Exhibit 12-1. Consultation Comments and Responses (Continued)

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 6, 2007

Public Affairs Officer
Pacific Missile Range Facility
Box 128
Kekaha, Hawaii 96752-0128

Attention: HRC EIS/OEIS

Gentlemen:

Subject: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Division of Aquatic Resources, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Charlene E. Unoki

for Russell Y. Tsuji
Administrator

LINDA LINGLE
GOVERNOR OF HAWAII

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAM

AQUATIC RESOURCES: 1046

DIRECTOR	✓
COMM. FISH	
AQ RES/ENV	
AQ REC	
PLANNER	
STAFF SVCS	
RCUH/UH	
STATISTICS	
AFRC/FED AID	
EDUCATION	
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 31, 2007

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x ~~Div. of Boating~~ & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division – Oahu, Maui, Hawaii & Kauai District

RECEIVED
AUG 2 2007
AQUATIC RESOURCES

FROM: Russell Y. Tsuji
SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex
LOCATION: Statewide
APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: Francis Oishi
Date: 7-4-07

Exhibit 12-1. Consultation Comments and Responses (Continued)

Suspense Date: 9/1/07

State of Hawaii
Department of Land and Natural Resources
DIVISION OF AQUATIC RESOURCES

Date: 9/4/07

MEMORANDUM

TO: Francis Oishi, Program Manager
FROM: Alton Miyasaka, Aquatic Biologist
SUBJECT: Comments on Navy Draft EIS for Combat Readiness Training

Comment	Date	Request	Receipt	Referral
Requested by: Russell Tsuji DLNR/Land		7/31/07	8/2/07	8/3/07

Summary of Proposed Project

Title: Draft EIS for Pacific Fleet Training Activities

Project by: Department of the Navy

Location: Statewide, Hawaii Range Complex

Brief Description: The applicant seeks comments on a draft EIS that evaluates the potential environmental effects of current and emerging training and research, development, test, and evaluation operations in Hawaii and proposes upgrades and modernization of Navy training and testing capabilities to maintain or improve combat readiness.

Comments: While the documentation provided did not identify such activities, we would have concerns if planned exercises involved the use of explosives in state waters. We recognize the importance of these exercises and the loss of some marine life may be unavoidable. To the extent practical, we would request that surveys of the affected areas and the shoreline be conducted after each exercise involving explosives to remove any dead fish or other marine life that should wash up on the shoreline. These clean-ups would be especially important near public recreational areas where the public makes full use of the beaches and shoreline.

Regarding possible impacts on marine mammals, we are aware that the Navy is working in close consultation with NOAA's National Marine Fisheries Service and National Ocean Service to identify and mitigate possible impacts. Given our close working relationship with NOAA in co-managing the Hawaiian Islands Humpback Whale National Marine Sanctuary and in supporting marine mammal stranding response in the Main Hawaiian Islands, we believe it would be most efficient and effective for all concerned to route any comments we might have regarding possible marine mammal impacts via these NOAA partner agencies. We appreciate the efforts the Navy and its contractors have made thus far to keep us informed of marine mammal impact analysis and proposed mitigation measures, and look forward to our continued communications in this regard in partnership with NOAA.

Exhibit 12-1. Consultation Comments and Responses (Continued)

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 10, 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawai'i 96752-0128
ATTN: HRC EIS/OEIS

Dear Public Affairs Officer:

We have reviewed the DEIS/OEIS for the Hawai'i Range Complex which evaluates the potential environmental effects of current and proposed training, research, development, and testing of Navy operations.

We are concerned that the groundwater resources are being affected by the chemical emissions from missile launches that occur during training exercises which may have adverse impacts to the water system at Polihale State Park. While the evaluation was conducted on water resources, it is unclear whether that category includes both ocean/marine resources and groundwater resources. For the health and safety of the public, we would appreciate an evaluation of the project's impacts to groundwater resources.

We appreciate the opportunity to review and comment on the DEIS/OEIS for the Hawai'i Range Complex.

Very truly yours,

Daniel S. Quinn
State Parks Administrator

c: Wayne Souza

United States Department of the Interior
OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
1111 Jackson Street, Suite 520
Oakland, California 94607

IN REPLY REFER TO:
ER#07/615

Filed Electronically

10 September 2007

ATTN: HRC EIS/OEIS
Public Affairs Officer,
Pacific Missile Range
Facility, P.O. Box 128,
Kekaha, Kauai, Hawaii, 96752-0128
deis_hrc@govsupport.us

Subject: Review of the Draft Environmental Impact Statement (DEIS), for the Hawaii Range Complex (HRC) Project, Honolulu, Maui, and Hawaii Counties, HI

Dear Public Affairs Officer:

The Department of the Interior has received and reviewed the subject document and has no comments to offer.

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC
FWS, HI
FWS, Portland

Exhibit 12-1. Consultation Comments and Responses (Continued)

Bryan J. Baptiste
Mayor

Beth A. Tokioka
Director

Office of Economic Development
County of Kaua`i
4444 Rice Street, Suite 200
Lihue, HI 96766
(808) 241-6390 Tel * (808) 241-6399 Fax

September 11, 2007

Public Affairs Officer
Pacific Missile Range Facility
Box 128
Kekaha HI, 96752

Re: Hawai'i Range Complex EIS

To whom it may concern:

Allow me to express my support for continued research and development efforts taking place at the Pacific Missile Range Facility (PMRF) on Kaua'i.

While this work is vitally important to our nation's security, it is also makes a significant contribution to our island's economy. Hundreds of jobs for residents of Kaua'i – primarily on the west side of the island where economic opportunities are limited – are provided through PMRF and its affiliated contractors.

We have always found the leadership at PMRF to be a willing partner in community efforts of all kinds. Their volunteerism and assistance during emergency response efforts over the years has been tremendous. Whenever issues of community concern and importance arise, PMRF has always been willing to meet and search for the best possible solution for all involved.

Balancing care for environment with national security and economic opportunity is critical to our island, and we have found that PMRF has been an outstanding partner in this effort. We hope that the results of this review will allow the work currently being undertaken at PMRF to continue and grow in the years to come.

Sincerely,

Beth Tokioka

The Chamber of Commerce of Hawaii
Since 1850

September 11, 2007

Mr. Tom Clements
Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kauai, Hawaii 96752-0128

Dear Mr. Clements:

We are in receipt of the Draft Environmental Impact Statement (DEIS) for the Hawaii Range Complex and offer the following comments.

We agree that the security threats faced by our 21st century naval force require that the U.S. Navy take action to upgrade and modernize the Hawaii Range Complex. The measures proposed should provide the level of training necessary to prepare our combat-ready naval forces to win the ongoing war against terrorism, deter aggression, and maintain freedom of the seas as mandated by Federal law.

We believe that this level of readiness is essential to meeting the nation's security objectives, and U.S. commitments with Asia Pacific nations. It has enabled the U.S. Navy to join with the U.S. Army, Marine Corps, and Air Force in successfully maintaining peace and stability within the region and providing humanitarian assistance in the wake of disasters and other emergencies. These efforts have strengthened U.S. relations in the region and served as the catalyst in enabling the growth of a thriving global economy.

In reviewing the DEIS, we believe that the Navy has studied the impacts of the proposed alternatives and complied with the spirit and intent of Federal environmental laws. We further believe that the depth of the study is a continuance of the Navy's outstanding record in protecting, restoring, and enhancing Hawaii's fragile environment.

Thank you for this opportunity to comment on the DEIS.

Sincerely,

James Tollefson
President & CEO

1132 Bishop Street, Suite 402 • Honolulu, Hawaii 96813 • Phone: (808) 545-4300 • Facsimile: (808) 545-4369

Exhibit 12-1. Consultation Comments and Responses (Continued)

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD07/3146B

September 12, 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kaua'i 96752-0128
ATTN: HRC EIS/OEIS

RE: Draft Environmental Assessment and Overseas Environmental Impact Statement for Proposed Upgrades and Modernization in the Hawai'i Range Complex.

To Whom It May Concern:

The Office of Hawaiian Affairs (OHA) is in receipt of your request for written comments regarding the Draft Environmental Assessment (DEA) and Overseas Environmental Impact Statement (OEIS) for Proposed Upgrades and Modernization in the Hawai'i Range Complex. OHA is the "principal public agency in this State responsible for the performance, development, and coordination of programs and activities relating to native Hawaiians and Hawaiians."[1] It is our duty to "[a]ssess[] the policies and practices of other agencies impacting on native Hawaiians and Hawaiians, and conduct[] advocacy efforts for native Hawaiians and Hawaiians."[2] In this capacity, we offer our understanding of the DEA and then offer comments.

SOUND EXPOSURE LEVEL AND ACOUSTIC DOSE-FUNCTIONS

The introductory paragraph of the July 27, 2007 version of section 4.1.2.4.9 states, "These exposure analyses assume that MFA sonar poses no risk to marine mammals if they are not exposed to sound pressure levels from the mid-frequency active sonar above some critical value." (emphasis added). Yet section 4.1.2.4.9.3a states that not only is the Navy using sound pressure levels for the first time to "assess the potential effects of mid-

[1] Hawai'i Revised Statutes (HRS) § 10-3(3).
[2] HRS § 10-3(4).

frequency sonar on marine mammals", but that "sound exposure level may be a better metric for estimating the potential effects of sonar exposures on an animal's hearing because it represents an accumulation of energy and the sensitivity of the mammalian ear degrades as energy accumulates." (emphasis added). This is indicative of the kind of science and lack of reasoned data that is being used in this DEA. While it is clear that the Navy is using sound pressure level (SPL) rather than sound exposure level (SEL) as the metric for behavioral disturbance, it is not clear why. The National Environmental Policy Act requires that actual analysis be provided for decision-makers so that an informed decision can be made. Analysis does not happen after-the-fact. Further, the DEA introduces this science with an assumption, which points to a lack of data.

Prior to this DEA, the Navy had relied on SEL to assess the potential effects of mid-frequency sonar on marine mammals and even admits (as seen above) in this DEA that it may be a better metric to use. The Navy's reason for this untried approach is because, "using SPL rather than SEL makes more data available."[3]

However, the Navy states that, "Based on the science available, marine mammals are likely to exhibit any of a suite of behavioral responses or combinations of behavioral responses upon exposures to sonar transmissions."[4] The Navy states that these responses can further vary depending on geographic characteristics, species, populations, differences in individuals, age, gender, reproductive status, social behavior and prior experience.[5] It becomes apparent that there is a need for more data, and the way to get that information is to collect it rather than change metrics or approaches.

For example, the Navy states in section 4.1.2.4.9 that it has been working "over the past several years" on developing an original metric for estimating the probability of "marine mammals being behaviorally harassed" by the effects of mid-frequency sonar. This new assemblage is called acoustic dose functions and it will "replace" the old acoustic thresholds used in the past.

[3] Section 4.1.2.4.9.3a, page 4-63.
[4] Section 4.1.2.4.9, page 4-54.
[5] Section 4.1.2.4.9, pages 4-53 and 4-54. Further, section 4.1.2.4.9.4 page 4-63b states that, "Acoustic dose-functions will be interpreted carefully for beaked whales." OHA appreciates this particular attention to beaked whales (most likely because of the events in 1996 when an unusual stranding event took place involving 12 Cuvier's beaked whales in the Mediterranean Sea near Greece coinciding with sonar "sound detecting system trials," the nine Cuvier's beaked whales found dead on 24–25 September 2002 on the Canary Islands of Fuerteventura and Lanzarote in conjunction with the Neo Tapopn exercises, and the March 2000 occurance, when whales of four different species, including Cuvier's beaked whales, two minke whales, and a dolphin stranded in the Bahamas as a result of tactical mid-frequency sonar transmitted from U.S. Navy vessels). However, we find it odd that the Navy would choose to pay particular attention to this species when it also sees no connection between these deaths and sonar use. OHA stresses that no single species should be singled out for careful attention and that each potentially impacted species be given the same level of scrutiny.

Exhibit 12-1. Consultation Comments and Responses (Continued)

However, the Navy states that it will "continue to use acoustic thresholds to estimate the probability of temporary or permanent threshold shifts and for behavioral responses to explosives."[6] Then, on the very next page (4-56), the Navy states that it will "continue to use acoustic thresholds to estimate the number of marine mammals that might be 'taken' through sensory impairment" for mammals exposed to mid-frequency sonar and that the Navy will use "acoustic dose functions to estimate the number of marine mammals that might be 'taken' by behavioral harassment" due to exposure to mid-frequency sonar.

Not only is it unclear why the Navy chose to use an "original" approach in this DEA, using science developed over only the "past several years", but it is wholly unclear which approach they will use choose to use, how they will use the two of them together and when. This mass of confusion is further illustrated when the Navy states, "While the Navy's original approach to calculating dose function was used to estimate marine mammal exposures in this draft EIS, the Navy and NMFS are planning to utilize the NMFS approach to calculating acoustic dose-functions for the final EIS".[7]

It is also OHA's understanding that while the Navy and NMFS are working together, NMFS has not approved or accepted the Navy's "original approach" towards acoustic modeling. This DEA is misleading in that it suggests otherwise.

The Navy in this DEA also realizes that there is not enough data to measure the effects of its activities on marine mammals: "Existing studies of behavioral effects of man-made sounds in marine environments remain inconclusive."[8] Therefore the Navy has to rely on "observations of various animals, including humans" to base the relationship represented by acoustic dose-function and behavioral response.[5] Using "observations" that are not presented in the DEA of entirely different species and that are not even marine is not an adequate foundation for an "original" approach to be presented in a DEA.

Indeed, the Navy in section 4.1.2.3 feels free to state that: "Extrapolation from human and marine mammal data to turtles is inappropriate given the morphological differences between the auditory systems of mammals and turtles."[10] This is another example of how the analysis used in one section of the DEA is fine when it apparently suits the Navy, yet when the same analysis is used in another section it is refuted. It also serves as a source of concern for OHA about the integrity of the data produced and the analysis used to get it.

---

[6] Section 4.1.2.4.9, page 4-55.
[7] See line 26, page 4-61, section4.1.2.4.9.3.
[8] Section 4.1.2.4.9, page 4-53.
[9] Section 4.1.2.4.9, page 4-56.
[10] The Navy then fails to give a specific threshold number for underwater detonations, which is a breach of NEPA requirements.

An example of favorable conclusions taken from inconclusive data is seen in Section 3.1.2.3:

> The potential role of long-range acoustical perception in sea turtles has not been studied and is unclear at this time; anecdotal information suggests that the acoustic… Any signature of a turtle's natal beach might serve as a cue for nesting returns. However, the concept of sound masking is difficult, if not impossible, to apply to sea turtles. Although low frequency hearing has not been studied in many sea turtle species, most of those that have been tested exhibit low audiometric and behavioral sensitivity to low frequency sound. It appears, therefore, that if there were the potential for the mid-frequency sonar to increase masking effects of any sea turtle species, it would be expected to be minimal as most sea turtle species are apparently low frequency specialists. (emphasis added)

Moreover, because the Navy is using a new approach, the Navy then holds out its acoustic dose-functions analysis for marine mammals to other acoustic dose-functions uses in the Environmental Protection Agency for "water quality criteria," the Nuclear Regulatory Commission, the Centers for Disease Control and Prevention, the Food and Drug Administration, and the Occupational Safety and Health Administration. Giving a veritable laundry list of other agencies that have used this approach in their very different applications does not add credence to the Navy's new use of it. If such information is presented, a comparison and analysis as to how it relates to the Navy and this DEA needs to be given as well.

The purpose of the DEA is to weigh the environmental effects of various alternatives to the proposed project. OHA stresses that this cannot be done when the applicant creates original approaches for analysis in some cases, yet relies on the older approach in other cases, and then points out that they will not use either for the final EIS. It seems clear that even the applicant acknowledges that in this case, in regard to the effects of mid frequency sonar on marine mammals, that both a lack of information exists and that there will be an adverse effect.[11] In fact, the Navy states it will have to "interpret" acoustic dose-functions "to compensate for the biases and uncertainties that are inherent in the data used to produce them."[12] Therefore, OHA recommends adopting a precautionary approach.[13]

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[11] Section 4.1.2.4.9, page 4-53 states, "Though, active sonar could have various indirect, adverse effects on marine mammals by disrupting marine food chains, a species' predators, or a species' competitors." Also in Section 4.1.2.9.1, page 4-58, "Over time, as the amount of data available to generate acoustic-dose functions increases….If and when that kind of data becomes available." There is no data now or research planned to get it.
[12] Section 4.1.2.4.9.4a, page 4-63b.
[13] This principle has become a binding norm of customary international law. (1) Principle adopted by the UN Conference on the Environment and Development (1992) that in order to protect the environment, a

Exhibit 12-1. Consultation Comments and Responses (Continued)

OHA also finds it alarming that the Navy apparently intends to move forward with a recognized and stated lack of data solely when it benefits the Navy to do so. However, in other situations where a recognized lack of data exists, the Navy will actually cite to that as a reason for not pursuing a course of action which would inhibit the Navy. See, for example, the following:

> Ramp-up for sonar as a mitigation measure is also an unproven technique. The implicit assumption is that animals would have an avoidance response to the low power sonar and would move away from the sound and exercise area; however, there is no data to indicate this assumption is correct. Given there is no data to indicate that this is even minimally effective and because ramp-up would have an impact on the effectiveness of the military readiness activity, it was eliminated from further consideration. [14]

ENDANGERED SPECIES

4.1.2.6.2 page 4-134 states that, "The exposure numbers are given without consideration of mitigation measures." (emphasis added). The very next section estimates the effects on Endangered Species Act (ESA) listed species. Without exception it states, "Based on the model results, behavioral patterns, acoustic abilities of blue whales, results of past training operations, and the implementation of mitigation measures, the Navy finds that the HRC training events would not likely result in any death or injury to Blue whales, Fin whales, Humpback whales, North Pacific Right whales, Sei whales, Sperm whales, or Hawaiian Monk seals." (emphasis added). It is unclear why the Navy would state they would use exposure numbers without mitigation measures and then continue to use mitigation measures as part of their blanket 'no effect' conclusion for any endangered species. This is also the case for the preferred alternative 2.

Further, the mitigation measures in section 6.1.3 are inadequate. Having five watchstanders or lookouts with binoculars in poor visibility conditions or high seas (not to mention night time) is not enough. OHA also finds the procedures for when marine mammals are detected to be inadequate as well. Simply turning down the volume, waiting 30 minutes or moving 2,000 yards away is not enough. Some whales remain

precautionary approach should be widely applied, meaning that where there are threats of serious or irreversible damage to the environment, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation. (2) The precautionary principle permits a lower level of proof of harm to be used in policy-making whenever the consequences of waiting for higher levels of proof may be very costly and/or irreversible. See, for example, Ocean Policy Statement by the President, March 10, 1983, accompanying Proclamation No. 5030, 48 Fed. Reg. 10,605 (1983), the 1995 Migratory and Straddling Stocks Agreement and the 2000 Honolulu Convention, and it has also been recognized in regional and national decisions.

[14] Section 6.1.5, page 6-8.

submerged for long periods. Others remain near the surface with just a small amount showing. Turtles only surface with their nostrils. Listening for silent animals that are not vocalizing will not work. There are too many variables to account for, and these measures fall short. Further, this violates 50 CFR sec. 404.9(c) of the Papahānaumokuākea Marine National Monument Monument regulations requiring the Navy to avoid adverse impacts to Monument resources.

Additionally, the DEA on page 4-148 states that, "Mitigation measures would be implemented to prevent exposure of marine mammals (and sea turtles) to impulsive sound or sound pressures from underwater detonations that would cause injury." Yet on page 4-17, "A small number of fish are expected to be injured by detonation of explosive, and some fish located in proximity of the initial detonations can be expected to die."

OHA finds it highly unlikely that someone with binoculars in the open ocean would be able to see a submerged turtle. It is even more unlikely that underwater detonations that are admittedly capable of killing fish will not even harm marine mammals and turtles due to inadequate (or any, for that matter) mitigation measures.

It is also apparent that the priority even in mitigation measures is not to mitigate:

> Navy aircraft participating in exercises at sea will conduct and maintain, when operationally feasible and safe, surveillance for marine species of concern as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties.[15]

It is clear that marine mammals are secondary to operational duties and feasibility, and this is not acceptable. The purpose of EIS law is not to justify the environmental effects of government actions after economic and technical decisions have been made. It appears that this DEA is being prepared to do so, or merely to discuss and possibly mitigate environmental effects, rather than to serve as an "informational document" to guide decision-making. While there is still much value to discussion and mitigation of environmental problems, this use of the EIS process misses the point of the EIS law to encourage discussion of environmental issues before important decisions are made.

Of further concern to environmental species is the analysis used to determine the yearly marine mammal exposures from the ASW (TRACKEX, TORPEX, RIMPAC, USWEX, Multiple Strike Group) and RIMPAC with two Strike Groups exercises. Tables 4.1.2.6.9-1 and 4.1.2.7.1-1 in section 4.1.2.7.1 show a total of 668 dose-function exposures (of 195 dB – TTS 195-215 dB re 1 μPa2-s) to the Hawaiian Monk seal from these two exercises.

[15] Section 6.1.3, page 6-3.

Exhibit 12-1. Consultation Comments and Responses (Continued)

However, in the example illustrated in figure 4.1.2.4.9-2 using the "particular acoustic dose-functions the Navy and NMFS (National Marine Fisheries Service) developed for this EIS", it states that "about 50 % of the marine mammals exposed to mid-frequency active sonar at a received level of 180dB would be expected to exhibit behavioral responses that NMFS would classify as harassment for the purposes of the MMPA (Marine Mammal Protection Act)." This apparently means that while there are 668 dose-function exposures to monk seals, this could actually only reflect those animals that "exhibit behavioral responses" to the exposure. Many more will be exposed, however, to a sound that could qualify as harassment under the MMPA and also a take under the Endangered Species Act (ESA). Figure 4.1.2.4.9-2 uses a 50% ratio, which would mean that the entire population of monk seals in the entire island would be exposed. This needs to be clarified. A specific percentage or curve needs to be drawn in the DEA analysis.

The DEA on page 4-57 states,

> Using both of these methods (the confusing hybrid of acoustic dose-functions and acoustic thresholds) to predict the number of marine mammals that might be "taken" by mid-frequency active sonar during training exercises will over-estimate the number of mammals by between approximately 5 and 10 percent.

While this may sound good and serve to ensure that the Navy has applied for enough take permits, it is not what the law requires. Both the MMPA and the ESA require a specific number for a limited number of permits. OHA stresses that an over-estimate is not acceptable and asks for a specific data set. This only adds to our concern that there is not enough data currently available for what the Navy proposes and, therefore, we are not able to make an informed decision.

OHA recognizes that the Hawaiian Monk seal is in crisis because the population is now declining at a rate of about 4 percent yearly.[16] Biologists estimate the current population at about 1,200 individuals.[17] Biologists' models predict the species' population will fall below 1,000 animals within the next three to four years, which places the Hawaiian Monk seal among the world's most endangered species.[18] All of this prompted the National Oceanic and Atmospheric Agency to sign a new Hawaiian Monk seal recovery plan in August 2007 which stated, "the Hawaiian monk seal is headed to extinction if urgent action is not taken."[19]

[16] Honolulu Advertiser, August 21, 2007.
[17] Ibid.
[18] Ibid.
[19] Recovery Plan, page V.

Further, most of the current Hawaiian Monk seal population is found in the Hawaiʻi Range Complex in the Northwestern Hawaiian Islands and the Papahānaumokuakea Marine National Monument. The DEA states on page 6-18, Section 6.4.5 that, "No specific threats to monk seals from activities associated with the HRC were identified in the Plan." This statement contradicts all the prior evidence. OHA finds that acoustic-dose functions that will expose half to all of the endangered Hawaiian Monk seal population are not acceptable. The Hawaiian Monk seal is but one example of the many species that will be affected by this proposed action. Further, how the Navy then finds such small numbers of takings under the MMPA is unclear.[20]

NORTHWESTERN HAWAIIAN ISLANDS

In Section 3.2 on page 3-77, the DEA states,

> Depending on the trajectory, missiles launched from the Pacific Missile Range Facility (PMRF) have the potential to overfly portions of the Papahanaumokuakea Marine National Monument. Of particular concern is missile overflight of Nihoa and Necker, which are the islands closest to the Main Hawaiian Islands.

OHA notes that all the islands are of equal concern and should be given the same level of analysis and attention. This is true for the Papahānaumokuākea Marine National Monument as well (note correct accents without which a different meaning is given). Hawaiian stewardship and perpetuation of Native Hawaiian culture is holistic and fully integrated with the natural and cultural resources. Papahānaumokuākea offers a vast, sacred and protected area from which to learn and reflect from that cannot be recreated or modeled anywhere else. "O ka mea I kūpono i kō kākou noʻonoʻo aku, ʻoia kā kākou e mālama." ("What is suitable for us to reflect on is what we should preserve.") (Fornander)

In Hawaiian traditions, the Northwestern Hawaiian Islands are considered a sacred place, a region of primordial darkness from which life springs and spirits return after death (Kikiloi 2006). Much of the information about the NWHI has been passed down in oral and written histories, genealogies, songs, dance, and archaeological resources.[21] According to these Native Hawaiian sources, Papahānaumokuākea existed since the beginning of time. Semantically the name of the monument resonates with the Native Hawaiian sense of place and origin. The earth mother (Papa) and the sky father (Wakea)

[20] The DEA on page 4-148 says that, "Based on analytical modeling results, five endangered marine mammal species occurring within the Hawaii OPAREA may be exposed to acoustic energy that could result in TTS or behavioral modification, including the fin whale, humpback whale, sei whale, sperm whale, and Hawaiian monk seal."
[21] The Papahānaumokuākea Marine National Monument website, http://hawaiireef.noaa.gov/heritage/welcome.html, September 10, 2007.

Exhibit 12-1. Consultation Comments and Responses (Continued)

joined in union and gave birth to not only the Native Hawaiians, but also the islands themselves. This cosmology is embodied in the name of the monument itself and reminds us of not only our connection to the land, but also of our responsibilities to it.

Further, the extensive coral reefs found in Papahānaumokuākea Marine National Monument are home to over 7,000 marine species, one quarter of which are found only in the Hawaiian Archipelago.[22] Also 21 species of tropical and subtropical seabirds breed in Papahānaumokuākea.[23] Virtually the entire world's populations of Laysan Albatross and Black-footed Albatross live there[24], as well as populations of "global significance" of Red-tailed Tropicbirds, Bonin Petrels, Tristram's Storm-Petrels, and White terns[25]. It is the largest seabird rookery in the world with four endangered endemic land birds which are found nowhere else in the world.[26] Papahānaumokuākea also has at least six species of endangered plants listed under the Endangered Species Act (ESA) and contains "countless endemics."[27] Almost all of the entire population of the Hawaiian Monk seal resides there, and it provides "nearly all" of the nesting habitat for the threatened Hawaiian green sea turtle in Hawai'i.[28] Four other endangered turtles and six ESA listed whales are found there.

This particular area of the Hawai'i Range Complex (HRC) overlaps one monument, two refuges, one reserve, and one national memorial.[29] The area that this project proposes to

[22] Ibid at http://hawaiireef.noaa.gov/about/welcome.html .
[23] Application for the World Heritage U.S. Tentative List, Papahānaumokuākea National Marine Monument, page 69.
[24] 99 and 98 percent, respectively and both are listed as vulnerable and endangered by the International Union for Conservation of Nature and Natural Resources (IUCN).
[25] Ibid.
[26] The final rule authorizing the Department of Defense to take migratory birds during military readiness activities (50 CFR Part 21) was published in the Federal Register on 28 February 2007. The rule states that the Armed Forces must confer and cooperate with the USFWS on the development and implementation of conservation measures to minimize or mitigate adverse effects of a military readiness activity if it determines that such activity may have a significant adverse effect on a population of a migratory bird species. OHA notes that this is such a case. See also, Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (10 January 2001).

[27] Ibid., page 68.
[28] Ibid., page 69.
[29] Papahānaumokuākea Marine National Monument, the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, the Hawaiian Islands National Wildlife Refuge, the Midway Atoll National Wildlife Refuge, and the Battle of Midway National Memorial. As a sanctuary, the National Marine Sanctuaries Act (NMSA) 16 U.S.C. § 1431 et seq. authorizes the Secretary of Commerce to designate as National Marine Sanctuaries areas of the marine environment that possess conservation, recreational, ecological, historical, research, and educational, or aesthetic resources and qualities of national significance, and to provide a comprehensive management and protection of these areas. To protect the area designated, any Federal action that is likely to destroy, cause the loss of, or injure a sanctuary resource must consult with the Secretary of Commerce prior to commencement of the action and adhere to reasonable and prudent alternatives set by the Secretary of Commerce. (emphasis added) NMSA 16 U.S.C. § 1431

shoot missiles and conduct war games on is also being considered as a World Heritage site. The President of the United States set aside Papahānaumokuākea as the world's largest, most protected marine preserve in the world. All of these actions recognize the special status and importance of the area that this DEIS treats in section 3.2. Yet the Navy fails recognize it. In fact, their analysis of the Northwestern Hawaiian Islands/ Papahānaumokuākea begins with:

> Of the 13 environmental resources that would be affected by the No-action Alternative, Alternative 1, or Alternative 2 considered for analysis, air quality, airspace, geology and soils, hazardous materials and waste, heath and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.[30] (emphasis added).

OHA expresses concerns over missile debris not only falling onto the islands and damaging them, but also falling into the water where it will sink to the bottom and be pushed about by the currents thereby destroying the very coral reefs that Papahānaumokuākea was set up to preserve. Even if the missile tracks are moved, there will still be unanalyzed and accounted for impacts in Papahānaumokuākea that this DEA fails to address.

For example, sonar buoys will be dropped from planes via parachutes. There is no mention in the DEA of what happens to the parachutes and the potential impacts (of which there are many). Also, radar observations show that chaff can spread over several hundreds of miles and stay in the air for up to a day.[31] The Air Force reported that chaff has a potential but remote chance of collecting in reservoirs and causing chemical changes that may affect water and the species that use it. The Air force also reported that surface-feeding or bottom-feeding animals and fish may ingest chaff, but this only affects a few individual animals and has a low impact on species populations except in the case of protected species.[32] Of further concern is that some types of chaff may not only be ingested, but that there is a likelihood that birds would use chaff for nests and expose the young.[33] These are but two examples of the kinds of impacts that are probable as a result of the Navy's actions and which are not addressed in the DEA. In fact, we are even told that they are "not addressed."

The EIS process is not discretionary. It does not allow for blanket exemptions of areas not to be treated. OHA urges that a full and careful analysis of each impact be given. NEPA calls for such an analysis so that impacts and alternatives can be weighed and

[30] Section 3.2, page 3-77.
[31] United States General Accounting Office, September, 1998 report, DOD Management Issues Related to Chaff.
[32] Ibid.
[33] Ibid.

Exhibit 12-1. Consultation Comments and Responses (Continued)

informed decision making results. The Navy stating that it will not address some things and failing to address others adequately is a breach of this requirement.

Further, OHA finds it odd that while the rest of the world finds this area worthy of multiple and overlapping areas of protection and elevated status, the Navy would start their analysis of this area by seeking to minimize their analysis of the potential impacts resulting from their actions in this area.

OHA does, however, appreciate that the Navy recognizes its duty under the Presidential Proclamation establishing the Monument:

> 3. All activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities.
>
> 4. In the event of threatened or actual destruction of, loss of, or injury to a monument resource or quality resulting from an incident, including but not limited to spills and groundings, caused by a component of the Department of Defense or the USCG [U.S. Coast Guard], the cognizant component shall promptly coordinate with the Secretaries for the purpose of taking appropriate actions to respond to and mitigate the harm and, if possible, restore or replace the monument resource or quality.[34]

The DEA then states on the same page, "Because Nihoa and Necker are more likely to be impacted by program activities, they are discussed in more detail at the end of this section."[35] Once again, OHA urges that environmental assessments are not discretionary. The Navy is not free to treat some areas more carefully than others because they feel that they have assessed their own actions and are aware of all the potential impacts. Clearly this is not reasonable, or even possible, and not a part of the DEA/National Environmental Policy Act (NEPA) requirements. OHA also notes that even the name that the Navy uses for Necker island alludes to their inhibited analysis. Necker is known as Mokumanamana.[36]

Additional duty to protect this area is added with Executive Order (EO) 13089 Coral Reef Protection (63 FR 32701) which requires the Navy "to preserve and protect the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems and the marine environment." It is also (as stated in the DEA) DOD policy to protect the U.S. and International coral reefs and to avoid impacting coral reefs to the maximum extent possible.

[34] U.S. Government, The White House, 2006, as cited in DEA, page 3-79.
[35] Section 3.2, page 3-79.
[36] Even Wikipedia lists these names for these islands. See, http://en.wikipedia.org/wiki/Nihoa .

OHA, which has a seat on the seven member Monument Management Board, notes that the area of the Northwestern Hawaiian Islands, known as Papahānaumokuākea, contains many culturally significant sites and is generally of great cultural significance to Native Hawaiians. The first part of the Hawaiian cosmology begins with Pō, the age of spirit or cosmic night. According to this creation chant the first physical being created was a coral polyp, from which all other things followed.[37] It is also the home to which those spirits return after physical death.[38] This area contains the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve and contains 4,500 square miles of coral reefs.[39] The principal purpose of the Reserve is the long-term conservation and protection of the coral reef ecosystem and related marine resources and species of the Northwestern Hawaiian Islands in their natural character.

Hawaiians themselves are further connected to Papahānaumokuākea by their ʻaumakua, kumu paʻa, and kino lau. These are their ancestral and supernatural body forms manifested in the animals and plants of Papahānaumokuākea.[40]

All of this is amply evidenced by the many archeological sites found in Papahānaumokuākea. The Navy only lists 78 sites for Nihoa when there are actually now 89 known sites.[41] Mokumanamana has 52 sites which are not discussed or even mentioned in the Navy's DEA.[42] On both of these islands there are religious and agricultural sites that indicate habitation starting a thousand years ago. This is an example of what the analysis in the DEA for an area that the Navy says is of "particular concern."

Native Hawaiians today continue to maintain their strong cultural ties to the land and sea and are ever-realizing their own connections to this area. It is believed Mokumanamana played a central role in Hawaiian ceremonial rites and practices a thousand years ago because it is directly in line (230 34.5' N) with the rising and setting of the equinotical sun on the path called the tropic of Cancer. In Hawaiian this path is called "ke ala polohiwa a Kane" or the "way of the dark clouds of Kane," which has been translated to mean death, or the westward passage of the ancestral spirits. Mokumanamana sits Public centrally on the axis between two spatial and cultural dimensions. Symbolically, Mokumanamana splits darkness and light, afterlife and existence, pō and ao. On the summer solstice, the sun travels slowest across the sky going directly over Mokumanamana. This aligns with the strategic concentration of ceremonial sites on the

[37] Johnson, Rubellite, Kawena, Kumulipo, Hawaiian Hymn of Creation, Volume I, 1981, page 4.
[38] Application for the World Heritage U.S. Tentative List, Papahānaumokuākea National Marine Monument, page 73.
[39] Northwestern Hawaiian Islands Marine National Monument, A Citizen's Guide, page 3.
[40] Some examples are turtles, whales, sharks and eels.
[41] Application for the World Heritage U.S. Tentative List, Papahānaumokuākea National Marine Monument, page 42.
[42] Ibid., page 65.

Exhibit 12-1. Consultation Comments and Responses (Continued)

island and serves as a reminder of the important spiritual role it plays in the Hawaiian culture.

OHA finds the Navy's analysis of these important sites in the DEA woefully inadequate. Their treatment in section 3.2.2.2 called, Cultural Resources-Northwestern Hawaiian Islands Onshore is only one page long. There is no attempt to asses the cultural significance of any of the other islands, the animals or plants and yet they admit that there is both a duty to avoid adverse impacts under the Presidential Proclamation establishing the Monument (numbers 3 and 4), and a potential for those impacts to occur.

OHA further notes that there is no section 106 analysis under the National Historic Preservation Act. This is a federal undertaking that directs the agency to take into account the effects of its actions on historic properties and provide the Advisory Council on Historic Preservation a reasonable opportunity to comment.[43] Below is the entire content of the Navy's analysis in Section 4.2.2.2 Cultural Resources- Northwestern Hawaiian Islands:

> Missile defense RDT&E operations, including THAAD, have the potential to generate debris that falls within areas of the Northwestern Hawaiian Islands, particularly the vicinity of Nihoa. Some of these islands are known to have significant cultural resources sites, and the islands of Nihoa and Necker are listed in the National and Hawaii State Registers of Historic Places. Debris analyses of the types, quantities, and sizes associated with the PMRF missile exercises indicate that the potential to impact land resources of any type is very low and extremely remote. In addition, trajectories can be altered under certain circumstances to further minimize the potential for impacts. As noted in Section 4.2.2.1, future missions will include consideration of missile flight trajectory alterations, if feasible, to minimize the potential for debris within these areas. As a result, impacts on cultural resources within the Northwest Hawaiian Islands are not expected.

OHA stresses that many of the places and objects in this area are eligible for inclusion in the National Register of Historic Places. As evidence of this, Mokumanamana was added to the National Register of Historic Places in 1988. As such, OHA, a federally listed Native Hawaiian Organization, is requesting assurances that a section 106 analysis be done as part of a much improved cultural resources analysis for the Northwestern Hawaiian Islands area, known as Papahānaumokuākea.

OHA appreciates being brought in to this early consultation and looks forward to further commenting on this project as it develops. Thank you for the opportunity to comment. If

[43] Section 106 of the national Historic Preservation Act, 16 U.S.C. 470f.

you have any further questions or concerns please contact Grant Arnold at (808) 594-0263 or granta@oha.org.

Sincerely,

Clyde W. Nāmu'o
Administrator

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Exhibit 12-1. Consultation Comments and Responses (Continued)

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Exhibit 12-1. Consultation Comments and Responses (Continued)

Bryan J. Baptiste
Mayor

Beth A. Tokioka
Director

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County of Kauai
4444 Rice Street, Suite 200
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September 12, 2007

Tom Clements
Pacific Missile Range Facility
Public Affairs Officer
Box 128
Kekaha HI, 96752

Dear Tom

I am very pleased to submit this letter of support for the many years of partnership that PMRF has provided to the community and residents of Kauai County.

For years, PMRF has employed generations of Kauai's civilian residents in various positions of importance on base. PMRF, through its leadership and personnel, have participated in events that are important to Kauai's unique community profile. With a sensitivity to the Hawaiian culture, and a true appreciation of traditional sites that boarder the Navy facility, PMRF practices great care and stewardship in protecting those things of great cultural importance and value to Kauai's people.

In my dual role as a local government employee, and as a recognized cultural practitioner, I was invited recently, to witness operational exercises aboard the Pacific fleets newest Aircraft Carrier, The USS Ronald Reagan. Amazed by my 24 hr. visit aboard that ship, only then, did I understand the full impact of the freedom and protection we enjoy as citizens of the United States of America, as the Navy, diligently stands watch through exercises conducted with PMRF and other Naval facilities here in Hawaii.

It is important to recognize the many ways our lives are positively impacted by our neighbors at PMRF.

Thank you for allowing me a moment to voice my support for the Pacific Missile Range facility and the Navy, as a good neighbor, partner and protector of us all.

Respectfully submitted,

Robbie Kaholokula
Tourism Specialist, OED County of Kaua'i

09/17/2007 14:31 8085234642 WASTEWATER PAGE 01

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IN REPLY REFER TO:
PRO 07-063

September 17, 2007

via fax: 808-335-4520

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kauai, Hawaii 96752-0128

ATTN: HRC EIS/OEIS

Subject: Hawaii Range Complex, Dept. of the Navy
Draft EIS/Overseas EIS, July 2007

We have reviewed the subject Draft EIS/OEIS transmitted to us via your letter dated 19 Jul 2007, and have the following comments:

In section 3.4.1.7, p. 3-199, the report states that "Of the 13 environmental resources considered for analysis ... utilities ... are not addressed." This is a concern to our Department because we have existing underwater pipelines in the vicinity of the various Navy operating areas. These pipelines include our ocean outfalls from our wastewater treatment plants (WWTP) at Waianae, Honouliuli, and Kailua, each of which extend over 1 mile offshore, and our wastewater pressurized force mains under Pearl Harbor. These are critical pipelines that need to be appropriately protected from potential adverse impacts from Navy operations. Of particular concern to us is the potential impacts of the Navy's Ewa Training Minefield on our existing outfall pipe from the Honouliuli WWTP.

Should you have any questions, please call Jack Pobuk, CIP Program Coordinator, at 768-3464.

Sincerely,

Eric S. Takamura, Ph.D., P.E.
Director

Exhibit 12-1. Consultation Comments and Responses (Continued)

LINDA LINGLE
GOVERNOR

ROBERT G. F. LEE
MAJOR GENERAL
ADJUTANT GENERAL

GARY M. ISHIKAWA
BRIGADIER GENERAL
DEPUTY ADJUTANT GENERAL

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

14 SEP 2007

MEMORANDUM FOR COMMANDER, UNITED STATES PACIFIC FLEET
250 Makalapa Drive
Pearl Harbor, HI 96860

FROM: HITAG

SUBJECT: Environmental Impact Statement 5090 N01CE1/0552

1. Thank you for the opportunity to review the final draft Environmental Impact Statement (EIS) for the Hawaii Range Complex. The State of Hawaii Department of Defense strongly supports the proposed upgrades and modernization to the ranges. The range complex is the single most critical component to successful military exercises, war gaming and day-to-day training for our Hawaii National Guard forces in the State of Hawaii. Your modernization proposals will ensure the complex remains a vital part of military training for the foreseeable future.

2. Questions can be addressed to Col Ann Greenlee, Chief of Staff, JFHQ – HI, 733-4230.

ROBERT G. F. LEE
Major General
Hawaii National Guard
Adjutant General

SEP-17-2007 MON 04:50 PM U.S.E.P.A. FAX NO. 4159473562 P. 01

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

FAX COVER SHEET:

TO:	**Public Affairs Officer, Pacific Missile Range Facility** **Attn: HRC EIS/OEIS**
Date:	**September 17, 2007**
Fax No.	**808-335-4520**
No. of Pages (incl. cover sheet)	8
FROM:	**Karen Vitulano, Environmental Review Office**
Phone No.	**415-947-4178**
Fax No.	**415-947-8026**
SUBJECT:	**EPA comments on the Hawaii Range Complex DEIS**
COMMENTS:	

Exhibit 12-1. Consultation Comments and Responses (Continued)

SEP-17-2007 MON 04:50 PM U.S.E.P.A. FAX NO. 4159473562 P. 02

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

September 17, 2007

Tom Clements
Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kehaha, Kauai, HI 96752-0128

Subject: Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS), Hawaii Range Complex, Hawaii (CEQ # 20070312)

Dear Mr. Clements:

The U.S. Environmental Protection Agency (EPA) has reviewed the above-referenced document pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. Our detailed comments are enclosed.

The Draft EIS/OEIS (herein DEIS) assesses the impacts of current and increased Navy training, and research and development activities in the Hawaii Range Complex, which includes 235,000 square nautical miles (nm) around the Main Hawaiian Islands and 2.1 million square nm of Temporary Operating Area of sea and airspace encompassing the Northwest Hawaiian Islands. The No-action Alternative evaluates the current level of Navy training in the range complex, which includes over 9,300 annual operations, including several Undersea Warfare Exercises per year and the biennial Rim of the Pacific exercise. Alternative 1 evaluates increased tempo and frequency of training and new training operations. Alternative 2 evaluates further increased tempo and training with increases of over 100% in the number of training operations over current training, increased research and development, and the addition of major exercises including training three Strike Groups simultaneously. The Navy's preferred alternative is Alternative 2.

Based on our review, we have rated the DEIS as Environmental Concerns – Insufficient Information (EC-2) (see enclosed "Summary of Rating Definitions"). EPA has concerns regarding impacts to marine resources from the preferred alternative. We understand there is substantial uncertainty regarding the acoustic impacts to these resources, including the extent that mid-frequency active sonar use plays in marine mammal strandings. Such uncertainty suggests that a more precautionary approach be taken than what is described in the preferred alternative to fully protect marine resources.

A limited range of alternatives are evaluated in the DEIS. EPA recommends additional alternatives be formulated and evaluated in the Final EIS to meet the Navy's mission while maximizing environmental protection. We recommend different training combinations and

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SEP-17-2007 MON 04:50 PM U.S.E.P.A. FAX NO. 4159473562 P. 03

levels be included, including an alternative that describes a much more precautionary approach in relation to mid-frequency active sonar. If additional alternatives are not analyzed, EPA recognizes the No-action Alternative, which maintains training at current levels, to be the environmentally preferable alternative per 40 CFR 1505 2 (b) and recommends its selection to minimize environmental impacts.

EPA appreciates the opportunity to review this DEIS. When the Final EIS is released for public review, please send one copy to the address above (mail code: CED-2). If you have any questions, please contact me at (415) 972-3846 or Karen Vitulano, the lead reviewer for this project, at 415-947-4178 or vitulano.karen@epa.gov.

Sincerely,

Connell Dunning
FOR Nova Blazej, Manager
Environmental Review Office

Enclosure: Summary of EPA Rating Definitions
EPA's Detailed Comments

cc: Chris Yates, National Marine Fisheries Service

2

Exhibit 12-1. Consultation Comments and Responses (Continued)

SUMMARY OF EPA RATING DEFINITIONS

This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the EIS.

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

ADEQUACY OF THE IMPACT STATEMENT

Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT, HAWAII RANGE COMPLEX, HAWAII, SEPTEMBER 17, 2007

Alternatives and Purpose and Need

The Draft Environmental Statement (DEIS) for the Hawaii Range Complex (HRC) states that the decision to be made by the Assistant Secretary of the Navy is to determine both the level and mix of training to be conducted and the range capability enhancements to be made within the HRC that best meets the needs of the Navy (p. ES-12). The alternatives evaluated in the DEIS do not contain a variety of levels and mixes of training and enhancements, however. The No-action Alternative represents the existing level of training; Alternative 1 consists of the exercises in the No-action Alternative with the addition of new training operations and an increased tempo and frequency of training; and Alternative 2 includes the same exercises as Alternative 1 with further increased tempo and training and substantial increases in the number of training operations including the addition of major exercises.

The Council on Environmental Quality (CEQ) Regulations for Implementing the National Environmental Policy Act (NEPA) states that the evaluation of alternatives is the "heart of the environmental impact statement" and that agencies should "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed action (40 CFR 1502.14). Based on the purpose and need described in Chapter 1, it is not clear that all reasonable alternatives that would meet the Navy's current and emerging training needs were included. The alternatives analysis of this DEIS would be improved by including alternatives that represented a more diverse level and mix of training instead of formulating alternatives that simply build upon one another. A more diverse range of alternatives would provide information to the decision-maker that could aid in selecting an alternative that meets the Navy's most important training needs while meeting the intent of our national environmental policy (42 USC 4331- 4335).

Recommendation: In the Final EIS (FEIS), EPA recommends evaluation of additional alternatives that represent a more diverse level and mix of training and research/ development activities. EPA recommends that the FEIS include a range of alternatives developed with reference to how well they meet immediate and future training needs. We recommend including an alternative that describes a much more precautionary approach in relation to the use of mid-frequency active sonar. We also recommend that the impacts of these alternatives be more clearly differentiated in the FEIS and presented in a comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public (40 CFR 1502.14). Consistent with this, we recommend that the amount of munitions use and their associated pollutants be quantified in the FEIS for all alternatives.

If additional alternatives are not analyzed in the FEIS, EPA recognizes the No-action Alternative, which maintains training at current levels, to be the environmentally preferable alternative per 40 CFR 1505.2 (b) and recommends its selection to minimize environmental impacts.

Exhibit 12-1. Consultation Comments and Responses (Continued)

Impacts from Mid-Frequency Active (MFA) Sonar

Considering Uncertainty in Impact Assessment

We understand that there is a substantial amount of uncertainty in predicting impacts to marine mammals and fish from MFA sonar. We are concerned, however, that this uncertainty has not been fully considered in the assessment of significance[1], and that more precaution is not being used to mitigate this uncertainty.

For example, we are aware that the Woods Hole Oceanographic Institution[2] expressed concern in the past regarding effects thresholds near 190 dB, citing a study[3] that reported significant behavioral responses in the North Atlantic right whale at 154 decibels (dB). Additionally, the 2006 Rim of the Pacific (RIMPAC) After Action Report (Appendix F) indicates that the National Marine Fisheries Service (NMFS) believed that the 190 dB sound exposure level (SEL) was "not sufficiently precautionary" and required the Navy to apply for its incidental harassment authorization for that exercise using 173 dB SEL (p. F-9). The DEIS indicates that the normal operating level for the Hawaii Range Complex (HRC) alternatives would be 235 dB and the preferred alternative includes 1,152 additional hours of MFA sonar (p. 4-19) and simultaneous multiple strike group training.

> *Recommendation:* We recommend the FEIS consider the uncertainty and unknown risks in assessing significance of impacts from MFA sonar on marine resources. We recommend modifications to the preferred alternative to incorporate additional precaution and mitigation measures commensurate with this level of uncertainty.

Impacts to Fish

The DEIS makes conclusions regarding impacts to fish that are not clearly supported by the discussion provided. For example, the DEIS concludes that impacts to fish would be minimal "considering the few fish species that would be able to detect sound in the frequencies of the proposed action" (p. 4-19). However, the DEIS states that species of tuna may be able to detect mid-frequency sounds (p. 3-14), and there are several tuna species present in open water in the project area (Table 3.1.2.2.1-1). An additional concern is that NMFS determined that overfishing was occurring Pacific-wide for one tuna species, the bigeye tuna (p. 3-11). The basis for the conclusion of negligible impacts is not clear and should be better supported or revised.

Additionally, the DEIS states that impacts to fish would be minimal because of the "limited exposure of juvenile fish with swim bladder resonance in the frequencies of the sound sources" (p. 4-19). The DEIS does not provide the swim bladder resonance of fish in the study area, which would depend on fish species, size and depth (p. 4-14), to offer the basis for the conclusion of negligible impacts in the DEIS.

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1 The Council on Environmental Quality Regulations for Implementing NEPA state that "the degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks" should be considered in evaluating significance (40 CFR 1508.27 (b) 5)

2 In its comment letter on the Atlantic Undersea Warfare Training Range EIS Jan 27, 2006

3 Available: https://darchive.mblwhoilibrary.org/handle/1912/248

> *Recommendation:* Consider and discuss potential impacts to tuna species, especially the bigeye tuna, in the FEIS. If additional information regarding swim bladder resonance of fish in the study area is available, include and discuss it in the FEIS. If this information is not available, the conclusions regarding significance of impacts should be qualified and the uncertainty considered. EPA recommends additional precautions be included in the proposed action to safeguard marine resources.

Hazardous Waste Contamination

Pearl Harbor Contamination

The Navy proposes a Demolition Exercise Area in the Middle Loch of Pearl Harbor, which has existing polychlorinated biphenyls (PCBs) and heavy metals contamination. The DEIS states that underwater detonations may create a crater and disperse the displaced bottom sediments into the water column (p. 4-370). We have concerns regarding potential mobilization of PCBs and other pollutants by underwater detonations and their spread into the shallow fringes of Middle Loch, especially if a detonation disturbs sediments more than a couple inches deep. The broad area of the Middle Loch has PCB levels which are just below levels which are of concern for exposure to waterfowl in shallow habitat (< 2 meters deep). Various heavy metals (cadmium, copper, mercury, and zinc) are present above levels of concern for a variety of ecological receptors in a broad area of the Loch. In addition, there is one sampling location near the east shore which has chlorinated pesticides (dieldrin and chlordanes) above levels of concern for fish.

Additionally, it is not clear whether the construction and operation of the Acoustic Test Facility (ATF) off Ford Island has the potential to mobilize existing sediment contaminants, including PCBs, heavy metals, and chlorinated pesticides, into the water column. There is an area of near shore samples just within the ATF on the southwest corner of Ford Island which has very high levels of PCBs (from 604 to 8448 parts per billion measured as the total of the NOAA 18 congeners). These same locations have zinc and chlorinated pesticides (dieldrin & endosulfan) above levels of concern. We have concerns regarding the potential disturbance of sediments in this small area along the shore because of the high probability that PCBs would be mobilized.

> *Recommendation:* In the FEIS, include a discussion as to whether underwater detonations will mobilize existing contaminants into the water column and what effects this mobilization could have on environmental resources considering the information above. Clarify the potential that the ATF has to disturb contaminated sediments. We note that these exercises and enhancements are proposed in some of the less contaminated portions of Pearl Harbor, however additional mitigation measures should be considered that reduce sediment disturbance to the greatest extent practicable, including the reduction of the quantity of exercises performed. EPA also recommends the avoidance of soil disturbance on the southwest corner of Ford Island which contains high PCB contamination and request this be included in the mitigation measures in Chapter 6.

Exhibit 12-1. Consultation Comments and Responses (Continued)

SEP-17-2007 MON 04:51 PM U.S.E.P.A. FAX NO. 4159473562 P. 08

Pollution Prevention

Guidance issued by the CEQ on integrating pollution prevention in Federal planning and decisions under NEPA[4] states that Federal agencies should use every opportunity to include pollution prevention features in NEPA planning and decisions and reflect such considerations in their NEPA documents. The DEIS identifies the contamination from munitions, including oils, heavy metals, and chemical simulants, that will be left in the water column and sediments. The preferred alternative involves "substantial" increases of materials expended on-sea ranges that include liquid and soluble hazardous constituents (p. 4-189).

Consistent with CEQ guidance, the FEIS should describe what actions the Navy is taking to reduce the introduction of pollutants during HRC activities. We strongly recommend that the Navy perform its training in a manner that minimizes the deposition of pollutants into soils and the water column, especially in those areas where waters do not meet water quality standards such as in Pearl Harbor. The DEIS notes that loadings of copper, nutrients, and leachate from anti-fouling paint used on ship hulls are of concern in Pearl Harbor (p. 3-225).

> *Recommendation:* In the FEIS, identify measures that the Navy is taking to reduce pollutant loadings in soil and water resources. Commit to specific measures to reduce pollutant loadings in areas where waters do not meet water quality standards and include these mitigation measures in the FEIS and in the Record of Decision (ROD). EPA recommends that the Navy explore and discuss ways to reduce the deposition of liquid and soluble hazardous constituents into water resources for this project, especially the substantial increases under the preferred alternative.

Depleted uranium

The Pohakuloa Training Area (PTA) will be the site for Air to Ground Gunnery exercises, bombing exercises, and live-fire exercises (p. 4-442). We understand that traces of historic munitions containing depleted uranium have been found at an impact area at PTA.

> *Recommendation:* The FEIS should identify whether ground disturbance will occur in impact areas that could contain depleted uranium, and assess the impacts to air resources and health and safety from such disturbance. Include an update of the Navy's efforts to address depleted uranium contamination at PTA and any other areas in the HRC. We recommend ground disturbance be avoided in areas that could contain depleted uranium.

[4] *Pollution Prevention and the National Environmental Policy Act*," CEQ, January 12, 1993

The Senate

STATE CAPITOL
HONOLULU, HAWAII 96813

September 17, 2007

Public Affairs Office
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752-0128

Attention: HRC EIS/OEIS

Subject: **URGENT** – 30 Day Extension Request
Hawai'i Range Complex NEPA Draft EIS

To Whom It May Concern:

Because of the size and complexity of the Hawai'i Range Complex NEPA Draft EIS, I would like to respectfully request a 30 day extension for the public review and comment period.

Because of numerous other pressing issues during the past 30 days, neither I nor my staff has had the opportunity to adequately review, analyze and comment on this important document. In addition, I have received several requests from constituents in my district who are also requesting a 30 day extension period for review and comment.

Thank you in advance for whatever assistance you are able to offer in extending the public review and comment period.

Sincerely,

Gary L. Hooser
Majority Leader
Hawaii State Senate
7th Senatorial District – Kaua'i & Ni'ihau

mm: GLH

Hawai'i State Capitol, Room 214-415 South Beretania Street-Honolulu, HI 96813
Phone 808-586-6030-Fax 808-586-6031-Tollfree from Kaua'i 274-3141+66030•
Cell Phone 808-652-4279-E-mail senhooser@Capitol.hawaii.gov

Exhibit 12-1. Consultation Comments and Responses (Continued)

CHARMAINE TAVARES
Mayor

JEFFREY S. HUNT
Director

COLLEEN M. SUYAMA
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

September 17, 2007

Mr. L. M. Foster
Director, Fleet Environmental
Department of the Navy
United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii 96860

Dear Mr. Foster:

SUBJECT: COMMENTS ON THE DRAFT EIS/OEIS FOR THE HAWAII RANGE COMPLEX, HAWAII (RFC 2007/0103) AND (LTR 2007/2709)

Thank you for a copy of your letter to the Executive Summary and Draft EIS/OEIS for the Department of the Navy's Hawaii Range Complex. The Maui County Planning Department (Department) acknowledges that a more robust, risk-based method of determining marine mammal impacts is being used by the Navy. The Department also notes that approximately seventy-five (75) individuals testified at the August 27, 2007 public hearing on the matter, held at Baldwin High School in Maui. The public expressed concern with a number of matters, but primarily were concerned with potential impacts to whales during their period of residence in the near shore waters of Maui. The Department recommends that the Navy exercise caution and implement prudent avoidance and mitigation measures to the extent practical, when operating in near shore waters of Maui County so as to reduce any potential adverse impacts on marine mammals.

Thank you for your inquiry and the opportunity to comment. Should further clarification be required contact Staff Planner Thorne Abbott by email at thorne.abbott@mauicounty.gov or by telephone at 270-7530

Sincerely,

JEFFREY S. HUNT, AICP
Planning Director

250 SOUTH HIGH STREET, WAILUKU, MAUI, HAWAII 96793
MAIN LINE (808) 270-7735; FACSIMILE (808) 270-7634
CURRENT DIVISION (808) 270-8205; LONG RANGE DIVISION (808) 270-7214; ZONING DIVISION (808) 270-7253

xc: Colleen M. Suyama, Deputy Planning Director
Clayton I. Yoshida, AICP, Planning Program Administrator
Zoe Norcross-Nu'u, Sea Grant Extension Agent

JSH:TEA:bv

RFC File
General File

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Exhibit 12-1. Consultation Comments and Responses (Continued)

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

LAURA H. THIELEN
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

September 21, 2007

L.M. Foster, Director, Fllet Environmental
Department of the Navy, Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii 96860-3131

LOG NO: 2007.2888
DOC NO: 0709NM15
Archaeology

Dear Mr. Foster:

SUBJECT: National Historic Preservation Act, Section 106 Review – Revised Replacement Pages for DEIS/OEIS Revision 1 Executive Summary
Enhancements to HNRC
PMRF and Northwest Hawaiian Islands, Island of Kauai
TMK: (4) various

The aforementioned is a revision to DEIS.

We believe that "**no historic properties will be affected,**" because:

- ☐ Intensive cultivation has altered the land
- ☐ Residential development/urbanization has altered the land
- ☐ Previous grubbing/grading has altered the land
- ☐ An accepted archaeological inventory survey (AIS) found no historic properties
- ☐ SHPD previously reviewed this project and mitigation has been completed
- ☒ Other: *No physical impacts.*

In the event that historic resources, including human skeletal remains, are identified during routine construction activities, all work needs to cease in the immediate vicinity of the find, the find needs to be protected from additional disturbance, and the State Historic Preservation Division, Kauai Section, needs to be contacted immediately at (808) 742-7033.

Aloha,

Laura Thielen
State Historic Preservation Officer

NM:jen

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
1111 Jackson Street, Suite 520
Oakland, California 94607

IN REPLY REFER TO:
ER#07/615

Filed Electronically

24 September 2007

ATTN: HRC EIS/OEIS
Public Affairs Officer,
Pacific Missile Range
Facility, P.O. Box 128,
Kekaha, Kauai, Hawaii, 96752-0128
deis_hrc@govsupport.us

Subject: Review of the Draft Environmental Impact Statement (DEIS), for the Hawaii Range Complex (HRC) Project, Honolulu, Maui, and Hawaii Counties, HI

Dear Public Affairs Officer:

The Department of the Interior has received and reviewed the subject document and has the following comments to offer:

The Department of the Interior (DOI) is submitting supplemental comments for Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for the Hawaii Range Complex (HRC), including the revised sections, provided by your office on July 27, 2007. Please consider these comments, and disregard our previous no comment letter.

These comments are provided in accordance with the National Environmental Policy Act of 1969 [42 U.S.C. 4321 *et seq.*; 83 Stat. 852] (NEPA);]; and other authorities mandating Federal oversight of environmental resources including the Fish and Wildlife Coordination Act of 1934 [16 U.S.C. 661 *et seq.*; 48 Stat. 401], as amended (FWCA); the Federal Clean Water Act [33 U.S.C. 1251 *et seq.*; 62 Stat. 1155], as amended (CWA); the Endangered Species Act of 1973 [16 U.S.C. 1531 *et seq.*; 87 Stat. 884], as amended (ESA); the Migratory Bird Treaty Act of 1918 [16 U.S.C. 703 *et seq.*; 40 Stat. 755] as amended (MBTA); and the Sikes Act of 1960 [16 USC *et seq.*;74 stat. 1052], as amended.

Proposed action would upgrade and modernize capabilities of HRC, which encompasses land, air and sea training ranges in and around the Hawaiian Islands. HRC supports local military units,

Exhibit 12-1. Consultation Comments and Responses (Continued)

multi-national exercises, and facilitates rapid deployment of U.S. defense forces, as necessary. Proposed action is intended to fulfill and improve U.S. government national security and alliance requirements in Pacific Region and increase strategic defense role of the Hawaiian Islands.

We have provided general comments on the Draft EIS/OEIS below. Document-specific comments are provided in Appendix 1.

Adequacy and scope

Overall, Draft EIS/OEIS lacks adequate information to assess potential impacts of proposed actions to fish and wildlife resources. Descriptions of affected environment and impact analyses are cursory, and role of other facility and management plans, particularly at facilities not under direct control of the Department of the Navy, are unclear. Due to these deficiencies, we recommend that a Revised Draft EIS/OEIS be prepared and re-submitted for public review.

For many facilities or locations, Draft EIS/OEIS only provides a description of proposed HRC actions that will be conducted at the site (*e.g.*, Section 3.4.2.15 Kaena Point, page 3-276 among others); and other key information is missing. For example, federally listed species and other Federal trust species have not been accurately identified for some facilities.
We recommend affected environment section for each facility be reviewed and revised to be accurate and complete. Where appropriate, we recommend relevant reference material is cited and, as necessary, surveys be conducted.

No definition of terms "tempo" or "frequency" is provided and meaning of these terms is unclear. In many instances throughout Draft EIS/OEIS, no specific description of changes in duration (*i.e.*, length of time the action will occur), timing (*i.e.*, month or season of the year), and frequency (*i.e.*, number of events each year) of training action is provided.

We believe that to assess potential impacts it is critical to account for duration, timing, and frequency of activities, as all factors will have an effect on magnitude of potential impact to fish and wildlife resources. We recommend each activity be clearly described, including expected duration, timing, and frequency of each proposed action for all alternatives.

Draft EIS/OEIS does not analyze potential threats to vegetation, wildlife, geology, and water resources expected as a result of proposed actions. Analysis in Draft EIS/OEIS generally indicates that effects to wildlife will be minimized or that no impacts are anticipated.

However, few potential impacts are identified or quantified, and little data and few citations to other scientific reports or literature are provided to support determination of minimized impact or no effect. Potential impacts such as wildfire, trampling, downdraft from aircraft, lighting effects, general harassment of animals over multiple seasons and longer durations, noise, dust, debris, explosions and vibrations, soil erosion and sedimentation, introduction of non-native species, construction related impacts, electromagnetic radiation (EMR), and increases in release and accumulation of potential environmental contaminants receive cursory, and in some cases no examination in Draft EIS/OEIS.

We recommend all potential impacts be identified in a Revised Draft EIS/OEIS and quantitative data be included in impact analysis. Where results warrant, we recommend appropriate mitigative measures be developed in cooperation with Fish and Wildlife office in Honolulu, to compensate for damages or losses to fish and wildlife resources as a result of proposed actions.

While Draft EIS/OEIS frequently states that new training activities have not been proposed, we find that numerous new activities and facilities have been included.

Currently, Draft EIS/OEIS states that additional environmental documentation and planning for new Directed Energy Operations (page 2-65) will be completed in future, but it does not contain sufficient detail to assess potential impacts associated with many other new activities or facilities, including: conducting Field Carrier Landing Practices; adding new chemical simulants; launching Intercept Targets into the Temporary Operating Area; SM-6s from sea based platforms and Micro-Satellites; testing Unmanned Aerial Vehicles and hypersonic vehicles; implementing Advanced Hypersonic Weapons training; constructing a large area tracking range and installing FORCEnet antenna arrays; implementing electronic warfare training and transient air wings; installing Automatic Identification System equipment; constructing a range operations control building and fiber optic infrastructure at the Pacific Missile Range Facility (PMRF); sinking a vessel to support Mobile Diving and Salvage Unit training; installing new buoys in Kingfisher Underwater Training Area; and developing and installing the Portable Undersea Tracking Range.

This document appears to be "programmatic" in scope and written as if additional environmental review documents will be tiered from it. Therefore, we recommend new actions be clearly identified, and, if additional environmental documentation will *not* be developed for these activities and facilities, we recommend more details regarding specifics of each proposed action, alternatives that were explored, discussion of affected environment, analysis of potential effects to federal trust species, and appropriate compensatory mitigation to compensate for damages to federal trust resources be included in Revised Draft EIS/OEIS.

As we have stated in previous comments provided on earlier versions of the Draft EIS/OEIS, it is unclear how pre-existing management plans and regulations, especially for facilities not operated by the Navy, fit into the structure of HRC. With exception of a 1999 biological opinion for Makua, no other facility-specific document or plan is described in Draft EIS/OEIS.

We are concerned that activities proposed in Draft EIS/OEIS may not be covered by management plans, Integrated Natural Resource Management Plans (INRMP), or biological opinions of these other facilities. We recommend Revised Draft EIS/OEIS clearly state the role of these other management documents in framework of proposed activities.

Threatened and Endangered Species

Draft EIS/OEIS provides an incomplete list of threatened and endangered species and presentation of information is inconsistent and at times confusing. For example, threatened and endangered species discussed are sometimes absent from tables. To assist you, we have provided a draft threatened and endangered species lists for facilities included in Draft EIS/OEIS (Enclosure 1).

Exhibit 12-1. Consultation Comments and Responses (Continued)

We recommend that this list, in conjunction with information from the Hawaii Biodiversity and Mapping Program, be used to determine which federally listed species occur at each facility. We also recommend that all federally listed species be included in tables in Revised Draft EIS/OEIS.

While many facilities are not located within critical habitat for threatened or endangered species, critical habitat may be located adjacent to or near lands considered in HRC. In many cases these military lands were excluded from critical habitat designation, because of development of an INRMP. This habitat is still considered essential to survival and recovery of species and has not been given consideration in Draft EIS/OEIS. Many proposed actions have potential to affect areas outside property boundaries, including adjacent critical habitat.

For those facilities adjacent to or near critical habitat units, or contain essential habitats, we recommend Revised Draft EIS/OEIS include discussion of these habitats under Environmentally Sensitive Habitat section for that facility.

With exception of the 1999 biological opinion for Makua, Draft EIS/OEIS does not acknowledge existing biological opinions for any military lands covered, nor does it adequately describe if any proposed activities would in conformance with those biological opinions. Draft EIS/OEIS does not define policies and procedures regularly implemented by the Navy to avoid and minimize effects to protected species and their habitats.

All Navy activities must be in conformance with most recent, existing biological opinions for areas within HRC. Increases in tempo and frequency could be above and beyond what was analyzed in existing biological opinions.

Draft EIS/OEIS indicates new training operations, enhancements, and/or construction, including adding equipment to existing facilities and communication towers, may be needed to facilitate Navy activities. If Navy activities are not in conformance with existing biological opinions or actions are new or beyond those previously analyzed, the Navy will need to consult with us pursuant to section 7 of the ESA regarding any potential impact to threatened and endangered species and/or critical habitat.

We commend the Navy for its early coordination with National Marine Fisheries Service (NMFS) regarding potential impacts to marine mammals. Due to potential adverse effects of mid-frequency sonar on marine vertebrates, and specifically federally threatened and endangered marine species, we recommend the Navy continue to coordinate with NMFS and Hawaii Division of Aquatic Resources to assess potential impacts of sonar use on these species.

Use of Chemical Simulants

Discussion of contaminants contained in Draft EIS/OEIS does not include information on expected concentrations or thresholds at which impacts to fish or wildlife resources are expected to occur. Contaminants are routinely described as environmentally safe, but no references or data are provided to support the determination.

For example, tributyl phosphate (TBP), one of the chemical simulants proposed for use in large quantity and described in Draft EIS/OEIS as without toxic effects, has been identified as "toxic to aquatic organisms" by World Health Organization's International Programme on Chemical Safety[1].

While Draft EIS/OEIS correctly assesses importance of dilution when considering environmental impact, we are concerned analysis has not fully taken into account sensitivity of marine organisms to low contaminant concentrations[2,3,4,5]. Concentrations well below levels established for human health and safety can adversely impact marine invertebrates, especially their planktonic larval stages, which can spend up to several months in open ocean. We recommend that Revised Draft EIS/OEIS better describe concentrations of proposed simulants expected as a result of proposed actions and that low impact threshold of marine organisms be incorporated into analysis and discussion of potential impacts.

Electromagnetic Radiation and Electromagnetic Fields

Wildlife species, particularly bats and birds, can be negatively impacted by electromagnetic radiation and electromagnetic fields. For example, bats can experience reduced activities when exposed to electromagnetic field strengths less than 2 volts/meter and have significantly reduced activities when the electromagnetic fields is greater than 2 volts/meter[6].

Bat behavior varies by radar type and may be associated with the characteristics and operating times of individual radar units. Electromagnetic radiation can also exert an aversive behavioral response in bats[7]. A recent literature review described behavioral, reproductive and physiological response of different bird species to electromagnetic fields emanating from powerlines[8]. Response was found to vary by magnitude of exposure and species.

Draft EIS/OEIS does not provide analysis of existing electromagnetic radiation and electromagnetic fields for facilities discussed, nor does it provide biological analyses of impacts resulting from increased tempo and frequency or addition of equipment, its operation, or construction of equipment, towers, antennas, or facilities. that will emit electromagnetic radiation and create an electromagnetic field.

Frequencies of radio waves or electromagnetic radiation have not been specified and electromagnetic fields have not been quantified. We recommend analysis be conducted to examine potential impacts of electromagnetic radiation and electromagnetic fields on breeding

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[1]International Chemical Safety Card 0584 available online from the Center of Disease Control at http://www.cdc.gov/niosh/ipcsneng/neng0584.html
[2]Heslinga, G. A. 1976. Effects of copper on the coral-reef enchinoid *Echinometra mathaei*, *Mar. Biol.* 35: 155–60.
[3]Negri, A. P., L. D. Smith, N. S. Webster, and A. J. Heyward. 2002. Understanding ship-grounding impacts on a coral reef: potential effects of anti-foulant paint contamination on coral recruitment. *Mar. Poll. Bull.* 44:111-7.
[4]Victor, S. and Richmond, R.H.. 2005. Effect of copper on fertilization success in the coral Acropora surculosa. *Mar. Poll. Bull.* 50: 1448-51.
[5]Reichelt-Brushett, A.J. and P. L. Harrison. 2005. The effect of selected trace metals on the fertilization success of several scleractinian corals species. *Coral Reefs* 24: 524-34.
[6]Nicholls B. and P.A. Racey. 2007. Bats avoid radar installations: could electromagnetic fields deter bats from colliding with wind turbines? PLoS ONE 2(3): e297.
[7]Nicholls B. and P.A. Racey. 2007. *op. cit.*
[8]Fernie, K.J. and J. Reynolds. 2005. The effects of electromagnetic fields from power lines on avian reproductive biology and physiology: a review. Journal of Toxicology and Environmental Health, Part B, 8:127-140.

Exhibit 12-1. Consultation Comments and Responses (Continued)

success, foraging, and behavior of Hawaiian hoary bat (*Lasirus cinereus semotus*) and all federally listed or migratory bird species that are known to breed, forage, or shelter near these facilities and this information should be included in Revised Draft EIS/OEIS.

As appropriate, we also recommend mitigative and conservation measures be developed to offset potential impacts from the proposed activities.

In summary, to serve as a decision document, we recommend Draft EIS/OEIS be strengthened and re-released for public comment as Revised Draft EIS/OEIS. As currently written, Draft EIS/OEIS lacks details on proposed actions, affected environment and its analysis to adequately assess potential impacts to fish and wildlife, especially federally listed and other Federal trust species.

If a Revised Draft EIS/OEIS will not be prepared, we recommend you coordinate with Pacific Islands Fish and Wildlife Office to address these concerns prior to issuing Final EIS.

Draft EIS/OEIS contains numerous new proposed activities for which insufficient detail has been provided in order to assess their potential impacts to fish and wildlife resources and their habitats. We believe that separate environmental review should be conducted for these new activities.

This review should include full disclosure of proposed action, alternatives considered, affected environments and complete analysis of impacts. As appropriate, compensatory mitigation will need to be developed.

Coordination with the Service, NMFS, and the Hawaii Department of Land and Natural Resources is recommended during development of detailed mitigation plans. If proposed project, including increased frequency and tempo, new activities, or any construction, is determined to affect listed species, their habitats, or critical habitat, then consultation under the ESA would be required prior to project implementation.

We appreciate the opportunity to comment on this Draft EIS/OEIS.

If you have questions regarding these comments please contact Fish and Wildlife Biologist Dwayne Minton at 808-792-9445.

Appendix 1: Specific Comments
Enclosures1: Draft List of Federally Listed Species

cc:
Director/OEPC, Washington D.C.
Mr. Don Steffeck, USFWS, Region 1, Portland
EPA Region 9, Honolulu
NMFS – PIRO, Honolulu
Hawaii DAR
Hawaii DOFAW

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Exhibit 12-1. Consultation Comments and Responses (Continued)

APPENDIX 1
Specific Comments on the Draft EIS/OEIS for the Hawaii Range Complex

Section ES 1.4 Proposed Action and Alternatives (page ES-12). While the number of training operations per year, including baseline and estimates for proposed alternatives, is described, it is not clear how this baseline number was determined. It is unclear if the baseline at each location includes the number of operations that could be completed by any military organization (including National Guard or other Foreign governments), as evaluated under existing biological opinions, or only the number of existing operations at each location that are completed by the dominant military unit (*e.g.*, the Army actions at Makua but not the Air Force activities that could occur at Makua). We recommend that clarification and supporting documentation that describes how the baseline numbers were established be included in the Revised Draft EIS/OEIS.

Section 2.2.3.5.3 Offshore Enhancements (page 2-48). The proposed Portable Undersea Tracking Range is a new activity proposed in this Draft EIS/OEIS. Anchors will be left in place when collecting sensor equipment, requiring the use of new anchors with each deployment. We are concerned that repeated deployment of anchors will result in measurable damage to deep-water coral reefs, especially if consistently deployed in the same area. Insufficient information on proposed location for deployment has been provided to assess its potential impact to deep-water coral reef habitats; as currently described the proposed area of use is extensive, covering many thousands of square kilometers. We recommend that additional information be provided on location(s) for the Portable Undersea Tracking Range and the frequency (*e.g.*, deployments/year) with which it will be relocated.

Section 2.2.3.5.3 Offshore Enhancements (page 2-48). The anchor size and weight for the electronic packages of the Portable Undersea Tracking Range are not specified. These anchor packages could adversely impact deep-water coral reef habitat. We recommend more information on the physical parameters of the anchors and any relevant deployment protocols be included in the Revised Draft EIS/OEIS. We also recommend that the Navy coordinate with NMFS and our office regarding buoy placement so that potential environmental impacts are reduced and appropriate mitigative measures can be developed.

Section 2.2.3.5.4 PMRF Enhancements (page 2-52). The proposed addition of a new area to the existing Kingfisher Underwater Training Area should be considered a new facility if it was not covered under the original environmental review. Insufficient information on the proposed action and the biological resources in the proposed facility area has been provided to make an assessment of the potential impacts. We recommend inclusion of additional information regarding the proposed locations of the buoys, whether the buoys are intended to be permanently deployed or occasionally relocated, and the deployment/retrieval protocols to ensure buoys are deployed/retrieved in ways that minimize environmental impacts. We also recommend that the Navy begin coordination with NMFS and our office regarding buoy placement so that potential environmental impacts are reduced and appropriate mitigative measures can be developed.

Section 2.2.4.4 Future RDT&E Operations (page 2-65). The Draft EIS/OEIS describes two potential locations for the Maritime Directed Energy Test Center (Test Center) at PMRF and notes that separate/additional environmental documentation will be required for this action. One of the proposed locations is within or adjacent to critical habitat for *Sesbania tomentosa* and *Panicum nihauense*. An analysis of the potential adverse affects of the construction and use of the Test Center on this critical habitat should be conducted. We recommend coordinating with our office regarding any direct or indirect affects from the proposed activity to critical habitat.

Section 3.2 Northwestern Hawaiian Islands (page 3-80). The Draft EIS/OEIS incorrectly states that only 12 species of algae, invertebrates and fish are recorded from the Northwest Hawaii Islands (NWHI). The coral reef fauna from the NWHI is rich, with over 1,000 identified species[9]. We recommend that this section be revised to accurately depict the biodiversity present in the NWHI.

Section 3.2 Northwestern Hawaiian Islands (page 3-80). The Northwest Hawaiian Islands Ecosystem Reserve is now called Papahānaumokuākea Marine National Monument. We recommend that the Revised Draft EIS/OEIS be updated to reflect the change in status of this area.

Section 3.3.1.1.1 Biological Resources – PRMF – Offshore (page 3-92). Opihi have been incorrectly identified as "keyhole limpets" (line 40). We recommend correcting the common name to "limpet."

3.3.2.1.3 Biological Resources – PMRF/Main Base (page 3-117). The Biological Resources section for each installation has an Environmentally Sensitive Habitats subsection. The descriptions of wetlands, estuaries, coastal areas and streams appear to reflect aquatic and marine habitat delineation and mapping performed by the Service's National Wetlands Inventory Program (NWI). We recommend that the source information be cited and definitions for habitat types and hydrologic regimes should either be included in the document or incorporated by reference. Note that the NWI maps for Oahu were updated in 2006-2007 and that the new NWI maps should be used to describe aquatic and coastal marine areas in Revised Draft EIS/OEIS.

Section 3.3.2.8 Mt. Kahili (page 3-168). This area is known to have Newell's shearwater (*Puffinus auricularis newelli*) and Hawaiian petrel (*Pterodroma phaeopygia sandwichensis*) traversing the area and may support breeding locations for these species. Hawaiian

[9] Friedlander, A.M., G. Aeby, R. Brainard, A. Clark, E. DeMartini, S. Godwin, J. Kenyon, R. Kosaki, J. Maragos, and P. Vroom. 2005. The State of Coral Reef Ecosystems of the Northwestern Hawaiian Islands. pp. 270-311. In: J. Waddell (ed.), The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2005. NOAA Technical Memorandum NOS NCCOS 11. NOAA/NCCOS Center for Coastal Monitoring and Assessment's Biogeography Team. Silver Spring, MD. 522 pp.

Exhibit 12-1. Consultation Comments and Responses (Continued)

hoary bats are also likely to be using Mt. Kahili. The EIS has not provided information on the outdoor lighting configuration, the duration of the past and projected use of this facility, the frequencies of radio waves used by the repeater station, or the electromagnetic field created. No assessment of the potential impacts on these federally listed sea bird and mammal species resulting from changes in the intensity or frequency of use for this facility has been included in the Draft EIS/OEIS. We recommend that additional information, including the FCC license and related consultations that evaluate the potential effects of this facility on endangered species, be provided in the Revised Draft EIS/OEIS.

3.3.2.9.1. Biological Resources – Niihau Vegetation (page 3-169). No threatened or endangered plants have been identified in the Draft EIS/OEIS for Niihau. However, Niihau supports populations of several listed plants (see Enclosure 1), including designated critical habitat for olulu or alula (*Brighamia insignis*). We recommend that the Revised Draft EIS/OEIS be updated to reflect the presence of these endangered species.

Section 3.3.2.9 Niihau (page 3-169). Based on its close proximity, it appears that the Microwave and EMESS 1 site may impact the endangered Newell's shearwater[10] and other MBTA seabird species nesting on Lehua. We recommend that additional information is provided about the potential area of effect for the microwave facilities on Niihau, and, as necessary, that the area of influence for Niihau be expanded to include Lehua and its biological resources.

Section 3.4.2.1.1 Biological Resources – Naval Station Pearl Harbor (page 3-209). The Draft EIS/OEIS indicates that there are no threatened or endangered plant species at the Naval Station Pearl Harbor. Recently, three endangered plants, kooloaula (*Abutilon menziesii*), ohai (*Sesbania tomentosa*) and loulu (*Pritchardia kaalae*) were established at the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge as mitigation for past projects. Due to the proximity of the endangered plants to the Naval Station Pearl Harbor we recommend that these plant populations be included in the discussion of the affected environment and that they are considered in the analysis of potential impacts resulting from the proposed actions.

Section 3.4.2.6.2 Biological Resources – U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport (page 3-237). The Kalaeloa Unit, which was once part of the former Barbers Point Naval Air Station, has been added to the Pearl Harbor National Wildlife Refuge and should be included under Environmentally Sensitive Habitat. The Kalaeloa Unit supports the second largest population of endangered ewa hina hina (*Achyranthes splendens*), which is not included in the list of threatened and endangered plant species. We recommend that the current status of this unit be corrected in the Revised Draft EIS/OEIS and that *A. splendens* be included in the list of threatened and endangered plant species for this area.

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[10] VanderWerf, E.A., K.R. Wood, C. Swenson, M. LeGrande, H.Eijzenga, and R.L. Walker. 2007. Avifauna of Lehua Islet, Hawaii: Conservation value and management needs. Pacific Science 61(1):39-52.

Section 3.4.2.9.2 Biological Resources – Hickam AFB (page 3-252). Federally endangered Hawaiian waterbirds, primarily Hawaiian Stilts (*Himantopus mexicanus knudseni*), are regular visitors to Hickam Air Force Base, having been observed foraging and nesting on Base and adjacent to the runway. On March 2006, at least two separate stilt pairs nested adjacent to the runway where dewatering ponds were in place on Hickam AFB[11]. We recommend that the discussion of threatened and endangered wildlife species be amended to include this information and address ways to minimize this issue (*e.g.*, remove the attraction of stilts to the ponds).

Section 3.4.2.11.1 Biological Resources – Makua Military Reservation (page 3-259). The consultation completed in 1999 for Makua Military Reservation (Makua) has been reinitiated three times, most recently in June 2007[12]. The new consultation covers 38 endangered or threatened plant species, critical habitat units for 36 plant species, the Oahu elepaio (*Chasiempis sandwichensis ibidis*), critical habitat for the Oahu elepaio, and an Oahu tree snail (*Achatinella mustelina*). The Oahu tree snail was not included in Table 3.4.2.11.1-1 and the plant list is incomplete. Figure 3.4.2.11.1-1 indicates that there is critical habitat within the boundary of Makua; however, the text indicates there is no critical habitat on site. The Makua action area includes areas outside of the reservation boundary, as training actions could impact species and critical habitat adjacent to Makua proper. We recommend that the Revised Draft EIS/OEIS include a discussion regarding whether the Navy's actions will be in compliance with the biological opinion.

3.4.2.11.1 Biological Resources - Makua Military Reservation (page 3-259 through 3-261). We recommend that the description of the intermittent stream and estuary that is found at the Makua Military Reservation be clarified. These aquatic features may be found on U.S. Geological Survey topographic maps and current NWI maps.

Section 3.4.2.12.1 Biological Resources - Kahuku Training Area (page 3-267) and Section 3.4.2.13.1 Biological Resources – Dillingham Military Reservation (page 3-272). The Kahuku Training Area and the Dillingham Military Reservation were addressed in the 2003 biological opinion for routine and transformation training conducted by the U.S. Army[13]. The Draft EIS/OEIS does not reference this biological opinion. We recommend that the Revised Draft EIS/OEIS include a discussion regarding whether or not the Navy's actions are in compliance with the biological opinion.

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[11] A. Hebshi, personal communication, 2007. Electronic mail dated May 24, 2007 with twelve attachments including "Hawaiian Stilt Incidental Take Biological Assessment Revised March 8, 2007

[12] Reinitiation of the 1999 Biological Opinion of the U.S. Fish and Wildlife Service For U.S. Army Military Training at Makua Military Reservation Island off Oahu June 22, 2007 (1-2-2005-F-0356). This document is available from the Department of Army.

[13] Biological Opinion of the U.S. Fish and Wildlife Service for Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light) U.S. Army Installations Island of Oahu. October 23, 2003. (1-2-2003-F-0004). This document is available from the Department of Army.

Exhibit 12-1. Consultation Comments and Responses (Continued)

Section 3.4.2.15 Kaena Point (page 3-276) and 4.4.2.15 Kaena Point (page 4-423). Kaena Point provides habitat for several listed plant species, nesting habitat for wedge-tailed shearwater (*Puffinus pacificus cholrorhynchus)* and Laysan albatross (*Phoebastria immutabilis*), and resting areas for the endangered monk seal (*Monachus schauinslandi*). The Draft EIS/OEIS does not provide information on the duration of the past and proposed future use of this area, particularly the frequencies of radio waves or strength of the electromagnetic field used. No assessment of the potential impacts to these species resulting from changes in the intensity or frequency of use for this site has been included. We recommend that additional information be provided in the Revised Draft EIS/OEIS to better evaluate potential impacts to the breeding sea birds and monk seal resulting from the proposed actions.

Section 3.6.2.1.2 Biological Resources – PTA (page 3-295); 4.6.2.1.1 Biological Resources – Pohakuloa Training Area (page 4-445) and 4.6.2.2.2 Biological Resources – Bradshaw Army Airfield (page 4-454). Routine and transformation training actions at Pohakuloa Training Area (PTA) and Bradshaw Army Airfield were addressed in the 2003 biological opinion for PTA[14]. We recommend that the Revised Draft EIS/OEIS include a discussion regarding whether or not the Navy's actions are in compliance with the biological opinion. We also recommend that Figure 3.6.2.1.2-1 be revised to include palila (*Loxioides bailleui*) critical habitat designated within and adjacent to PTA.

Section 4.1.2.2.1 No-action Alternative (Fish – Biological Resources – Open Ocean) (page 4-15). Information on peak sonar levels and length of operation at peak levels is not provided. "Normal Operation" is not described. We recommend that additional information be provided on sonar peak levels and operation in order to allow assessment of the potential impacts of these proposed activities.

Section 4.1.2.2.2 Alternative 1 (Fish – Biological Resources – Open Ocean) (page 4-17). The Draft EIS/OEIS states that Alternative 1 will increase Anti Submarine Warfare (ASW) training to 4,027 hours, but does not provide a baseline value with which to compare this figure. We recommend that Revised Draft EIS/OEIS include in the text the hours of ASW training for the No-action Alternative to allow readers to better assess the magnitude of the training increase.

Section 4.1.2.2.2 Alternative 1 (Fish – Biological Resources – Open Ocean) (page 4-18). The text contained in the Draft EIS/OEIS is confusing and appears contradictory. It states that "[t]he number of hours of sonar for Alternative 1 is the same as the No-action Alternative" (line 5-7), but later in the same paragraph states "the number of sonar and the number of underwater detonations would increase" (line 9-10). We recommend clarifying the text in this section.

[14] Biological Opinion of the U.S. Fish and Wildlife Service for Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light) U.S. Army Installations Island of Hawaii. December 23, 2003. (1-2-2003-F-0002). This document is available from the Department of Army.

Section 4.1.2.2.2 Alternative 1 (Fish – Biological Resources – Open Ocean) (page 4-19). The Draft EIS/OEIS states that Alternative 2 will have 1,590 hours of sonar activity, but does not provide a baseline value with which to compare this value. We recommend that Revised Draft EIS/OEIS include in the text the number of hours of sonar activity for the No-action Alternative to allow better assessment of the magnitude of the proposed training increase.

Section 4.1.2.3 Sea Turtles (Biological Resources – Open Ocean) (page 4-21). It is unclear if collisions with sea turtles have occurred in the past. We recommend that any collisions with sea turtles be disclosed in order to assess the Navy's Standard Operating Procedures (SOP) to reduce collisions.

Section 4.1.2.3 Sea Turtles (Biological Resources – Open Ocean) (page 4-20 through 4-21). The Draft EIS/OEIS states that "[e]xtrapolation from human and marine mammal data to turtles is inappropriate" (page 4-20, line 10) for potential sonar impacts to hearing, but in the discussion of impacts to hearing associated with underwater detonations, marine mammal data are extrapolated to turtles (page 4-21, line 35). We recommend that this apparent discrepancy be explained.

Section 4.1.4.1.1 HRC Training operations (page 4-178). Marine organisms have been shown to be susceptible to low concentrations of contaminants. No data has been provided in the Draft EIS/OEIS on expected concentrations or known toxicity thresholds for marine organisms to support the determination of no effect. We recommend that additional data be provided in the Revised Draft EIS/OEIS to support the determination of no effect.

Section 4.2.2 Northwestern Hawaiian Islands Onshore (page 4-202 through 4-205). Both Alternatives 1 and 2 include an increase in the use of chemical simulants, but no analysis or data has been provided to support the determination of no effect to fish and wildlife resources. We recommend that details of the analysis conducted to reach the determination of no effect, including the estimated probability of debris striking each island as conducted in Section 4.1.1.1.1.1 for marine mammals, be provided in the Revised Draft EIS/OEIS.

Section 4.2.2 Northwestern Hawaiian Islands Onshore (page 4-202 through 4-205). Quantitative data on the amount of debris and its impacts on the ecosystems of the NWHI are lacking. We recommend that the Navy coordinate with the NMFS's debris removal effort and our office to better quantify the amount of debris and its impacts resulting to fish and wildlife on and around the NWHI.

Section 4.3.1.1.1 Biological Resources – PMRF Offshore (page 4-209) and Section 4.3.1.2.1 Biological Resources – Niihau Offshore (page 4-221). No data on potential impacts to coral reefs resulting from Expeditionary Assault or SPECWAROPS amphibious landing exercises have been provided. We recommend that these potential impacts be analyzed and discussed in the Revised Draft EIS/OEIS and that appropriate compensatory mitigative measure be developed in cooperation with NMFS and our office.

Exhibit 12-1. Consultation Comments and Responses (Continued)

Section 4.3.1.2 Niihau Offshore (pages 4-220 though 4-222). Buoys deployed at Kingfisher Underwater Training Area can act Fish Aggregating Devices (FAD), and in Hawaii can attract pelagic species such as tuna, mahimahi, wahoo, and numerous shark species[15]. The Draft EIS/OEIS fails to discuss the possibility that deployed buoys may act as FADs and attract fishermen. We recommend that Revised Draft EIS/OEIS include an analysis of the buoys as FADs and include a discussion of the proposed provisions for public safety and management.

Section 4.3.1.3.1 Biological Resources – Kaula Offshore (page 4-223 through 4-225) and 4.3.2.10.2.1 No-action Alternative (Biological Resources – Kaula) (page 4-320). It is unclear from the text whether Alternatives 1 and 2 will result in increased GUNEX training operations. Many species of seabirds nest on Kaula and any training activities near or on Kaula need to be assessed pursuant to each action. In addition, a revised avian survey should be conducted to determine if any threatened or endangered seabirds nest at Kaula and this information should be included in the Revised Draft EIS/OEIS. Increased GUNEX operations would likely result in increased soil erosion from Kaula and Niihau that may adversely impact nearshore coral reefs. No analysis of this potential impact has been conducted. We recommend that the Revised Draft EIS/OEIS clarify if an increase (including its magnitude over the No-action alternative) in GUNEX operations will occur under the two alternatives. If an increase is proposed, we recommend that an analysis of the potential impact of soil erosion and coastal sedimentation be conducted.

4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Vegetation* (page 4-240 through 2-241). We are concerned that military inspectors do not inspect goods and personnel transferred to Hawaii from the U.S. mainland. Non-native species can be brought to Hawaii from the mainland, and, if they become established, can result in significant damage to Federal trust species. We recommend that in order to assist in the effort to prevent the introduction of non-native species to Hawaii that the Navy consider inspecting all inbound flights in a manner similar to those originating from foreign areas.

4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Vegetation* (page 4-241). The Draft EIS/OEIS indicates that vegetation near the Strategic Target System launch pad can be temporarily impacted from missile launches, but that no long-term adverse effects have been detected. Neither the impact radius from the missile launch pad nor the duration of the detected effects and their recovery time has been provided. Short-term or temporary effects may potentially have lasting negative impacts to listed plants. To prevent potential impacts to listed plant species or critical habitat, we recommend that all launch sites be located such that no listed species or their habitat, including critical habitat, is within the impact radius. We further recommend that adequate fuel or fire breaks be established around the impact area.

[15]For information on FADs in Hawaii, check the State of Hawaii's Fish Aggregation Device Program's webpage at http://www.hawaii.edu/HIMB/FADS/.

4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Wildlife* (page 4-241). The Draft EIS/OEIS indicates that if marine mammals or sea turtle are found on the beach at PMRF, planned exercises are "…delayed until the animals leave the area" (line 23), but no time limit is provided for the length of the delay. We recommend that the length of the delay be included in the Revised Draft EIS/OEIS.

4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Wildlife* (page 4-241). No discussion about the potential impacts of amphibious landings on nesting seabirds (*e.g.*, wedge-tail shearwater and Laysan albatross) has been provided in the Draft EIS/OEIS. We recommend that an analysis of these potential impacts on nesting seabirds be conducted to include avoidance measures such as conducting amphibious landings only after nestlings have fledged, or prior to the start of the next nesting season, or move activities to unoccupied areas.

4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Wildlife* (page 4-241). The Draft EIS/OEIS provides no discussion of the potential effect on Laysan albatross resulting from the proposed increased in activity at PMRF. Laysan albatross nest at PMRF and are currently the focus of facility management actions. We recommend the current management Standard Operating Procedures (SOPs) for the Laysan albatross (*e.g.*, egg and chick removal) and the potential impacts resulting from the proposed actions on this species be discussed in the Revised Draft EIS/OEIS. We also recommend that PMRF continue to work with our office, the U.S. Department of Agriculture's Animal and Plan Health Inspection Service, and the Bird Aircraft Strike Hazard Program to further reduce impacts to this federally protected species while better facilitating military actions.

4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Wildlife* (page 4-241). The Draft EIS/OEIS does not provide sufficient analysis of the potential impacts resulting from the launching of drones. No impact radius associated with the launches is provided. Potential impacts from wildfire are not analyzed for vegetation and wildlife resources. We recommend that additional information and analysis of the potential impacts of drone launches be provided in the Revised Draft EIS/OEIS.

4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Noise* (page 4-241 through 4-242). The Draft EIS/EIS states that wildlife in the vicinity of missile launches resume normal behaviour patterns after a launch; however, no data or citation is provided to support this statement. We recommend that supporting data be cited. We also recommend that the terms "severe" and "repeated" (page 4-241, line 41) be defined and the species routinely affected by the noise be specified.

4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Air Emissions* (page 4-242). The Draft EIS/OEIS provides no discussion regarding the chemical breakdown, by-products, or the biological impacts of these products for aluminium oxide and hydrogen chloride. We recommend that a discussion of the chemical breakdown and the by-products of these chemicals be

Exhibit 12-1. Consultation Comments and Responses (Continued)

included in the Revised Draft EIS/OEIS. We also recommend that analysis of the potential impacts of these products on wildlife resources, including both affects on species and the possibility of bioaccumulation, be conducted as appropriate.

4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Debris* (page 4-242 through 4-243). No information is provided on the launch safety zone (page 2-242, line 29), and little information has been provided on the location of the safety zones or the SOPs for sea turtles or monk seals that are observed in the safety zone prior to launch. We recommend that additional information on the location of the safety zone and the duration of delays for animals in the safety zone be provided.

4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Debris* (page 4-242 through 4-243). A launch mishap involving a liquid-propelled missile has been described as an "unlikely event" (page 2-242, line 35) that could result in contaminated soil. No discussion of soil mitigative measures and no analysis of potential impacts to vegetation and wildlife have been provided. We recommend that information on the expected burn area and the vegetation and wildlife that could be impacted be provided and that appropriate mitigation measures, such as restoring other habitat to attract species away from the potential burn zone, be considered in the Revised Draft EIS/OEIS.

4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Environmentally Sensitive Habitat* (page 4-243). While training does not occur within environmentally sensitive dune systems or wetlands, it is unclear if these areas may potentially be impacted by debris or wildfire. We recommend that a map depicting the locations of sensitive habitat and the potential areas of debris and wildfire impact be included in the Revised Draft EIS/OEIS. If appropriate, we also recommend that conservation measures to minimize adverse effects to sensitive habitats be developed. The minimization measures should be such that the primary constituent elements are maintained intact within any critical habitat, even if currently unoccupied, so that it remains viable for future occupation.

4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *New Training Operation* (page 4-244). The Draft EIS/OEIS states that sound levels from adding Field Carrier Landing Practice will be similar to existing sound levels. However, no data are provided for comparison. We are concerned that night time activities could impact migratory and federally listed seabird species that disperse at night and Hawaiian hoary bats that actively forage at night. As the proposed activity is new for PMRF, we recommend a more detailed evaluation of potential effects of Field Carrier Landing Practices on these nocturnally active species.

4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *HRC Enhancements* (page 4-245 through 4-246). The Navy is proposing to use existing towers for the placement of new equipment to enhance electronic warfare training capability; however, the Draft EIS/OEIS provides no biological analyses of impacts resulting from the addition of equipment and its operation. Many bird species are known to strike objects, such as antennas or guy-wires that protrude above the surrounding vegetation height. In Hawaii there are several species of federally listed seabirds that are attracted to lights and are known to collide with buildings, light poles, wires, and other tall objects. Additional equipment added to existing towers may impact species via changes to lighting, electromagnetic radiation or electromagnetic fields, or the physical size of the structure. We recommend that an analysis of potential impacts to biological resources from the proposed activities, including the development of appropriate mitigative and minimization measures be included in the Revised Draft EIS/OEIS. The following website may help in avoiding and minimizing impacts to wildlife species from communications towers, http://www.fws.gov/migratorybirds/issues/towers/comtow.html.

4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *HRC Enhancements* (page 4-245). The Draft EIS/OEIS states that PMRF will provide "dedicated equipment and other support to Strike Groups" (line 33), but the nature of this support is not described. We recommend that additional details about the dedicated equipment and other support be provided as well as the details of the analysis used to reach the determination of no effect.

4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *Construct Range Operations Control Building* (page 4-246). The construction of a Control Range Operations Control Building is a new activity, and currently, the analysis conducted as part of this Draft EIS/OEIS lacks sufficient data and analysis to assess the potential impacts to fish and wildlife resources. The Draft EIS/OEIS indicates that construction would not likely directly impact any wetlands, but provides no supporting data. The analysis fails to consider indirect effects from construction to the wetlands, nor does it adequately address any avoidance, minimization, or mitigation measures to offset impacts to federally listed and other Federal trust species. The Hawaiian duck (*Anas wyvilliana*), Hawaiian moorhen (*Gallinula chloropus sanvicensis*), Hawaiian coot (*Fulica alai*), and Hawaiian stilt (*Himantopus mexicanus knudseni*) are known from this area and could be using the wetlands for nesting; however, potential impacts to these species from the construction of a new Control Building are not addresses. We recommend that additional detailed environmental information be prepared for this new proposed action.

4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *Enhanced and Future RDT&E Operations* (page 4-246). The Draft EIS/OEIS correctly states that additional environmental documentation will be needed for the construction of a permanent facility to house and operate a high energy laser system. Without completing appropriate environmental planning and review, it is premature to determine that "…impacts [from constructions of the facility] would be similar to those from other constructions…" (lines 34-35) described in other sections of the Draft EIS/OEIS. We recommend that this statement is removed from the Revised Draft EIS/OEIS.

4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *Advanced Hypersonic Weapon* (page 4-247). The Draft EIS/OEIS indicates that the Advanced Hypersonic Weapons will have payloads that impact on Illeginni Island in U.S. Army Kwajalein Atoll. No information has been provided on the resources present at the impact location and no analysis of the potential impacts to these resources has been included in the Draft EIS/OEIS. Without additional information, it is unclear if this new activity is addressed in existing

Exhibit 12-1. Consultation Comments and Responses (Continued)

management plans or environmental documentation for Illeginni Island. We recommend that additional information be provided in order to fully assess the potential impacts of this proposed activity.

4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *Additional Major Exercises – Multiple Strike Group Training* (page 4-247) and 4.3.2.2.2.3 Alternative 2 (Biological Resources – Makaha Ridge) (page 4-297). The Draft EIS/OEIS does not indicate if separate environmental documentation will be prepared to analyze the Multiple Strike Group Training activity. If a separate document will not be prepared, additional information and analysis is needed with respect to changes in lighting, fire potential, noise, electromagnetic radiation/ electromagnetic fields from increased operations, and the introduction of non-native species. We recommend that the Navy clarify its intentions regarding environmental documents and, as necessary, provide adequate information in the Revised Draft EIS/OEIS to assess the potential impacts of this proposed activity.

4.3.2.2.2.2 Alternative 1 (Biological Resources – Makaha Ridge) *Vegetation* (page 4-296) and 4.3.2.3.2.2 Alternative 1 (Biological Resources – Kokee) *Vegetation* (page 4-303). We are concerned about impacts to Federal trust species resulting from SPECWAROPS training. In the event that these species cannot be avoided, we recommend that the Navy coordinate with us regarding potential impacts from this proposed training.

4.3.2.3.2.2 Alternative 1 (Biological Resources – Kokee) *HRC Enhancements* (page 4-303). No analysis of the potential impacts resulting from the proposed FORCEnet Integration Laboratory or antenna arrays is presented in the Draft EIS/OEIS. Equipment, including antenna arrays, added to existing towers may potentially impact Federal trust species via changes to lighting, electromagnetic radiation or electromagnetic fields, or by altering the physical size of the structure. We recommend that an analysis of the potential impacts to fish and wildlife resources from these proposed activities be provided in the Revised Draft EIS/OEIS and that appropriate avoidance and minimization measures be developed.

4.3.2.3.2.2 Alternative 1 (Biological Resources – Kokee) *HRC Enhancements* (page 4-303). The Draft EIS/OEIS does not include an analysis of potential impacts to Federal trust species resulting from the installation of fiber optic cables to existing and new poles. Federally listed seabirds and birds protected under the MBTA in Hawaii are prone to collisions with powerlines and other structures[16,17,18,19]. The federally listed Newell's shearwater and Hawaiian petrel have been observed colliding with powerlines and

[16]Reed, J.R., J.L. Sincock, and J.P. Hailman. 1985. Light attraction in endangered procellariiform birds: reduction by shielding upward radiation. The Auk, 102:377-383.
[17]Telfer, T.C., J.L. Sincock, G.V. Byrd, and J.R. Reed. 1987. Attraction of Hawaiian seabirds to lights: conservation efforts and effects of moon phase. Wildlife Society Bulletin, 15:406-413.
[18]Cooper, B.A., and R.H. Day. 1998. Summer behavior and mortality of dark-dumped petrels and Newell's shearwaters at power lines on Kauai. Colonial Waterbirds, Vol. 21, No. 1, pp. 11-19.

poles[20]. The risk of adult seabird mortality at powerlines is correlated to the number and spread of lines in the array[21]. We recommend that a complete analysis of the potential impacts to federally listed species from the installation of additional cables be included in the Revised Draft EIS/OEIS.

4.3.2.6 Port Allen and 4.3.2.7 Kikiaola Small Boat Harbor (pages 4-310 through 4-311) and 4.6.2.3. Kawaihae Pier (page 4-457 through 4-458). Ports and harbors can be initial invasion sites for non-native species transported via ships. The Draft EIS/OEIS has not provided information on the proposed increase in berthing or arrival of vessels from new areas and the potential impacts of the inter-island transport of non-native species. We recommend that additional information, including and procedures used to prevent the introduction of non-native species, be provided in the Revised Draft EIS/OEIS.

Section 4.3.2.9.1 Biological Resources – Niihau (page 4-314). Niihau supports populations of several listed plants (Enclosure 1), and fire is a significant threat. The Draft EIS/OEIS details measures "…to deal with potential fire hazard…" (line 9), but contains no analysis of potential impacts of wildland fire on federally listed species that may occur as a result of the proposed increase in training operations. We recommend that an analysis of wildland fire impact impacts on federally listed plant species be in included in the Draft EIS/OEIS, and, as appropriate, mitigative measures be developed in cooperation with our office.

Section 4.3.2.9.1 Biological Resources – Niihau (page 4-314) and Section 4.3.2.10.4 Geological Resource – Niihau (page 4-322). Increased GUNNEX training operation can alter terrestrial fire regimes, increasing soil erosion and sedimentation on nearshore coral reefs. No analysis has been conducted examining the potential impact of altered wildfire regimes associated with the proposed activities on nearshore coral reefs. We recommend that an analysis of wildfire impacts on soil stability, erosion, and coastal sedimentation be in included in the Revised Draft EIS/OEIS, and, as appropriate, mitigative measures to stabilize soils and reduce sediment impacts be developed in cooperation with the U.S. Environmental Protection Agency, NMFS, and our office.

4.3.2.10.2.1 No-action Alternative (Biological Resources – Kaula) (page 4-320); 4.4.2.7.2 Biological Resources – MCBH (page 4-387); 4.4.2.9.2 Biological Resources – Hickam AFB (page 4-401); 4.4.2.10.1 Biological Resources – Wheeler Army Airfield (page 4-404); 4.4.2.10.1 Biological Resources – Wheeler Army Airfield (page 4-404). These sections of the Draft EIS/OEIS state that migratory seabirds may be impacted by the various proposed training operations and exercises, but do not identify which species may be affected

[19]Podolsky, R., D.G. Ainley, G. Spencer, L. DeForest, and N. Nur. 1998. Mortality of Newell's shearwaters caused by collisions with urban structures on Kauai. Colonial Waterbirds, Vol. 21, No. 1, pp. 20-34.
[20]Cooper, B.A., and R.H. Day. 1995. Interactions of dark-rumped petrels and Newell's shearwaters with utility structures in Kauai, Hawaii. Final report, EPRI TR-105847-VI, Electric Power Research Institute, Palo Alto, CA.
[21]Podolsky, R., D.G. Ainley, G. Spencer, L. DeForest, and N. Nur. 1998. *op. cit.*

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nor provide data to describe the magnitude of the impact. We recommend that the Navy provide the data and analysis to support their conclusions regarding effects to the migratory birds for each facility where migratory birds may be impacted.

<u>Section 4.4.1.1.1 Biological Resources – Puuloa Underwater Range (page 4-327) and Section 4.4.1.1.1 Biological Resources – Naval Defense Sea Area (page 4-332)</u>. Prior to the sinking of any vessels or deployment of steel frames for Naval Special Warfare exercises, appropriate environmental documents need to be developed and reviewed. We recommend that the Navy begin early coordination with NMFS and our office to assist with the planning and appropriate placement of the vessel to reduce environmental impacts and to assist with the development of appropriate mitigative measures.

<u>Section 4.4.1.9.1 Biological Resources – SESEF (page 4-354)</u>. Under Alternative 1, the total number of training hours per day is unclear. The Draft EIS/OEIS states that "…12 to 16 tests per day and an average duration of about 2 hours per test…" (lines15-16) will be conducted. This suggests 24 to 36 hours of training per day. We recommend that the total hours of training be clarified.

<u>4.4.2.1.1 Biological Resources – Naval Station Pearl Harbor (page 4-360)</u>. The Draft EIS/OEIS indicates that the proposed activities have a low probability of affecting migratory birds (lines 24-25) and that current activities "…have not resulted in any significant impacts to the four endangered waterbirds…" identified at the site (lines 20-21). The term "low probability" has not been quantified and no data to support the determination of no significant impact to endangered waterbirds has been provided. We recommend that the term "low probability" be defined quantitatively and that the data be used to determine if there is a potential impact to endangered waterbirds from current training operations. This information should be provided in the Revised Draft EIS/OEIS.

<u>4.4.2.3.1 Biological Resources – Naval Inactive Ship Maintenance Facility, Pearl Harbor (page 4-368) and 4.4.2.5.1 Biological Resources – Lima Landing (page 4-377)</u>. The Naval Inactive Ship Maintenance Facility is located adjacent to the Pearl Harbor National Wildlife Refuge, which supports breeding populations of endangered waterbirds. Lima Landing is located near known waterbird habitat. Explosives are currently used in these facilities, but the potential impacts (*e.g.*, noise, vibration, etc.) resulting from the increase in underwater explosions on endangered waterbirds are unclear. We recommend that additional detail regarding the potential impacts from explosives on endangered waterbirds be provided in the Draft EIS/OEIS.

<u>4.4.2.4.1 Biological Resources – EOD Land Range – NAVMAG Pearl Harbor West Loch (page 4-371)</u>. The EIS/OEIS indicates that explosions at the EOD pit could startle wildlife at the Pearl Harbor National Wildlife Refuge. A discussion of noise levels that could be generated is included, but information on the noise level at which a startle response is generated in birds and the actual noise levels occurring at the Refuge during the current training operations are not provided. We recommend that additional detail be provided so that potential affects of explosive noise on birds at the Refuge as a result of the proposed actions can be evaluated.

<u>4.4.2.6.2 Biological Resources – U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport (page 4-382)</u>. Mitigative measures to protect endangered plants from aircraft downdraft, wildfire, and the introduction of non-native species are not described. We recommend that the mitigative measures to decrease potential impacts from these issues be included in the Revised Draft EIS/OEIS.

<u>4.4.2.6.2 Biological Resources – U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport (page 4-382)</u>. The Draft EIS/OEIS states that "…[m]ajor exercises do not appear to affect threatened green turtles …or the endangered Hawaiian stilt" (lines 25-26), but no supporting data are provided. We recommend data to support this determination be provided in the Revised Draft EIS/OEIS.

<u>4.4.2.9.2 Biological Resources – Hickam AFB (page 4-401)</u>. Hickam AFB has had recent airstrikes with federally protected birds[22]. We anticipate that increased operations would increase the chance of further airstrikes. The EIS/OEIS does not examine the potential impact of increased airstrikes to threatened and endangered bird species that may result from the proposed actions. We recommend that a full analysis of the potential impacts to federally listed species be included in the EIS/OEIS and that the Navy and Hickam AFB coordinate with us to develop an action plan that would reduce the possibility of airstrikes.

<u>4.4.2.11.1 Biological Resources – Makua Military Reservation (page 4-408)</u>. A more recent biological opinion (June 22, 2007) has been completed for Makua[23] that addressed training impacts to listed plants, Oahu elepaio, and Oahu tree snail. Beaches and the species using them are not included in the 2007 biological opinion, and the proposed SPECWAROPS are not covered in the biological opinion. We recommend that this section be revised to describe how the Navy will be compliant with the ESA for this action.

<u>Section 4.4.2.16 Mt. Kaala (page 4-424)</u>. The Draft EIS/OEIS does not provide an assessment of the use of the facility and potential impacts to plant and wildlife resources. We recommend that additional information be provided in the Revised Draft EIS/OEIS, including the identity of the leaser and any prior reviews of the use of this site for impacts to plant and wildlife resources.

<u>Section 4.4.2.17 Wheeler network Segment Control / PMRF Communication sites (page 4-425); Section 4.4.2.18 Mauna Kapu Communication Site (page 4-426);Section 4.4.2.19 Makua Radio/Repeater/Cable Head (page 4-427); Section 4.5.2 Maui Space Surveillance System (page 4-434); Section 43.5.2.3 Sandia Maui Haleakala Facility (page 4-436); Section 4.5.2.4 Molokai Mobile Transmitter Site (page 4-437)</u>. The Draft EIS/OEIS has not provided information on the duration of the current use of these facilities nor proposed future use. The frequencies of radio waves or electromagnetic radiation have not been specified. No assessment of the potential impacts to Federal trust resources resulting from the proposed actions has been included. We recommend that additional

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[22]Aaron Hebshi. 2007. *op. cit.*
[23]Reinitiation of the 1999 Biological Opinion of the U.S. Fish and Wildlife Service For U.S. Army Military Training at Makua Military Reservation Island off Oahu June 22, 2007 (1-2-2005-F-0356). This document is available from the Department of Army.

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information and analysis, particularly in relation to electromagnetic radiation and wildlife species, be provided to support the determination of no effect.

Section 4.8 Conflicts with Federal, State, and Local Land Use Plans, Policies, and Controls (page 4-461 to 4-462). We recommend that Executive Order 13089 (Coral Reef Protection) and Wildlife Coordination Act of 1934 [16 U.S.C. 661 et seq.; 48 Stat. 401] be added to table 4.8-1.

Section 6.1.2 General Maritime Mitigation Measures (page 6-2). The SOPs do no appear to include instructions for handling or reporting marine life that has been accidentally struck. We recommend that the Navy develop SOPs to potentially assist injured animals and to report the collision to NMFS.

ENCLOUSRE 1

Draft List of Federally Listed Species at Military Facilities in the Hawaiian Islands.

Species Scientific Name	Pohakuloa Training Area	Bradshaw Air Force Base	Pearl Harbor Naval Station	Hickam Air Force Base	Barbers Pt. Coast Guard Airfield	Makua Military Reservation	Wheeler Air Force Base	Schofield Barracks	Dillingham Airfield	Kahuku Training Area	Marine Corps. Base Hawaii	Marine Corps Training Area Bellows	Pacific Missile Range Facility	Makaha Ridge	Mount Kahili	Kokee Air National Guard	Niihau	Nihoa and Necker Islands
Plants																		
Abutilon sandwicense						X		X										
Achyranthes splendens					X	X												
Adenophorus periens										X								
Alectryon macrococcus						X		X										
Amaranthus brownii																		X
Asplenium fragile var.insulare	X	X																
Bonamia menziesii						X												
Brighamia insignis																	X	
Cenchrus agrimonioides						X												
Centaurium sebaeoides						X												
Chamaesyce celastroides						X												
Chamaesyce herbstii						X												
Chamaesyce rockii								X		X								
Chamaesysce skottsbergii skottsbergii					X													

Exhibit 12-1. Consultation Comments and Responses (Continued)

Species Scientific Name	PTA	Bradshaw AFB	Pearl Harbor	Hickam AFB	Barbers Pt.	Makua	Wheeler AFB	Schofield	Dillingham	KTA	MCBH	Bellows	PMRF	Makaha	Mt. Kahili	Kokee	Niihau	Nihoa & Necker
Ctenitis squamigera						X												
Cyanea acuminata								X										
Cyanea grimesiana						X		X		X								
Cyanea koolauensis								X		X								
Cyanea longiflora						X				X								
Cyanea superba						X												
Cyperus trachysanthos						X			X								X	
Cyrtandra dentata						X												
Cyrtandra subumbellata								X										
Cyrtandra viridiflora								X										
Delissea subcordata						X		X										
Diellia falcata						X		X										
Dubautia herbstobatae						X												
Eugenia koolauensis										X								
Euphorbia haeleeleana						X												
Flueggea neowawraea						X		X										
Gardenia mannii								X		X								
Gouania vitifolia						X												
Haplostachys haplostachya	X	X																
Hedyotis coriacea	X	X																
Hedyotis degeneri						X												
Hedyotis parvula						X												
Hesperomannia arborescens								X		X								

Species Scientific Name	PTA	Bradshaw AFB	Pearl Harbor	Hickam AFB	Barbers Pt.	Makua	Wheeler AFB	Schofield	Dillingham	KTA	MCBH	Bellows	PMRF	Makaha	Mt. Kahili	Kokee	Niihau	Nihoa & Necker
Hesperomannia arbuscula						X												
Hibiscus brackenridgei						X			X									
Isodendrion hosakae	X	X																
Isodendrion laurifolium						X												
Isodendrion longifolium								X										
Isodendrion pyrifolium						X												
Labordia cyrtandrae								X										
Lepidium arbuscula						X		X										
Lipochaeta tenuifolia						X												
Lipochaeta venosa	X	X																
Lobelia gaudichaudii ssp. *koolauensis*								X										
Lobelia niihauensis						X											X	
Mariscus pennatiformis						X												
Melicope hiiakae								X										
Neraudia angulata						X												
Neraudia ovata	X	X																
Nototrichium humile						X			X									
Panicum niihauense													X				X	
Peucedanum sandwicense						X												
Phlegmariurus nutans								X										
Phyllostegia hirsuta								X		X								
Phyllostegia kaalaensis						X		X										
Phyllostegia mollis								X										

Exhibit 12-1. Consultation Comments and Responses (Continued)

Species Scientific Name	PTA	Bradshaw AFB	Pearl Harbor	Hickam AFB	Barbers Pt.	Makua	Wheeler AFB	Schofield	Dillingham	KTA	MCBH	Bellows	PMRF	Makaha	Mt. Kahili	Kokee	Niihau	Nihoa & Necker
Plantago princeps						X		X										
Portulaca sclerocarpa	X	X																
Pritchardia aylmer-robinsonii																	X	
Pritchardia kaalae						X												
Pritchardia remota																		X
Psychotria grandiflora																X		
Pteris lidgatei								X										
Sanicula mariversa						X												
Sanicula purpurea								X										
Schiedea hookeri						X		X										
Schiedea kaalae						X		X	X									
Schiedea nuttallii						X												
Schiedea obovatum						X												
Schiedea trinervis								X										
Schiedea verticillata																		X
Sesbania tomentosa						X							X				X	X
Silene hawaiiensis	X	X																
Silene lanceolata	X	X				X												
Solanum incompletum	X	X																
Solanum sandwicense						X												
Spermolepis hawaiiensis	X	X				X								X				
Stenogyne angustifolia	X	X																
Tetramolopium arenarium spp *arenarium*	X	X																

Species Scientific Name	PTA	Bradshaw AFB	Pearl Harbor	Hickam AFB	Barbers Pt.	Makua	Wheeler AFB	Schofield	Dillingham	KTA	MCBH	Bellows	PMRF	Makaha	Mt. Kahili	Kokee	Niihau	Nihoa & Necker
Tetramolopium filiforme						X												
Tetraplasandra gymnocarpa								X		X								
Vigna o-wahuensis	X	X				X												
Viola chamissoniana						X		X										
Viola oahuensis								X										
Wilkesia hobdyi														X				
Zanthoxylum hawaiiense	X	X																
Reptiles																		
Chelonia myda			X	X	X				X		X	X	X				X	X
Eretmochelys imbricata											X	X						
Birds																		
Acrocephalus familiaris kingi																		X
Anas wyvilliana			X	X					X		X	X	X		X		X	
Branta sandvicensis	X	X											X	X	X			
Buteo solitarius	X	X																
Chasiempis sandwichensis ibidis						X		X	X	X								
Fulica americana alai			X	X					X		X	X	X		X		X	
Gallinula chloropus sandvicensis			X	X					X		X	X	X		X			
Hemignathus munroi	X																X	
Himantopus mexicanus knudseni			X	X	X				X		X	X	X		X		X	
Loxioides bailleui	X																	
Paroreomyza maculata								X	X	X								
Pterodroma phaeopygia sandwichensis	X	X									X	X	X	X	X	X		

Exhibit 12-1. Consultation Comments and Responses (Continued)

Species Scientific Name	PTA	Bradshaw AFB	Pearl Harbor	Hickam AFB	Barbers Pt.	Makua	Wheeler AFB	Schofield	Dillingham	KTA	MCBH	Bellows	PMRF	Makaha	Mt. Kahili	Kokee	Niihau	Nihoa & Necker
Puffinus auricularis newelli	X	X									X	X	X	X	X	X		
Telespyza ultima																		X
Mammals																		
Lasiurus cinereus	X		X	X		X	X	X	X	X		X	X	X	X	X		
Invertebrates																		
Achatinella bulimoides										X								
Achatinella byronii								X										
Achatinella caesia										X								
Achatinella curta										X								
Achatinella decipiens								X										
Achatinella dimorpha										X								
Achatinella elegans										X								
Achatinella leucorraphe								X										
Achatinella mustelina						X		X										
Achatinella sowerbyana								X		X								
Achatinella valida										X								
Drosophila aglaia								X										
Drosophila hemipeza								X										
Drosophila montgomeryi								X										
Drosophila musaphila																X		
Drosophila obatai						X												
Drosophila substenoptera								X										
Drosophila tarphytrichia								X										

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC
FWS, HI
FWS, Portland

Exhibit 12-1. Consultation Comments and Responses (Continued)

10/02/2007 18:48 FAX 301 504 0099 MARINE MAMMAL COMM. 001

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From: Tim Ragen

Subject: ______

Comments: ______

10/02/2007 18:48 FAX 301 504 0099 MARINE MAMMAL COMM. 002

MARINE MAMMAL COMMISSION
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BETHESDA, MD 20814-4447

2 October, 2007

Public Affairs Officer
Pacific Missile Range Facility
PO Box 128
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Dear Sir:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, has reviewed the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS) provided by the Department of the Navy in support of its planned Navy Pacific Fleet training and defense-related research on the Hawaii Range Complex (HRC). The HRC consists of onshore as well as offshore areas covering 235,000 square nautical miles around the Hawaiian Islands, with an additional 2.1 million square-mile Temporary Operating Area of sea and air space. The HRC is a complex of instrumented ocean areas, airspace, ocean surface operation areas, targets, and land range facilities. The DEIS identifies three alternative levels of training and research-related activities and estimates the potential unmitigated and mitigated environmental effects from range-wide training and research, development, testing, and evaluation activities. Based on a finding of no significant adverse impacts, with mitigation, the Navy has submitted an application for a Marine Mammal Protection Act Letter of Authorization (LOA) to authorize the incidental take of marine mammals that may result from the implementation of the activities analyzed in the DEIS.

The HRC DEIS covers an unprecedented scope of effort and affected area in a document that is for the most part thorough and clear. Later in this letter we note a number of particularly difficult issues or concepts that have been described with considerable clarity and addressed with novel and improved measures. The Commission also has identified three major elements of the DEIS in need of reconsideration and revision.

RECOMMENDATIONS

The Marine Mammal Commission believes that the Final EIS/OEIS and associated request for an LOA under the Marine Mammal Protection Act require major revision with regard to the estimation of risk, the mitigation of that risk, and, perhaps most important, the evaluation of action alternatives. Therefore, the Marine Mammal Commission recommends that the Navy—

- create an alternative of reduced or no range use, and adequately document the likely consequences for national defense readiness, to be weighed against whatever reductions in environmental risk would be obtained by the no action or reduced action alternative;
- provide a comprehensive description of the proposed dose-response relationships and the manner in which they will be used; and

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- provide a comprehensive description of the various monitoring and mitigation measures that might be used, evaluate the performance of those measures taking into account existing marine mammal monitoring and mitigation data, and instigate planning to evaluate and address the strengths and shortcomings of the proposed measures.

RATIONALE

The three major areas of recommended revisions to the DEIS are as follows:

Action Alternatives—In the HRC DEIS the Navy takes the unusual, if not unprecedented, approach of treating the current ongoing level of training activity as the "no action" alternative, with two options of increased activity as alternatives 1 and 2. Typically a no action alternative refers to the consequence of not going forward with the requested action at all. Instead the Navy argues that all three proffered alternatives can be mitigated to zero effect, and therefore the environmental risk of choosing any of the options would be the same. We do not believe that the risk can be mitigated to zero (and will offer arguments in support of that perspective), in which case the consideration of an alternative that offers reduced environmental risk is essential to making an informed decision about the costs and benefits of all reasonably available alternatives.

The DEIS would benefit from a review of anticipated changes in Naval training that are being implemented for other reasons, but which might also affect the potential environmental risks. Cost savings and reduced manning goals are reasons other than environmental stewardship that have driven research and acquisition efforts by the U.S. Navy to reduce the time and money demands of training. Growing costs of fuel and the climatic consequences of large scale combustion of hydrocarbon fuels in military training are another emerging factor in considering the merits of alternatives, despite the well-established and widely accepted merits of realism in training. Such considerations should be described in the EIS to promote informed decisionmaking about alternatives and the relative environmental risks of each.

The Commission recognizes that a considerable amount of effort will be required to document both the Navy's ongoing efforts to reduce training cost and expense and its efforts to document the impact of any loss of training capability on readiness. However, we also believe that much of the needed information already exists within the Navy and could be relatively easily brought into the HRC EIS. For example, recent efforts by the Department of Defense to document for Congress the cost of lost training due to "encroachment" on range activities, such as the loss of the Vieques range, could provide this specific EIS with information on the potential impacts on readiness from lost HRC training opportunities. Similarly, existing documentation required to justify the costs of Navy research, development, testing and evaluation efforts to improve training also exist and should be useful in determining the trade-offs and feasibility of implementing alternative training procedures.

For these reasons, the Marine Mammal Commission recommends that the Navy create an alternative of reduced or no range use, and adequately document the likely consequences for national defense readiness, to be weighed against whatever reductions in environmental risk would be obtained by the no action or reduced action alternative.

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Risk Estimation Protocols—The Commission recognizes the considerable effort the Navy and the National Marine Fisheries Service have applied to the development of clear, scientifically based Level A acoustic risk criteria and commends the comparable effort to develop Level B risk criteria using dose-response relationships to better reflect the natural individual variability within a given population. However, a number of aspects of the risk estimation process are not well explained, specifically the means by which animal density data and sound field data are integrated to produce the sound exposure levels for risk evaluation, and the estimated effectiveness of mitigation measures on risk of either injury or behavioral harassment. The use of heuristic techniques such as time-invariant probabilistic two-dimensional representations of animal density, and the use of time averaging techniques for prolonged and intermittent sound exposure are among the features of this novel and complex risk estimation procedure that need to be explained in greater detail. This explanation should include one or more illustrative examples of how data on animal abundance and distribution are derived from the literature, or how data on the nature and duration of activities on the range are combined and translated into an exposure metric. Therefore, the Marine Mammal Commission recommends that the Navy provide a comprehensive description of the proposed dose-response relationships and the manner in which they will be used. Such information is necessary to allow readers to evaluate the nature and level of risk to marine mammals.

Monitoring And Mitigation—With regard to monitoring and mitigation, the HRC DEIS suffers two main shortcomings: it does not include a comprehensive description of monitoring and mitigation options, and it offers estimates of performance for proposed mitigation measures that are inconsistent with existing performance data from similar survey and mitigation efforts. Although the methods for assessing mitigation performance are well understood and such an assessment can be easily carried out, the Navy apparently has not done so. The Navy's own SURTASS LFA EIS includes such analyses, and these same analyses should already have been conducted for the kinds of ongoing fleet activities listed in the HRC DEIS. In the absence of such information, we believe it is incumbent upon the Navy to include a plan for obtaining performance data to justify its confidence in such critical mitigation measures as sonar ramp-up, watchstander training effectiveness, and watchstander probability of detection of marine mammals and other species of concern. This is most obviously true of watchstander performance, for which substantial quantitative data are available from many well-documented surveys for marine mammals and sea turtles. Probabilities of detection for experienced survey observers under ideal conditions, counting highly visible species, still do not rise to the 100 percent probability of detection claimed for Navy watchstanders who have far less experience sighting animals at sea and multiple duties to perform. Detection probabilities are even lower for difficult-to-detect species such as beaked whales or sea turtles. Such probability-of-detection data are easily verified by well-known methods such as dual ship surveys or multiple independent blind control surveys of similar design. Such verification and validation procedures are regularly undertaken by the Navy to verify training performance and to establish the performance of new systems under standard research, development, testing, and evaluation processes that precede acquisition and fleet use. Performing similar verification and validation for environmental effects mitigation would not be unduly costly and would clarify whether the Navy is in fact being realistic in its claims for its proposed mitigation efforts.

Exhibit 12-1. Consultation Comments and Responses (Continued)

In addition, passive acoustics and other sensing technologies that might improve marine mammal detection and risk mitigation are rejected without undergoing similar performance evaluation and development. Dismissing additional mitigation as not well enough developed to use and then making no effort to bring such tools to maturity should not be an acceptable position when the potential adverse effects of the proposed action are significant and the action agency is as technically adept and strong in new technology acquisition as the Navy. For these reasons, the Marine Mammal Commission recommends that the Navy provide a comprehensive description of the various monitoring and mitigation measures that might be used, evaluate the performance of those measures taking into account existing marine mammal monitoring and mitigation data, and instigate planning to evaluate and address the shortcomings of the proposed measures.

DETAILED COMMENTS

The following detailed comments either reinforce the above points with reference to specific parts of the HRC DEIS, or note additional areas of strength or weakness within the DEIS that merit consideration by the Navy.

Action Alternatives—Pages 2-8 to 2-12 define the action alternatives in greatest detail. The national defense plans behind these three alternatives are not sufficiently described to enable the reader to assess whether there is any national defense readiness cost or benefit to any of these alternatives. Therefore, readers of this DEIS cannot make an informed decision as to whether the "historical" level of training must be maintained to prevent the Navy from suffering substantive, quantifiable decrements in some readiness area essential to its long-term plans. Such plans must exist to justify the expenditure of billions of dollars of fuel, expendable equipment and sailor hours.

Similarly, the DEIS should describe the consequences to readiness and options available if either Alternative 1 or 2 are rejected. This information is essential to weigh and consider the costs and benefits in terms of both readiness and environmental impact. Part of that consideration should include an option for reducing amounts, types and locations of training to ensure national ocean stewardship and environmental quality goals. For example, RIMPAC is one of the specified training events that is slated for expansion in Alternatives 1 and 2. The DEIS should explain under this alternative why it is necessary for the number of ships in this exercise to expand. The Navy should be able to provide an unclassified yet substantive basis for asking that an increased environmental footprint be allowed, along with the added cost, manpower, and loss of time available for other activities, all of which are all implicit in the three alternatives.

The assertion on page 4-65, line 25-29 that because no beaked whales have stranded in Hawaii the HRC activities are therefore not likely to pose a risk to beaked whales in the future is inconsistent with an otherwise well-reasoned and thorough DEIS. This is a case where absence of evidence is mistakenly offered as evidence of absence even though it is mutually agreed that the historical record is known to be unreliable, that historical usage patterns of the area by the Navy may not in fact be reliable predictors of future Naval training needs, and where the problem of concern is known to be more complicated than simply stranding or not stranding in the presence of sonar sound. Reporting of strandings in the main Hawaiian Islands has probably not been consistent until quite recently, and is even less consistent in the history of the northwestern Hawaiian Islands.

Furthermore, stranding is not the only possible outcome of concern. It is also easily arguable that the Navy has in fact not been pursuing the same level and type of training, research, development, testing, and evaluation activities "with essentially the same equipment for the past 30 years."

The DEIS dismisses specific instructive events, such as the USS Shoup transit of Haro Strait (p. 4-85-86) without serious discussion. For example, the reports of behavioral effects on killer whales, Dall's porpoise, and minke whales are not included in this discussion but beg the question as to why the Navy believes these types of effects are not of concern. Other aspects of this event, like the modeling of the Shoup sound fields, were included in the joint Navy-National Marine Fisheries Service development of the dose-response functions used in this DEIS, so it seems inconsistent to consider some aspects of the Shoup event highly relevant to this EIS, but not others.

Supporting data and a more considered discussion are needed for the assertion that none of the Japanese beaked whale strandings cited by Brownell et al (2004) coincided with naval activities in Japan. The cited Center for Naval Analysis examination of the data is probabilistic, not deterministic, and sets a probability that temporal patterns between two sets of events (beaked whale strandings and naval sonar use) are or are not correlated. It does not necessarily indicate that no events co-occurred, but only that the degree of co-occurrence may or may not be explained by chance alone (p. 4-65, line 21-23).

Risk Estimation—The DEIS derivation of the "shorthand" version of mid-frequency sound exposure is difficult to understand. While it is understandable that some details of the operating characteristics of the 53-C sonar may be classified, considerable detail has been provided in previous unclassified examples of typical 53-C pings and ping series: the Evans and England 2001 report includes discussion of source levels when in omnidirectional mode (235 dB nominal source Sound Pressure Level (SPL)) and beam-steered or "searchlight" mode (nominal 240+ dB SPL) at 10-20 second intervals, the recent report from the JASON panel includes detailed discussions of sonar ping characteristics, and no doubt other unclassified sources of information could be readily found. The DEIS should include the already released and presumably unclassified information that justifies its use of the expedient of 235 dB SLP, 1-second pings at 30-second intervals to characterize the range of sonar usage patterns and subsequent risk outcomes that might occur (p. 4-96).

Information on sound frequency, source level, or basic usage pattern for other sources of noise (helicopter dipping sonars, torpedo sonars, etc.) is completely lacking. These omissions should be corrected because almost all risk assessments for environmental sound now include such a table of source characteristics to facilitate evaluation of the potential acoustic risk associated with them.

The risk calculation process (p. 4-99) and especially the exposure volume calculation (lines 6-11), are very difficult to follow. For example, it is difficult to understand the process by which 10 hours of sonar pings by a presumably moving vessel are translated into one hour "averages" and how these in turn are applied to a static volume of water populated by apparently static animals. Similarly, it is not clear to us how sound energy, used to calculate the hourly averages, is to be translated into the single ping sound pressure level threshold within the dose-response function to yield either a probable Level B take or probable no-take. Are all animals within the specified water volume assumed to be at the depth of greatest sound intensity? Do they remain there for the entire

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hour or ten hours? How, once the threshold is triggered, is multiple counting avoided? Intuitively, one thinks in terms of an individual animal and its tendency to move up and down in the water column and to travel in the two-dimensional horizontal plane over time relative to the source, which also is moving. It is hard to understand how this variability in exposure regime over time is captured in the described process, or if it is ignored, how the calculation may over- or under-estimate risk due to the simplifying assumptions of the model. Some sample calculations, and even graphical representations of the probability density surfaces for sound and animal density would be useful in helping the reader navigate this complicated and novel risk estimation process.

The characteristics of the Extended EchoRanging (EER) source are not clear. Rather than refer to another, difficult-to-access document (the JTFEX/COMPTUEX document), it might be better to provide actual charge weight or impulse source level of the EER "ping" (p. 4-102, line 20-27).

With regard to the establishment of the extent of Level A take (page 4-175), the Navy goes to great lengths to suggest that it has zero risk of causing a Level A take because its models are actually grossly overestimating encounter rates. This brings up the question of why the Navy is using models it believes to be defective and unsupported by the best available knowledge. More to the point, however, the mitigation is presumed to reduce to zero the risk of unmitigated exposures, whatever their level. But then on lines 23-27 the Navy arbitrarily "agrees to" ask for two lethal or injurious takes for each of five species, apparently also selected arbitrarily as no specific reason or reasons are provided. If there is in fact no rationale for doing this, and all the presented evidence is to the contrary, then it is not clear why the Navy should ask for any Level A takes. Earlier in section 4 the DEIS suggests that a possible concession to uncertainty about beaked whale sensitivity to mid-frequency sonar would be to count 1 percent of all estimated Level B takes as Lethal A takes. Given an estimate of over 2,000 Level B takes, that would indicate a potential for 20 Level A takes of beaked whales if this precaution is invoked, well above the nominal 2 per species suggested on page 4-175. These contrary statements are at best ambivalent about the risk and at worst misleading to the reader. To avoid such confusion we believe the DEIS needs to adopt a single approach to risk estimation based on the best available information and use that approach consistently. We do not believe that it is acceptable to offer an indefensible risk estimate and then create arbitrary concessions.

On page 4-21-22, and in Table 4.1.2.3.1-1 on the same page, the blast risk criteria differ slightly from those used by the National Marine Fisheries Service in various Gulf of Mexico rig removal and construction projects, e.g., Bienville Offshore Energy Terminal DEIS of June 2007, vol. 2, Appendix C. This discrepancy between current regulatory agency *de facto* standards and the Navy's proposed criteria should be reconciled before issuance of the FEIS and requested Letter of Authorization. Also, here and elsewhere in the HRC DEIS it is "Navy policy" to use a temporary threshold shift (TTS) criterion of 12 psi peak pressure for charges greater than 2,000 pounds TNT-equivalent, but a TTS criterion of 23 psi for smaller charges (also see page 4-104, line 6-13). The basis for this differential threshold criterion for the same physiological damage issue is not clear and should be clarified.

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The Navy has done a commendable job in this DEIS of explaining the relationship between physiological and behavioral effects as biological phenomena, versus the definition of regulatory criteria under the Marine Mammal Protection Act of Level A or Level B harassment. This is a confusing but necessary set of distinctions and the DEIS does a very good job on pages 4-35 and 36 of clarifying those relationships and explaining the Navy's rationale for apportioning risk among physiological and behavioral effects to then determine the Level A or Level B consequences of a given physiological or behavioral effect.

The Navy also has done a good job of clearly exploring the relationship of permanent threshold shift (PTS) and temporary threshold shift, the relationship between Sound Pressure Level (SPL) and Sound Energy Level (SEL), and other metrics. These relationships are not generally well understood and the DEIS does a good job of clearly explaining them on pages 4-37 through 4-47.

The DEIS also provides a thorough exploration of the relationship of rectified diffusion, decompression syndrome (DCS), acoustic resonance and other physiological or biomechanical effects of sound (pages 4-48 and 49). The DEIS continues with a similarly strong background review of these physiological phenomena and the scientific evidence for and against manmade sound as a contributing factor on pages 4-49 and 50. While the potential risk to marine mammals from sound via these mechanisms needs further scientific exploration, the DEIS offers the reader sufficient information and original reference material to make an informed judgment based on the currently available science.

The use of a dose-response relationship to capture the probabilistic nature of behavioral reaction to sound is well described, with excellent depth of background references (pages 4-53 through 63). The amount and relevance of data to support this particular dose-response curve is not ideal, nor is it even as substantive as the data used in the SURTASS LFA dose-response function, but the DEIS does indicate an intent by Navy to obtain more and better data to strengthen that risk estimating function.

On page 4-63b, lines 334-342, various environmental conditions of special concern are cited as factors in estimating risk for beaked whales. Those conditions include canyon-like bathymetry, surface ducts, etc. However the process by which these factors are to be considered in estimating risk is not described in sufficient detail to enable the estimates to be vetted by an independent outside evaluator. In Section 9, the appendix containing the report after the 2006 RIMPAC exercises, these factors are actually recommended for removal from consideration based on the idea that they are poorly defined and difficult to apply, and/or existing data do not support the idea that these features are in any way predictive of beaked whale occurrence or elevated risk. It should be noted that although more useful data are being generated on the distribution and abundance of beaked whales in the Hawaiian Islands by McSweeney, Baird, Barlow and others, these sources of information are not sufficiently cited and the manner in which such information will be used in planning is not sufficiently described, even though the Navy supported some of the work to generate those data (e.g. Baird et al, 2006). The seasonal avoidance of humpback whales is well described throughout the document, and a convincing case is made that this is factored into event planning. The same is not true for beaked whales. Similarly, on page 4-63b, line 30-33 and in the risk threshold tables a special category is created for harbor porpoises and justification is provided for

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their special treatment. Since harbor porpoises are not a species found in the HRC this information should be eliminated from this document.

A somewhat outdated paper by Ketten (1998) is cited as the source of an upper hearing limit for baleen whales of 20 kHz (p. 4-64, line 8). More recent observational data by Nowacek et al. (2004) and others, and more recent unpublished analyses by Ketten (2004) and colleagues from Boston University and the Navy Research Lab also suggest that the upper frequency limit for at least some baleen whales may be above 20 kHz (but likely below 30 kHz). It would strengthen the EIS to incorporate recently published work, or citable gray literature references from these researchers.

Mitigation And Monitoring—The Navy has high expectations for the effectiveness of watchstanders in mitigation efforts. Such expectations should be substantiated because 1) a great deal of evidence argues to the contrary, and 2) other means such as passive or active acoustics, radar, infra-red or other sensors may substantially augment visual watches and may be more effective. Page 6-23, lines 1-2 hints at a watchstander validation process, but the statement lacks convincing details. The British Royal Navy has a well developed process for both shoreside simulator training and shipboard training that provides a mechanism to quantifiably validate watchstander performance. We would encourage the U.S. Navy to adopt a similar process, especially when the proposed estimate of Level B and Level A takes is being reduced from tens of thousands of takes to zero through the use of visual monitoring alone.

The Navy should provide greater detail on the listed protocols for passive acoustic monitoring and mitigation, and reconcile that information with assertions elsewhere in the DEIS that visual monitoring alone is sufficient to assure 100 percent detection of all species of concern before they enter within range of the mitigation zones. A number of mitigation actions are listed on page 6-3. Measure #3 asserts that all personnel manning passive anti-submarine warfare (ASW) sensors will monitor for marine mammals. A great deal of detail is missing and needed before a reader can assess whether this is an effective practice. It is not clear whether the personnel will receive any training comparable to visual watchstanders to enable them to detect and classify marine mammal sounds, how well the available sensors (which were designed for other purposes) will detect and process marine mammal sounds, or whether they will be more or less effective than the SURTASS LFA passive acoustic system (effective only to 500 Hz), which failed to detect any marine mammals in more than 400 hours of monitoring (SURTASS LFA Final Report, 2000-2006). In addition, the DEIS should describe communications between ASW personnel and command personnel responsible for making decisions about mitigation action (sonar source level reduction, shut-down, etc.). Mitigation measure #13 describes a similar effort using submarine sensors without providing sufficient details as to the effectiveness of such effort, or the communication chain by which such information makes its way to decisionmakers responsible for taking mitigation action in a timely manner.

The use of permanent or temporary monitoring arrays (passive acoustic or other) also is insufficiently described. The Navy refers throughout the DEIS to the potential utility of the Pacific Missile Range Facility (PMRF) monitoring arrays like BARSTUR and BSURE, and to new devices like the portable array or Scripps ARP/HARP bottomed monitoring devices, but offers no concrete plan for implementation of such monitoring on a regular basis, or for validation of performance.

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On page 6-23, line 32 the Navy proposes to capture data on animal presence before and after exercises but cites security reasons for not capturing data during exercises. We would propose that the Navy consider approaches that could capture and archive data throughout that period and either offer declassified redacted data to confirm effect/no effect at all stages of the exercise, or make the classified data available for assessment by appropriately cleared persons.

The Portable Offshore Training Range mentioned in the DEIS deserves further discussion, both as a sound source and as a possible mitigation tool. Described on page 2-51, the portable range produces sound to communicate the relative positions of the listening nodes and to communicate with vessels and other devices carrying pingers through the range. The sound is of relatively low amplitude, with a source level of 190 dB re 1 microPascal SPL, but it is within the range of hearing of most marine mammals at a nominal 8.8, 17, and 40 kHz. The patches of territory where the portable offshore range might be deployed run outside the figure and it appears possible in some cases that such portable range use could be very close to the protected waters of the northwestern Hawaiian Islands. It is not clear how use of the portable ranges would be scheduled and whether the National Marine Fisheries Service would be consulted during this decision. In light of these concerns, discussion of potential environmental impacts of the portable ranges in section 4 seems insufficient. Similarly, the potential for this portable listening array to be used for mitigation monitoring or for post-test analysis of visual observer performance also are not discussed in Section 6. The permanent ranges at the Pacific Missile Range Facility figure prominently in bolstering monitoring for activities within the area covered by those ranges, and it is not clear why the portable ranges are not used similarly.

The criteria for resumption of sonar use after detection of a marine mammal seem unrealistically short. Thirty minutes without re-acquiring visual contact with an animal previously detected within the mitigation zone is too short for animals that may dive for more than 30 minutes, or might go more than 30 minutes without presenting another detectable surfacing due to glare, waves, or wind-hindered visibility. The alternative, resumption after the ship has travelled 2000 yards means about 5-6 minutes for a ship travelling at 10 knots. This provides even less time to determine whether the animal has been able to clear the safety zones or whether the animal has in fact fled underwater at 5 knots running straight before the ship and thus could have actually closed range since it was first detected.

The use of ramp-up as a mitigation tool has been a subject of considerable debate and in section 6-8 and Appendix F the Navy rightly questions the effectiveness of this procedure. Ramp-up procedures have never been tested to either validate their effectiveness or to verify that they are ineffective, or perhaps even counterproductive. From the DEIS it appears that the Navy has no plans to take advantage of the current temporary defense exemption to test whether or not ramp-up is in fact effective. Such an assessment effort would be straightforward and could potentially save the Navy considerable time and money if ramp-up were shown to be useless. Alternatively, if the test showed ramp-up to be effective, then confidence in the Navy's environmental risk reduction protocol would be greatly strengthened.

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The considerable list of precautions for beaked whales described in mitigation measure #14 (page 6-4) are impressive, but the Navy stated in its RIMPAC 2006 report (DEIS Section 9, appendix F) that most of these measures were difficult to define, of unproven relevance, or overly expensive and therefore not recommended in light of the experiences in the RIMPAC 2006 exercise. In aggregate, the Navy's arguments against these measures elsewhere in the document create an impression that the proposed mitigation efforts may not be regularly applied during planning and execution of ASW exercises and similar sound-producing activities on the range complex. Verification and validation of actual decision processes are a critical aspect of acceptance of the proposed protocol, and we would encourage the Navy to look into the kinds of decision aids and recording devices used by the British Royal Navy to create an alteration-proof record of real-time actions during the planning and execution of its environmental mitigation practices for underwater sound from sonars. We note that the U.S. Navy outlines a process whereby the Officer in Tactical Command has the authority to give consideration to delay, suspend or alter activities, and that it will issue post-exercise reports that would presumably be available as unclassified public documents. Presumably these would be similar to the LFA and RIMPAC unclassified after-action reports and/or as classified documents reviewable by appropriately cleared persons (p. 6-5). That framework could form the basis for an effective verification procedure, and thus greatly reduce concerns about external verification and accountability without unduly taxing Naval resources.

Related to the above concern, the risk estimation and reduction procedures for beaked whales are not as clear as they should be (p. 4-114, line 22-28 for Blainville's beaked whales, p. 4-115, line 24-31 for Cuvier's beaked whales). The contention that more than 2000 encounters with beaked whales would all be successfully mitigated through visual monitoring alone is inconsistent with numerous reports of the low probability of detection of beaked whales even in dedicated visual surveys (e.g., Barlow and Gisiner, 2006). Indeed a wealth of literature on visual survey methods suggests that probabilities of detection for almost all species fall well below 50 percent in most circumstances. The U.S. Coast Guard's considerable body of data on the difficulty of detecting persons or small objects in the water by visual means alone is consistent with the marine mammal survey data, suggesting that with maximal motivation, where human life is at stake, the odds of detecting a relatively small, low-profile object at sea are small. In fact, the Navy's own SURTASS LFA Final Report for mitigation effort 2002-2006 found that visual survey was a poor source of marine mammal detections relative to its own active marine mammal detection sonar. Similarly, while the RIMPAC EIS predicted more than 33,000 takes, visual survey resulted in only 29 actual detection events (for a total of about 100 animals detected) within that mitigation zone. Even within the very much smaller 190 dB threshold zone, the estimated number of takes in the RIMPAC EIS was 256, more than double what was detected visually. Either the model greatly over-predicted takes relative to the number of animals that were actually present (which is likely, but unavoidable due to the uncertainties involved), and/or animals were present but not detected (also more likely than not). The Navy has the means to quantitatively test the effectiveness of visual watch and other means of mitigation and should be able to present a strong plan for iterative testing and improvement of its mitigation monitoring capabilities. The Navy's own very conscientious watches for collisions, and rigorous reporting of all collisions, indicate that marine mammals escape detection almost every year, to the point where they actually come in physical contact with the vessel without being detected. All this evidence shows that the effectiveness of visual monitoring will be nowhere near the 100% that would be required to justify a decision of no effect in this DEIS.

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The Navy presents a confusing and inconsistent stance on the utility of non-Naval platforms or independent observers on Naval platforms. The arguments for safety and limitations of berthing space in this section and in Appendix F are well taken, and it would seem reasonable not to expect to include non-military personnel and aircraft as a regular part of normal training and exercise. But that would not seem to preclude a deliberately designed test, outside the context of an actual exercise, to generate some of the performance statistics needed to properly evaluate the effectiveness of various mitigation measures the Navy either considers highly effective, or wishes to eliminate as ineffective and cumbersome. The verification and validation procedures are quite familiar in the Navy and are used often in assessing the performance of new tactical sensors and weapons systems, as well as for assessing personnel, individual unit and multi-ship performance on tactical mission requirements such as minehunting or ASW. The DEIS in fact alludes to such efforts on page 6-25 lines 5-21 and again on page 6-24, lines 4-30, but does not make a definite commitment to try the new technologies or to conduct the third-party testing that would verify performance. Technologies such as passive acoustics are well known to the Navy and the advancement of these technologies for tactical applications is already an existing and growing area of emphasis for the Navy. It would seem that the advancement of supplemental or alternative monitoring technologies would be a priority during the defense exemption, and afterward, as the Navy tries to improve its understanding of the actual risk posed by these environmental concerns, the actual numbers and habitat types of the animals of concern, and the means by which they may be avoided. The argument advanced on pages 6-8 and 9 that new mitigation technologies are expensive and limited in availability should be followed by an explanation about how the Navy plans to go about changing that, just as it would for any technology that was deemed of tactical or safety benefit, from hearing protection aboard aircraft carriers to improvements to torpedo propulsion systems. Page 6-9 refers to the Navy's commitment to continue to fund research, without adequate explanation as to whether the current amount is sufficient, excessive or insufficient to support the Navy's need to plan and execute its mission with an acceptable level of risk to the environment. Simply committing to an amount, without a plan as to how that helps solve the problem, is of little value in this context.

The DEIS asserts that archiving and analysis of survey data is unnecessary and unproductive (e.g. page 6-8, lines 34-40), and in section 9 (Appendix F) argues against efforts to use monitoring data for studies of habitat use, abundance or other biologically meaningful questions. The Navy argues that such effort extends beyond the requirement to monitor and verify effect or lack thereof, and that such additional effort imposes a burden of data analysis and communication that detracts from other mission-essential activities (p. 6-7). The Commission believes that such data and the follow-up analyses that can be done with them are equally valuable to the Navy in planning future activities, and as such, the data provide value to the Navy beyond the immediate need to verify compliance for the activity during which they are collected. Data from prior exercises constitute a valuable resource for making better decisions in the future and for developing an improved ability to meet future training requirements. In a data-poor world, in which the Navy itself contends that it is making overly conservative assumptions about risk, the addition of data to make better informed decisions in the future is probably the most valuable mitigation tool the Navy has, and one that is more likely to reduce the burden of compliance than increase it (or more positively stated, renders the Navy more effective in meeting its environmental stewardship goals). Therefore a plan to archive, analyze and frequently update information obtained from mitigation monitoring should be a

Exhibit 12-1. Consultation Comments and Responses (Continued)

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clearly developed part of this EIS and part of the Navy's overall plan for addressing its environmental stewardship goals.

We thank the Navy for this opportunity to comment on the HRC DEIS and hope that the Commission's comments prove beneficial to the development of the Final EIS and Request for a Letter of Authorization under the Marine Mammal Protection Act. We have tried to keep our recommendations within the demonstrated capabilities of the Navy and hope that the recommended changes will enhance its ability to carry out its mission-essential activities in a manner consistent with its long and widely respected record of leadership in ocean environmental stewardship.

Sincerely,

Timothy J Ragen

Timothy J. Ragen, Ph.D.
Executive Director

cc: Captain Larry Rice
The Honorable Donald Schregardus
Craig Johnson

Baird, R.W., D.L. Webster, D.J. McSweeney, A.D. Ligon, G.S. Schorr, and J. Barlow. 2006. "Diving behaviour of Cuvier's (*Ziphius cavirostris*) and Blainville's (*Mesoplodon densirostris*) beaked whales in Hawai'i, Canadian Journal of Zoology 84:1120-1128.

Barlow, J. and R. Gisiner. 2006. Mitigation, monitoring and assessing the effects of anthropogenic sound on beaked whales. J. Cetacean Res. Manage., 7(3):239-249.

Brownell, R.L., T. Yamada, J.G. Mead, and A.L. van Helden. 2004. Mass strandings of Cuvier's beaked whales in Japan: U.S. Naval acoustic link Paper SC/56/E37 presented to the IWC Scientific Committee (unpublished). 10pp. [Available from the Office of the Journal of Cetacean Research and Management] Barlow and Gisiner, JCRM 2006.

Ketten, D.R. 1998. Marine mammal auditory systems: A summary of audiometric and anatomical data and its implications for underwater acoustic impacts. NOAA-TM-NMFS SWFSC-256, Department of Commerce.

Ketten, D.R. 2004. Marine mammal auditory systems: A summary of audiometric and anatomical data and implications for underwater acoustic impacts. International Whaling Commission, Scientific Committee (IWC-SC) Report, Annex K: Standing Working Group on Environmental Concerns Report (May 2004), Appendix 4.

Nowacek, D.P., M.P. Johnson, and P.L. Tyack. 2004. North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alerting stimuli. Proceedings of the Royal Society of London, Part B., 271:227-231.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
2008-TA-0021

NOV 0 8 2007

Mr. Larry M. Foster
United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii 96860-3131

Subject: Species List and Technical Assistance regarding Informal Section 7 Consultation for the Hawaii Range Complex

Dear Mr. Foster:

This letter is in response to your letter dated October 12, 2007, requesting concurrence with your species and critical habitat lists and requesting initiation of informal section 7 consultation. The *Hawaii Range Complex Biological Assessment – Terrestrial* (Terrestrial BA), and the *Hawaii Range Complex Biological Assessment – Marine* (both dated September 2007) were also transmitted with your letter to support your request for informal consultation. We received your request on October 16, 2007. The Hawaii Range Complex, as a proposed action by the U.S. Navy, is the ongoing and future construction, modification, operation, and maintenance of support facilities and the ongoing and future instrumentation, launch, flight and other training activities associated with the U.S. Navy's use of Department of Defense (DOD) facilities within and around the Hawaiian Islands. This response is in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.).

We have reviewed the species and critical habitat lists that you have provided and determined that several of the lists are incomplete; therefore, we have enclosed updated species and critical habitat lists for all areas identified in your October 12, 2007, letter.

The U.S. Fish and Wildlife Service (Service) has begun a review of candidate species and/or potential critical habitat to propose for listing under the Endangered Species Act. Under section 7(a)(4) of the Act, Federal action agencies may request a conference on a proposed action that may affect proposed species or proposed critical habitat. The Service recommends the U.S. Navy conference on the proposed species and critical habitat, in lieu of re-initiating consultation after the listing process. If you wish to do so, we can provide a candidate species list.

TAKE PRIDE IN AMERICA

Exhibit 12-1. Consultation Comments and Responses (Continued)

Mr. Larry M. Foster 2

We have also begun reviewing the Terrestrial BA to determine if the continued implementation and initiation of new activities, by the U.S. Navy within the Hawaii Range Complex, will affect federally endangered or threatened species or their designated critical habitat. The Hawaii Range Complex covers many DOD facilities and many U.S. Navy actions. Due to the size and complexity of the proposed action, additional time and site visits will be needed to provide adequate review. Once we have completed our preliminary review of the Terrestrial BA, we propose to coordinate with you via telephone to set up a series of informal meetings or conference calls. These informal meetings would be specific to each DOD facility in order to address any outstanding information needs. When necessary, these meetings should be scheduled at the facility in question so that a site visit can be completed.

If you have any additional questions regarding this letter or the development of appropriate conservation measures, please contact Megan Laut, Fish and Wildlife Biologist, Consultation and Technical Assistance Program, at 808-792-9400.

Sincerely,

/s/ Patrick Leonard
Field Supervisor

Enclosure

Mr. Larry M. Foster 3

Enclosure 1. List of Endangered, Threatened and Candidate Species and their Critical Habitat on Facilities Listed in the Hawaii Range Complex Terrestrial Biological Assessment

NIHOA AND NECKER ISLANDS		
Common Name	**Scientific Name**	**Status**
Plants		
No common name	*Amaranthus brownii*	Endangered
Lo ulu	*Pritchardia remota*	Endangered
No common name	*Schiedea verticellata*	Endangered
Ohai	*Sesbania tomentosa*	Endangered
Reptiles		
Green sea turtle	*Chelonia mydas*	Threatened
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered
Birds		
Nihoa millerbird	*Acrocephalus familiaris kingi*	Endangered
Nihoa finch	*Telespyza ultima*	Endangered
Mammals		
Hawaiian monk seal	*Monachus schauinslandi*	Endangered
KAUAI		
Pacific Missile Range Facility/Main Base		
Plants		
Lau ehu	*Panicum niihauense*	Endangered
Ohai	*Sesbania tomentosa*	Endangered
Reptiles		
Loggerhead sea turtle	*Caretta caretta*	Threatened
Green sea turtle	*Chelonia mydas*	Threatened
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered
Olive ridley sea turtle	*Lepidochelys olivacea*	Threatened
Birds		
Hawaiian duck	*Anas wyvilliana*	Endangered
Hawaiian goose	*Branta sandvicensis*	Endangered
Hawaiian coot	*Fulica alai*	Endangered
Hawaiian moorhen	*Gallinula chloropus sandvicensis*	Endangered
Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered
Short-tailed albatross*	*Phoebastria albatrus*	Endangered

Exhibit 12-1. Consultation Comments and Responses (Continued)

Hawaiian petrel	*Pterodroma phaeopygia sandwichensis*	Endangered
Newell's shearwater	*Puffinus auricularis newellii*	Threatened
Mammals		
Hawaiian hoary bat	*Lasiurus cinerueus semotus*	Endangered
Hawaiian monk seal	*Monachus schauinslandi*	Endangered
Critical Habitat		
Lau ehu	*Panicum niihauense*	Endangered
Ohai	*Sesbanai tomentosa*	Endangered

*observed in May 2000

Pacific Missile Range Facility – Kahili

Birds		
Hawaiian duck	*Anas wyvilliana*	Endangered
Hawaiian goose	*Branta sandvicensis*	Endangered
Hawaiian coot	*Fulica alai*	Endangered
Hawaiian moorhen	*Gallinula chloropus sandvicensis*	Endangered
Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered
Hawaiian petrel	*Pterodroma phaeopygia sandwichensis*	Endangered
Newell's shearwater	*Puffinus auricularis newellii*	Threatened
Mammals		
Hawaiian hoary bat	*Lasiurus cinerueus semotus*	Endangered

Pacific Missile Range Facility – Kokee

Plants		
Akoko	*Chamaesyce halemanui*	Endangered
No common name	*Diellia pallida*	Endangered
Na ena e	*Dubautia latifolia*	Endangered
No common name	*Lipochaeta waimeaensis*	Endangered
Aiea	*Nothocestrum peltatum*	Endangered
No common name	*Phyllostegia waimeae*	Endangered
Kopiko	*Psychotria grandiflora*	Candidate
No common name	*Schiedea spergulina spergulina*	Endangered
Popolo aiakeakua	*Solanum sandwicense*	Endangered
No common name	*Spermolepsis hawaiiensis*	Endangered
Invertebrates		
Hawaiian picture-wing fly	*Drosophila musaphila*	Endangered
Birds		
Hawaiian duck	*Anas wyvilliana*	Endangered
Hawaiian goose	*Branta sandvicensis*	Endangered
Hawaiian coot	*Fulica alai*	Endangered

Hawaiian moorhen	*Gallinula chloropus sandvicensis*	Endangered
Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered
Hawaiian petrel	*Pterodroma phaeopygia sandwichensis*	Endangered
Newell's shearwater	*Puffinus auricularis newellii*	Threatened
Mammals		
Hawaiian hoary bat	*Lasiurus cinerueus semotus*	Endangered
Critical Habitat		
Akoko	*Chamaesyce halemanui*	
Na ena e	*Dubautia latifolia*	
No common name	*Mariscus pennatiformis*	
Aiea	*Nothocestrum peltatum*	
No common name	*Poa mannii*	
No common name	*Poa siphonoglossa*	
Popolo aiakeakua	*Solanum sandwicense*	

Pacific Missile Range Facility – Makaha Ridge

Plants		
No common name	*Spermolepis hawaiiensis*	Endangered
Dwarf iliau	*Wilkesia hobdyi*	Endangered
Birds		
Hawaiian goose	*Branta sandvicensis*	Endangered
Hawaiian petrel	*Pterodroma phaeopygia sandwichensis*	Endangered
Newell's shearwater	*Puffinus auricularis newellii*	Threatened
Mammals		
Hawaiian hoary bat	*Lasiurus cinerueus semotus*	Endangered

Pacific Missile Range Facility – Niihau

Plants		
Olulu	*Brighamia insignis*	Endangered
Pu uka a	*Cyperus trachysanthos*	Endangered
No common name	*Lobelia niihauensis*	Endangered
Lau ehu	*Panicum niihauense*	Endangered
Lo ulu	*Pritchardia aylmer-robinsonii*	Endangered
Ohai	*Sesbania tomentosa*	Endangered
Reptiles		
Green sea turtle	*Chelonia mydas*	Threatened
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered
Birds		
Hawaiian duck	*Anas wyvilliana*	Endangered
Hawaiian goose	*Branta sandvicensis*	Endangered

Exhibit 12-1. Consultation Comments and Responses (Continued)

Hawaiian coot	*Fulica alai*	Endangered
Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered

Mammals

Hawaiian hoary bat	*Lasiurus cinerueus semotus*	Endangered
Hawaiian monk seal	*Monachus schauinslandi*	Endangered

Critical Habitat

Olulu	*Brighamia insignis*

Pacific Missile Range Facility – Kaula

Plants

No common name	*Amaranthus brownii*	Endangered
Lo ulu	*Pritchardia remota*	Endangered
No common name	*Schiedea verticellata*	Endangered
Ohai	*Sesbania tomentosa*	Endangered

Reptiles

Green sea turtle	*Chelonia mydas*	Threatened
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered

Mammals

Hawaiian monk seal	*Monachus schauinslandi*

OAHU

Coast Guard Air Station Barbers Point

Plants

Ewa Hinahina	*Achyranthes splendens* var. *rotundata*	Endangered
Akoko	*Chamaesysce skottsbergii* var. *skottsbergii*	Endangered

Reptiles

Loggerhead sea turtle	*Caretta caretta*	Threatened
Green sea turtle	*Chelonia mydas*	Threatened
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered

Birds

Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered

Mammals

Hawaiian monk seal	*Monachus schauinslandi*	Endangered

Dillingham Military Reservation (DMR), exclusive of Military Vehicle Trail

Plants

Pu uka a	*Cyperus trachysanthos*	Endangered
No common name	*Diellia falcata*	Endangered
Ma o hau hele	*Hibiscus brackenridgei*	Endangered
Kulu i	*Nototrichium humile*	Endangered
Mo oli oli	*Schiedea kealiae*	Endangered

Reptiles

Green sea turtle	*Chelonia mydas*	Threatened
Leatherback sea turtle	*Dermochelys coriacea*	Endangered

Birds

Hawaiian duck	*Anas wyvilliana*	Endangered
Hawaiian coot	*Fulica alai*	Endangered
Hawaiian moorhen	*Gallinula chloropus sandvicensis*	Endangered
Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered

Mammals

Hawaiian hoary bat	*Lasiurus cinereus semotus*	Endangered
Hawaiian monk seal	*Monachus schauinslandi*	Endangered

Critical Habitat

Ma o hau hele	*Hibiscus brackenridgei*
Mo oli oli	*Schiedea kealiae*
No common name	*Vigna owahuensis*

Ford Island

Reptiles

Green sea turtle	*Chelonia mydas*	Threatened

Mammals

Hawaiian monk seal	*Monachus schauinslandi*	Endangered

Hickam Air Force Base

Reptiles

Green sea turtle	*Chelonia mydas*	Threatened

Birds

Hawaiian duck	*Anas wyvilliana*	Endangered
Hawaiian coot	*Fulica alai*	Endangered
Hawaiian moorhen	*Gallinula chloropus sandvicensis*	Endangered
Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered

Exhibit 12-1. Consultation Comments and Responses (Continued)

Mammals

Hawaiian hoary bat	*Lasiurus cinerueus semotus*	Endangered
Hawaiian monk seal	*Monachus schauinslandi*	Endangered

Kahuku Training Area

Plants

No common name	*Adenophorus periens*	Endangered
Akoko	*Chamaesyce rockii*	Endangered
Haha	*Cyanea grimesiana* ssp. *grimesiana*	Endangered
Haha	*Cyanea koolauensis*	Endangered
Haha	*Cyanea longiflora*	Endangered
Nioi	*Eugenia koolauensis*	Endangered
Nanu	*Gardenia mannii*	Endangered
No common name	*Hesperomannia arborescens*	Endangered
Haha	*Phyllostegia hirsuta*	Endangered
Ohe ohe	*Tetraplasandra gymnocarpa*	Endangered

Invertebrates

Oahu tree snail	*Achatinella bulimoides*	Endangered
Oahu tree snail	*Achatinella curta*	Endangered
Oahu tree snail	*Achatinella dimorpha*	Endangered
Oahu tree snail	*Achatinella elegans*	Endangered
Oahu tree snail	*Achatinella sowerbyana*	Endangered
Oahu tree snail	*Achatinella valida*	Endangered

Birds

Hawaiian duck	*Anas wyvilliana*	Endangered
Oahu elepaio	*Chasiempis sandwichensis ibidis*	Endangered

Mammals

Hawaiian hoary bat	*Lasiurus cinereus semotus*	Endangered

Critical Habitat

Nioi	*Eugenia koolauensis*
Haha	*Cyanea longiflora*
Haha	*Cyanea koolauensis*
Haha	*Cyanea crispa*
Nanu	*Gardenia mannii*
No Common Name	*Viola oahuensis*

Keehi Lagoon

Reptiles

Green sea turtle	*Chelonia mydas*	Threatened

Birds

Hawaiian duck	*Anas wyvilliana*	Endangered
Hawaiian coot	*Fulica alai*	Endangered
Hawaiian moorhen	*Gallinula chloropus sandvicensis*	Endangered
Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered

Mammals

Hawaiian monk seal	*Monachus schauinslandi*	Endangered

Lima Landing

Reptiles

Green sea turtle	*Chelonia mydas*	Threatened

Birds

Hawaiian duck	*Anas wyvilliana*	Endangered
Hawaiian coot	*Fulica alai*	Endangered
Hawaiian moorhen	*Gallinula chloropus sandvicensis*	Endangered
Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered

Mammals

Hawaiian monk seal	*Monachus schauinslandi*	Endangered

Makua Military Reservation

Plants

No common name	*Abutilon sandwicense*	Endangered
Mahoe	*Alectryon macrococcus* var. *micrococcus*	Endangered
No common name	*Bonamia menziesii*	Endangered
Kamanomano	*Cenchrus agrimonioides* var. agrimonioides	Endangered
Akoko	*Chamaesyce celastroides* var. *kaenana*	Endangered
Akoko	*Chamaesyce herbstii*	Endangered
Pauoa	*Ctenitis squamigera*	Endangered
Haha	*Cyanea grimesiana* ssp. *obatae*	Endangered
Haha	*Cyanea longiflora*	Endangered
Haha	*Cyanea superba* ssp. *superba*	Endangered
Ha iwale	*Cyrtandra dentata*	Endangered
No common name	*Delissea subcordata*	Endangered
No common name	*Diellia falcata*	Endangered
Na ena e	*Dubautia herbstobatae*	Endangered
No common name	*Euphorbia haeleeleana*	Endangered
Mehamehame	*Flueggea neowawraea*	Endangered
No common name	*Gouania vitifolia*	Endangered
No common name	*Hedyotis degeneri var. degeneri*	Endangered

Exhibit 12-1. Consultation Comments and Responses (Continued)

No common name	*Hedyotis parvula*	Endangered
No common name	*Hesperomannia arbuscula*	Endangered
Ma o hau hele	*Hibiscus brackenridegei* ssp. *mokuleianus*	Endangered
No common name	*Lobelia niihauensis*	Endangered
Nehe	*Melanthera tenuifolia* (= *Lipochaeta tenuifolia*)	Endangered
No common name	*Neraudia angulata*	Endangered
Kulu i	*Nototrichium humile*	Endangered
Makou	*Peucedanum sandwicense*	Threatened
No common name	*Phyllostegia kaalaensis*	Endangered
Laukahi kuahiwi	*Plantago princeps var. princeps*	Endangered
Loulu	*Pritchardia kaalae*	Endangered
No common name	*Sanicula mariversa*	Endangered
No common name	*Schiedea hookeri*	Endangered
No common name	*Schiedea kaalae**	Endangered
No common name	*Schiedea nuttallii*	Endangered
No common name	*Schiedea obovata* (= *Alsinidendron obovatum*)	Endangered
No common name	*Silene lanceolata*	Endangered
No common name	*Spermolepis hawaiiensis*	Endangered
No common name	*Tetramolopium filiforme*	Endangered
olopu; pamakani	*Viola chamissoniana* ssp. *chamissoniana*	Endangered
Invertebrates		
Oahu tree snail	*Achatinella mustelina*	Endangered
Hawaiian picture-wing fly	*Drosophila obatai*	Endangered
Reptiles		
Green sea turtle	*Chelonia mydas*	Threatened
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered
Leatherback sea turtle	*Dermochelys coriacea*	Endangered
Birds		
Oahu elepaio	*Chasiempis sandwichensis ibidis*	Endangered
Oahu creeper	*Paroreomyza maculata*	Endangered
Mammals		
Hawaiian hoary bat	*Lasiurus cinereus spp. semotus*	Endangered
Hawaiian monk seal	*Monachus schauinslandi*	Endangered
Plant Critical Habitat		
No common name	*Bonamia menziesii*	
Kamanomano	*Cenchrus agrimonioides* var. *agrimonioides*	
Akoko	*Chamaesyce celastroides* var. *kaenana*	
Akoko	*Chamaesyce herbstii*	
Kauila	*Colubrina oppositifolia*	
Haha	*Cyanea grimesiana* ssp. *obatae*	

Haha	*Cyanea longiflora*
Haha	*Cyanea superba* ssp. *superba*
No common name	*Cyperus pennatiformis*
Ha iwale	*Cyrtandra dentata*
No common name	*Delissea subcordata*
No common name	*Diellia falcata*
Na ena e	*Dubautia herbstobatae*
No common name	*Euphorbia haeleeleana*
Mehamehame	*Flueggea neowawraea*
No common name	*Gouania vitifolia*
No common name	*Hedyotis degeneri* var. *degeneri*
No common name	*Hedyotis parvula*
No common name	*Hesperomannia arbuscula*
Ma o hau hele	*Hibiscus brackenridgei* ssp. *mokuleianus*
Aupaka	*Isodendrion laurifolium*
Aupaka	*Isodendrion longifolium*
Wahine noho kula	*Isodendrion pyrifolium*
Nehe	*Melanthera tenuifolia*
Alani	*Melicope pallida*
No common name	*Neraudia angulata*
Kulu i	*Nototrichium humile*
No common name	*Phyllostegia kaalaensis*
Laukahi kuahiwi	*Plantago princeps* var. *princeps*
No common name	*Sanicula mariversa*
No common name	*Schiedea hookeri*
No common name	*Schiedea kaalae*
No common name	*Schiedea nuttallii*
No common name	*Schiedea obovata*
Popolo aiakeakua	*Solanum sandwicense*
No common name	*Spermolepis hawaiiensis*
Bird Critical Habitat	
Oahu elepaio	*Chasiempis sandwichensis ibidis*

**Schiedea kealiae*, a different species, occurs at DMR

Marine Corps Base Hawaii

Reptiles		
Green sea turtle	*Chelonia mydas*	Threatened
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered
Birds		
Hawaiian duck	*Anas wyvilliana*	Endangered
Hawaiian coot	*Fulica alai*	Endangered
Hawaiian moorhen	*Gallinula chloropus sandvicensis*	Endangered
Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered
Hawaiian petrel	*Pterodroma phaeopygia sandwichensis*	Endangered

Exhibit 12-1. Consultation Comments and Responses (Continued)

Newell's shearwater	*Puffinus auricularis newellii*	Threatened

Mammals

Hawaiian hoary bat	*Lasiurus cinerueus semotus*	Endangered
Hawaiian monk seal	*Monachus schauinslandi*	Endangered

Marine Corps Training Area Bellows

Reptiles

Green sea turtle	*Chelonia mydas*	Threatened
Hawksbill sea turtle	*Eretmochelys imbricate*	Endangered

Birds

Hawaiian duck	*Anas wyvilliana*	Endangered
Hawaiian coot	*Fulica alai*	Endangered
Hawaiian moorhen	*Gallinula chloropus sandvicensis*	Endangered
Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered
Hawaiian petrel	*Pterodroma phaeopygia sandwichensis*	Endangered
Newell's shearwater	*Puffinus auricularis newellii*	Threatened

Mammals

Hawaiian hoary bat	*Lasiurus cinerueus semotus*	Endangered
Hawaiian monk seal	*Monachus schauinslandi*	Endangered

Pearl Harbor Naval Station

Reptiles

Green sea turtle	*Chelonia mydas*	Threatened

Birds

Hawaiian duck	*Anas wyvilliana*	Endangered
Hawaiian coot	*Fulica alai*	Endangered
Hawaiian moorhen	*Gallinula chloropus sandvicensis*	Endangered
Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered

Mammals

Hawaiian monk seal	*Monachus schauinslandi*	Endangered

West Loch Pearl Harbor – Explosive Ordnance Disposal

Reptiles

Green sea turtle	*Chelonia mydas*	Threatened

Birds

Hawaiian duck	*Anas wyvilliana*	Endangered
Hawaiian coot	*Fulica alai*	Endangered
Hawaiian moorhen	*Gallinula chloropus sandvicensis*	Endangered
Hawaiian stilt	*Himantopus mexicanus knudseni*	Endangered

Mammals

Hawaiian monk seal	*Monachus schauinslandi*	Endangered

Wheeler Air Field

Invertebrates

Hawaii picture-wing fly	*Drosophila tarphytrichia*	Endangered

Mammals

Hawaiian hoary bat	*Lasiurus cinerueus semotus*	Endangered

HAWAII ISLAND

Pohakuloa Training Area and Bradshaw Army Airfield

Plants

Fragile fern	*Asplenium fragile* var. *insulare*	Endangered
Honohono	*Haplostachys haplostachya*	Endangered
Kioele	*Kadua coriacea*(previously *Hedyotis coriacea*)	Endangered
Aupaka	*Isodendrion hosakae*	Endangered
Nehe	*Lipochaeta venosa*	Endangered
Spotted nettlebrush	*Neraudia ovata*	Endangered
Poe	*Portulaca sclerocarpa*	Endangered
Hawaiian catchfly	*Silene hawaiiensis*	Threatened
Lance-leaf catchfly	*Silene lanceolata*	Endangered
Popolo ku mai	*Solanum incompletum*	Endangered
Hawaiian parsley	*Spermolepis hawaiiensis*	Endangered
No common name	*Stenogyne angustifolia*	Endangered
No common name	*Tetramolopium arenarium* ssp. *arenarium*	Endangered
Oahu vigna	*Vigna o-wahuensis*	Endangered
Ae	*Zanthoxylum hawaiiense*	Endangered

Birds

Hawaiian goose	*Branta sandvicensis*	Endangered
Hawaiian hawk	*Buteo solitarius*	Endangered
Palila	*Loxioides bailleui* (Critical Habitat only)	Endangered
Hawaiian dark-rumped petrel	*Pterodroma phaeopygia* spp. *sandwichensis*	Endangered
Newell's Shearwater	*Puffinus auricularis newelli*	Endangered

Mammals

Hawaiian hoary bat	*Lasiurus cinereus* spp. *semotus*	Endangered

Exhibit 12-1. Consultation Comments and Responses (Continued)

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
2008-FA-0035

DEC 28 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawaii 96752-0128

Dear Sir or Madam:

The U.S. Fish and Wildlife Service (Service) has reviewed the Preliminary Final Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for the Hawaii Range Complex (HRC) provided by your office on November 26, 2007. These comments are provided in accordance with the National Environmental Policy Act of 1969 [42 U.S.C. 4321 *et seq.*; 83 Stat. 852] and other authorities mandating Federal oversight of environmental resources, including the Fish and Wildlife Coordination Act of 1934 [16 U.S.C. 661 *et seq.*; 48 Stat. 401], as amended; the Federal Clean Water Act [33 U.S.C. 1251 *et seq.*; 62 Stat. 1155], as amended; the Endangered Species Act of 1973 [16 U.S.C. 1531 *et seq.*; 87 Stat. 884], as amended; the Migratory Bird Treaty Act of 1918 [16 U.S.C. 703 *et seq.*; 40 Stat. 755] as amended; and the Sikes Act of 1960 [16 USC *et seq.*;74 stat. 1052], as amended.

The proposed action would upgrade and modernize the capabilities of the HRC, which encompasses land, air and sea training ranges in and around the Hawaiian Islands. The HRC supports local military units and multi-national exercises and facilitates the rapid deployment of U.S. defense forces, as necessary. This proposed action is intended to fulfill and improve U.S. government national security and alliance requirements in the Pacific Region and increase the strategic defense role of the Hawaiian Islands.

In a previous letter (dated September 24, 2007), we raised concerns about the adequacy of the Draft EIS/OEIS to serve as a decision-making document for the proposed HRC action. Based upon our subsequent discussions and our review of the Preliminary Final EIS/OEIS our concerns have been adequately addressed and we support proceeding to a final document.

As we continue to coordinate on the HRC activities, we recommend incorporating improvements to the Laysan albatross relocation program enacted to reduce bird air strike hazards (BASH) at the Pacific Missile Range Facility. Attached is a summary of our recommendations.

TAKE PRIDE IN AMERICA

Public Affairs Officer 2

We appreciate the opportunity to comment on this Preliminary Final EIS/OEIS and the willingness of the Navy to collaborate closely with us on the review. If you have questions regarding these comments please contact Fish and Wildlife Biologist Dwayne Minton or Megan Laut at 808-792-9400.

Sincerely,

for Patrick Leonard
Field Supervisor

Attachment

cc:
Mr. Vajai N. Rai, OEPC, Washington D.C.
Ms. Patricia Port, OEPC, Oakland
Mr. Don Steffeck, USFWS, Region 1, Portland
EPA Region 9, Honolulu
NMFS – PIRO, Honolulu
Hawaii DAR
Hawaii DOFAW

Exhibit 12-1. Consultation Comments and Responses (Continued)

ATTACHMENT

Currently, the Navy contracts the U.S. Department of Agriculture's Animal Plant and Health Inspection Service - Wildlife Services (WS) to capture, band, and translocate breeding and non-breeding adult Laysan albatross from Pacific Missile Range Facility (PMRF) to the north shore of Kauai, where they are released. This practice has been in place for many years, and is applied to non-breeding birds and breeding birds once their eggs have been taken. The purpose of the translocation is to reduce the risk of aircraft strike by encouraging birds to nest at a site other than PMRF. Partnership with the Kilauea Point National Wildlife Refuge (KPNWR) allows Laysan albatross eggs laid at PMRF to be fostered by birds at KPNWR and in other nearby breeding colonies. In the case of many other bird species, these actions would successfully reduce nesting activity, however, the biology and behavior of the Laysan albatross was not adequately considered when this program was developed for PMRF.

Habitat Modifications to Deter Nesting

Laysan albatross nest on the ground and prefer to locate their nests in open areas. To the best of our knowledge, the WS albatross management plan does not include methods to deter nesting in high-risk areas, e.g., near launch pads or runways, through modification of vegetation or other means. Discouraging the albatross from nesting in high risk areas would benefit both the Navy and the birds. Therefore, we would like to work with you to deter albatross nesting through various methods such as planting dense woody vegetation and/or the installation of ground cloth to make specific areas inhospitable to nesting.

Laysan Albatross Relocation

When nests fail under natural circumstances, breeding albatross will return to their nest sites intermittently before abandoning the site and returning to sea. Therefore, breeders that are captured and relocated from PMRF return to the base. Band resighting data indicate that many breeders are relocated multiple times in a single season. For example, during the 2006-07 breeding season, 166 breeding Laysan albatross were relocated from PMRF a total of 587 times; of these, nearly half of the individuals were captured four or more times each and transported to the north shore for release (one individual was relocated 15 times during the past season). Therefore, rather than reducing potential air strikes with albatross, this practice increases the amount of bird traffic flying into the airspace at PMRF, which is contrary to the intended purpose of the BASH Program.

In addition, no albatross nesting on the north shore of Kauai were banded as breeders at PMRF, nor have breeders banded at PMRF been observed breeding at colonies on other islands. Moreover, the repeated intervention in the birds' natural process of abandoning empty nests likely prolongs rather than curtails their presence at PMRF. Allowing breeding albatross at PMRF to abandon the colony on their own once their eggs have been removed likely will hasten their departure from the colony for the season. In summary, no data exist to demonstrate that capturing and moving breeding albatross is an effective means of discouraging these birds from returning to PMRF. We, therefore, strongly recommend that this practice be discontinued.

Egg Removal and Cross-Fostering

Until 2005, WS destroyed albatross eggs on PMRF as soon as they were laid. In 2005, a lapse in funding resulted in PMRF albatross incubating their eggs nearly to hatching. The Service biologist at KPNWR was able to locate albatross pairs on the Refuge and in other north shore colonies to foster the eggs from PMRF. All of the viable eggs transferred from PMRF nests to these surrogate pairs hatched, and most of the chicks fledged successfully. These excellent results of the partnership between the Navy, WS, and the Service led to similar efforts in the two subsequent breeding seasons to develop an alternative to destroying the albatross eggs laid at PMRF. The goal of these efforts was to remove eggs from PMRF nests and foster them to failed north shore nests as early as possible in the season.

Now we have learned that the removal of most albatross eggs to an incubator directly after laying has resulted in the loss of 50 percent or more of all the eggs produced in the last two seasons. Either the eggs didn't hatch or chicks died at hatching, a rate far higher than the natural rate of egg loss in a Laysan albatross colony. Data from the past two years of egg removal and artificial incubation prior to placement in foster nests indicate that successful hatching of eggs removed from albatross nests is inversely related to the amount of time they spend in the incubator. Egg viability can be determined as soon as seven days after laying. We recommend eggs should be left in the nest until their viability can be assessed and then transferred directly to foster nests on the north shore, or placed in the incubator until a foster nest can be identified. Minimizing time in the incubator decreases the potential of damage to the eggs.

Continued Partnership

The efforts of the BASH Program at PMRF to address concerns about albatross on the base with a minimum of egg and adult mortality are laudable and should continue. The voluntary partnership of the Navy, WS, and the Service has been instrumental in assessing the effectiveness and efficiency of the program. Working closely with Navy and WS staff, Service biologists have contributed significant time and expertise to analyze the BASH Program and other data and provide recommendations for improving methods to reduce potential bird strike risks at PMRF, reduce handling of and risk to adult birds, increase survival of fostered eggs, and minimize staff time and resources necessary for these activities. Analysis of data collected by WS, including timing of egg removal, banding information, and when birds are moved off the base provides new insights into the life history and behavior of the Laysan albatross, and this knowledge affords better management of the species, especially at PMRF. For the management on the base to continue to improve, this partnership should continue. We recommend that complete data exchange between the three partner agencies continue unimpeded, if necessary through formalized, regularly scheduled meetings to plan for the upcoming season, exchange information, and discuss necessary modifications to the existing program.

Exhibit 12-1. Consultation Comments and Responses (Continued)

Public Affairs Officer 5

In summary, we recommend the following in regard to the PMRF BASH Program and the Laysan albatross:

1. Make areas near runway and missile launch areas inhospitable to nesting albatross (ground cloth, vegetation changes, etc.) to encourage nesting pairs to find other places to nest.
2. To reduce the number of birds flying through PMRF airspace and the staff time and resources expended on the BASH program, leave incubating adults at nest site when eggs are removed from nests. Discontinue all capture and transport of breeding albatross, because this activity does not reduce bird air strike risk.
3. Until further modifications are made to the BASH program, coordinate the release of all captured non-breeding adult birds with KPNWR staff to improve knowledge of post-release status and behavior.
4. To reduce egg mortality, improve hatch success, and minimize the resources and staff time expended on the BASH program, allow albatross to incubate their eggs until viability can be determined.
5. To reduce egg mortality, draft and circulate for review a protocol for moving albatross eggs that minimizes vibration and jarring and minimizes their time in transport between nests or between nest and incubator.
6. In partnership with the Service, determine viability of albatross eggs at PMRF and in foster colonies as soon as possible (seven days) after laying and move PMRF eggs off base; eliminate or minimize artificial incubation.
7. Provide KPNWR with complete data sheets to improve knowledge of life history and behavior of the Laysan albatross.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

In Reply Refer To:
2008-TA-0021

DEC 28 2007

Mr. Larry M. Foster
United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii 96860-3131

Subject: Technical Assistance Regarding Section 7 Consultation for the Hawaii Range Complex

Dear Mr. Foster:

This letter is a follow up to our November 8, 2007, response regarding your request for informal section 7 consultation for the U.S. Navy's (Navy) proposed Hawaii Range Complex (HRC) training actions. In our previous correspondence we provided you with a list of endangered and threatened species and critical habitat that may occur within the vicinity of the proposed action. We also requested additional time for a site visit and coordination with your office so that we can adequately understand and assess the numerous proposed actions and their potential impacts to listed species and/or critical habitat. The HRC, as a proposed action by the Navy, is the ongoing and future construction, modification, operation, and maintenance of support facilities and the ongoing and future instrumentation, launch, flight and other training activities associated with the Navy's use of Department of Defense (DOD) facilities within and around the Hawaiian Islands. This response is in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

We reviewed the *Hawaii Range Complex Biological Assessment – Terrestrial* (Terrestrial BA), dated September 2007, to determine if the continued implementation and initiation of new activities by the Navy within the HRC will adversely affect federally listed species or their designated critical habitat. The HRC incorporates several DOD facilities and many Navy training actions. We have two concerns about the proposed Navy activities:

1) Currently, no Biological Opinion from the U.S. Fish and Wildlife Service (Service) has been issued for Navy activities and facilities in Hawaii. We are planning a site visit to Pacific Missile Range Facility in to learn more about ongoing and proposed HRC actions.

TAKE PRIDE IN AMERICA

Exhibit 12-1. Consultation Comments and Responses (Continued)

Mr. Larry M. Foster 2

2) Your October 12, 2007, letter states that when another DOD property is used, "the Navy adheres to all existing rules, regulations, and agreements that affect the usage of the property" and therefore is not initiating consultation for any of its activities on property of other DOD branches. Neither the BA nor the draft Environmental Impact Statement (EIS) addressed communications procedures between the Navy and other branches of the DOD about required environmental restrictions and conservation measures for endangered species. A number of the activities the Navy listed as potential training actions at other DOD installations in the BA and EIS would not be in accordance with existing Biological Opinions issued by the Service. We didn't find sufficient evidence in your documentation that the Navy is aware of current restrictions on other DOD facilities. In order to comply with your request to avoid consultation on Navy actions at other DOD properties, we would like the Navy to provide more information about pre-training communications with other branches of DOD and their respective environmental offices. Additionally, the Service requests more information regarding environmental training of soldiers and the enforcement of conservation measures on the ground.

If you have any additional questions regarding this letter, please contact Megan Laut, Fish and Wildlife Biologist, Consultation and Technical Assistance Program, at 808-792-9400.

Sincerely,

Patrick Leonard
Field Supervisor

DEPARTMENT OF THE NAVY
COMMANDER
UNITED STATES PACIFIC FLEET
250 MAKALAPA DRIVE
PEARL HARBOR, HAWAII 96860-3131

IN REPLY REFER TO:
5090
N01CE1/0151
22 Feb 2008

Mr. Abbey Seth Mayer
Interim Director, Office of Planning
Department of Business, Economic Development and Tourism
P.O. Box 2359
Honolulu, HI 96804

Dear Mr. Mayer:

In accordance with the Federal Coastal Zone Management Act, we request your review and concurrence on the Navy's consistency determination based on the assessment provided in the July 2007 Hawaii Range Complex (HRC) Draft Environmental Impact Statement (DEIS)/ Overseas Environmental Impact Statement (OEIS) and the February 2008 Supplement to the HRC DEIS/OEIS (the Supplement). These documents have been provided to your office under separate covers for review under the National Environmental Policy Act.

The Proposed Action is to support and conduct current and emerging training and Research, Development, Training & Evaluation (RDT&E) activities in the HRC and upgrade or modernize range complex capabilities to enhance and sustain Navy training and RDT&E.

We anticipate the Record of Decision (ROD) in June 2008 and that the National Marine Fisheries Service (NMFS) final rule for the required Letter of Authorization (LOA) will be issued prior to December 31, 2008. Because of schedule challenges between Navy's NEPA process and NMFS' process to promulgate a final rule providing a LOA, our evaluation of consistency is two-fold. First, for Navy actions involving the use of sonar from the ROD until January 2009, our evaluation considered the analyses in the HRC DEIS/OEIS and the Supplement together with the National Defense Exemption (NDE) to the Marine Mammal Protection Act (MMPA). Second, for Navy actions following expiration of the NDE and with issuance of the LOA, our evaluation considered the same analyses in the HRC DEIS/OEIS and the Supplement, included mitigations already established as a part of the NDE, and added mitigations to be stipulated by NMFS in the LOA. In both cases

Exhibit 12-1. Consultation Comments and Responses (Continued)

5090
N01CE1/0151
22 Feb 2008

Navy has determined that based on an evaluation in light of the applicable enforceable policies in the State of Hawaii's Coastal Zone Management (CZM) Program, there are no adverse direct or indirect (cumulative or secondary) effects on coastal uses or resources and the Proposed Action and its Alternatives are consistent to the maximum extent practicable with the enforceable policies of the State's CZM Program.

We appreciate your staff's continued support, patience, and professionalism. My point of contact is Mr. Neil Sheehan at (808) 474-7836, e-mail: neil.a.sheehan.ctr@navy.mil.

Sincerely,

J. R. RIOS
Captain, CEC, U.S. Navy
Deputy, Fleet Civil Engineer
By Direction

Copy to:
COMNAVREG HI PEARL HARBOR HAWAII (N00L)
NAVFAC PACIFIC PEARL HARBOR HI (EV2)

2

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, Maryland 20910

JAN 3 1 2008

Rear Admiral Larry Rice
Chief, Naval Operations (N45)
2511 Jefferson Davis Highway
Arlington, VA 22202

Dear Admiral Rice:

At the December 13, 2007 meeting between NOAA and the Navy, we agreed to analyze the risk function that is an adaptation from the solution in Feller (1968) to develop a dose response curve for purposes of assessing the probability of marine mammal behavioral responses that NMFS would classify as harassment given exposure to specific levels of mid-frequency active sonar (MFAS). We agreed to convene a panel of scientists and ask them to finalize the curve formula. Subsequent to our meeting we determined we could not ask the science panel to "finalize the curve formula" because of limitations imposed on Federal decision makers by the Federal Advisory Committee Act. Instead, we agreed to convene the panel of scientists and solicit their views, individually, of the use of the Feller adapted risk function versus the "mean of means" approach that NMFS and Navy had previously developed. We then asked our internal NMFS experts, Drs. Brandon Southall and Amy Scholik to synthesize the individual reviews and present a summary and a recommendation to me for consideration.

On December 20, 2007, we convened a panel of six scientists and presented them with background information on NOAA and Navy's joint efforts to develop a dose function curve and asked each of them to review the options and provide individual input on their scientific merit and relevance to the issues at hand. As requested, Drs. Southall and Scholik reviewed the responses and produced a summary and recommendation (Southall and Scholik memorandum to James H. Lecky, 3 January attached).

Drs. Southall and Scholik summarized the scientific reviews and determined that among them there was a distinct preference for an approach based on the Feller adapted risk function as opposed to the "mean-of-means" function. One reviewer provided a recommendation for adoption of the function as used in the low frequency acoustic sonar case, including the steepness parameter set at A = 10. One reviewer supported the Feller adapted risk function and indicated the steepness parameter needed to be determined. Four other reviewers did not explicitly discuss the appropriate steepness parameter of the Feller adapted risk function. Based on their synthesis of the reviews, Dr. Southall and Dr. Scholik recommended a single curve derived from the Feller adapted risk function with the input parameters of B = 120 dB, K = 45, A = 10, 99% point = 195 dB, and the 50% point = 165 dB.

In reviewing their recommendation, my office questioned whether the recommendation captured the breadth of views expressed by reviewers who posed alternatives beyond the ones we asked them to consider. Several of the reviewers suggested we consider deriving probabilistic functions directly from the data. Each of these generally reflect greater probability of a

Exhibit 12-1. Consultation Comments and Responses (Continued)

behavioral response that could be classified as harassment at relatively low received levels, as a function of the direct application of the Nowacek et al. (2004) data than those predicted by the Feller adapted risk function with a steepness parameter of A = 10. The derived Feller adapted risk function for MFAS is based on three datasets, the only mysticete data being that provided in Nowacek et al.(2004). Several reviewers also suggested that given variability in species and how they use sound more than one curve might be appropriate. Considering these views, I met with Drs. Southall and Scholik to discuss whether the curve they recommended gave appropriate consideration to the Nowacek study. In that discussion, we determined that applying the Feller adapted risk function with a steepness parameter of A=8 for mysticetes would better reflect the sense of the reviewers and the relevance of the Nowacek study than a single curve.

Therefore, I have concluded, based on the above, that we should adopt two curves: one for odontocetes and one for mysticetes. Both should be based on the Feller adapted risk function with input parameters of B = 120 dB, K = 45, 99% point = 195 dB, the 50% point = 165 dB. Only the steepness parameter should vary, and it should be A = 10 for odontocetes and A = 8 for mysticetes. We did not solicit comment on a curve for pinnipeds, but based on additional discussions with Dr. Southall, we should use the odontocete curve for pinnipeds.

Finally, NMFS agrees with many of the reviewers that exposure-response functions should be based directly on empirical measurements. However, the data currently available are too limited both in quantity and direct relevance to the situation in question to be used to support such a direct application. Consequently, the Feller adapted risk functions described in this document should be clearly identified by both NMFS and Navy as an interim approach (using the best available science) for Navy MMPA authorizations for major MFAS exercises and operating areas designated to be completed before the end of 2009. In the meanwhile, we expect to continue working with the Navy to fill the indicated data gaps to support the development of exposure-response functions based more directly on empirical measurements.

Thank you for your input regarding the Feller adapted risk function and your assistance convening the scientific reviewers. If you have any questions, please contact me at (301) 713-2332, ext. 127, or Jolie Harrison at (301) 713-2289, ext. 166.

Sincerely,

James H. Lecky
Director
Office of Protected Resources

Enclosure

Feller, W. (1968). Introduction to probability theory and its application. Vol 1. 3rd ed. John Wilay & Sons, NY, NY.

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EPO-08-032

April 3,2008

Mr. J. P. Rios, Captain
Department of the Navy
Commander
United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii 96860-3131

Dear Mr. Rios:

SUBJECT: Draft Environmental Impact Statement (DEIS) I Overseas Environmental Impact Statement (OEIS) for the Hawaii Range Complex

Thank you for allowing us to review and comment on the subject application. The document was routed to the various branches of the Department of Health (DOH) Environmental Health Administration. We have the following Clean Water Branch, Waste Water Branch and General comments.

Clean Water Branch

The Department of Health, Clean Water Branch (CWB), has reviewed the subject document and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at
http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

Exhibit 12-1. Consultation Comments and Responses (Continued)

Mr. Rios
April 3,2008
Page 2

2. Please call the Army Corps of Engineers at (808) 438-9258 to see if this project requires a Department of the Army (DA) permit. Permits may be required for work performed in, over, and under navigable waters of the United States. Projects requiring a DA permit also require a Section 401 Water Quality Certification (WQC) from our office.

3. You are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for NPDES general permit coverage by submitting a Notice of Intent (NOI) form:

   a. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi).

   b. Storm water associated with construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land a e a includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a lager common plan of development or sale. An NPDES permit is required before the start of the construction activities.

   c. Hydrotesting water.

   d. Construction dewatering effluent.

   You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before to the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

4. For types of wastewater not listed in Item 3 above or wastewater discharging into Class 1 or Class AA waters, you may need an NPDES individual permit. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

5. You must also submit a copy of the NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the CWB that SHPD has or is in the process of evaluating

Mr. Rios
April 3,2008
Page 3

your project. Please submit a copy of your request for review by SHPD or SHPD's determination letter for the project along with your NOI or NPDES permit application, as applicable.

6. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at 586-4309.

Waste Water Branch

The document states that the proposed action is to support and conduct current and emerging training and RDT&E operations in the HRC and upgrade or modernize range complex capabilities to enhance and sustain Navy training and testing.

As wastewater generation and treatment and disposal are not a primary concern, we have no objections to the proposed action for the Hawaii Range Facility.

Should there be domestic wastewater generated, we advise the developer that it be treated and disposed of according to our rules.

All wastewater plans must meet Department's Rules, HAR Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. If you have any questions, please contact the Planning & Design Section of the Wastewater Branch at 586-4294.

General

We strongly recommend that you review all of the Standard Comments on our website: www.state.hi.us/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this project should be adhered to.

Exhibit 12-1. Consultation Comments and Responses (Continued)

Mr. Rios
April 3,2008
Page 4

If there are any questions about these comments please contact Jiacai Liu with the Environmental Planning Office at 586-4346.

Sincerely,

KELVIN H. SUNADA, MANAGER
Environmental Planning Office

c: EPO
CWB
WWB

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1601 Kapiolani Blvd., Suite 1110
Honolulu, Hawaii 96814-4700
(808) 944-2200 • Fax: (808) 973-2941

April 7, 2008

RADM Michael A. Giorgione
Commander, Naval Facilities Engineering Command, Pacific
258 Makalapa Drive Suite 100
Pearl Harbor, HI 96860

Dear Admiral Giorgione:

The National Oceanic and Atmospheric Administration's National Marine Fisheries Service Pacific Islands Regional Office (NMFS) has reviewed the "Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS" prepared in October 2007 and "informally" submitted to this office in February 2008. The document and supporting EIS describe various activities and potential impacts associated with Navy's Hawaii Offshore Areas, facilities used by the Navy Undersea Warfare Center Detachment Pacific on west Oahu, the Explosive Ordnance Disposal Shore Area at Pearl Harbor and other Hawaii Onshore Areas.

NMFS Habitat Conservation Division conducted this review in accordance with the Fish and Wildlife Coordination Act (16 U.S.C. § 662(a)), the Magnuson-Stevens Fishery Conservation and Management Act (MSA), (16 U.S.C. § 1855(b)(2)), Coral Reef Executive Order 13089 and the National Environmental Policy Act. Since this project involves essential fish habitat (EFH), the process is guided by the requirements of our EFH regulations (50 C.F.R. §§ 600.905 - 930), which mandate the preparation of EFH Assessments and generally outline each agency's obligations in this consultation procedure.

Magnuson-Stevens Fishery Conservation and Management Act

Background. Pursuant to the MSA, the Secretary of Commerce, through NMFS, is responsible for the conservation and management of fishery resources found off the coasts of the United States. *See* 16 U.S.C. 1801 *et seq.* Section 1855(b)(2) of the MSA requires federal agencies to consult with NMFS, with respect to "any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat identified under this Act." The statute defines EFH as "those waters and substrates necessary to fish for spawning, breeding, feeding or growth to maturity." 16 U.S.C. 1802(10). Adverse effects on EFH are defined further as "any impact that reduces the quality and/or quantity of EFH," and may include "site-specific or habitat-wide impacts, including individual, cumulative

Exhibit 12-1. Consultation Comments and Responses (Continued)

or synergistic consequences of actions." 50 C.F.R. § 600.810(a). The consultation process allows NMFS to make a determination of the project's effects on EFH and provide Conservation Recommendations to the lead agency on actions that would adversely affect such habitat. *See* 16 U.S.C. 1855(b)(4)(A).

Essential Fish Habitat
The proposed project site is located in an area that has been identified as essential fish habitat under the following Western Pacific Regional Fishery Management Council (WPRFMC) Fishery Management Plans (FMPs): Pelagics (eggs, larvae, juveniles, adults), Bottomfish (eggs, larvae, juveniles, adults), Crustaceans (eggs, larvae, juveniles, and adults), Coral Reef Ecosystem (eggs, larvae, juveniles and adults) and Precious Corals.

Proposed mitigation measures to minimize impacts to EFH include conducting operations in open ocean away from sensitive EFH, avoiding areas of live coral during inshore operations, and restricting amphibious landing to specific areas of designated beaches.

Conclusions
The document adequately describes the potential impact to EFH resulting from the proposed action. Provided that the proposed mitigation measures are implemented to protect EFH in the area of operation, we concur that it unlikely that proposed project and alternatives would have adverse impacts to EFH for the various WPRFMC FMPs. No further conservation recommendations are necessary at this time. However, individual actions covered under the EIS may require permitting from the U.S. Army Corps of Engineers. We reserve the right to provide additional comments or recommendations during the Corps permit review process.

NMFS appreciates the opportunity to comment on this project. If you have any questions regarding this determination, contact Mr. Alan Everson at 808 944-2212 (alan.everson@noaa.gov).

Sincerely,

William L. Robinson
Regional Administrator

cc: Western Pacific Fishery Management Council
U.S. Fish and Wildlife Service, Environmental Services

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

April 10, 2008

Tom Clements
Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kehaha, Kauai, HI 96752-0128

Subject: Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS), Hawaii Range Complex, Hawaii (CEQ # 20070312)

Dear Mr. Clements:

The U.S. Environmental Protection Agency (EPA) has reviewed the above-referenced document pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. Our detailed comments are enclosed.

EPA reviewed the Draft Environmental Impact Statement (DEIS) and provided comments to the Department of the Navy (DON) on September 17, 2007. We rated the DEIS as Environmental Concerns - Insufficient Information (EC-2) due to concerns regarding impacts to marine resources from the preferred alternative. We recommended additional alternatives be evaluated and a more precautionary approach be taken regarding the use of mid-frequency active (MFA) sonar in training exercises due to the substantial uncertainty of these impacts on marine resources. We also requested additional information regarding impacts to fish from MFA sonar and additional discussion of the potential for underwater detonations to disperse polychlorinated biphenyls (PCBs) and heavy metal contamination in Pearl Harbor.

DON has prepared this Supplemental DEIS (SDEIS) to address impacts to marine mammals from Navy acoustic sources. Specifically, the Navy has changed the methodology used to estimate sonar hours of mid-frequency active (MFA) use for the exercises and has changed the methodology used to evaluate effects of MFA sonar on marine mammals. The new methodologies result in substantially lower estimates of sonar hours and predicted adverse impacts to marine mammals.

The Supplement DEIS also includes an additional Alternative 3 which proposes the same increased frequency and tempo of training events, addition of major exercises including supporting up to three Strike Groups, and increased research, development, test and evaluation (RDT&E) operations as the previously preferred Alternative 2, but with the amount of MFA sonar use as occurs in current ongoing training, RDT&E operations and support of existing range

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Exhibit 12-1. Consultation Comments and Responses (Continued)

capabilities (No Action Alternative). Alternative 3 is the new preferred alternative.

We must commend the Navy for reducing the proposed increase in mid-frequency sonar use under Alternative 2. However, we have concerns regarding the changes to the methodologies for impact assessment, the basis of which contains substantial uncertainties, and for the possibility that impacts could be underestimated. We are also concerned with impacts to the endangered Hawaiian Monk Seal, especially since the threshold for harassment has been raised in the SDEIS for this species. The Hawaiian Monk Seal is in precipitous decline with extinction a real possibility in the Northwest Hawaiian Islands. Additionally, we note that the Record of Decision for this action will utilize the National Defense Exemption from the Marine Mammal Protection Act. We are rating the DSEIS as Environmental Concerns - Insufficient Information (EC-2) (see enclosed "Summary of Rating Definitions").

EPA recommends the Navy identify and explore additional ways of minimizing MFA sonar use in its Anti-submarine Warfare (ASW) training and utilize the NEPA process to develop a broader range of alternatives which avoid potentially significant impacts (40 CFR 1500.2(e)). We encourage precaution, as a remedy for the significant uncertainties that abound in the impact assessment, and in the use of MFA sonar. We also encourage collaboration and joint fact-finding with interested agencies and organizations to resolve disputes over scientific and technical issues.

We note that EPA's comments on the DEIS regarding the potential for underwater detonations to disperse polychlorinated biphenyls (PCBs) and heavy metal contamination in Pearl Harbor and our request for disclosure of the amount of munitions use and their associated pollutants for all alternatives were not addressed in this SDEIS. We continue to extend these requests.

EPA appreciates the opportunity to review this SDEIS. When the Final EIS is released for public review, please send one copy to the address above (mail code: CED-2). If you have any questions, please contact me at (415) 972-3846 or Karen Vitulano, the lead reviewer for this project, at 415-947-4178 or vitulano.karen@epa.gov.

Sincerely,

Connell Dunning

For Nova Blazej, Manager
Environmental Review Office

Enclosure: Summary of EPA Rating Definitions
EPA's Detailed Comments

cc: Chris Yates, National Marine Fisheries Service

SUMMARY OF EPA RATING DEFINITIONS

This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the EIS.

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

ADEQUACY OF THE IMPACT STATEMENT

Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

Exhibit 12-1. Consultation Comments and Responses (Continued)

EPA DETAILED COMMENTS ON THE SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT, HAWAII RANGE COMPLEX, HAWAII, APRIL 9, 2008

Minimizing Mid-Frequency Sonar Use

We understand the need for the Navy to use mid-frequency active (MFA) sonar in its anti-submarine warfare (ASW) training. MFA sonar is currently the only way to detect modern quiet submarines, and the Navy maintains that its use is the only way to provide realistic training and testing with this sonar technology. However, the potentially significant impacts from MFA sonar on marine mammals are of significant concern to the public, as evidenced in high litigation for these projects. EPA is also concerned about these impacts, especially considering future anticipated effects of climate change on marine ecosystems[1] and the additional strain MFA sonar impacts may have on increasingly stressed resources.

EPA recommends a comprehensive strategy for meeting ASW training needs while minimizing the use of MFA sonar. Since, as the Navy indicates, the effective use of sonar is a perishable skill that must be practiced frequently, additional means of practicing these skills should be developed. Computer-assisted simulations of sonar use and response that simulates what sonar technicians see on ship should be explored, if this is not already occurring, to augment and complement the use of MFA sonar in training. The drawbacks of simulation must be compared to training situations that include the various court and agency imposed restrictions on MFA sonar use, not to an ideal situation with no restrictions.

The clear identification of minimum training needs with regard to MFA sonar use can be useful in planning training programs that minimize MFA sonar use and maximize the skills gained from its use. This was the basis for our comment on the DEIS which recommended that the document include a range of alternatives developed with reference to how well they meet immediate and future training needs. Without specifically identifying minimum training needs, it is difficult to devise alternatives that avoid potentially significant impacts. The inclusion of an additional alternative in the SDEIS that proposes to stretch the existing hours of MFA sonar use (no action alternative) across additional training exercises demonstrates that there is flexibility in the amount of MFA sonar use that occurs during training. The NEPA documents do not identify the minimum requirements that are needed for the Hawaii Range Complex, nor is there evidence of Navy coordination with other Range Complexes in Southern California, the Northern Mariana Islands, and the Pacific Northwest for opportunities to maximize the training benefit of MFA sonar use.

EPA also encourages the Navy to consider the benefits of collaboration in addressing this controversial issue. The Council on Environmental Quality, by releasing new guidance on Collaboration in NEPA[2], has communicated the need for Federal agencies to better engage interested parties in collaborative environmental analysis and federal decision-making. We understand national security issues would limit some opportunities to collaborate, but we suspect

[1] Intergovernmental Panel on Climate Change, 4th Assessment Report ""Impacts, Adaptation and Vulnerability", Section 4.4.9 – Oceans and Shallow Seas. Available: http://www.ipcc.ch/ipccreports/ar4-wg2.htm

[2] Available: http://www.nepa.gov/ntf/Collaboration_in_NEPA_Oct_2007.pdf

that some opportunities with other interested parties may exist, such as in developing a broader range of alternatives and/or in joint fact-finding (an inclusive and deliberative process to foster mutual learning and resolve disputes over scientific and technical issues). Collaboration might offer an alternative to litigation and we recommend its consideration.

> *Recommendation:* EPA recommends that the FEIS identify all efforts that the Navy is taking to minimize MFA sonar use in ASW training and to identify additional opportunities to meet training needs while minimizing MFA sonar use. We continue to recommend that a broader range of alternatives be evaluated, and the identification of minimum training requirements and minimum sonar use for ASW exercises will facilitate the development of alternatives that avoid potentially significant impacts (40 CFR 1500.2(e)).
>
> We also recommend the Navy explore the use of simulations to augment the use of MFA sonar training, or if this is occurring, to invest in better simulations. We request that information about these efforts be included in the FEIS. We also recommend coordination of ASW training that is occurring in other Range Complexes in Southern California, the Northern Mariana Islands, and the Pacific Northwest for opportunities to maximize the benefit gained from each MFA sonar use.
>
> We encourage collaboration with interested outside parties where possible, especially in the development of alternatives and in joint fact-finding to resolve disputes over scientific and technical issues. Please address this possibility in the FEIS.

Changes to Sonar Hours

The new method of calculating sonar hours utilizes the Sonar Positional Reporting System (SPORTS), a database tool established in March 2006 to determine geographic locations of sonar use and into which all commands employing MFA sonar and sonobuoys are to input MFA sonar use daily. We commend the Navy for attempting to refine the estimated sonar hour usage originally collected, and for including submarine sonar in the analysis in the SDEIS (p. 2-1). However, very little information regarding the SPORTS database is revealed in the SDEIS. We understand from the Navy that the database is classified, had been in use for 14 months, and contained some inaccuracies that were corrected using best professional judgment. Since so little information about this data is revealed, it is not clear that the SPORTS data is in fact more representative; certainly the documentation in the SDEIS does not demonstrate this. Since this new method of calculating sonar use produced an estimate that is much lower than that estimated in the DEIS, more information is needed to substantiate its use to ensure that sonar use is not being underreported.

> *Recommendation:* The FEIS should include more information about the data in the SPORTS database. The FEIS should also provide detail of the method previously used, which we understand from the Navy was based on a 2-year study for the Range Complex Management Plan and involved estimates and the use of best professional judgment. Additional discussion as to why the SPORTS method is considered more accurate should

Exhibit 12-1. Consultation Comments and Responses (Continued)

be included in the FEIS. EPA recommends that this discussion include a comparison of the attributes and limitations of both methodologies in a comparative manner for the benefit of the reader and decision-maker.

Analytical Methodology

The Supplemental Draft Environmental Impact Statement (SDEIS) modifies the analytical methodology used to evaluate marine mammal behavior responses to MFA sonar in the Hawaii Range Complex (HRC). The DEIS had used a dose function analytical approach, and the SDEIS uses a risk function developed with the National Marine Fisheries Service (NMFS). The SDEIS indicates that this change resulted from efforts to develop more appropriate model input parameters (p. es-2) in the hopes of increasing the accuracy of the Navy's assessment. It also indicates that the Navy believed that the methodology in the DEIS had overestimated potential effects (p. 3-14).

We commend the Navy for attempting to refine and improve methods for impact analysis, however substantial limitations and uncertainty appear to exist for the risk function. The SDEIS admits the risk function is based on "very limited data" (p. 3-6) consisting of just three data sets. One of the three data sets used acoustic stimuli that was unlike the Navy's MFA sonar (p. 3-9), and another data set's observations were "anecdotal and inconsistent" and lacked controls (p. 3-10). Additionally, the data sets represent responses from a limited number of species (four).

Recommendation: EPA has concerns due to the substantial scientific uncertainty associated with the data that informed the Navy's new methodology. In the process of refining methods for impact analysis, the Navy should ensure that impacts are not underreported. Because of the high level of uncertainty, it is prudent to err on the side of more precaution. We recommend application of buffers in calculating impacts to account for this uncertainty and that considers cumulative impacts that these resources are receiving from other stressors. As we stated in our comments on the DEIS, the determination of impact significance, as it relates to NEPA disclosure, must consider this uncertainty.[3]

As mentioned above, opportunities for joint fact-finding with interested parties to resolve disputes over scientific and technical issues should be considered.

Impacts to the Hawaiian Monk Seal

The impact analysis in the SDEIS raised the threshold for determining harassment to the endangered Hawaiian monk seal (HMS). The determination of temporary threshold shift (TTS), a temporary shift in hearing sensitivity, and the permanent threshold shift (PTS), a permanent hearing loss, were altered to utilize the TTS of the elephant seal which the SDEIS states is more closely related to the HMS than other pinnepeds. The SDEIS provides very little information regarding this change, which appears to be based on the information from one researcher. We

[3] The Council on Environmental Quality Regulations for Implementing NEPA state that "the degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks" should be considered in evaluating significance (40 CFR 1508.27 (b) 5)

are concerned with potentially underestimating impacts to the HMS because the species is in such precipitous decline, with extinction of the Northwest HMS a real possibility.[4]

Recommendation: Provide additional information in the FEIS regarding the use of a higher harassment threshold for the rapidly declining HMS. Unless there is complete scientific agreement that these thresholds are more appropriate, we recommend against change to the assessment methodology, believing a more precautionary approach is appropriate for such a vulnerable species.

Additional Comment

We recommend that the tables in Chapter 3 of the SDEIS be reviewed as it appears there are some errors, at least for the humpback whale PTS in Table 3.3.1-1 and on pages 3-22, 3-26, and 3-28.

[4] Western Pacific Regional Fishery Management Council, Pacific Islands Fishery News, Winter 2008

Exhibit 12-1. Consultation Comments and Responses (Continued)

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13.0 Comments and Responses—Draft EIS/OEIS

13.0 COMMENTS AND RESPONSES—DRAFT EIS/OEIS

This chapter presents responses to comments received on the Hawaii Range Complex (HRC) Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) (July 2007). The comments were expressed during the public comment period for the document. Section 13.1 provides an overview of the Public Involvement process, Section 13.2 is a summary of comments received, and Section 13.3 is a summary of responses. Section 13.4 includes data summary tables organized by the source of the comment: Written Public Comments, Email Public Comments, Public Hearing Comments, and Webmail Comments (Sections 13.4.1, 13.4.2, 13.4.3, and 13.4.4). See Chapter 14.0 for responses to comments received on the Supplement to the Draft HRC EIS/OEIS.

13.1 PUBLIC INVOLVEMENT PROCESS

13.1.1 PUBLIC SCOPING PROCESS

The HRC EIS/OEIS public involvement process began with the publishing of a Notice of Intent (NOI) to prepare an EIS. The NOI initiated a public scoping period, and was published in the *Federal Register* on August 29, 2006. The NOI was also published in five local newspapers: the *Maui News*, the *Honolulu Star Bulletin*, the *Hawaii Tribune Herald*, the *Garden Island*, and the *Honolulu Advertiser*) on September 2, 4, and 5, 2006. The scoping period lasted 46 days, concluding on October 13, 2006. Four scoping meetings were held on September 13, 14, 16, and 18, 2006, one each on the islands of Maui, Oahu, Hawaii, and Kauai. Table 1.5.3.1-1 lists the location, date, and number of attendees at the scoping meetings.

The scoping meetings were held in an open house format, presenting informational posters and written information and making Navy staff and project experts available to answer participants' questions. A court reporter was available to record participants' oral comments. The interaction during the information sessions was productive and helpful to the Navy, and comments received during scoping were used to help determine the breadth of issues analyzed in the Draft EIS/OEIS.

In addition to the scoping meetings, the public could make comments through a toll-free telephone number, by sending an email, or by mailing a written comment. Issues identified by the public were provided to resource specialists working on the Draft EIS/OEIS to ensure that all comments were considered during the preparation of the document. Table 1.5.3.1-2 presents a summary of the number of issues identified for each resource during scoping.

13.1.2 PUBLIC REVIEW PROCESS

After scoping, a Draft EIS/OEIS was prepared to assess the potential impacts of the Proposed Action and alternatives on the environment. It was then provided to the U.S. Environmental Protection Agency (USEPA) for review and comment in accordance with their responsibilities under Section 309 of the Clean Air Act and to have a Notice of Availability (NOA) published in the *Federal Register*. USEPA published the NOA for the HRC Draft EIS/OEIS in the *Federal*

Register on Friday, July 27, 2007. The Navy also placed NOAs in the aforementioned five newspapers.

Copies of the Draft EIS/OEIS were distributed to various Agencies, libraries, and private citizens (see distribution list, Chapter 10.0). A cover letter accompanying the Draft EIS/OEIS informed the public that the Draft EIS/OEIS was also available on the HRC Public website: http://www.govsupport.us/hrc, and informed the public of the dates, locations, and times for the public hearings on the Draft EIS/OEIS. A notification post card was sent to the entire mailing list, which included community members, elected officials, agency staff and individuals who signed up at the scoping meetings. The postcard included public hearing information. The Pacific Missile Range Facility (PMRF) Public Affairs Office also provided a press release of the availability of the Draft EIS/OEIS on July 27, 2007 to all Hawaii media outlets (TV, print, associated press, radio, individual reporters, and Pacific Fleet website).

Table 13.1.2-1 lists the public libraries where copies of the Draft EIS/OEIS were placed.

Table 13.1.2-1. Information Repositories with Copies of the HRC Draft EIS/OEIS

Library	Address			
Hawaii State Library, Hawaii and Pacific Section Document Unit	478 South King Street	Honolulu	HI	96813
Hilo Public Library	300 Waianuenue Avenue	Hilo	HI	96720
Kahului Public Library	90 School Street	Kahului	HI	96732
Lihue Public Library	4344 Hardy Street	Lihue	HI	96766
Princeville Public Library	4343 Emmalani Drive	Princeville	HI	96722
Wailuku Public Library	251 High Street	Wailuku	HI	96793
Waimea Public Library	PO Box 397	Waimea	HI	96796
University of Hawaii, Hamilton Library	2550 McCarthy Mall	Honolulu	HI	96822

On August 3, 2007, the Navy published a Notice of Public Hearings in the *Federal Register* that included the extension of the initial public comment period from 45 days to 52 days, until September 17, 2007. The *Federal Register* notice included supplemental information, including the size and location of the HRC, specifics on the activities proposed in the Draft EIS/OEIS, and, at the request of the National Marine Fisheries Service (NMFS), a brief discussion of the Navy's request for a Marine Mammal Protection Act Letter of Authorization (LOA) that would govern incidental takes of marine mammals during the training activities described in the Draft EIS/OEIS.

Detailed information concerning locations and times for each of the public hearings was published in local and regional newspapers (Table 13.1.2-2).

Table 13.1.2-2. Advertisements Published for the HRC Draft EIS/OEIS Public Hearings and Comment Period

Hawaii Newspapers	*The Garden Island*	*Hawaii-Tribune Herald*	*The Honolulu Advertiser*	*Honolulu-Star Bulletin*	*The Maui News*
Dates Published	7/27/07	7/27/07	7/27/07	7/27/07	7/27/07
	8/12/07	8/19/07	8/12/07	8/14/07	8/15/07
	8/16/07	8/22/07			8/19/07
	8/23/07				
	8/26/07				

The purpose of the public hearings was to solicit comments on the Draft EIS/OEIS. In addition, the public hearings identified significant environmental issues that the public and government agencies believed needed further analysis. This chapter includes transcripts from the hearings and copies of written public comments received during the comment period.

Table 13.1.2-3 lists the locations where public hearings were held. During these public hearings, attendees were invited to ask questions and make comments to the program representatives at each meeting. In addition, written comments were received from the public and regulatory agencies by letter, email, and through the HRC public website during the comment period. Comments received from the public and agencies pertaining to specific resource areas and locations were considered, and more-detailed analysis was provided in the EIS/OEIS. Those comments received from the public concerning Department of Defense (DoD) policy and program issues outside the scope of analysis in this EIS/OEIS were not addressed in the EIS/OEIS.

Table 13.1.2-3. Public Hearing Locations, HRC Draft EIS/OEIS

City (Island)	Date	Location
Lihue (Kauai)	21 August 2007	Kauai War Memorial Convention Hall
Honolulu (Oahu)	23 August 2007	McKinley High School
Wailuku (Maui)	27 August 2007	Baldwin High School
Hilo (Hawaii)	29 August 2007	Waiakea High School

At the public hearings, a Navy representative provided a clear and concise HRC overview, explaining the Proposed Action and Alternatives. This overview was followed by individual testimony. A summary of attendance at the four public hearings is as follows:

Kauai: 55 individuals signed in
18 individuals provided verbal comments
1 individual provided written comments

Oahu:	29 individuals signed in 4 individuals provided verbal comments 1 individual provided written comments
Maui:	76 individuals signed in 35 individuals provided verbal comments 5 individuals provided written comments
Island of Hawaii:	51 individuals signed in 26 individuals provided verbal comments 7 individuals provided written comments

The Navy solicited additional comments from agencies and the public during the comment period that followed the public hearings for the Draft EIS/OEIS. The comment period ended September 17, 2007. In addition to the public hearings, the public was able to provide comments through the Navy's National Environmental Policy Act (NEPA) Programs in Hawaii website, by sending an email, or by mailing a written comment.

The Draft EIS/OEIS analyzed potential impacts to marine mammals from Navy actions that involve the use of acoustic sources. Following publication of the Draft EIS/OEIS in July 2007, the Navy, in coordination with the NMFS, conducted a re-evaluation of the analysis in that document. This re-evaluation and subsequent identification of new information led the Navy to prepare a Supplement to the Draft EIS/OEIS, which was released to the public in February 2008.

The NOI for the Supplement to the Draft EIS/OEIS was published in the *Federal Register* on January 17, 2008. The Supplement to the Draft EIS/OEIS was filed with USEPA for release to the public on February 22, 2008, and a Notice of Public Meeting was published in the *Federal Register* on February 26, 2008. The Navy also placed notices in the aforementioned newspapers announcing the availability of the Supplement to the Draft EIS/OEIS. The Supplement to the Draft EIS/OEIS was circulated for public review, and the comment period ended April 7, 2008. See Chapter 14.0 for responses to comments received on the Supplement to the Draft HRC EIS/OEIS.

13.2 SUMMARY OF COMMENTS

The Navy received public comments from 677 separate sources—608 were citizens, 45 represented organizations, and 24 represented government agencies. The majority of commenters were from Hawaii (422 of 677); however, the Navy also received comments from individuals residing in 9 foreign countries, 41 states, the District of Columbia, and Puerto Rico. Table 13.2-1 shows the forums that the public used to submit their comments and the number of commenters for each forum.

Table 13.2-1. Number of Public Commenters—HRC Draft EIS/OEIS

Source	Number of Commenters
Written	72
Email	419
Transcript of Public Hearings	83
Website	103
Total	**677**

The Navy received a total of 2,575 comments on the Draft EIS/OEIS. Table 13.2-2 provides a breakdown of comments received during the public hearings/public comment period and indicates the percentage of total comments that each resource area or issue received (rounded to the nearest tenth percent). Comments are organized by resource area. The summary that follows gives an overview of comments received during the comment period. The first set of comments is organized alphabetically by resource area, concluding with Water Resources. The second set of comments covers non-resource specific issues or questions that were raised. Most resource areas are self-explanatory: “Biological Resources–Marine” includes all sonar comments; “Hazardous Materials and Waste” includes depleted uranium issues. “Program” refers to concerns with the Proposed Action in general. “Policy/NEPA Process” refers to concerns with policies that led to the Proposed Action.

Air Quality

Comments in this category requested that the Navy analyze more global impacts of its activities, such as impacts on the ozone layer, the use of carbon “offsets,” and effects on weather patterns and the atmosphere. The public also expressed concern over emissions from ships, training at Pohakuloa Training Area (PTA), and perceived increases in the number of aircraft at the Hilo International Airport.

Airspace

Comments focused on potential hazards to aircraft from missile intercepts, perceived increases in the number of aircraft at the Hilo International Airport, the proposed use of directed energy systems (lasers), and the potential for increased training to interfere with commercial and private air traffic.

Table 13.2-2. Number of Comments by Resource Issue
HRC Draft EIS/OEIS

Resource Area	Number of Comments	Percent of Total Comments
Air Quality	10	0.4%
Airspace	10	0.4%
Biological Resources—Marine	492	19.1%
Biological Resources—Terrestrial	69	2.7%
Cultural Resources	299	11.6%
Geology and Soils	2	0.1%
Hazardous Materials and Waste	372	14.4%
Health and Safety	26	1.0%
Land Use	20	0.8%
Noise	5	0.2%
Socioeconomics	29	1.1%
Transportation	3	0.1%
Utilities	8	0.3%
Water Resources	15	0.6%
Environmental Justice	24	0.9%
Alternatives	524	20.4%
Program	439	17.0%
Policy/NEPA Process	87	3.4%
Mitigation Measures	59	2.3%
Cumulative Impacts	36	1.4%
Miscellaneous	46	1.8%
Total	**2,575**	

Biological Resources—Marine

Many of the comments were focused on the perceived harmful effects of mid-frequency active (MFA) sonar and the impacts of proposed Navy activities on whales, sea turtles, fish, and marine life. Some of the comments were concerned with international stranding events. Specifically, the public requested:

- A separate threshold for calculating sonar impacts on beaked whales
- Additional marine mammal dose function modeling details
- Additional analysis to determine the impact on divers during sonar training activities
- Additional discussion and analysis of the melon-headed whales stranded in Hanalei Bay on Kauai during the 2004 Rim of the Pacific (RIMPAC) Exercise

- Additional discussion and analysis of the Bahamas marine mammal stranding incident
- Analysis of 12 marine mammal stranding incidents
- Additional analysis regarding impacts on fish during the use of sonar
- Additional analysis concerning bubble propagation or development in marine mammals exposed to active sonar
- Avoidance of endangered populations or areas of high numbers of marine mammals while training with sonar, i.e., Northwestern Hawaiian Islands Marine National Monument, State Refuge, and the Hawaiian Islands Humpback Whale National Marine Sanctuary
- Further analysis of Navy ship collisions with marine mammals

Biological Resources—Terrestrial

Commenters asked for additional details about the effectiveness of Navy policies and procedures that minimize invasive plant species, the potential for Expeditionary Assault activities to disturb beaches and dunes at PMRF, and impacts of debris from missile interceptions and chemical simulants on the Northwestern Hawaiian Islands.

Cultural Resources

Commenters were concerned that the military's presence and activities on the Hawaiian Islands causes harm and limits access to Native Hawaiian cultural and religious sites, particularly in the Northwestern Hawaiian Islands. Commenters requested the addition of updated archaeological data for the Papahānaumokuākea Marine National Monument. Other commenters expressed concern about impacts on recreational and subsistence fishing, an important activity for Hawaiians. Two commenters requested additional information on Section 106 analysis under the National Historic Preservation Act. The significance of marine mammals in Native Hawaiian culture and religion was noted.

Geology and Soils

Two commenters requested clarification for one of the references in the text. The reference was specific to lead concentrations near the Vandal launch site at PMRF.

Hazardous Materials/Hazardous Waste

Comments regarding hazardous materials and waste in general included requests for the Navy to identify and clean up former and currently contaminated sites. Other comments expressed concern about the potential effects of Navy technologies, such as the Directed Energy Laser Weapons Program, and the use of munitions that contain or result in exposure to depleted uranium and other heavy metals. Some commenters offered suggestions on how the Navy can manage waste on ships and maximize recycling and reuse.

Health and Safety

Several commenters asked the Navy to analyze the potential health and safety impacts of a specific activity or technology, such as missile launch failures, nuclear-powered ships, lasers, electromagnetism, chemical simulants, and gamma rays. Other commenters asked about the danger to scuba divers from the use of MFA sonar and the risk to people using the access road to Polihale State Park during directed energy tests.

Land Use

Commenters expressed concern about public access and other impacts on the beach areas at PMRF, in particular, Polihale State Park, the Upper Rifle Range, and Kokole Point. Other commenters identified specific policies and plans that the Navy must consider in its analysis, such as Coastal Zone Management laws. Two commenters suggested that additional information be included in Appendix I, Land Use.

Noise

Comments included concern for the noise generated from purported sonic booms and increases in the Navy presence at Hilo International Airport, PTA, Bradshaw Army Airfield, and the Kawaihae Pier.

Socioeconomics

Comments were largely focused on potential impacts on the tourist industry. Several commenters requested that the EIS/OEIS analyze in greater detail the social costs of Navy activities, including how increases in permanent and visiting Navy personnel would impact rent rates, prostitution, traffic, noise, utilities, schools, social services, water usage, and sewage.

Transportation

Commenters requested additional information about Navy ship strikes to small fishing and recreational vessels, the transportation of Stryker vehicles on the Superferry, and how various shipping companies operate under the Voluntary Intermodal Sealift Program and U.S. Transportation Command (USTRANSCOM).

Utilities

Comments included concerns about the impacts from the proposed Directed Energy Laser Weapons Program facility, recommendations for coordination with the Kauai County Water Use and Development Plan, and concerns over potential impacts on various underwater pipelines in the vicinity of Navy activities.

Water Resources

Commenters requested study of the project's impacts on groundwater resources, highlighting issues that the Navy is currently having with perchlorate detection in the groundwater. Commenters also requested more details on the effect of the hydrogen fluoride waste generated from the proposed Directed Energy Laser Weapons Program.

Environmental Justice

Environmental Justice comments were largely focused on the perception that activities in the EIS/OEIS would have an effect on Native Hawaiian sovereignty and self determination.

Alternatives

Many commenters requested that the Navy consider alternative sites within and outside the HRC to conduct its activities. Several commenters suggested alternatives to sonar technologies, such as computer simulation. The majority of the "Alternatives" comments supported the No-action Alternative, (i.e., no expansion); while others saw fallacy in the assumption that baseline activity is acceptable as the No-action Alternative and requested an analysis of a reduction of Navy activity. Other commenters requested that different training combinations and levels be included, such as an alternative that describes a much more precautionary approach in relation to MFA sonar.

Policy/National Environmental Policy Act Process

Comments on Navy Policy and the NEPA process were split between those that praised and criticized the format and content of the document. Some commenters were concerned that they could not find where their scoping comments had been incorporated into the Draft EIS/OEIS.

Another group of comments expressed concerns with future steps in this specific NEPA process. These comments included requests that the Navy provide a Supplement to the Draft EIS/OEIS with more information regarding the sonar impacts, including the model methodology, source data, means, and other aspects of the dose response function.

Program

Program comments included concern about the permanent stationing of the Army's 2/25th Stryker Brigade Combat Team on the islands, Navy involvement in the development of the Superferry, and the need for a greater military presence in Hawaii. Many of the commenters requested a reduction in the amount of all military training; others suggested that military funds be redirected to other types of activities, such as education, alternative energy, and environmental restoration. Several comments were of a general nature and suggested that the Navy rethink its programs and purpose. Some commenters communicated support of the Navy's proposal to increase activities and upgrade facilities.

Mitigation Measures

Most comments regarding mitigation measures focused on marine mammals. For example, it was requested that the Navy employ better protective measures than those used in RIMPAC Exercises, such as conducting more monitoring and enforcing larger safety zones around ships. A few commenters requested the study and use of foreign government's sonar mitigation for marine mammals.

Cumulative Impacts

Commenters on cumulative impacts expressed concern about the overall impact of past and present military activity in Hawaii and requested that the Navy initiate cleanup activities. Additional commenters requested that the Navy study the impacts of other actions, such as initiation of Stryker Brigade activities, stationing of C-17s in Hawaii, and the Superferry. There were multiple requests for cumulative impacts analysis to account for sound sources other than Navy sonar activities, including multiple exposures to sonar, fishing activities, shipping activities, and coastal development.

Miscellaneous

There were a few general comments regarding the structure and format of the EIS/OEIS document. Comments addressed the spelling of Hawaiian words using diacritical marks, access to specific references, and the organization of the document by location.

13.3 SUMMARY OF RESPONSES

Many of the comments received on the Draft EIS/OEIS were declarative statements not requiring a direct response, but which are noted in the context of overall public review. Examples of comments on non-EIS-related topics include operation of the Superferry, the deployment and activities of the Stryker program, the Iraq war, and other general operations of the military. Some comments were related to program issues such as system cost, potential threat, and system effectiveness. These general program-related comments are considered to be outside the scope of this EIS/OEIS and therefore require no revision to the EIS/OEIS.

Some comments questioned the methodologies, analyses, and conclusions for various environmental resource impacts and mitigations presented in the EIS/OEIS. For each of these comments, a specific response was prepared. In addition, the acquisition of new data and the preparation of additional analyses were included in the HRC EIS/OEIS as required. New information and analysis supporting or changing the conclusions of the Draft EIS/OEIS have been incorporated into the text of the Final EIS/OEIS.

The Navy received many substantive comments during a rigorous EIS/OEIS process and carefully considered all public input in the decision-making process prior to issuing this final document. Specifically, the Navy addressed the public comments discussed above in the following manner:

Air Quality

Language has been added to the EIS/OEIS regarding ozone and global warming. Launch exhaust is limited spatially, is temporary, and does not have a globally significant impact on ozone depletion.

Projected increases in carbon dioxide emissions have been quantified at PMRF. Most propellant systems produce carbon dioxide, which is a greenhouse gas. Table 4.3.2.1.1.1-2 shows that the estimated quantity of carbon dioxide emissions from typical missile launches ranges from 0 to 0.5 ton per launch, depending on the missile. Although it is not easy to know with precision how long it takes greenhouse gas to leave the atmosphere, missile exhaust emissions per launch are relatively small and short-term. The No-action Alternative does not include specific Navy flight training activities. Aircraft and vehicle emissions are quantified for Alternatives 1, 2, and 3, and the impacts are minor. Carbon dioxide from launches, aircraft, and vehicles would have an insignificant effect on global warming. Hydrocarbon fuel usage for vessels is not quantified in the EIS/OEIS but is addressed as irreversible or irretrievable effects due to the use of nonrenewable energy sources.

A plan is being developed by the Army to fully address the issue of depleted uranium at PTA.

Airspace

As part of the planning process for each missile flight test, intercept debris patterns will be generated and reviewed to minimize potential impacts and to define the area for the Notice to Airmen (NOTAM). There are no proposed activities in the EIS/OEIS that include Navy training at Hilo Airport. As the laser program matures, and specific information is available, the Navy will coordinate with the Federal Aviation Administration (FAA) Western Service Area specialists to determine potential impacts on airspace. The increased training would be accommodated within the existing airspace, therefore it will not interfere with commercial and private air traffic.

Biological Resources—Marine

<u>A separate threshold for calculating sonar impacts on beaked whales</u>—Adequate data currently do not exist to support development of a separate threshold for beaked whales. However, there is widespread consensus that cetacean response to MFA sound signals needs to be better defined using controlled experiments. The Navy is contributing to an ongoing behavioral response study in the Bahamas that is anticipated to provide some initial information on beaked whales, the species identified as the most sensitive to MFA sonar. Until additional data is available, NMFS and the Navy have determined that the datasets described in Section 4.1.2.4.9 are the most applicable for the direct use in the development of risk function parameters to describe what portion of a population exposed to specific levels of MFA sonar will respond in a manner that NMFS would classify as harassment.

The Navy also analyzed the known range of operational, biological, and environmental factors involved in the Bahamas stranding and focused on the interplay of these factors to reduce risks to beaked whales from Anti-Submarine Warfare (ASW) training. The confluence of these factors does not occur in the Hawaiian Islands (see Section 4.1.2.4.9.8).

<u>Additional marine mammal dose function modeling details</u>—As presented in the Supplement to the Draft EIS/OEIS, the risk function has replaced the dose function. The development of the risk function is detailed in Section 4.1.2 and reflects the recommendations of NMFS and the scientific review panel charged with revision of the analytical methodology.

<u>Additional analysis to determine the impact on divers during sonar training activities</u>—Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level would be approximately 190 decibels (dB). At 2,000 yards or approximately 1 nautical mile (nm), this same unprotected diver could operate for over 3 hours. This text has been added to the EIS/OEIS.

<u>Additional discussion and analysis of the Hanalei Bay incident</u>—The Hanalei Bay "stranding" is discussed in Section 4.1.2.4.10.2. Investigations of Hanalei Bay concluded that it was not known what caused the pod to enter the bay. NMFS's report indicated that sonar may have contributed to a "confluence of events," including human presence (notably the uncontrolled and random human interactions fragmenting the pods of whales on 3 July) and/or other unknown biological or physical factors. The full moon could have been a contributing factor in terms of bringing the animals closer to the shore. Many assumptions and qualifications went into the

findings documented in the Hanalei Bay report. Dr. Southall has indicated since the report was written that he is aware of a separate event involving melon-headed whales and rough-toothed dolphins that took place over the same period of time off Rota in the Northern Marianas Islands, which is several thousand miles from Hawaii. No known active sonar transmissions occurred in the vicinity of that event. NMFS's original report on the Hanalei Bay event was issued before it knew of the events near Rota.

The reason the Rota Stranding was noted is that NMFS considered the Hanalei "mass stranding" anomalous when considering causal factors leading to the event. Given the Rota stranding was simultaneous, this and other information was not considered in the NMFS report on the Hanalei event, and the previous findings presented in the NMFS report should be re-examined. The Rota event was termed a stranding under the same criteria that the Hanalei event was termed a "mass stranding" by NMFS.

Additional discussion and analysis of the Bahamas marine mammal stranding incident—More details have been added to the EIS/OEIS and this new conclusion added: The post-mortem analyses of stranded beaked whales lead to the conclusion that the immediate cause of death resulted from overheating, cardiovascular collapse and stresses associated with being stranded on land. However, the presence of subarachnoid and intracochlear hemorrhages were believed to have occurred prior to stranding and were hypothesized as being related to an acoustic event. Passive acoustic monitoring records demonstrated that no large-scale acoustic activity besides the Navy sonar exercise occurred in the times surrounding the stranding event. The mechanism by which sonar could have caused the observed traumas or caused the animals to strand was undetermined. The spotted dolphin was in overall poor condition for examination, but showed indications of long-term disease. No analysis of baleen whales (minke whale) was conducted. Baleen whale stranding events have not been associated with either low-frequency or MFA sonar use (International Council for the Exploration of the Sea, 2005a, 2005b).

Analysis of 12 marine mammal stranding incidents—More details were added; however, they did not change the overall conclusions in the EIS/OEIS. Section 4.1.2.4.10.2 includes specific stranding events that have been linked to potential sonar operations. Of note, these events represent a small overall number of animals over an 11-year period (approximately 40 animals) worldwide.

Additional analysis regarding impacts on fish during the use of sonar—The EIS/OEIS includes new findings by Popper et al.(2007) who exposed rainbow trout, a fish sensitive to low frequencies, to high-intensity low-frequency sonar (215 dB re 1 μPa^2 170-320 Hz) with receive levels for two experimental groups estimated at 193 dB for 324 or 648 seconds. While low-frequency sonar is not included in the Proposed Action, these results of low-frequency sonar effects on low-frequency sensitive rainbow trout are encouraging in that similar results may be found with mid-frequency sonar use when applied to mid-frequency sensitive fish. Fish exhibited a slight behavioral reaction, and one group exhibited a 20-dB auditory threshold shift at one frequency. No direct mortality, morphological changes, or physical trauma was noted as a result of these exposures.

Additional analysis concerning bubble propagation or development in marine mammals exposed to active sonar—Section 4.1.2.4.7 of the Draft EIS/OEIS presents a thorough discussion of acoustically mediated bubble growth and decompression sickness. In brief, although theoretical predictions suggest the possibility for acoustically mediated bubble growth, there is considerable disagreement among scientists as to its likelihood. Evidence supporting the possible phenomenon is, therefore, debatable.

Avoidance of endangered populations or areas of high numbers of marine mammals while training with sonar (i.e., within the Northwestern Hawaiian Islands Marine National Monument, State Refuge, and the Hawaiian Islands Humpback Whale National Marine Sanctuary)—Training in or near these areas is necessary because the geography of these areas provides realistic and effective ASW training and assessment during Undersea Warfare Training Exercises (USWEXs). It is critical for the Navy to be able to conduct USWEXs in a variety of environmental and bathymetric conditions, including in the vicinity of seamounts.

Further analysis of Navy ship collisions with marine mammals—Section 4.1.2.4.10.1 of the EIS/OEIS provides details on the various causes of marine mammal strandings, including ship strikes. The discussion states, that while there are reports and statistics of whales struck by ships in U.S. waters, the magnitude of the risks commercial ship traffic poses to marine mammal populations is difficult to quantify or estimate. In addition, there is limited information on ship strike interactions between ships and marine mammals outside of U.S. waters. Naval activities represent a very small percentage of the overall U.S. ship traffic. While Navy ship movements may contribute to the ship strike threat, given the lookout and mitigation measures adopted by the Navy, the probability of ship strikes is greatly reduced.

Biological Resources—Terrestrial

Wash downs, agricultural inspections, brown tree snake inspections, and ballast water procedures will continue to minimize the effects of Navy actions on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species. These measures are now discussed in Appendix C and Chapter 6.0 of the EIS/OEIS. No impact on wildlife from electromagnetic radiation generation is anticipated. Text has been added to Section 4.2.1.1.1.1 concerning the size and area of anticipated missile intercept debris fields. Additional information about chemical simulants has been added to Section 2.2.3.5. Amphibious landings, which occur at Majors Bay, are not located within nesting areas. As stated in Section 4.3.1.1.1.1, "Within 1 hour prior to initiation of Expeditionary Assault landing event, landing routes and beach areas are surveyed for the presence of sensitive wildlife."

Cultural Resources

Using the information provided in the Papahānaumokuākea Marine National Monument World Heritage Application (March 2007), Section 3.2.2.2 has been updated to reflect the most current archaeological information for Nihoa and Necker (Mokumanamana), the southeastern most portion of the Monument where missile intercepts and associated falling debris could occur.

Section 106 consultation was initiated during the scoping process for this EIS/OEIS in the fall of 2006. Representatives from the Navy held public and Agency meetings at several locations throughout the islands between September 13 and September 18, 2006, and additional Agency coordination has been conducted since that time. This includes providing the Hawaii State Historic Preservation Officer (SHPO) with a copy of the Draft EIS/OEIS. A follow-up letter was also sent to the SHPO's office, and a concurrence letter was received by the Navy on September 17, 2007 indicating that "no historic properties will be affected." In addition, there is an existing Programmatic Agreement (PA) in place for Navy activities in Hawaii. Signed in June 2003, the PA was negotiated between the Commander, Navy Region Hawaii, the Advisory

Council on Historic Preservation, and the Hawaii SHPO. There were also several consulting parties to this PA including the National Park Service, the National Trust for Historic Preservation, and the Office of Hawaiian Affairs (see Appendix H.2).

Existing policies regarding native Hawaiian access to recreational, religious, traditional, and cultural sites or Native Hawaiian religious and subsistence practices (e.g., fishing) are noted throughout the Draft EIS/OEIS and remain unchanged with the proposed activities. Access to these types of areas is accommodated within the constraints of the mission and in consideration of any safety issues.

Laws that protect cultural resources are not directly applicable to animals, including marine mammals; however, they are protected by the Endangered Species Act and the Marine Mammal Protection Act. Any potential effects on marine mammals and associated mitigation measures are discussed within the biological sections of the EIS/OEIS.

Geology and Soils

An additional Navy reference regarding lead concentrations near the Vandal launch site at PMRF has been added to the EIS/OEIS.

Hazardous Materials/Hazardous Waste

The Navy recognizes that past practices may have resulted in contamination of certain sites. Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available.

Projected research, development, test, and evaluation (RDT&E) laser programs do not include the use of hydrogen fluoride, and therefore the use of hydrogen fluoride is not part of the Proposed Action. In the event laser programs do come to PMRF, separate environmental documentation would be required to analyze potential impacts from training. The Proposed Action includes the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. Section 4.1.7.1.1 of the EIS/OEIS provides more details on the analysis of potential impacts from these DU projectiles. This is the only use of DU in the HRC EIS/OEIS Proposed Action. In addition, any training activities proposed at PTA will follow guidance provided to users of the facility.

The Navy's at-sea waste disposal practices are consistent with Federal laws and regulations, and comparable to those of commercial and recreational vessels.

Health and Safety

The Navy does not see a catastrophic launch failure as a reasonably foreseeable impact, and thus an analysis of the impact would be based on pure conjecture. The impact of the Navy's nuclear power programs is beyond the scope of this EIS/OEIS, which addresses increased levels of personnel training using the current inventory of nuclear-powered ships and land facilities.

Human exposure to underwater noise is addressed in Section 4.1.5.1.1. The Navy issues Notices to Mariners (NOTMARs) to alert commercial and recreational users, such as dive services, about upcoming at-sea training activities so that they may divert to open areas.

Section 4.3.2.1.7.2 includes health and safety analysis of the chemical simulants proposed. None of the proposed simulants are considered hazardous substances or constituents; however, caution would be used when they are handled. For the proposed high-energy laser, PMRF would develop the necessary Standard Operating Procedures and range safety requirements necessary to provide safe operations, including the safety of people using the access road to Polihale State Park during directed energy tests. Separate environmental documentation would be required to analyze potential impacts from training activities. Section 4.3.2.1.7.3 describes health and safety concerns regarding the use of high-energy lasers at PMRF.

Land Use

Impacts on the beach areas at PMRF, in particular, Polihale State Park, the Upper Rifle Range, and Kokole Point include the 30 times per year that the Navy can apply a restrictive easement due to missile launches from PMRF. The anticipated times that the easement is expected to be used for the Proposed Action could be between 7 and 28 annually (if PMRF provides support for the exercise).

The Navy is complying with the requirements of the Coastal Zone Management Act (CZMA). Early consultation was initiated with the State and a Coastal Consistency Determination (CCD) was submitted to the Hawaii Coastal Zone Management Program (CZMP) for review on February 22, 2008. Navy determined the activities proposed in the HRC EIS/OEIS consistent to the maximum extent practicable with the enforceable policies of Hawaii's Coastal Zone Management Program.

Appendix I describes the circumstances by which the lands now known as PMRF came into Federal ownership, and is not intended to represent the full or complete recitation of law(s) relating to the lands now known as PMRF.

Noise

The Proposed Action does not include Navy activities at the Hilo International Airport.

Supersonic flight and sonic booms are discussed in Section 4.1.6.1 for the Open Ocean activities and in detail in Appendix G. The HRC is approved for supersonic flight; however, no data are available that describe the exact location of supersonic operations. Supersonic activity in the HRC is generally restricted to altitudes greater than 30,000 feet above sea level or in areas at least 30 nm from shore. These restrictions prevent most sonic booms from reaching the ground. Sonic booms are also discussed in Section 3.3.2.1.9 for missile launches at PMRF/Main Base. Populated areas are not likely to be affected by sonic booms generated during launch activities because missile trajectories will not include over flight of populated areas.

While training events would increase in number at PTA, the type of training would be the same and would not increase the current modeled noise levels. The proposed training would be individual events and would not occur simultaneously. The additional training events at Bradshaw Army Airfield would produce noise levels similar to the current levels. Current training at Kawaihae Pier includes Expeditionary Assault and Special Warfare Operations. The training proposed for Alternatives 1, 2, and 3 at Kawaihae Pier would be the same and would produce noise levels similar to those currently produced during Navy training events. The proposed training would be considered individual events and would not occur simultaneously.

Socioeconomics

The social cost of the Proposed Action is directly related to the addition of permanent military personnel. The only anticipated permanent increase of personnel is for the operation of the proposed Range Operations Control building at PMRF—an increase by 34 percent (from 120 to 161) or 41 additional personnel. Added personnel are not anticipated to affect society at large.

The social costs of and impacts on the various resources have been considered in the. Socioeconomic Sections for various applicable locations within Hawaii.

Transportation

Ship strikes to small fishing and recreational vessels are not within the scope of the EIS/OEIS. Commercial vessels (i.e., Superferry, Matson vessels, Horizon Lines, and other carriers operating in Hawaii), the Voluntary Intermodal Sealift Program (VISA), and the USTRANSCOM are not within the scope of this document.

Utilities

The proposed Directed Energy Laser Weapons Program facility requires the development of Standard Operating Procedures and range safety requirements necessary to provide safe operations with future high-energy laser tests. In the event laser programs come to PMRF, separate environmental documentation would be required to analyze any potential impacts.

Training operations that could occur at the Ewa Training Minefield are the same as have occurred there in the past. Therefore, the Navy would continue to take the same safety precautions that have protected the underwater outfall pipes in the past. To ensure that all local or municipal rules and regulations are followed, the Navy maintains a cooperative working relationship with the Kauai County Water Department.

Water Resources

There are currently no plans for chemical lasers. Because plans for the directed energy program have not been finalized, they cannot be fully analyzed in this EIS/OEIS. Regarding perchlorate, USEPA has recommended 24 parts per billion (ppb) as the level of concern for perchlorate in groundwater. However, as stated in Section 3.3.2.1.13 of the EIS/OEIS, the Navy has adopted 4 ppb. Results from groundwater tests at PMRF have shown the perchlorate level to be below 4 ppb.

Environmental Justice

Comments regarding the occupation of Hawaii by the military and the rights of Native Hawaiians to lands are noted but are outside the scope of this EIS/OEIS.

Alternatives

As discussed in Chapter 1.0 of the EIS/OEIS, the Navy considers, but rejects, a reduction in training and does not consider alternate locations because this analysis would not be consistent with the purpose and need of this EIS/OEIS. Although the Navy does do some simulated training, such simulation does not fully develop the skills and capabilities necessary to attain appropriate military readiness.

Alternative 3 was added to the Final EIS/OEIS. Alternative 3 consists of the MFA and high-frequency active (HFA) sonar usage analyzed under the No-action Alternative plus all non-ASW training and RDT&E activities from Alternative 2 (as described in Sections 2.2.4.1 and 2.2.4.3 through 2.2.4.8). In relation to MFA sonar, the Navy has changed the MFA sonar hours used each year for the No-action Alternative in the EIS/OEIS.

Policy/National Environmental Policy Act Process

Regarding requests for a Supplemental EIS/OEIS—The Navy released a Supplement to the Draft EIS/OEIS for public comment in February 2008 in light of the new sonar data and noise modeling methodology.

Program

The permanent stationing of the Army's 2/25th Stryker Brigade Combat Team on the islands, and the Superferry are both discussed in Chapter 5.0, Cumulative Impacts. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary.

Mitigation Measures

Mitigation measures identified to reduce effects or ensure that there would be no future impacts have not substantially changed from the Draft EIS/OEIS.

The EIS/OEIS does not assert that visual monitoring alone is sufficient to ensure 100 percent detection. Chapter 6.0, Mitigation Measures, presents the Navy's protective measures that have been Standard Operating Procedures for unit-level ASW training since 2004. The Navy continues to analyze the effectiveness of the current mitigation measures. In addition, the Navy's current mitigation measures reflect the use of the best available science balanced with the NMFS regulatory requirements and the requirements of the Navy to train.

Imposing training restrictions from other countries on the Navy without considering the differences between each navies' capabilities, systems, mission requirements, and threats; and without considering whether the foreign country's training restrictions are more effective in protecting marine mammals from harm than the extensive precautions currently taken by the Navy, would arbitrarily undermine the Navy's ability to maintain military readiness.

To give an example of how foreign mitigation would undermine military readiness in Hawaii: The Royal Australian Navy restricts sonar use above 210 dB within 30 nautical miles of the coastline when practicable. Such a reduction would be problematic for the U.S. Navy because much of the established fixed Shallow Water Training Range/PMRF range would fall within 30 nm of the coastline, and restricting sonar use to below 210 dB in that area would make training unrealistic, greatly diminishing the value of training.

Cumulative Impacts

The Navy recognizes that past practices may have resulted in contamination of certain sites. Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available.

Given the location of the Superferry water lanes, it is not anticipated that the increased vessel traffic from this commuting ferry will contribute to the cumulative effects when assessed in combination with the actions proposed in this EIS/OEIS. Detailed analysis for the permanent stationing of the 2/25th Stryker Brigade Combat Team is beyond the scope of this EIS/OEIS but can be found in the Army's Final EIS (U.S. Department of the Army, 2008). Cumulative impacts from Army activities are considered in Chapter 5.0.

Section 5.4.2.3 has been added to discuss anthropogenic sources of ambient noise that are most likely to have contributed to increases in ambient noise. These include vessel noise from commercial shipping and general vessel traffic, oceanographic research, and naval and other use of sonar.

Miscellaneous

Many of the miscellaneous comments received on the Draft EIS/OEIS were declarative statements not requiring a direct response.

13.4 SUMMARY TABLES

Sections 13.4.1 through 13.4.4 of the EIS/OEIS provide reproductions of all the original letters, emails, and transcripts that were received during the public comment period for the HRC Draft EIS/OEIS. Responses to issues included in those documents are also provided. As shown below, the organization of Sections 13.4.1 through 13.4.4 provides a separate comment/response section for each of the forums (email, written, etc.) that the public used to submit their comments:

- 13.4.1 Written Public Comments
  - Table 13.4.1-1 Written Commenters on the Draft HRC EIS/OEIS
  - Exhibit 13.4.1-1 Copy of Written Documents
  - Table 13.4.1-2 Responses to Written Comments

- 13.4.2 Email Public Comments
  - Table 13.4.2-1 Email Commenters on the Draft HRC EIS/OEIS
  - Exhibit 13.4.2-1 Copy of Email Documents
  - Table 13.4.2-2 Responses to Email Comments

- 13.4.3 Public Hearing Comments
  - Table 13.4.3-1 Public Hearing Commenters on the Draft HRC EIS/OEIS
  - Exhibit 13.4.3-1 Copy of Public Hearing Documents
  - Table 13.4.3-2 Responses to Public Hearing Comments

- 13.4.4 Webmail Comments
  - Table 13.4.4-1 Webmail Commenters on the Draft HRC EIS/OEIS
  - Exhibit 13.4.4-1 Copy of Webmail Documents
  - Table 13.4.4-2 Responses to Webmail Comments

The first table in each section provides an index of the names of the individuals who submitted comments on the Draft EIS/OEIS. Each individual was assigned an identification number. The code in the middle of the identification number indicates the source of the comment as follows:

- W = Written comments
- E = Email comments
- T = Transcript comments from public hearing
- N = Comments received via the public HRC website

Comments that were received during the public review period for the Draft EIS/OEIS were treated equally regardless of the form or commenter. A commenter can be listed multiple times. Each comment was carefully documented, thoroughly read and evaluated, and categorized according to the environmental resource area (see Table 13.2-2). Each of the identified issues was numbered as shown in the exhibit in each section. For example, if the 10th speaker presented in a transcript from a public hearing (P-T-0010) provided comments on seven separate topics, those comments were numbered P-T-0010-1 through P-T-0010-7. Finally, the Navy responded to each comment, as provided in the second table in each section.

To follow comments and responses for a specific individual, find their commenter number (e.g., D-W-0042, D-E-0003, D-T-0021, D-N-0030) in the appropriate Commenters table, locate their document within the Copy of Documents exhibit, and use the issue numbers to identify corresponding responses in the Response Table.

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13.4.1 WRITTEN PUBLIC COMMENTS

There were 72 members of the public who provided written comments on the Draft EIS/OEIS. Twenty-four of the 72 were from governmental organizations.

Table 13.4.1-1 lists individuals who commented in writing, with their respective commenter identification number. This number can be used to find the written document that was submitted and to locate the corresponding table in which responses to each comment are provided.

Exhibit 13.4.1-1 presents reproductions of the written comment documents that were received in response to the Draft EIS/OEIS. Comment documents are identified by commenter ID number, and each statement or question that was categorized as addressing a separate environmental issue is designated with a sequential comment number (D-W-0082-1, D-W-0082-2, etc.).

Table 13.4.1-2 presents the responses to written comments on the Draft EIS/OEIS. Responses to specific comments can be found by locating the corresponding commenter ID number and sequential comment number identifiers.

Table 13.4.1-1. Commenters on the HRC Draft EIS/OEIS (Written)

Commenter	Comment ID	Commenter	Comment ID
Eleanor Ballard	D-W-0082	Duane Erway	D-W-0128
Bonnie P. Bator	D-W-0089	Clyde Fuse, on behalf of the Federal Aviation Administration	D-W-0075
Nova Blazej, Manager, Environmental Review Office, on behalf of the U.S. Environmental Protection Agency	D-W-0090	Marsha Green, North American Representative, on behalf of the International Ocean Noise Coalition	D-W-0111
John Broussard	D-W-0079	Cory Harden	D-W-0110
Evelyn de Buhr	D-W-0102	Cory Harden, on behalf of the Sierra Club, Moku Loa Group	D-W-0097
Inanna Carter	D-W-0103	Cory Harden	D-W-0125
Lester Chang, Director, on behalf of the City and County of Honolulu, Department of Parks and Recreation	D-W-0127	Jennifer Ho	D-W-0106
John and Nancy Conley	D-W-0080	Gary Hooser, Majority Leader, on behalf of the Hawaii State Senate	D-W-0098
Peter Courture	D-W-0088	Jeffrey S. Hunt, Planning Director, on behalf of the County of Maui Department of Planning	D-W-0132

Table 13.4.1-1. Commenters on the HRC Draft EIS/OEIS (Written) (Continued)

Commenter	Comment ID	Commenter	Comment ID
Bob Jacobson, Councilmember, on behalf of the Hawaii County Council, District 6	D-W-0078	Alton Miyasaka, Aquatic Biologist, on behalf of the State of Hawaii, Department of Land and Natural Resources, Division of Aquatic Resources	D-W-0074
Wayne Johnson	D-W-0066	Nina Monasevitch	D-W-0109
Robbie Kaholokula, Tourism Specialist, on behalf of the County of Kauai, Office of Economic Development	D-W-0095	Nina Monasevitch	D-W-0136
Micah A. Kane, Chairman, on behalf of the Hawaiian Homes Commission	D-W-0077	David Monasevitch	D-W-0134
Ken C. Kawahara	D-W-0069	Hans Mortensen	D-W-0121
Manuel Kuloloio	D-W-0115	Thomas Nakagawa	D-W-0118
Robert G.F. Lee, Adjutant General, on behalf of the Hawaii National Guard	D-W-0131	Lynn Nakkim	D-W-0124
Cathy Liss, President, on behalf of the Animal Welfare Institute	D-W-0112	Clyde Namuo, Administrator, on behalf of the Office of Hawaiian Affairs	D-W-0091
Judie Lundborg	D-W-0017	Star Newland	D-W-0123
C.A. Macgeorge	D-W-0087	Akahi Nui	D-W-0129
Cheryl Magill	D-W-0138	John Y. Ota	D-W-0083
Kristin McCleery	D-W-0086	Vincent K. Pollard	D-W-0084
Bob McDermott	D-W-0116	Patricia S. Port, Regional Environmental Officer, U.S. Department of the Interior, Office of Environmental Policy and Compliance	D-W-0076
Nancy Merrill	D-W-0135	Daniel S. Quinn, State Parks Administrator, on behalf of the State of Hawaii, Department of Land and Natural Resources, Division of State Parks	D-W-0073
Jay Miller	D-W-0107	Timothy Ragen, Executive Director, on behalf of the Marine Mammal Commission	D-W-0130
Sandra Miner	D-W-0085	Peter Rappa	D-W-0092

Table 13.4.1-1. Commenters on the HRC Draft EIS/OEIS (Written) (Continued)

Commenter	Comment ID	Commenter	Comment ID
Cynthia Rapu	D-W-0081	Russell Y. Tsuji, Administrator, Land Division, on behalf of the State of Hawaii, Department of Land and Natural Resources, Commission on Water Resource Management	D-W-0067
Roland Sagum	D-W-0099	Russell Y. Tsuji, Administrator, Land Division, on behalf of the State of Hawaii, Department of Land and Natural Resources	D-W-0068
Helen Schonwatter	D-W-0126	Russell Y. Tsuji, Administrator, Land Division, on behalf of the State of Hawaii, Department of Land and Natural Resources, Division of Forestry and Wildlife	D-W-0070
Howard Sharpe	D-W-0117	Russell Y. Tsuji, Administrator, Land Division, on behalf of the State of Hawaii, Department of Land and Natural Resources, Engineering Division	D-W-0071
Edmond Silva	D-W-0108	Russell Y. Tsuji, Administrator, Land Division, on behalf of the State of Hawaii, Department of Land and Natural Resources, Division of Boating and Ocean Recreation	D-W-0072
Lanny Sinkin	D-W-0120	Steve Tyler	D-W-0104
Shelley Stephens	D-W-0122	Maria Walker	D-W-0101
Eric S. Takamura, Director, on behalf of the City and County of Honolulu, Department of Environmental Services	D-W-0096	Valerie Weiss	D-W-0100
Laura Thielen, State Historic Preservation Officer, on behalf of the State of Hawaii, Department of Land and Natural Resources	D-W-0133	Juan Wilson	D-W-0113
Beth Tokioka	D-W-0094	Mike Winneguth	D-W-0137
James Tollefson, President and CEO, on behalf of The Chamber of Commerce Hawaii.	D-W-0093	Anita Wintner	D-W-0119

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COMMENT NUMBER
D-W-0017

NAVY EXPANSION

8/21/07

Written Testimony:

In reviewing the maps contained in the Navy's EIS, it is clear that the Hawaiian Islands are being turned into a war zone.

1 I am totally opposed to any further expansion. Already, with 4+ military facilities on our islands, the residents are at risk of being a target. Further expansion will only exacerbate the risk. The US is viewed with fear and as terrorists by much of the world.

2 Finally, having the Navy prepare an EIS for what the Navy wants to do is like having the fox guarding the hen house! How could it possibly be objective.

Sincerely,

J Hilke Lundborg

Judie Hilke Lundborg

Lihue, Hawaii

COMMENT NUMBER
D-W-0066

8/10/2007

Dear Mr Foster.

1 I hope you will make a decision to end Sonar Training where it presents Any Risk to Any Marine Mammals even 1%.

Wayne Johnson Ph.D

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION

2007 AUG 13 A 10:22

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

2007 AUG -3 A 10:07

July 31, 2007

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x ~~Office of~~ Conservation & Coastal Lands
x Land Division – Oahu, Maui, Hawaii & Kauai District

FROM: Russell Y. Tsuji
SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex
LOCATION: Statewide
APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

(X) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed:
Date: 8/10/07

COMMENT NUMBER
D-W-0067
1

LINDA LINGLE
GOVERNOR OF HAWAII

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 31, 2007

MEMORANDUM

From: ~~TO:~~ **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
TO: x Land Division – Oahu, Maui, Hawaii & Kauai District

FROM: Russell Y. Tsuji
SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex
LOCATION: Statewide
APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(X) We have no comments.
( ) Comments are attached.

Signed:
Date: 8/3/07

COMMENT NUMBER
D-W-0068
1

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0069 (cont.)

LINDA LINGLE
GOVERNOR OF HAWAII

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
07 AUG 2 P3:54
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 31, 2007

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
x Engineering Division
x ~~Div. of Forestry & Wildlife~~
x ~~Div. of State Parks~~
x Commission on Water Resource Management
x ~~Office of Conservation & Coastal Lands~~
x Land Division – Oahu, Maui, Hawaii & Kauai District

FROM: Russell Y. Tsuji
SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex
LOCATION: Statewide
APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed: ____________
Date: ____________

COMMENT NUMBER
D-W-0069 (cont.)

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION
2007 AUG 10 P 2:42

LAURA H. THIELEN
INTERIM CHAIRPERSON
MEREDITH J. CHING
JAMES A. FRAZIER
NEAL S. FUJIWARA
CHIYOME L. FUKINO, M.D.
DONNA FAY K. KIYOSAKI, P.E.
LAWRENCE H. MIIKE, M.D., J.D.
KEN C. KAWAHARA, P.E.
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

August 9, 2007

REF: Navy DEIS.dr

TO: Russell Tsuji, Administrator
Land Division

FROM: Ken C. Kawahara, P.E., Deputy Director
Commission on Water Resource Management

SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex

FILE NO.:

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore, all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at *http://www.hawaii.gov/dlnr/cwrm*.

Our comments related to water resources are checked off below.

☒ 1. We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information. 1

☐ 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

☒ 3. There may be the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality. 2

Permits required by CWRM: Additional information and forms are available at *www.hawaii.gov/dlnr/cwrm/forms.htm.*

☐ 4. The proposed water supply source for the project is located in a designated ground-water management area, and a Water Use Permit is required prior to use of ground water.

☐ 5. A Well Construction Permit(s) is (are) required before the commencement of any well construction work.

☐ 6. A Pump Installation Permit(s) is (are) required before ground water is developed as a source of supply for the project.

DRF-IA 03/02/2006

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

Russell Tsuji, Administrator
Page 2
August 9, 2007

☐ 7. There is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be affected by any new construction, they must be properly abandoned and sealed. A permit for well abandonment must be obtained.

☐ 8. Ground-water withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

☐ 9. A Stream Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed and/or banks of a stream channel.

☐ 10. A Stream Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or altered.

☐ 11. A Petition to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) of surface water.

☐ 12. The planned source of water for this project has not been identified in this report. Therefore, we cannot determine what permits or petitions are required from our office, or whether there are potential impacts to water resources.

☐ 13. We recommend that the report identify feasible alternative non-potable water resources, including reclaimed wastewater.

☒ OTHER:

If the selected alternative(s) results in an increase in water demand or impacts to available water supplies or water resources, we recommend that the project be incorporated in the respective County Water Use and Development Plan

If there are any questions, please contact Lenore Nakama at 587-0218.

DRF-IA 04/15/2005

COMMENT NUMBER

D-W-0069 (cont.)

3

NA – coordinate DOFAW

LINDA LINGLE
GOVERNOR OF HAWAII

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

July 31, 2007

MEMORANDUM

RECEIVED
LAND DIVISION
2007 AUG 29 P 3:22

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x Div. of Boating & Ocean Recreation
~~x Engineering Division~~
x Div. of Forestry & Wildlife
~~x Div. of State Parks~~
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division – Oahu, Maui, Hawaii & Kauai District

FROM: Russell Y. Tsuji
SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex
LOCATION: Statewide
APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(X) Comments are attached.

Signed:
Date: AUG 2 8 2007

COMMENT NUMBER

D-W-0070

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0070 (cont.)

LINDA LINGLE
GOVERNOR OF HAWAII

Laura H. Thielen, Acting

Ken C. Kawahara

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

August 28, 2007

PMRF Public Affairs Officer
U.S. Department of Defense
Department of Navy
P.O. Box 128
Kekaha, Hawaii 96752

Dear PMRF Public Affairs Officer:

Subject: Draft EIS/ Overseas EIS for Hawaii Range Complex, Hawaii.

We appreciate the opportunity to comment on your subject request. DLNR, Division of Forestry and Wildlife will comment on the environmental impacts of current and emerging training and research operations in the Hawaii Range Complex; moreover, as they relate to the impacts to onshore biological resources at these training areas.

The Division of Forestry and Wildlife appreciate the Navy's position to include internal policies and procedures to minimize impacts on the biological resources and prevent the introduction of invasive species to these training areas. The environmental review process including NEPA, allows further public disclosure to Navy actions that may eventually have a negative impact to onshore biological resources. Since the first publicized INRMP disclosed in 2001, we have worked with the various island Navy complex officials to incorporate collaborative measures aimed at reducing these impacts. Subsequently, DLNR, Division of Forestry and Wildlife, June 29, 2006 letter to Mr. Leighton Wong will remain relevant to our response for the Hawaii Range Complex (attachment). Thank you for allowing us to review your project.

Sincerely yours,

Paul J. Conry
Administrator

Attachment

C: DOFAW Kauai Branch
DOFAW Oahu Branch
DLNR, Land Division

COMMENT NUMBER
D-W-0070 (cont.)

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG

ROBERT K. MASUDA

DEAN NAKANO, Acting

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

June 29, 2006

Mr. Leighton G.M. Wong
Business Line Manager, Environmental
Department of the Navy
Naval Facilities Engineering Command, Pacific
258 Makalapa Drive STE. 100
Peal Harbor, Hawaii 96860-3134

Dear Mr. Wong:

Subject: Request for Comments: Commander Navy Region Hawaii INRMP Updates – Oahu Complex and Kauai Pacific Missile Range, State of Hawaii.

We appreciate the opportunity to comment on your subject request. DLNR, Division of Forestry and Wildlife's August 29, 2001 comments (see attachment) 5-years ago remain relevant to this request with the following added recommendations.

General Comments:

- Encourage the Department of Navy to integrate its natural resource management programs with DLNR, Division of Forestry and Wildlife Comprehensive Wildlife Strategic Plan. 1
- Strongly encourage the integration of statewide response between DLNR and Department of Navy for invasive species, oil spills, stranded wildlife, and avian disease monitoring. 2
- Maintain and restore cultural resources on Department of Navy lands. 3
- Provide recreational opportunities and uses on Department of Navy lands. 4
- Increase fauna and flora T&E populations currently present on Navy lands. In addition, DLNR, Division of Forestry and Wildlife on Kauai are developing a management plan for the Mana Waterbird Sanctuary that may benefit PMRF to protect native resources in the area. Also, DLNR, Division of Forestry and Wildlife encourage Department of Navy to fence portions of Makaha ridge facility on Kauai to maintain the vegetation required for nene habitat and their nesting areas. 5
- Encourage Department of Navy to acquire lands to buffer impacts to existing resource management programs and areas. 6
- Encourage the Department of Navy to develop watershed (i.e. develop Waianae watershed partnership alliances) and wetland partnership programs in areas beneficial to all interested cooperating entities. 7

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

LINDA LINGLE
GOVERNOR OF HAWAII

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

'07 AUG 01 PM03:47 ENGINEERING

July 31, 2007

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x ~~Div. of Boating &~~ Ocean Recreation
x Engineering Division
x ~~Div. of Forestry &~~ Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division – Oahu, Maui, Hawaii & Kauai District

FROM: Russell Y. Tsuji
SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex
LOCATION: Statewide
APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(X) We have no comments.
( ) Comments are attached.

Signed:
Date: 8/31/07

COMMENT NUMBER
D-W-0071
1

LINDA LINGLE
GOVERNOR OF HAWAII

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

RECEIVED LAND DIVISION
2007 AUG 15 P

July 31, 2007

Additional information enclosed.

MEMORANDUM

TO: **DLNR Agencies:**
~~x Div. of Aquatic Resources~~
x Div. of Boating & Ocean Recreation
~~x Engineering~~ Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division – Oahu, Maui, Hawaii & Kauai District

FROM: Russell Y. Tsuji
SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex
LOCATION: Statewide
APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

(X) We have no objections.
( ) We have no comments.
( ) Comments are attached.

Signed:
Date: 8/14/07

COMMENT NUMBER
D-W-0072
1

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0073

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF STATE PARKS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 10, 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawai'i 96752-0128
ATTN: HRC EIS/OEIS

Dear Public Affairs Officer:

We have reviewed the DEIS/OEIS for the Hawai'i Range Complex which evaluates the potential environmental effects of current and proposed training, research, development, and testing of Navy operations.

1 We are concerned that the groundwater resources are being affected by the chemical emissions from missile launches that occur during training exercises which may have adverse impacts to the water system at Polihale State Park. While the evaluation was conducted on water resources, it is unclear whether that category includes both ocean/marine resources and groundwater resources. For the health and safety of the public, we would appreciate an evaluation of the project's impacts to groundwater resources.

We appreciate the opportunity to review and comment on the DEIS/OEIS for the Hawai'i Range Complex.

Very truly yours,

Daniel S. Quinn
State Parks Administrator

c: Wayne Souza

COMMENT NUMBER
D-W-0074

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 6, 2007

Public Affairs Officer
Pacific Missile Range Facility
Box 128
Kekaha, Hawaii 96752-0128

Attention: HRC EIS/OEIS

Gentlemen:

Subject: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Division of Aquatic Resources, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Charlene E. Unoki
for Russell Y. Tsuji
Administrator

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

LINDA LINGLE
GOVERNOR OF HAWAII

ALLAN A. SMITH
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

AQUATIC RESOURCES: 1046

DIRECTOR	✓
COMM. FISH	
AQ RES/ENV	
AQ REC	
PLANNER	
STAFF SVCS	
RCUH/UH	
STATISTICS	
AFRC/FED AID	
EDUCATION	
SECRETARY	
OFFICE SVCS	
TECH ASST	
Return to:	
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Copies to:	
Due Date:	

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July 31, 2007

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
x ~~Div. of Boating &~~ Ocean Recreation
x Engineering Division
x Div. of Forestry & Wildlife
x Div. of State Parks
x Commission on Water Resource Management
x Office of Conservation & Coastal Lands
x Land Division – Oahu, Maui, Hawaii & Kauai District

FROM: Russell Y. Tsuji
SUBJECT: Draft Environmental Impact Statement/Overseas Environmental Impact Statement, Hawaii Range Complex
LOCATION: Statewide
APPLICANT: US Department of Defense, Department of the Navy

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 1, 2007.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(✓) Comments are attached.

Signed: Francis Oishi
Date: 9-4-07

COMMENT NUMBER

D-W-0074 (cont.)

Suspense Date: 9/1/07

State of Hawaii
Department of Land and Natural Resources
DIVISION OF AQUATIC RESOURCES

Date: 9/4/07

MEMORANDUM
TO: Francis Oishi, Program Manager
FROM: Alton Miyasaka, Aquatic Biologist
SUBJECT: Comments on Navy Draft EIS for Combat Readiness Training

Comment	Date	Request	Receipt	Referral
Requested by: Russell Tsuji DLNR/Land		7/31/07	8/2/07	8/3/07

Summary of Proposed Project

Title: Draft EIS for Pacific Fleet Training Activities

Project by: Department of the Navy

Location: Statewide, Hawaii Range Complex

Brief Description: The applicant seeks comments on a draft EIS that evaluates the potential environmental effects of current and emerging training and research, development, test, and evaluation operations in Hawaii and proposes upgrades and modernization of Navy training and testing capabilities to maintain or improve combat readiness.

Comments: While the documentation provided did not identify such activities, we would have concerns if planned exercises involved the use of explosives in state waters. We recognize the importance of these exercises and the loss of some marine life may be unavoidable. To the extent practical, we would request that surveys of the affected areas and the shoreline be conducted after each exercise involving explosives to remove any dead fish or other marine life that should wash up on the shoreline. These clean-ups would be especially important near public recreational areas where the public makes full use of the beaches and shoreline. 1

COMMENT NUMBER

D-W-0074 (cont.)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0074 (cont.)

Regarding possible impacts on marine mammals, we are aware that the Navy is working in close consultation with NOAA's National Marine Fisheries Service and National Ocean Service to identify and mitigate possible impacts. Given our close working relationship with NOAA in co-managing the Hawaiian Islands Humpback Whale National Marine Sanctuary and in supporting marine mammal stranding response in the Main Hawaiian Islands, we believe it would be most efficient and effective for all concerned to route any comments we might have regarding possible marine mammal impacts via these NOAA partner agencies. We appreciate the efforts the Navy and its contractors have made thus far to keep us informed of marine mammal impact analysis and proposed mitigation measures, and look forward to our continued communications in this regard in partnership with NOAA.

COMMENT NUMBER
D-W-0075

-----Original Message-----
From: Clyde.Fuse
Sent: Thursday, August 23, 2007 4:03 PM
To: Gallien, Randy Mr USASMDC
Cc: Edd Joy; Wes Norris; Neil Sheehan; Diane.Tom ; Debbie.Saito ; Neal.Kurosaki
Subject: Re: FAA Comments on HRC EIS

Randy
Thanks for calling us back. The comments on the EIS from FAA Air Traffic are:

1. The Special Use Airspace will be undergoing some changes in July 2008. The northern boundary will be "pulled south". to the south, the boundary will be moved north. 1
2. If lasers are used, the operational data must be forwarded to our Western Service Area specialists for review and NOTAMs issued. Dependent on their assessment, there could be an impact to Air Traffic operations. 2

Aloha
Clyde

"Gallien, Randy Mr USASMDC"

To
Clyde Fuse/AWP/FAA@FAA
cc
08/23/2007 10:46 AM
<
<
<
Subject
FAA Comments on HRC EIS

Clyde

You may provide your comments to me at this address. Please copy the guys I

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0075 (cont.)

have copied to ensure we have them.

Thanks and it was nice talking again,

Randy

From Concept to Combat
Celebrating 50 Years of Excellence in Missile Defense and Space
SMDC/ARSTRAT - 1957-2007

COMMENT NUMBER
D-W-0076

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
1111 Jackson Street, Suite 520
Oakland, California 94607

IN REPLY REFER TO:
ER#07/615

Filed Electronically

10 September 2007

ATTN: HRC EIS/OEIS
Public Affairs Officer,
Pacific Missile Range
Facility, P.O. Box 128,
Kekaha, Kauai, Hawaii, 96752-0128
deis_hrc@govsupport.us

Subject: Review of the Draft Environmental Impact Statement (DEIS), for the Hawaii Range Complex (HRC) Project, Honolulu, Maui, and Hawaii Counties, HI

Dear Public Affairs Officer:

The Department of the Interior has received and reviewed the subject document and has no comments to offer. 1

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC
FWS, HI
FWS, Portland

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0077

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII

DEPARTMENT OF HAWAIIAN HOME LANDS

P.O. BOX 1879

HONOLULU, HAWAII 96805

August 23, 2007

Public Affairs Officer
Pacific Missile Range Facility
P. O. Box 128
Kekaha, Hawaii 96752-0128

Attention: HRC EIS/OEIS

Gentlemen:

1 Thank you for the opportunity to provide comments on the Department of Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement to assess the Navy's Hawaii Range Complex (HRC). The Department of Hawaiian Home Lands has no comments.

Should you have any questions, please call the Planning Office at (808) 586-3836.

Aloha and mahalo,

Micah A. Kane, Chairman
Hawaiian Homes Commission

COMMENT NUMBER
D-W-0078

BOB JACOBSON
Councilmember

Chair, Environmental Management Committee
Vice-Chair, Finance Committee

333 Kīlauea Avenue, Second Floor
Ben Franklin Building, Hilo, Hawai'i 96720

Mailing Address: 25 Aupuni Street, Suite 200
Phone: (808) 961-8263
Fax: (808) 961-8912
E-Mail: bjacobson@co.hawaii.hi.us

HAWAI'I COUNTY COUNCIL

County of Hawai'i

August 30, 2007

Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawai'i 96752-0128

Re: Comments in Opposition to Military Activities in the North Hawaiian Islands National Marine Sanctuary

Aloha:

I would like to express my opposition to war games, sonar testing, and any other military activities that will certainly degrade the fragile environment within the Northwestern Hawaiian Islands National Marine Sanctuary. The federal government recognized the importance of protecting the health of the oceans surrounding Hawai'i by establishing the sanctuary. The Navy now proposes to undermine federal and state policy by increasing war games in the area; thus, jeopardizing the welfare of numerous species endemic to the Northwestern Hawaiian Islands and polluting the delicate ecosystem that exists there. 1

Please consider these comments and the many others you are sure to receive.

Mahalo,

for: Bob Jacobson

Bob Jacobson, Member
Hawai'i County Council, District 6

BJ/mf

c: Michael Payne, National Marine Fisheries Service

District 6 ~ Upper Puna, Ka'ū, and South Kona
Hawai'i County Is An Equal Opportunity Provider And Employer

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-W-0079

Kamuela HI
August 29, 2007

Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha HI 96752-0128

Re: Expanded Naval War Games in Hawai'i

Dear Mr. Clements,

2 We were greatly disturbed to learn that the Navy proposes to engage in live-fire bombing and use of high-intensity sonar in a marine monument and a whale sanctuary. The designation of these preserves as special and protected areas is meaningless if such practices are allowed in them or close enough to adversely impact them.

1 The National Marine Fisheries Service acknowledged that use of high-intensity sonar by the Navy was the likely cause of whale strandings in Hawai'i three years ago, and there is a growing body of evidence that it has caused injury and beachings of whales and other marine mammals in various parts of the world. It simply is not reasonable to assume that millions of times the maximum decibel level deemed safe for human divers will have no serious ill effects on marine life.

We urge you to oppose any expanded military exercises in Hawai'i's fragile marine environment, or the use of high-intensity sonar anywhere in the world where it might seriously harm, either directly or indirectly, marine mammals or important resources such as fisheries and reefs.

Sincerely,

Dr. John Broussard
Carolyn Pomeroy

COMMENT NUMBER

D-W-0080

ALOHA ACRES

JOHN P. CONLEY & NANCY JANE M. CONLEY
KILAUEA, HI.

Pacific Missile Range Facility
Public Affairs Officer
P. O. Box 128
Kekaha, HI 96752-0128

Sept. 8, 2007
Re: Hawaii Range Complex

To Whom It May Concern:

The island of Kauai is sacred and should not be damaged or desecrated in any manner. Please remember that "The Life of the Land is Perpetuated in righteousness" is the motto of the State of Hawaii, the Navy should act accordingly.

We object to any and all expansion of ground, sea or air operations at the Pacific Missile Range Facility on Kauai and within the Hawaii Range Complex.

The existing level of activity at P.M.R.F. is already too much. The continuing missile 1
launches are creating a "hole" in the ozone layer directly above Kauai, exposing all of the residents, visitors, plants and animals to unsafe levels of solar radiation. Every attempt should be made by the Navy to minimize the damage and reverse the effects.

We have personally witnessed the effects of the Rim of the Pacific exercises upon marine mammals. The stranding and confusion of the Melon Headed whales in Hanalei
Bay was enough to make one cry. The use of sonar and massing of Naval fleets within the 2
Papahanaumokuakea Marine National Monument and the Hawaii Range Complex should be banned.

The proposed plans for research and development in "directed energy", advanced 3
hypersonic weapons and other new and emerging technologies, vehicles and systems should not even be considered on the oldest inhabited Hawaiian island – KAUAI. Increased training exercises, testing and training for new weapon systems, supporting and rapidly deploying naval units and striking brigades and building and operating a portable undersea tracking range should be done at Pearl Harbor on Oahu.

Building and operating an instrumented minefield training area and the closure of 4
popular recreational beaches near P.M.R.F. certainly gives the impression that the Navy intends to be a separate entity on this island, with a shoot to kill attitude toward anyone who comes near the facility. Please try being good guests and respect the island and its inhabitants.

We have raised our children on Kauai and hope that they may do the same. We believe that the Navy should be held to the highest environmental standards in all that you do.

Sincerely :

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0081

FROM : 00000000000 / PHONE NO. : 0 Aug. 23 2007 07:10AM

Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawai'i 96752-0128

Email: Fax: 808-335-4520

Subject: Expanding Naval Wargames in Hawaii is Unacceptable

Dear Tom Clements,

The world recognizes Hawai'i hosts unique and fragile marine environments crucial to the overall health of our oceans. The U.S. acknowledged the importance of protecting Hawai'i's oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands. This is the primary foraging grounds of last few remaining Hawaiian monk seals, home of rare cold water coral reefs,

The Navy's proposal to significantly increase wargames in the Hawaiian Islands 1
directly undermines the policies of the federal and state governments to protect the
NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary. The 2
Navy's plan to use active sonar that harms marine mammals, spread toxic chemicals 3
that undermine the public's health, and jeopardize cultural sites sacred to Native 4
Hawaiians is completely unacceptable and cannot be allowed.

Sincerely,
C Rapu
Cynthia Rapu

COMMENT NUMBER
D-W-0082

August 22, 2007

To:
Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawaii 96752-0128

From:
Eleanor Ballard
Brooksville, FL

Dear Mr. Clements,

The statements following my letter explain better than I can a proposal by our Navy that is so shameful and hurtful to the environment we are entrusted with that for this plan to be considered is, I believe, directly opposed to our countries stated values.

To represent this program of destruction to the delicate infrastructure that has existed for thousands of years as being a 'good' location for war games is reprehensible.
I implore you to do whatever you are able to prevent this proposal from 5
becoming a reality.
Thank you for your attention.

Sincerely,
Eleanor Ballard
Eleanor Ballard

"The world recognizes that Hawaii hosts unique and fragile marine environments crucial to the overall health of our oceans. The U.S. acknowledged the importance of protecting Hawaii's oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands. This is the primary foraging grounds of last few remaining Hawaiian monk seals, home of rare cold water coral reefs.

The Navy's proposal to significantly increase war games in the Hawaiian 1
Islands directly undermines the policies of the federal and state governments
to protect the NWHI Marine Monument, State Refuge, and the Humpback
Whale Sanctuary. The Navy's plan to use active sonar that harms marine 2
mammals, spread toxic chemicals that undermine the public's health, and 3
jeopardize cultural sites sacred to Native Hawaiians is completely 4
unacceptable and cannot be allowed. "

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-W-0083

10 Sept 2007

PMRF Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

John Y. Ota

Hilo, HI

Navy Environmental Impact Statement/Overseas Environmental Impact Statement EIS/OEIS

1 The Draft EIS/OEIS does not address discovery of Depleted Uranium (DU) at Pohakaloa Training Area (PTA). All prior denials by the Army that DU is not present at PTA were revealed to be "False" by a civilian contractor. Excuses, including "radioactive reading is below the safety margin" of affecting human beings and the "area of DU discovery is not accessible to the Public" were used after the discovery. The excuses do not address the concern of the Citizens in this County. The Citizens are well aware that DU dust particles are harmful to the health of the populace. Both Mountain Peaks, Mauna Kea and Mauna Loa, provide the only source of drinking water for the majority of the populace; PTA is located in-between the two Mountains. Allowing continual Military Training to be conducted at PTA without identifying all possible locations where DU rounds may have landed or exploded would only complicate matters. The Military equipment and exploding ammunition could create DU Dust Particles to rise into the air. Although the Military may not have a very high concern for the health and welfare of the populace, where would the Military be if it was not the young men from the populace that supplements the much needed manpower to run the Military?

2

1. Is the Navy planning to conduct Training at PTA before the Army completes their evaluation to search, identify, test and verify all areas within PTA that could possibly contain the presence of DU rounds or radiation and remove the presence of both from this Island, forever?

3

2. Is the Military concerned about the possible effects of loud noise from all Military equipment, including the firing and exploding ammunition, have on the declining endangered populace to multiply? The referenced statement "no adverse impact" used to minimize the effect of loud noise from equipment and exploding shells is well known. Why is it not possible for the Military schedule their Training when the mating seasons are over?

4

3. How does the vibrations caused by firing of ammunition and the exploding rounds affect the ice under the Peaks of Mauna Kea and Mauna Loa? Does the vibration cause the ice to fracture or cracks appear to melt the ice at a faster rate?

5 The statement concerning the Navy use of Sonar, "There is no Scientific proof to support claims that Sonar has harmed or killed marine mammals" does not address the real issue. The Citizens of the Big Island are not convinced by the conclusions stated by the Navy in the EIS/OEIS. Posting a Look-Out on other War Ships during Exercises is a cover-up to mislead the Public. Marine Mammals only surface above the Ocean waters long enough to expel the carbon dioxide and in-take new fresh Oxygen. The duration of this activity is very short in comparison to the time that they are under-water. So, how is the posting of Look-Out on War Ships save the

COMMENT NUMBER: D-W-0083 (cont.)

6 Mammals from harm? Why do commercial fishermen use electronic "Fish Finders"? Are the Navy Submarines NOT capable of identifying Marine Mammals underwater? Why Not?

A. Question. <u>Does the Navy have Scientific proof that Sonar DOES NOT harm or kill Marine Mammals</u>? If the Navy is in possession of a scientific Document that is able to support this claim, this DATA should be made available to the public.
B. Why is the Navy, NOT ABLE TO DETECT Marine Mammal movements underwater?
C. The Ocean surrounding the Hawaiian Islands are known for their warm temperature. Migrating Whales, South to North or North to South, are known to give birth to Calves in these waters. There is a time period of approximately 3 months that the Mother Whale (7) will tend to the every need of the new born and to ensure that the Baby is able to make the long journey to join the rest of the herd. How will Sonar, High, Medium or Low Frequency affect the new born? Is the Training Scheduled to be conducted when new born Whales are in the immediate area?

Sincerely,

John Y. Ota

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-W-0084

Vincent K. Pollard

Honolulu, HI

7 September 2007

Mr. Tom. Clements
Pacific Missile Range Facility
P. O. Box 128
Department of the Navy
Kekaha, Kauai, Hawai'i 96752-0128

Re: Hawaii Range Complex ("Notice of Intent to Prepare an Environmental Impact Statement")

Dear Mr. Clements,

Thank you for the Department of the Navy (DoD)'s Notice published in the *Federal Register*, vol. 72 no. 144 (Friday, July 27, 2007).

With this letter, I am responding to the Hawaii Range Complex, *Draft Environmental Impact Statement/Overseas Environmental Impact Statement—Proposed Action & Alternatives and Summary of Draft EIS/OEIS Environmental Impacts* (August 2007).

1 Partly because I reside in Honolulu, I am concerned about the physical and psychological trauma and health damage to be caused by noise to mammals and other creatures on and in the ocean waters near O'ahu. The reported extent of ongoing and proposed research development, test and evaluation activities leaves me concerned. In my view, these activities leave us less secure.

Regarding the number of operations per year, I recommend the "No Action Alternative."

2 Also, while the following goes beyond the scope of your "Notice of Intent," I further strongly suggest that the Navy seriously consider drastically scaling back ongoing activity as a way of minimizing further damage to the environment.

Thank you for considering my views.

Sincerely,

Vincent K. Pollard

Vincent K. Pollard

COMMENT NUMBER

D-W-0085

LV, NV 89103

September 3, 2007

Public Affairs Officer
Pacific Missile Range Facility
P. O. Box 128
Kekaha, HI 96752

RE: San Francisco Courts reversal of Sonar Ban

As a concerned American, who has lived on the Pacific Rim for over 50 years, I'm deeply concerned about the Navy's appeal, with regard to the Order to Ban Naval Sonar Testing, which was reversed Friday in San Francisco.

You should be well aware of the beachings and deaths of mammals in the waters where this testing has been done. I would like to suggest you place Navy Seal volunteers in the waters where you are testing, to see if they survive the barrage emitted by your sonar weapons. They would have a choice, and voice in the matter.

1 Are you aware that the chinstrap penquins of Antartica have declined around 70%? You are killing our wildlife with this evil weapon. This was a very bad invention, and it needs to be stopped, it was overturned in Court, but America should not perpetuate this evil murder. It must be stopped. PLEASE do something to help stop this weapon testing.

Please

Sandra Miner

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0086

Pacific Missile Range Facility
Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

To Whom It May Concern:

1 I strongly oppose your decision to continue testing active sonar in Hawaii's waters. The 1,145 exercises will cover ¼ million square miles around our shorelines. You will potentially be affecting 7,000 species, 25% of which are endemic to Hawaii. The National Monument and the Hawaiian Island Humpback Whale National Marine Sanctuary should be protected areas.

2 In March, 2000 in the Bahamas, 17 whales beached themselves, 7 of which died. The fate of the other 10 after pushed back out to sea is unknown. In the Bahamas sonar was used at 150-160 dB. If this can kill whales, how can you justify using anything louder? How can 195 dB be safe for marine life? 215 dB is clearly going to injure and kill many more marine mammals and fish. This is 1,000,000 times louder. Why not rely on passive sonar or do tests out at sea where there is much less wildlife?

3 The Navy claims turtles and fish are not affected by sonar because they cannot hear the frequencies used however, these violently loud sound waves have shown to cause hemorrhaging around brains, other organs and auditory damage. These sound waves rupture cell membranes. Sonar can and has affected scuba divers. People should not feel unsafe to enter the water when they see a navy vessel offshore. They should feel the opposite.

4 The mitigation measures provided in your Draft Environmental Impact Statement are inadequate. You cannot prove the null hypothesis. How will you determine the effects on marine life below the water between the vessel and the distance sonar travels?

I am one of many who feel this action is absolutely unnecessary.

Kristin McCleery

COMMENT NUMBER
D-W-0087

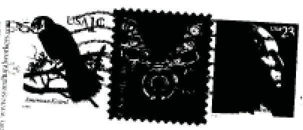
War is a racket. It always has been.
It is possibly the oldest, easily the most profitable, surely the most vicious.
It is the only one international in scope.
It is the only one in which the profits are reckoned in dollars and the losses in lives.

A racket is best described, I believe, as something that is not what it seems to the majority of people. Only a small "inside" group knows what it is about. It is conducted for the benefit of the very few, at the expense of the very many. Out of war a few people make huge fortunes.

Major General Smedley D. Butler, 1935
US Marine Corps
Two-time winner Congressional Medal of Honor

"WAR IS A RACKET"
–MARINE GENERAL SMEDLEY BUTLER

Smedley Butler (1881-1940) won the Congressional Medal of Honor twice. His book *War Is A Racket*



Aloha,

1 As regards the U.S. NAVY's proposed military training in Hawaii, I prefer the "NO-ACTION" alternative.

Mahalo

C.A. Macgeorge
USMC (BRAT)

C. A. Macgeorge
Keaau HI

Proudly UNION printed in USA on REAL recycled paper

Public Affairs Officer
Pacific Missile Range Facility
P.O. BOX 128
KEKAHA, HI 96752

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0088

Peter Courture

Hanalei Hawaii

4th September 2007

Public Affairs Office
Pacific Missile Range Facility
P.O. Box 128
Kekaha Hawaii 96752-0128
Attn HRC EIS/OEIS
Fax 808 335-4520
Email : hrs@govsupport.us

Messrs. et Madames :

1 I am extremely distressed to learn that our government intends to condone sonar testing in an area where whales and other sensitive marine life shelter. Due to the hazards such testing presents to these lives, I respectfully request that you move your testing to a location where such dangers are not presented. Moreover, as part of our governmental process, you owe those who can speak for the lives who cannot a clear explanation why you must conduct this testing in such

2 a sensitive area, and permit us to respond. Finally, no such testing should be conducted without at least the same mitigation measures which were adopted in 2006 after the Court challenges. It seems both wasteful and disrespectful to skirt voluntary compliance, forcing human citizens to intervene.

As you know, the Hawaiian Islands, and especially Kauai, are key ecological shelters for important life, including dolphins, whales and others. The Hawaiian waters are important winter breeding grounds for, among others, thousands of endangered humpback whales.

It is undisputed (and the Navy has no contrary evidence) that the sort of testing (and sonar emissions) proposed in the RIMPAC and USWEX exercises present a clear and present danger to endangered and highly intelligent marine mammals. I have not fully prepared myself on the deficiencies such testing and the Navy's behavior present under the law, but believe that

3 your present and proposed actions violate the Marine Mammal Protection Act, the National Marine Sanctuaries Act, the Coastal Zone Management Act, and

In the South Pacific, I have been eye to eye with humpbacks underwater and had the pleasure to spiral with them as they revelled in the oceans we share. I believe that no one who has experienced the gaze of a humpback could ever condone endangering them. You must be aware of this, but persist. I am ashamed of your behavior and beseech you to take corrective action before it is too late.

Yours sincerely,

Peter Courture

COMMENT NUMBER
D-W-0089

Kapa`a, Hawai`i 96746

2 September 2007

Commander
Hawaii Range Complex
Pacific Missile Range Facility (PMRF)
P.O. Box 128
Kekaha, Hawai`i 96752-0128

Re: Comment on the Draft Environmental Impact Statement (dEIS)
Ocean Environmental Impact Statement (OEIS)

To Whom It May Concern:

Aloha! Mahalo for the opportunity to comment on the U.S. Navy's dEIS/OEIS in the Hawaii Range Complex.

First, I was deeply disappointed to find that the testimony that I submitted during the Scoping Process was not present in the dEIS/OEIS. Additionally, I was not listed as one of the "Private Citizens" on page 10-7 in the Draft EIS/OEIS Volume 3 of 3: Chapters 5-14 - Appendices A-K July 2007. This indicates that the U.S. Navy doesn't respect the citizens whom it 'supposedly' protects. **What exactly is the agenda of the U.S. Navy?** 4 5

Exceedingly, insufficient in the draft EIS/OEIS is that the Navy *only* wrote: "In total, the Navy received 353 comments. This summary gives an overview of comments received through these means during the scoping period. Comments are organized by issue area." ~ **Give us a break** ~ The Hawaii Range encompasses 235,000 nautical miles of ocean. The offshore area includes all air, surface and subsurface ocean areas within 12 nautical miles of the 18 Hawaiian Islands; while the open ocean area includes everything further out. **The concerns of the citizens are valid ~ ESPECIALLY given the vast expanse of sea, `aina and airspace**.

Furthermore, as a grandmother I am outraged at the Navy's "planned enhancements" for the Hawaii Range Complex. Which are: increased testing & training for electronic warfare/operating a portable undersea tracking range/Building & operating an instrumented minefield training area/use of additional chemical stimulants for launches/Unmanned boats and advanced hypersonic weapons. 6

The magnitude of this proposal is incomprehensible!! The multi billion dollars (if not trillions of dollars) to implement this *Star War's* nightmare at the expense of curtailing public access, not to mention the degradation of the environment and habitat of endangered species is an abomination. 250 million American's haven't medical coverage. Climate change is barreling down the pike… Folk's whom suffered the devastation of Hurricane Katrina are still displaced. Food Banks can't keep food on the shelves—people are starving!! **Troops of veterans from the ongoing Iraqi War are suffering from *PTSD* and aren't getting the medical care and support that they deserve**. How about "Giving Peace A Chance?" as John Lennon sang so many years ago?!

I am the daughter of a *WWII* veteran; my only sibling's only son is serving is his 2[nd] round in Iraq.

In conclusion, has not the U.S. Navy done enough to desecrate the Hawaiian Islands and perpetuate genocide of the Hawaiian people?
First was the illegal overthrow of Queen Lili`uokalani. Coupled with years of *War Games* on Kaho`olawe. Global defense technology as proposed in the dEIS/OEIS is continued abuse of traditional rights which are connected to the `aina, sea and clean air. The `aina is the foundation of native Hawaiian culture.

Mahalo for your attention to this matter and I look forward to receiving a copy of the final EIS/OEIS.

On behalf of my children and grandchildren, Sincerely with ALOHA,

Bonnie P. Bator & `Ohana

C: Rep Hermina M. Morita Sen Gary L. Hooser

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

SEP-17-2007 MON 04:50 PM U.S.E.P.A. FAX NO. 4159473562 P. 02

COMMENT NUMBER
D-W-0090

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

September 17, 2007

Tom Clements
Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kehaha, Kauai, HI 96752-0128

Subject: Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS), Hawaii Range Complex, Hawaii (CEQ # 20070312)

Dear Mr. Clements:

The U.S. Environmental Protection Agency (EPA) has reviewed the above-referenced document pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. Our detailed comments are enclosed.

The Draft EIS/OEIS (herein DEIS) assesses the impacts of current and increased Navy training, and research and development activities in the Hawaii Range Complex, which includes 235,000 square nautical miles (nm) around the Main Hawaiian Islands and 2.1 million square nm of Temporary Operating Area of sea and airspace encompassing the Northwest Hawaiian Islands. The No-action Alternative evaluates the current level of Navy training in the range complex, which includes over 9,300 annual operations, including several Undersea Warfare Exercises per year and the biennial Rim of the Pacific exercise. Alternative 1 evaluates increased tempo and frequency of training and new training operations. Alternative 2 evaluates further increased tempo and training with increases of over 100% in the number of training operations over current training, increased research and development, and the addition of major exercises including training three Strike Groups simultaneously. The Navy's preferred alternative is Alternative 2.

1 Based on our review, we have rated the DEIS as Environmental Concerns – Insufficient Information (EC-2) (see enclosed "Summary of Rating Definitions"). EPA has concerns regarding impacts to marine resources from the preferred alternative. We understand there is substantial uncertainty regarding the acoustic impacts to these resources, including the extent that mid-frequency active sonar use plays in marine mammal strandings. Such uncertainty suggests that a more precautionary approach be taken than what is described in the preferred alternative to fully protect marine resources.

2 A limited range of alternatives are evaluated in the DEIS. EPA recommends additional alternatives be formulated and evaluated in the Final EIS to meet the Navy's mission while maximizing environmental protection. We recommend different training combinations and

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levels be included, including an alternative that describes a much more precautionary approach in relation to mid-frequency active sonar. If additional alternatives are not analyzed, EPA recognizes the No-action Alternative, which maintains training at current levels, to be the environmentally preferable alternative per 40 CFR 1505 2 (b) and recommends its selection to minimize environmental impacts. 9

EPA appreciates the opportunity to review this DEIS. When the Final EIS is released for public review, please send one copy to the address above (mail code: CED-2). If you have any questions, please contact me at (415) 972-3846 or Karen Vitulano, the lead reviewer for this project, at 415-947-4178 or vitulano.karen@epa.gov.

Sincerely,

For Connell Dunning

Nova Blazej, Manager
Environmental Review Office

Enclosure: Summary of EPA Rating Definitions
EPA's Detailed Comments

cc: Chris Yates, National Marine Fisheries Service

2

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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SUMMARY OF EPA RATING DEFINITIONS

This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the EIS.

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

ADEQUACY OF THE IMPACT STATEMENT

Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

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EPA DETAILED COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT, HAWAII RANGE COMPLEX, HAWAII, SEPTEMBER 17, 2007

Alternatives and Purpose and Need

The Draft Environmental Statement (DEIS) for the Hawaii Range Complex (HRC) states that the decision to be made by the Assistant Secretary of the Navy is to determine both the level and mix of training to be conducted and the range capability enhancements to be made within the HRC that best meets the needs of the Navy (p. ES-12). The alternatives evaluated in the DEIS do not contain a variety of levels and mixes of training and enhancements, however. The No-action Alternative represents the existing level of training; Alternative 1 consists of the exercises in the No-action Alternative with the addition of new training operations and an increased tempo and frequency of training; and Alternative 2 includes the same exercises as Alternative 1 with further increased tempo and training and substantial increases in the number of training operations including the addition of major exercises.

The Council on Environmental Quality (CEQ) Regulations for Implementing the National Environmental Policy Act (NEPA) states that the evaluation of alternatives is the "heart of the environmental impact statement" and that agencies should "rigorously explore and objectively evaluate all reasonable alternatives" to the proposed action (40 CFR 1502.14). Based on the purpose and need described in Chapter 1, it is not clear that all reasonable alternatives that would meet the Navy's current and emerging training needs were included. The alternatives analysis of this DEIS would be improved by including alternatives that represented a more diverse level and mix of training instead of formulating alternatives that simply build upon one another. A more diverse range of alternatives would provide information to the decision-maker that could aid in selecting an alternative that meets the Navy's most important training needs while meeting the intent of our national environmental policy (42 USC 4331- 4335).

Recommendation: In the Final EIS (FEIS), EPA recommends evaluation of additional alternatives that represent a more diverse level and mix of training and research/ development activities. EPA recommends that the FEIS include a range of alternatives developed with reference to how well they meet immediate and future training needs. We recommend including an alternative that describes a much more precautionary approach in relation to the use of mid-frequency active sonar. We also recommend that the impacts of these alternatives be more clearly differentiated in the FEIS and presented in a comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public (40 CFR 1502.14). Consistent with this, we recommend that the amount of munitions use and their associated pollutants be quantified in the FEIS for all alternatives. 3

If additional alternatives are not analyzed in the FEIS, EPA recognizes the No-action Alternative, which maintains training at current levels, to be the environmentally preferable alternative per 40 CFR 1505.2 (b) and recommends its selection to minimize environmental impacts.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

Impacts from Mid-Frequency Active (MFA) Sonar

Considering Uncertainty in Impact Assessment

We understand that there is a substantial amount of uncertainty in predicting impacts to marine mammals and fish from MFA sonar. We are concerned, however, that this uncertainty has not been fully considered in the assessment of significance[1], and that more precaution is not being used to mitigate this uncertainty.

For example, we are aware that the Woods Hole Oceanographic Institution[2] expressed concern in the past regarding effects thresholds near 190 dB, citing a study[3] that reported significant behavioral responses in the North Atlantic right whale at 154 decibels (dB). Additionally, the 2006 Rim of the Pacific (RIMPAC) After Action Report (Appendix F) indicates that the National Marine Fisheries Service (NMFS) believed that the 190 dB sound exposure level (SEL) was "not sufficiently precautionary" and required the Navy to apply for its incidental harassment authorization for that exercise using 173 dB SEL (p. F-9). The DEIS indicates that the normal operating level for the Hawaii Range Complex (HRC) alternatives would be 235 dB and the preferred alternative includes 1,152 additional hours of MFA sonar (p. 4-19) and simultaneous multiple strike group training.

4 *Recommendation:* We recommend the FEIS consider the uncertainty and unknown risks in assessing significance of impacts from MFA sonar on marine resources. We recommend modifications to the preferred alternative to incorporate additional precaution and mitigation measures commensurate with this level of uncertainty.

Impacts to Fish

The DEIS makes conclusions regarding impacts to fish that are not clearly supported by the discussion provided. For example, the DEIS concludes that impacts to fish would be minimal "considering the few fish species that would be able to detect sound in the frequencies of the proposed action" (p. 4-19). However, the DEIS states that species of tuna may be able to detect mid-frequency sounds (p. 3-14), and there are several tuna species present in open water in the project area (Table 3.1.2.2.1-1). An additional concern is that NMFS determined that overfishing was occurring Pacific-wide for one tuna species, the bigeye tuna (p. 3-11). The basis for the conclusion of negligible impacts is not clear and should be better supported or revised.

Additionally, the DEIS states that impacts to fish would be minimal because of the "limited exposure of juvenile fish with swim bladder resonance in the frequencies of the sound sources" (p. 4-19). The DEIS does not provide the swim bladder resonance of fish in the study area, which would depend on fish species, size and depth (p. 4-14), to offer the basis for the conclusion of negligible impacts in the DEIS.

[1] The Council on Environmental Quality Regulations for Implementing NEPA state that "the degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks" should be considered in evaluating significance (40 CFR 1508.27 (b) 5)

[2] In its comment letter on the Atlantic Undersea Warfare Training Range EIS Jan 27, 2006

[3] Available: https://darchive.mblwhoilibrary.org/handle/1912/248

Recommendation: Consider and discuss potential impacts to tuna species, especially the bigeye tuna, in the FEIS. If additional information regarding swim bladder resonance of fish in the study area is available, include and discuss it in the FEIS. If this information is not available, the conclusions regarding significance of impacts should be qualified and the uncertainty considered. EPA recommends additional precautions be included in the proposed action to safeguard marine resources. 5

Hazardous Waste Contamination

Pearl Harbor Contamination

The Navy proposes a Demolition Exercise Area in the Middle Loch of Pearl Harbor, which has existing polychlorinated biphenyls (PCBs) and heavy metals contamination. The DEIS states that underwater detonations may create a crater and disperse the displaced bottom sediments into the water column (p. 4-370). We have concerns regarding potential mobilization of PCBs and other pollutants by underwater detonations and their spread into the shallow fringes of Middle Loch, especially if a detonation disturbs sediments more than a couple inches deep. The broad area of the Middle Loch has PCB levels which are just below levels which are of concern for exposure to waterfowl in shallow habitat (< 2 meters deep). Various heavy metals (cadmium, copper, mercury, and zinc) are present above levels of concern for a variety of ecological receptors in a broad area of the Loch. In addition, there is one sampling location near the east shore which has chlorinated pesticides (dieldrin and chlordanes) above levels of concern for fish.

Additionally, it is not clear whether the construction and operation of the Acoustic Test Facility (ATF) off Ford Island has the potential to mobilize existing sediment contaminants, including PCBs, heavy metals, and chlorinated pesticides, into the water column. There is an area of near shore samples just within the ATF on the southwest corner of Ford Island which has very high levels of PCBs (from 604 to 8448 parts per billion measured as the total of the NOAA 18 congeners). These same locations have zinc and chlorinated pesticides (dieldrin & endosulfan) above levels of concern. We have concerns regarding the potential disturbance of sediments in this small area along the shore because of the high probability that PCBs would be mobilized.

Recommendation: In the FEIS, include a discussion as to whether underwater detonations will mobilize existing contaminants into the water column and what effects this mobilization could have on environmental resources considering the information above. Clarify the potential that the ATF has to disturb contaminated sediments. We note that these exercises and enhancements are proposed in some of the less contaminated portions of Pearl Harbor, however additional mitigation measures should be considered that reduce sediment disturbance to the greatest extent practicable, including the reduction of the quantity of exercises performed. EPA also recommends the avoidance of soil disturbance on the southwest corner of Ford Island which contains high PCB contamination and request this be included in the mitigation measures in Chapter 6. 6

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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Pollution Prevention

Guidance issued by the CEQ on integrating pollution prevention in Federal planning and decisions under NEPA[4] states that Federal agencies should use every opportunity to include pollution prevention features in NEPA planning and decisions and reflect such considerations in their NEPA documents. The DEIS identifies the contamination from munitions, including oils, heavy metals, and chemical simulants, that will be left in the water column and sediments. The preferred alternative involves "substantial" increases of materials expended on-sea ranges that include liquid and soluble hazardous constituents (p. 4-189).

Consistent with CEQ guidance, the FEIS should describe what actions the Navy is taking to reduce the introduction of pollutants during HRC activities. We strongly recommend that the Navy perform its training in a manner that minimizes the deposition of pollutants into soils and the water column, especially in those areas where waters do not meet water quality standards such as in Pearl Harbor. The DEIS notes that loadings of copper, nutrients, and leachate from anti-fouling paint used on ship hulls are of concern in Pearl Harbor (p. 3-225).

7

Recommendation: In the FEIS, identify measures that the Navy is taking to reduce pollutant loadings in soil and water resources. Commit to specific measures to reduce pollutant loadings in areas where waters do not meet water quality standards and include these mitigation measures in the FEIS and in the Record of Decision (ROD). EPA recommends that the Navy explore and discuss ways to reduce the deposition of liquid and soluble hazardous constituents into water resources for this project, especially the substantial increases under the preferred alternative.

Depleted uranium

The Pohakuloa Training Area (PTA) will be the site for Air to Ground Gunnery exercises, bombing exercises, and live-fire exercises (p. 4-442). We understand that traces of historic munitions containing depleted uranium have been found at an impact area at PTA.

8

Recommendation: The FEIS should identify whether ground disturbance will occur in impact areas that could contain depleted uranium, and assess the impacts to air resources and health and safety from such disturbance. Include an update of the Navy's efforts to address depleted uranium contamination at PTA and any other areas in the HRC. We recommend ground disturbance be avoided in areas that could contain depleted uranium.

[4] *Pollution Prevention and the National Environmental Policy Act,*" CEQ, January 12, 1993

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HRD07/3146B

September 12, 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kaua'i 96752-0128
ATTN: HRC EIS/OEIS

RE: Draft Environmental Assessment and Overseas Environmental Impact Statement for Proposed Upgrades and Modernization in the Hawai'i Range Complex.

To Whom It May Concern:

The Office of Hawaiian Affairs (OHA) is in receipt of your request for written comments regarding the Draft Environmental Assessment (DEA) and Overseas Environmental Impact Statement (OEIS) for Proposed Upgrades and Modernization in the Hawai'i Range Complex. OHA is the "principal public agency in this State responsible for the performance, development, and coordination of programs and activities relating to native Hawaiians and Hawaiians."[1] It is our duty to "[a]ssess[] the policies and practices of other agencies impacting on native Hawaiians and Hawaiians, and conduct[] advocacy efforts for native Hawaiians and Hawaiians."[2] In this capacity, we offer our understanding of the DEA and then offer comments.

SOUND EXPOSURE LEVEL AND ACOUSTIC DOSE-FUNCTIONS

The introductory paragraph of the July 27, 2007 version of section 4.1.2.4.9 states, "These exposure analyses assume that MFA sonar poses no risk to marine mammals if they are not exposed to sound pressure levels from the mid-frequency active sonar above some critical value." (emphasis added). Yet section 4.1.2.4.9.3a states that not only is the Navy using sound pressure levels for the first time to "assess the potential effects of mid-

[1] Hawai'i Revised Statutes (HRS) § 10-3(3).
[2] HRS § 10-3(4).

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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frequency sonar on marine mammals", but that "sound exposure level may be a better metric for estimating the potential effects of sonar exposures on an animal's hearing because it represents an accumulation of energy and the sensitivity of the mammalian ear degrades as energy accumulates." (emphasis added). This is indicative of the kind of science and lack of reasoned data that is being used in this DEA. While it is clear that the Navy is using sound pressure level (SPL) rather than sound exposure level (SEL) as the metric for behavioral disturbance, it is not clear why. The National Environmental Policy Act requires that actual analysis be provided for decision-makers so that an informed decision can be made. Analysis does not happen after-the-fact. Further, the DEA introduces this science with an assumption, which points to a lack of data. 1

Prior to this DEA, the Navy had relied on SEL to assess the potential effects of mid-frequency sonar on marine mammals and even admits (as seen above) in this DEA that it may be a better metric to use. The Navy's reason for this untried approach is because, "using SPL rather than SEL makes more data available."[3]

However, the Navy states that, "Based on the science available, marine mammals are likely to exhibit any of a suite of behavioral responses or combinations of behavioral responses upon exposures to sonar transmissions."[4] The Navy states that these responses can further vary depending on geographic characteristics, species, populations, differences in individuals, age, gender, reproductive status, social behavior and prior experience.[5] It becomes apparent that there is a need for more data, and the way to get that information is to collect it rather than change metrics or approaches.

For example, the Navy states in section 4.1.2.4.9 that it has been working "over the past several years" on developing an original metric for estimating the probability of "marine mammals being behaviorally harassed" by the effects of mid-frequency sonar. This new assemblage is called acoustic dose functions and it will "replace" the old acoustic thresholds used in the past.

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[3] Section 4.1.2.4.9.3a, page 4-63.
[4] Section 4.1.2.4.9, page 4-54.
[5] Section 4.1.2.4.9, pages 4-53 and 4-54. Further, section 4.1.2.4.9.4 page 4-63b states that, "Acoustic dose-functions will be interpreted carefully for beaked whales." OHA appreciates this particular attention to beaked whales (most likely because of the events in 1996 when an unusual stranding event took place involving 12 Cuvier's beaked whales in the Mediterranean Sea near Greece coinciding with sonar "sound detecting system trials," the nine Cuvier's beaked whales found dead on 24–25 September 2002 on the Canary Islands of Fuerteventura and Lanzarote in conjunction with the Neo Tapopn exercises, and the March 2000 occurance, when whales of four different species, including Cuvier's beaked whales, two minke whales, and a dolphin stranded in the Bahamas as a result of tactical mid-frequency sonar transmitted from U.S. Navy vessels). However, we find it odd that the Navy would choose to pay particular attention to this species when it also sees no connection between these deaths and sonar use. OHA stresses that no single species should be singled out for careful attention and that each potentially impacted species be given the same level of scrutiny.

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However, the Navy states that it will "continue to use acoustic thresholds to estimate the probability of temporary or permanent threshold shifts and for behavioral responses to explosives."[6] Then, on the very next page (4-56), the Navy states that it will "continue to use acoustic thresholds to estimate the number of marine mammals that might be 'taken' through sensory impairment" for mammals exposed to mid-frequency sonar and that the Navy will use "acoustic dose functions to estimate the number of marine mammals that might be 'taken' by behavioral harassment" due to exposure to mid-frequency sonar.

Not only is it unclear why the Navy chose to use an "original" approach in this DEA, using science developed over only the "past several years", but it is wholly unclear which approach they will use choose to use, how they will use the two of them together and when. This mass of confusion is further illustrated when the Navy states, "While the Navy's original approach to calculating dose function was used to estimate marine mammal exposures in this draft EIS, the Navy and NMFS are planning to utilize the NMFS approach to calculating acoustic dose-functions for the final EIS".[7]

It is also OHA's understanding that while the Navy and NMFS are working together, NMFS has not approved or accepted the Navy's "original approach" towards acoustic modeling. This DEA is misleading in that it suggests otherwise.

The Navy in this DEA also realizes that there is not enough data to measure the effects of its activities on marine mammals: "Existing studies of behavioral effects of man-made sounds in marine environments remain inconclusive."[8] Therefore the Navy has to rely on "observations of various animals, including humans" to base the relationship represented by acoustic dose-function and behavioral response.[5] Using "observations" that are not presented in the DEA of entirely different species and that are not even marine is not an adequate foundation for an "original" approach to be presented in a DEA.

Indeed, the Navy in section 4.1.2.3 feels free to state that: "Extrapolation from human and marine mammal data to turtles is inappropriate given the morphological differences between the auditory systems of mammals and turtles."[10] This is another example of how the analysis used in one section of the DEA is fine when it apparently suits the Navy, yet when the same analysis is used in another section it is refuted. It also serves as a source of concern for OHA about the integrity of the data produced and the analysis used to get it.

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[6] Section 4.1.2.4.9, page 4-55.
[7] See line 26, page 4-61, section4.1.2.4.9.3.
[8] Section 4.1.2.4.9, page 4-53.
[9] Section 4.1.2.4.9, page 4-56.
[10] The Navy then fails to give a specific threshold number for underwater detonations, which is a breach of NEPA requirements.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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An example of favorable conclusions taken from inconclusive data is seen in Section 3.1.2.3:

> The potential role of long-range acoustical perception in sea turtles has not been studied and is unclear at this time; anecdotal information suggests that the acoustic… Any signature of a turtle's natal beach might serve as a cue for nesting returns. However, the concept of sound masking is difficult, if not impossible, to apply to sea turtles. Although low frequency hearing has not been studied in many sea turtle species, most of those that have been tested exhibit low audiometric and behavioral sensitivity to low frequency sound. It appears, therefore, that if there were the potential for the mid-frequency sonar to increase masking effects of any sea turtle species, it would be expected to be minimal as most sea turtle species are apparently low frequency specialists. (emphasis added)

Moreover, because the Navy is using a new approach, the Navy then holds out its acoustic dose-functions analysis for marine mammals to other acoustic dose-functions uses in the Environmental Protection Agency for "water quality criteria," the Nuclear Regulatory Commission, the Centers for Disease Control and Prevention, the Food and Drug Administration, and the Occupational Safety and Health Administration. Giving a veritable laundry list of other agencies that have used this approach in their very different applications does not add credence to the Navy's new use of it. If such information is presented, a comparison and analysis as to how it relates to the Navy and this DEA needs to be given as well.

2 The purpose of the DEA is to weigh the environmental effects of various alternatives to the proposed project. OHA stresses that this cannot be done when the applicant creates original approaches for analysis in some cases, yet relies on the older approach in other cases, and then points out that they will not use either for the final EIS. It seems clear that even the applicant acknowledges that in this case, in regard to the effects of mid frequency sonar on marine mammals, that both a lack of information exists and that there will be an adverse effect.[11] In fact, the Navy states it will have to "interpret" acoustic dose-functions "to compensate for the biases and uncertainties that are inherent in the data used to produce them."[12] Therefore, OHA recommends adopting a precautionary approach.[13]

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[11] Section 4.1.2.4.9, page 4-53 states, "Though, active sonar could have various indirect, adverse effects on marine mammals by disrupting marine food chains, a species' predators, or a species' competitors." Also in Section 4.1.2.9.1, page 4-58, "Over time, as the amount of data available to generate acoustic-dose functions increases….If and when that kind of data becomes available." There is no data now or research planned to get it.

[12] Section 4.1.2.4.9.4a, page 4-63b.

[13] This principle has become a binding norm of customary international law. (1) Principle adopted by the UN Conference on the Environment and Development (1992) that in order to protect the environment, a

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OHA also finds it alarming that the Navy apparently intends to move forward with a recognized and stated lack of data solely when it benefits the Navy to do so. However, in other situations where a recognized lack of data exists, the Navy will actually cite to that as a reason for not pursuing a course of action which would inhibit the Navy. See, for example, the following:

> Ramp-up for sonar as a mitigation measure is also an unproven technique. The implicit assumption is that animals would have an avoidance response to the low power sonar and would move away from the sound and exercise area; however, there is no data to indicate this assumption is correct. Given there is no data to indicate that this is even minimally effective and because ramp-up would have an impact on the effectiveness of the military readiness activity, it was eliminated from further consideration.[14]

ENDANGERED SPECIES

4.1.2.6.2 page 4-134 states that, "The exposure numbers are given without consideration of mitigation measures." (emphasis added). The very next section estimates the effects on Endangered Species Act (ESA) listed species. Without exception it states, "Based on the model results, behavioral patterns, acoustic abilities of blue whales, results of past training operations, and the implementation of mitigation measures, the Navy finds that the HRC training events would not likely result in any death or injury to Blue whales, Fin whales, Humpback whales, North Pacific Right whales, Sei whales, Sperm whales, or Hawaiian Monk seals." (emphasis added). It is unclear why the Navy would state they would use exposure numbers without mitigation measures and then continue to use mitigation measures as part of their blanket 'no effect' conclusion for any endangered species. This is also the case for the preferred alternative 2. 4

Further, the mitigation measures in section 6.1.3 are inadequate. Having five watchstanders or lookouts with binoculars in poor visibility conditions or high seas (not to mention night time) is not enough. OHA also finds the procedures for when marine mammals are detected to be inadequate as well. Simply turning down the volume, waiting 30 minutes or moving 2,000 yards away is not enough. Some whales remain 5

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precautionary approach should be widely applied, meaning that where there are threats of serious or irreversible damage to the environment, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation. (2) The precautionary principle permits a lower level of proof of harm to be used in policy-making whenever the consequences of waiting for higher levels of proof may be very costly and/or irreversible. See, for example, Ocean Policy Statement by the President, March 10, 1983, accompanying Proclamation No. 5030, 48 Fed. Reg. 10,605 (1983), the 1995 Migratory and Straddling Stocks Agreement and the 2000 Honolulu Convention, and it has also been recognized in regional and national decisions.

[14] Section 6.1.5, page 6-8.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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submerged for long periods. Others remain near the surface with just a small amount showing. Turtles only surface with their nostrils. Listening for silent animals that are not vocalizing will not work. There are too many variables to account for, and these measures fall short. Further, this violates 50 CFR sec. 404.9(c) of the Papahānaumokuākea Marine National Monument Monument regulations requiring the Navy to avoid adverse impacts to Monument resources.

Additionally, the DEA on page 4-148 states that, "Mitigation measures would be implemented to prevent exposure of marine mammals (and sea turtles) to impulsive sound or sound pressures from underwater detonations that would cause injury." Yet on page 4-17, "A small number of fish are expected to be injured by detonation of explosive, and some fish located in proximity of the initial detonations can be expected to die."

OHA finds it highly unlikely that someone with binoculars in the open ocean would be able to see a submerged turtle. It is even more unlikely that underwater detonations that are admittedly capable of killing fish will not even harm marine mammals and turtles due to inadequate (or any, for that matter) mitigation measures.

It is also apparent that the priority even in mitigation measures is not to mitigate:

> Navy aircraft participating in exercises at sea will conduct and maintain, when operationally feasible and safe, surveillance for marine species of concern as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties.[15]

It is clear that marine mammals are secondary to operational duties and feasibility, and this is not acceptable. The purpose of EIS law is not to justify the environmental effects of government actions after economic and technical decisions have been made. It appears that this DEA is being prepared to do so, or merely to discuss and possibly mitigate environmental effects, rather than to serve as an "informational document" to guide decision-making. While there is still much value to discussion and mitigation of environmental problems, this use of the EIS process misses the point of the EIS law to encourage discussion of environmental issues before important decisions are made.

3

Of further concern to environmental species is the analysis used to determine the yearly marine mammal exposures from the ASW (TRACKEX, TORPEX, RIMPAC, USWEX, Multiple Strike Group) and RIMPAC with two Strike Groups exercises. Tables 4.1.2.6.9-1 and 4.1.2.7.1-1 in section 4.1.2.7.1 show a total of 668 dose-function exposures (of 195 dB – TTS 195-215 dB re 1 μPa2-s) to the Hawaiian Monk seal from these two exercises.

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[15] Section 6.1.3, page 6-3.

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However, in the example illustrated in figure 4.1.2.4.9-2 using the "particular acoustic dose-functions the Navy and NMFS (National Marine Fisheries Service) developed for this EIS", it states that "about 50 % of the marine mammals exposed to mid-frequency active sonar at a received level of 180dB would be expected to exhibit behavioral responses that NMFS would classify as harassment for the purposes of the MMPA (Marine Mammal Protection Act)." This apparently means that while there are 668 dose-function exposures to monk seals, this could actually only reflect those animals that "exhibit behavioral responses" to the exposure. Many more will be exposed, however, to a sound that could qualify as harassment under the MMPA and also a take under the Endangered Species Act (ESA). Figure 4.1.2.4.9-2 uses a 50% ratio, which would mean that the entire population of monk seals in the entire island would be exposed. This needs to be clarified. A specific percentage or curve needs to be drawn in the DEA analysis.

The DEA on page 4-57 states,

> Using both of these methods (the confusing hybrid of acoustic dose-functions and acoustic thresholds) to predict the number of marine mammals that might be "taken" by mid-frequency active sonar during training exercises will over-estimate the number of mammals by between approximately 5 and 10 percent.

While this may sound good and serve to ensure that the Navy has applied for enough take permits, it is not what the law requires. Both the MMPA and the ESA require a specific number for a limited number of permits. OHA stresses that an over-estimate is not acceptable and asks for a specific data set. This only adds to our concern that there is not enough data currently available for what the Navy proposes and, therefore, we are not able to make an informed decision.

OHA recognizes that the Hawaiian Monk seal is in crisis because the population is now declining at a rate of about 4 percent yearly.[16] Biologists estimate the current population at about 1,200 individuals.[17] Biologists' models predict the species' population will fall below 1,000 animals within the next three to four years, which places the Hawaiian Monk seal among the world's most endangered species.[18] All of this prompted the National Oceanic and Atmospheric Agency to sign a new Hawaiian Monk seal recovery plan in August 2007 which stated, "the Hawaiian monk seal is headed to extinction if urgent action is not taken."[19]

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[16] Honolulu Advertiser, August 21, 2007.
[17] Ibid.
[18] Ibid.
[19] Recovery Plan, page V.

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Further, most of the current Hawaiian Monk seal population is found in the Hawai'i Range Complex in the Northwestern Hawaiian Islands and the Papahānaumokuakea Marine National Monument. The DEA states on page 6-18, Section 6.4.5 that, "No specific threats to monk seals from activities associated with the HRC were identified in the Plan." This statement contradicts all the prior evidence. OHA finds that acoustic-dose functions that will expose half to all of the endangered Hawaiian Monk seal population are not acceptable. The Hawaiian Monk seal is but one example of the many species that will be affected by this proposed action. Further, how the Navy then finds such small numbers of takings under the MMPA is unclear.[20]

NORTHWESTERN HAWAIIAN ISLANDS

In Section 3.2 on page 3-77, the DEA states,

> Depending on the trajectory, missiles launched from the Pacific Missile Range Facility (PMRF) have the potential to overfly portions of the Papahanaumokuakea Marine National Monument. Of particular concern is missile overflight of Nihoa and Necker, which are the islands closest to the Main Hawaiian Islands.

OHA notes that all the islands are of equal concern and should be given the same level of analysis and attention. This is true for the Papahānaumokuākea Marine National Monument as well (note correct accents without which a different meaning is given). Hawaiian stewardship and perpetuation of Native Hawaiian culture is holistic and fully integrated with the natural and cultural resources. Papahānaumokuākea offers a vast, sacred and protected area from which to learn and reflect from that cannot be recreated or modeled anywhere else. "O ka mea I kūpono i kō kākou no'ono'o aku, 'oia kā kākou e mālama." ("What is suitable for us to reflect on is what we should preserve.") (Fornander)

In Hawaiian traditions, the Northwestern Hawaiian Islands are considered a sacred place, a region of primordial darkness from which life springs and spirits return after death (Kikiloi 2006). Much of the information about the NWHI has been passed down in oral and written histories, genealogies, songs, dance, and archaeological resources.[21] According to these Native Hawaiian sources, Papahānaumokuākea existed since the beginning of time. Semantically the name of the monument resonates with the Native Hawaiian sense of place and origin. The earth mother (Papa) and the sky father (Wakea)

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[20] The DEA on page 4-148 says that, "Based on analytical modeling results, five endangered marine mammal species occurring within the Hawaii OPAREA may be exposed to acoustic energy that could result in TTS or behavioral modification, including the fin whale, humpback whale, sei whale, sperm whale, and Hawaiian monk seal."

[21] The Papahānaumokuākea Marine National Monument website, http://hawaiireef.noaa.gov/heritage/welcome.html, September 10, 2007.

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joined in union and gave birth to not only the Native Hawaiians, but also the islands themselves. This cosmology is embodied in the name of the monument itself and reminds us of not only our connection to the land, but also of our responsibilities to it.

Further, the extensive coral reefs found in Papahānaumokuākea Marine National Monument are home to over 7,000 marine species, one quarter of which are found only in the Hawaiian Archipelago.[22] Also 21 species of tropical and subtropical seabirds breed in Papahānaumokuākea.[23] Virtually the entire world's populations of Laysan Albatross and Black-footed Albatross live there[24], as well as populations of "global significance" of Red-tailed Tropicbirds, Bonin Petrels, Tristram's Storm-Petrels, and White terns[25]. It is the largest seabird rookery in the world with four endangered endemic land birds which are found nowhere else in the world.[26] Papahānaumokuākea also has at least six species of endangered plants listed under the Endangered Species Act (ESA) and contains "countless endemics."[27] Almost all of the entire population of the Hawaiian Monk seal resides there, and it provides "nearly all" of the nesting habitat for the threatened Hawaiian green sea turtle in Hawai'i.[28] Four other endangered turtles and six ESA listed whales are found there.

This particular area of the Hawai'i Range Complex (HRC) overlaps one monument, two refuges, one reserve, and one national memorial.[29] The area that this project proposes to 7

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[22] Ibid at http://hawaiireef.noaa.gov/about/welcome.html .

[23] Application for the World Heritage U.S. Tentative List, Papahānaumokuākea National Marine Monument, page 69.

[24] 99 and 98 percent, respectively and both are listed as vulnerable and endangered by the International Union for Conservation of Nature and Natural Resources (IUCN).

[25] Ibid.

[26] The final rule authorizing the Department of Defense to take migratory birds during military readiness activities (50 CFR Part 21) was published in the Federal Register on 28 February 2007. The rule states that the Armed Forces must confer and cooperate with the USFWS on the development and implementation of conservation measures to minimize or mitigate adverse effects of a military readiness activity if it determines that such activity may have a significant adverse effect on a population of a migratory bird species. OHA notes that this is such a case. See also, Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (10 January 2001).

[27] Ibid., page 68.

[28] Ibid., page 69.

[29] Papahānaumokuākea Marine National Monument, the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve, the Hawaiian Islands National Wildlife Refuge, the Midway Atoll National Wildlife Refuge, and the Battle of Midway National Memorial. As a sanctuary, the National Marine Sanctuaries Act (NMSA) 16 U.S.C. § 1431 et seq. authorizes the Secretary of Commerce to designate as National Marine Sanctuaries areas of the marine environment that possess conservation, recreational, ecological, historical, research, and educational, or aesthetic resources and qualities of national significance, and to provide a comprehensive management and protection of these areas. To protect the area designated, any Federal action that is likely to destroy, cause the loss of, or injure a sanctuary resource <u>must consult with the Secretary of Commerce prior to commencement of the action and adhere to reasonable and prudent alternatives set by the Secretary of Commerce</u>. (emphasis added) NMSA 16 U.S.C. § 1431

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shoot missiles and conduct war games on is also being considered as a World Heritage site. The President of the United States set aside Papahānaumokuākea as the world's largest, most protected marine preserve in the world. All of these actions recognize the special status and importance of the area that this DEIS treats in section 3.2. Yet the Navy fails recognize it. In fact, their analysis of the Northwestern Hawaiian Islands/ Papahānaumokuākea begins with:

> Of the 13 environmental resources that would be affected by the No-action Alternative, Alternative 1, or Alternative 2 considered for analysis, air quality, airspace, geology and soils, hazardous materials and waste, heath and safety, land use, noise, socioeconomics, transportation, utilities, and water resources are not addressed.[30] (emphasis added).

8

OHA expresses concerns over missile debris not only falling onto the islands and damaging them, but also falling into the water where it will sink to the bottom and be pushed about by the currents thereby destroying the very coral reefs that Papahānaumokuākea was set up to preserve. Even if the missile tracks are moved, there will still be unanalyzed and accounted for impacts in Papahānaumokuākea that this DEA fails to address.

For example, sonar buoys will be dropped from planes via parachutes. There is no mention in the DEA of what happens to the parachutes and the potential impacts (of which there are many). Also, radar observations show that chaff can spread over several hundreds of miles and stay in the air for up to a day.[31] The Air Force reported that chaff has a potential but remote chance of collecting in reservoirs and causing chemical changes that may affect water and the species that use it. The Air force also reported that surface-feeding or bottom-feeding animals and fish may ingest chaff, but this only affects a few individual animals and has a low impact on species populations except in the case of protected species.[32] Of further concern is that some types of chaff may not only be ingested, but that there is a likelihood that birds would use chaff for nests and expose the young.[33] These are but two examples of the kinds of impacts that are probable as a result of the Navy's actions and which are not addressed in the DEA. In fact, we are even told that they are "not addressed."

The EIS process is not discretionary. It does not allow for blanket exemptions of areas not to be treated. OHA urges that a full and careful analysis of each impact be given. NEPA calls for such an analysis so that impacts and alternatives can be weighed and

[30] Section 3.2, page 3-77.
[31] United States General Accounting Office, September, 1998 report, DOD Management Issues Related to Chaff.
[32] Ibid.
[33] Ibid.

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informed decision making results. The Navy stating that it will not address some things and failing to address others adequately is a breach of this requirement.

Further, OHA finds it odd that while the rest of the world finds this area worthy of multiple and overlapping areas of protection and elevated status, the Navy would start their analysis of this area by seeking to minimize their analysis of the potential impacts resulting from their actions in this area.

OHA does, however, appreciate that the Navy recognizes its duty under the Presidential Proclamation establishing the Monument:

> 3. All activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities.
>
> 4. In the event of threatened or actual destruction of, loss of, or injury to a monument resource or quality resulting from an incident, including but not limited to spills and groundings, caused by a component of the Department of Defense or the USCG [U.S. Coast Guard], the cognizant component shall promptly coordinate with the Secretaries for the purpose of taking appropriate actions to respond to and mitigate the harm and, if possible, restore or replace the monument resource or quality.[34]

The DEA then states on the same page, "Because Nihoa and Necker are more likely to be impacted by program activities, they are discussed in more detail at the end of this section."[35] Once again, OHA urges that environmental assessments are not discretionary. The Navy is not free to treat some areas more carefully than others because they feel that they have assessed their own actions and are aware of all the potential impacts. Clearly this is not reasonable, or even possible, and not a part of the DEA/National Environmental Policy Act (NEPA) requirements. OHA also notes that even the name that the Navy uses for Necker island alludes to their inhibited analysis. Necker is known as Mokumanamana.[36]

Additional duty to protect this area is added with Executive Order (EO) 13089 Coral Reef Protection (63 FR 32701) which requires the Navy "to preserve and protect the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems and the marine environment." It is also (as stated in the DEA) DOD policy to protect the U.S. and International coral reefs and to avoid impacting coral reefs to the maximum extent possible.

[34] U.S. Government, The White House, 2006, as cited in DEA, page 3-79.
[35] Section 3.2, page 3-79.
[36] Even Wikipedia lists these names for these islands. See, http://en.wikipedia.org/wiki/Nihoa .

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OHA, which has a seat on the seven member Monument Management Board, notes that the area of the Northwestern Hawaiian Islands, known as Papahānaumokuākea, contains many culturally significant sites and is generally of great cultural significance to Native Hawaiians. The first part of the Hawaiian cosmology begins with Pō, the age of spirit or cosmic night. According to this creation chant the first physical being created was a coral polyp, from which all other things followed.[37] It is also the home to which those spirits return after physical death.[38] This area contains the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve and contains 4,500 square miles of coral reefs.[39] The principal purpose of the Reserve is the long-term conservation and protection of the coral reef ecosystem and related marine resources and species of the Northwestern Hawaiian Islands in their natural character.

Hawaiians themselves are further connected to Papahānaumokuākea by their ʻaumakua, kumu paʻa, and kino lau. These are their ancestral and supernatural body forms manifested in the animals and plants of Papahānaumokuākea.[40] 9

All of this is amply evidenced by the many archeological sites found in Papahānaumokuākea. The Navy only lists 78 sites for Nihoa when there are actually now 89 known sites.[41] Mokumanamana has 52 sites which are not discussed or even mentioned in the Navy's DEA.[42] On both of these islands there are religious and agricultural sites that indicate habitation starting a thousand years ago. This is an example of what the analysis in the DEA for an area that the Navy says is of "particular concern."

Native Hawaiians today continue to maintain their strong cultural ties to the land and sea and are ever-realizing their own connections to this area. It is believed Mokumanamana played a central role in Hawaiian ceremonial rites and practices a thousand years ago because it is directly in line (230 34.5' N) with the rising and setting of the equinotical sun on the path called the tropic of Cancer. In Hawaiian this path is called "ke ala polohiwa a Kane" or the "way of the dark clouds of Kane," which has been translated to mean death, or the westward passage of the ancestral spirits. Mokumanamana sits Public centrally on the axis between two spatial and cultural dimensions. Symbolically, Mokumanamana splits darkness and light, afterlife and existence, pō and ao. On the summer solstice, the sun travels slowest across the sky going directly over Mokumanamana. This aligns with the strategic concentration of ceremonial sites on the

37 Johnson, Rubellite, Kawena, Kumulipo, Hawaiian Hymn of Creation, Volume I, 1981, page 4.
38 Application for the World Heritage U.S. Tentative List, Papahānaumokuākea National Marine Monument, page 73.
39 Northwestern Hawaiian Islands Marine National Monument, A Citizen's Guide, page 3.
40 Some examples are turtles, whales, sharks and eels.
41 Application for the World Heritage U.S. Tentative List, Papahānaumokuākea National Marine Monument, page 42.
42 Ibid., page 65.

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island and serves as a reminder of the important spiritual role it plays in the Hawaiian culture.

OHA finds the Navy's analysis of these important sites in the DEA woefully inadequate. Their treatment in section 3.2.2.2 called, Cultural Resources-Northwestern Hawaiian Islands Onshore is only one page long. There is no attempt to asses the cultural significance of any of the other islands, the animals or plants and yet they admit that there is both a duty to avoid adverse impacts under the Presidential Proclamation establishing the Monument (numbers 3 and 4), and a potential for those impacts to occur. 10

OHA further notes that there is no section 106 analysis under the National Historic Preservation Act. This is a federal undertaking that directs the agency to take into account the effects of its actions on historic properties and provide the Advisory Council on Historic Preservation a reasonable opportunity to comment.[43] Below is the entire content of the Navy's analysis in Section 4.2.2.2 Cultural Resources- Northwestern Hawaiian Islands: 12

> Missile defense RDT&E operations, including THAAD, have the potential to generate debris that falls within areas of the Northwestern Hawaiian Islands, particularly the vicinity of Nihoa. Some of these islands are known to have significant cultural resources sites, and the islands of Nihoa and Necker are listed in the National and Hawaii State Registers of Historic Places. Debris analyses of the types, quantities, and sizes associated with the PMRF missile exercises indicate that the potential to impact land resources of any type is very low and extremely remote. In addition, trajectories can be altered under certain circumstances to further minimize the potential for impacts. As noted in Section 4.2.2.1, future missions will include consideration of missile flight trajectory alterations, if feasible, to minimize the potential for debris within these areas. As a result, impacts on cultural resources within the Northwest Hawaiian Islands are not expected.

OHA stresses that many of the places and objects in this area are eligible for inclusion in the National Register of Historic Places. As evidence of this, Mokumanamana was added to the National Register of Historic Places in 1988. As such, OHA, a federally listed Native Hawaiian Organization, is requesting assurances that a section 106 analysis be done as part of a much improved cultural resources analysis for the Northwestern Hawaiian Islands area, known as Papahānaumokuākea. 11

OHA appreciates being brought in to this early consultation and looks forward to further commenting on this project as it develops. Thank you for the opportunity to comment. If

43 Section 106 of the national Historic Preservation Act, 16 U.S.C. 470f.

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you have any further questions or concerns please contact Grant Arnold at (808) 594-0263 or granta@oha.org.

Sincerely,

Clyde W. Nāmu'o
Administrator

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C: Patrick Leonard, Field Supervisor
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UNIVERSITY OF HAWAI'I AT MANOA
Environmental Center

September 17, 2007
RE:0766

Public Affairs Office
Attn: HRC-EIS/OEIS
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawaii 96752-0128

Dear Sir/Madam:

NEPA Draft Environmental Impact Statement
Hawaii Range Complex

The Hawai'i Range Complex (HRC) consists of open ocean areas (outside 12 nautical miles (nm)), offshore areas (within 12 nm from land), and onshore areas geographically situated on and around the Hawaiian Islands. The complex covers 235,000 square nm around the main Hawaiian Islands chain and a 2.1 million square nm Temporary Operating Area (TOA) of sea and airspace. The study area is a complex consisting of instrumented ocean areas, airspace, ocean surface operation areas, targets, and land range facilities. The Navy proposes to support and conduct current and emerging training and defense related research, development, test and evaluation (RDT&E) operations in the HRC and to upgrade or modernize range complex capabilities to enhance and sustain Navy training and defense-related testing. This would be accomplished by increasing training operations and implementing necessary force structure changes; supporting three transient Strike Group training exercises at the same time and an additional aircraft carrier during Rim of the Pacific (RIMPAC) Exercises; operating a Portable Undersea Tracking Range; constructing and operating an Acoustic Test Facility; enhancing research, development, test and evaluation, and training operations at the Pacific Missile Range Facility (PMRF); and using the TOA as required

This review was conducted with the assistance of Michael Jones, UHM Physics and Astronomy.

General Comments

Section 2.2.1.2 on Alternative Locations for Training Conducted in the Hawaii Range Complex (pages 2-9 to 2-11) does not adequately address other alternative training locations. The whole section focuses on why Hawaii is the best place for the training. This section consists of two pages and concludes that it is "neither reasonable, practical nor appropriate to seek alternative locations" No details are given to justify this conclusion. Two examples make it clear that alternative locations for some activities do exist. One is field carrier landing practice (FCLP). It is noted on page 2-14 that no FCLP training operations are part of the baseline so apparently some alternative locations for FCLP exist. The DEIS does not compare these locations with those at PMRF and MCBH proposed in alternatives 1 and 2 so there is no basis to judge whether these new 1

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locations are needed. Because no carriers are homeported in Hawaii, there seems to be little justification for FCLP in Hawaii. The other example is major training exercises. The recent Valiant Shield exercises near Guam seem to be a reasonable and practical alternative to similar exercises in Hawaii. The 10 August 2007, article in the Honolulu Star-Bulletin noted that four Hawaii-based ships participated and reported that Admiral Robert Willard, the Pacific Fleet Commander, "said Guam's military training ranges offered a perfect location for a large-scale exercise." This "perfect location" should be evaluated as an alternative in the EIS. An adequate discussion in this section would include other areas on the West Coast of the United States or in the Territory of Guam and the Commonwealth of the North Mariana Islands.

The section on No-Action Alternative (pages 2-11 to 2-12) is a restatement of the project itself. The No-Action Alternative assumes that training has always taken place in Hawaii and always will. What is not discussed, however, is what would happen if training in Hawaii were abandoned as a result of finding another area to train.

2 We would also like to note that our reviewer was denied access to one of the references listed on page 9-55, "Laser Safety Survey Report for the Pacific Missile Range Facility Open Ocean Range," P. Solis, 2004. It is difficult to review the DEIS when we cannot check the references. Are there others references that were not accessible to the public? They should be noted in the documents with an explanation of why they are not accessible.

Specific Comments on the DEIS

Executive Summary (p. ES-57)

3 Table ES-11 includes high energy laser tests and operations that "present the potential for fires on Niihau" as a health and safety issue. If this implies that high-power laser beams could be projected at targets on or near Niihau, a detailed evaluation is needed in the final EIS.

Pacific Missile Range Facility (p. 2-22)

4 It would be useful to compare the propellant weights of the missiles shown in Figure 2.2.2.4.1-1 on page 2-22.

Missile Defense (p. 2-24 – 2-29)

5 Figure 2.2.2.4.1-3 on page 2-26 shows existing missile flight corridors from PMRF. What environmental analyses have been done for the corridors to the north and south? What missiles have been launched along these corridors?

20 Figures 2.2.2.4.1-4 and 2.2.2.4.1-5 on pages 2-27 and 2-28 show conceptual intercept scenarios involving air or sea targets which have ranges exceeding 400 nautical miles (about 740 kilometers) and thus could violate the INF Treaty and possibly the START Treaty. The DEIS has no discussion of INF Treaty restrictions on long-range air-launched and sea-launched targets or

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20 START Treaty restrictions on sea-launched targets. As noted in a comment on the 1998 PMRF Enhanced Capability DEIS (page 9-323 of the 1998 PMRF Enhanced Capability final EIS.), INF Treaty Article VII, paragraph 12d restricts launches for research and development so that "the launchers for such booster systems are fixed, emplaced above ground and located only at research and development launch sites which are specified in the Memorandum of Understanding." In addition, the START Treaty Article V, paragraph 18a, prohibits tests and deployment of "ballistic missiles with a range in excess of 600 kilometers, or launchers of such missiles, for installation on waterborne vehicles, including free-floating launchers, other than submarines." The 1998 PMRF Enhanced Capability EIS and the 2003 GMD ETR EIS did not consider treaty compliance despite the fact that previous analyses (1994 TMD ETR EIS and 1998 TMD ETR Draft Supplemental EIS) did consider this issue. The 1994 TMD ETR EIS explicitly refers to the INF Treaty restrictions on page 2-10 and states, "In order to comply with the Intermediate-Range Nuclear Force (INF) Treaty, mobile and fixed sea launch platforms for targets would be located no more than 500 km (311 mi) from the planned target impact point." The 1998 TMD ETR DSEIS notes that the START treaty prohibits launches from sea-based platforms and that launches from ships are restricted to ranges less than 600 kilometers. There can be no meaningful public evaluation of the proposed tests without a detailed discussion of treaty compliance in the final EIS. Responses such as, "We will not implement any actions that are not in accordance with current U.S. policy on treaty compliance" (page 9-331 of the 1998 PMRF Enhanced Capability final EIS) or "This is beyond the scope of the EIS."(page 8-326 of the 2003 GMD ETR final EIS) are neither reassuring nor informative.

Intercept Targets Launched in the TOA (p. 2-42 and 2-43)

6 Debris from intercepts of targets launched from Wake Island, Kwajalein, or Vandenberg AFB could pose a hazard to aircraft in the flight corridors shown in Figure 2.2.3.4-1 on page 2-43. The final EIS should show diagrams of the debris areas with jet routes superimposed. Such diagrams for other intercept scenarios are in Figures 2.1.8-1 to 2.1.8-6 in the 2003 GMD ETR final EIS.

Micro-Satellite Launch (p. 2-42)

7 The discussion of the Super Strypi system on page 2-42 gives a total propellant weight of over 48,000 pounds, which is considerably larger than that for the Strategic Target System (36,750 pounds). It is stated that the Super Strypi "would require a 1,500-ft radius circle ground hazard area around the launcher." The 1,500-ft radius circle could refer to the ESQD arc shown in Figure 2.2.2.4.1-2 rather than the radius of the ground hazard area for the launch, which is 10,000 feet for the Strategic Target System. Table E-8 on page E-9 gives ground hazard radii of 2,000 feet for "most unguided systems" and 6,000 to 10,000 feet for guided systems. We understood from a 23 August 2007, meeting that the Super Strypi was a rail-launched system and thus would have a smaller GHA than that for the Strategic Target System. The final EIS should clarify this, explicitly show GHA diagrams for Super Strypi launches, and give details about the determination of the ground hazard area.

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Directed Energy (p. 2-65)

Page 2-65 contains the statement that, "Construction of the Maritime Directed Energy Test 8
Center would require separate/additional environmental documentation." Presumably this
documentation would include analysis of the serious safety issues associated with such high-power
laser beams projected onto air and surface targets. The final EIS should at least examine alternative
locations, such as the White Sands Missile Range or a floating platform, for such tests.

Advanced Hypersonic Weapon (p. 2-65 – 2-67)

The DEIS states on pages 2-65 and 2-66 that testing for the Advanced Hypersonic Weapon 9
would include two launches of the Strategic Target System and two launches of Orion boosters
from KTF. Because of the larger amount of propellant in the Orion boosters (41,760 pounds) than
in the Strategic Target System (36,750 pounds), some justification is needed for use of the same
ground hazard area for Orion launches. Is a detailed environmental analysis planned for Orion
launches from KTF? If the launch azimuth for these launches is other than 280 degrees, diagrams
of the ground hazard areas should be shown either in the final EIS or a subsequent environmental
analysis.

Soils (p. 123)

The reference for the lead concentrations near the Vandal launch site on page 3-123 does 21
not indicate which of the many U.S. Department of the Navy references in section 9.0 is intended.
As noted in comments by Michael Jones on the 1998 PMRF Enhanced Capability EIS (page 9-378
of the final EIS), soil sampling results are in the PMRF Environmental Baseline Study dated
January 1996. A reference to this document, which was designated "for official use only," was
included on page 10-13 of the final EIS. The Restrictive Easement for STARS and Vandal 22
launches in Appendix C of the final EIS states that the GRANTEE will "clean up any debris or any
releases of hazardous substances resulting from its launches in accordance with all federal and
applicable State and local environmental laws." There seems to be no exemption for the area
within 100 feet of the launch pad.

Ship Collisions (p. 4-25)

The DEIS notes on page 4-25 that the Navy has adopted a standard operating procedure that 11
reduces potential collisions with surfaced marine mammals. Have there been any collisions with
surfaced mammals and naval vessels?

Hazards During Vehicle Launch/Flight (p. 4-258 – 4-259)

The DEIS mentions on page 4-259 that ground hazard areas (GHA) typically extend from 12
1,000 to 20,000 feet from the launch point. However, previous environmental analyses left
unresolved safety issues involving Strategic Target System and THAAD launches at PMRF. No

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D-W-0092 (cont.)

September 17, 2007
Page 5 of 7

detailed hazard areas have been shown for Strategic Target System launches at azimuths other than 12
280 degrees. Similarly, no diagrams showing the THAAD hazard area were given in the 2002
THAAD EA and no detailed analysis was cited to justify the reduction in the hazard area radius
from 20,000 feet in the 1998 PMRF EIS to 10,000 feet in the THAAD EA.

Off-based Land Use (p. 4-266)

The DEIS has a brief discussion on page 4-266 of the restrictive easement which permits 13
removal of people from the part of Polihale State Park within the GHA for some missile launches.
It should also be noted that this easement can be employed a maximum of 30 times per year --
including times for which the area is cleared but no launch occurs. The final EIS should give
information about the number of times the easement has been used in the past several years and
how many times would be expected with alternatives 1 and 2.

Future RDT&E Operations (p. 4-286)

The DEIS mentions on page 4-286 and again on page 4-290 that the Directed Energy Test 14
Center's "[b]asic Facility Requirements report has not being completed." The final EIS should
clarify whether this report has been or is being completed. Where will it be available for public
review?

Projects Analyzed For Cumulative Impacts (p. 5-1 – 5-13)

Table 5.2-1 does not include any other missile testing programs in the Pacific as part of 15
cumulative impacts. It would be useful for the final EIS to give the cumulative numbers of
launches at the various launch sites for tests analyzed in the 1998 PMRF Enhanced Capability EIS,
the 2001 North Pacific Targets Program EA, the 2002 THAAD EA, and the 2003 GMD ETR EIS.
The 2004 draft BMDS PEIS estimated 515 launches between 2004 and 2014. Any tests of the
Kinetic Energy Interceptor program near PMRF should be included. The final EIS should also
include any test launches of offensive missiles. For example, tests of the Trident D5 were reported
to be planned near PMRF in 2005.

Appendix K

Appendix K contains a general discussion of missile launch safety. It is noted on page K-1 16
that risk values depend on the probability of vehicle failure. Pages K-5 and K-6 briefly discuss
rocket motor failure and note that three types of guidance/control failures have been observed in
previous launches. However, no quantitative estimates of failure probabilities are given. In fact, no
such estimates were given in either the 1994 BMD draft PEIS or in the 2004 draft BMDS PEIS.
This information is necessary for any meaningful assessment of the risks from launch failures. As
noted in an earlier comment by Michael Jones, on the 2003 GMD ETR DEIS (page 8-219 in the
final EIS), an analysis of Minuteman test launches found a rate of severe failures of 15%. The
Strategic Target System had no failures in four launches at PMRF and two serious failures (9
November 2001 and 25 May 2007) in three launches from Kodiak.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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Because there have been serious consequences from past accidents during missile launch and Navy training activities, it is worth noting these as examples of what can go wrong. In December 1988, a commercial ship near Kauai was hit by a missile launched from an aircraft and one of the ship's crew was killed. The 15 June 1993 Minuteman failure at Vandenberg AFB started a brush fire that burned 1,000 acres. (This accident is relevant to PMRF because a similar failure there could trap people in the north half of Polihale State Park.) On 4 May 1994, two 20 mm depleted uranium rounds were accidentally fired inland from the Aegis cruiser Lake Erie while it was moored in Pearl Harbor. The 8 July 1994 Vandal launch failure at PMRF resulted in elevated lead concentrations near the launch pad. The most regrettable incident was the sinking of the Japanese ship Ehime Maru by a Navy submarine on 9 Feb. 2001.

The 1998 PMRF Enhanced Capability EIS explicitly excluded the Navy Theater-Wide System (subsequently called Sea-Based Midcourse in MDA Fact Sheets dated March 2002 and January 2003 and now called Aegis BMD) from evaluation and asserted (page 9-332), "This document covers enhanced capabilities for PMRF to support Area Defense and the Aegis Leap Intercept. The Theater-Wide program is not sufficiently developed to be included in this analysis." The conceptual intercept scenarios analyzed (e.g. Figure 2.3.5-1 of the final EIS) involve only a "Ship Area Interceptor" and targets launched within 1200 kilometers of PMRF. According to the January 2003 MDA Fact Sheet, the Aegis Leap Intercept (ALI) phase was completed with intercepts in January and June 2002. It further added, "With the completion of ALI, Aegis BMD is now transitioning to intercepts against more stressing ballistic missile targets and target scenarios based upon technological advances in associated risk reduction activities." It is clear from earlier BMDO Fact Sheets that the ALI tests were part of the Theater-Wide program. BMDO Fact Sheet AQ-99-03 on Navy Theater Wide (NTW) stated, "The NTW flight demonstration phase is the AEGIS LEAP Intercept (ALI)." BMDO Fact Sheet AQ-99-02 described the Navy Area program as using AEGIS ships and SM-2 interceptors. An article in the16 December 2001 New York Times reported that the Navy Area program had been canceled by the Pentagon. No subsequent environmental analysis has been done even though Aegis BMD tests have been done near PMRF using the same interceptor (SM-3) as the Theater-Wide System. Thus it seems that environmental analyses have been done only for a canceled program and a completed program, but not for an ongoing program. The final EIS should evaluate Aegis BMD tests, including conceptual intercept scenarios, or indicate when separate environmental analyses of these tests will be done.

SEP-17-2007 MON 04:21 PM UH-ENVIRONMENTAL CNTR. 99563980 P. 02

COMMENT NUMBER
D-W-0092 (cont.)
18

September 17, 2007
Page 7 of 7

For these reasons, we find that the DEIS is inadequate and should be revised and resubmitted for public review. Thank you for the opportunity to review this DEIS.

Sincerely,

Peter Rappa
Environmental Review Coordinator

cc: OEQC
James Moncur
Michael Jones

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0093

The Chamber of Commerce of Hawaii

Since 1850

September 11, 2007

Mr. Tom Clements
Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kauai, Hawaii 96752-0128

Dear Mr. Clements:

We are in receipt of the Draft Environmental Impact Statement (DEIS) for the Hawaii Range Complex and offer the following comments.

We agree that the security threats faced by our 21st century naval force require that the U.S. Navy take action to upgrade and modernize the Hawaii Range Complex. The measures proposed should provide the level of training necessary to prepare our combat-ready naval forces to win the ongoing war against terrorism, deter aggression, and maintain freedom of the seas as mandated by Federal law.

We believe that this level of readiness is essential to meeting the nation's security objectives, and U.S. commitments with Asia Pacific nations. It has enabled the U.S. Navy to join with the U.S. Army, Marine Corps, and Air Force in successfully maintaining peace and stability within the region and providing humanitarian assistance in the wake of disasters and other emergencies. These efforts have strengthened U.S. relations in the region and served as the catalyst in enabling the growth of a thriving global economy.

1 In reviewing the DEIS, we believe that the Navy has studied the impacts of the proposed alternatives and complied with the spirit and intent of Federal environmental laws. We further believe that the depth of the study is a continuance of the Navy's outstanding record in protecting, restoring, and enhancing Hawaii's fragile environment.

Thank you for this opportunity to comment on the DEIS.

Sincerely,

James Tollefson
President & CEO

1132 Bishop Street, Suite 402 • Honolulu, Hawaii 96813 • Phone: (808) 545-4300 • Facsimile: (808) 545-4369

COMMENT NUMBER
D-W-0094

Bryan J. Baptiste
Mayor

Beth A. Tokioka
Director

Office of Economic Development
County of Kaua'i
4444 Rice Street, Suite 200
Lihue, HI 96766
(808) 241-6390 Tel * (808) 241-6399 Fax

September 11, 2007

Public Affairs Officer
Pacific Missile Range Facility
Box 128
Kekaha HI, 96752

Re: Hawai'i Range Complex EIS

To whom it may concern:

Allow me to express my support for continued research and development efforts taking place at the Pacific Missile Range Facility (PMRF) on Kaua'i.

While this work is vitally important to our nation's security, it is also makes a significant contribution to our island's economy. Hundreds of jobs for residents of Kaua'i – primarily on the west side of the island where economic opportunities are limited – are provided through PMRF and its affiliated contractors.

We have always found the leadership at PMRF to be a willing partner in community efforts of all kinds. Their volunteerism and assistance during emergency response efforts over the years has been tremendous. Whenever issues of community concern and importance arise, PMRF has always been willing to meet and search for the best possible solution for all involved.

Balancing care for environment with national security and economic opportunity is critical to our island, and we have found that PMRF has been an outstanding partner in this effort. We hope that the results of this review will allow the work currently being undertaken at PMRF to continue and grow in the years to come. 1

Sincerely,

Beth Tokioka

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0095

Bryan J. Baptiste
Mayor

Beth A. Tokioka
Director

Office of Economic Development
County of Kauai
4444 Rice Street, Suite 200
Lihue, HI 96766

September 12, 2007

Tom Clements
Pacific Missile Range Facility
Public Affairs Officer
Box 128
Kekaha HI, 96752

Dear Tom

I am very pleased to submit this letter of support for the many years of partnership that PMRF has provided to the community and residents of Kauai County.

For years, PMRF has employed generations of Kauai's civilian residents in various positions of importance on base. PMRF, through its leadership and personnel, have participated in events that are important to Kauai's unique community profile. With a sensitivity to the Hawaiian culture, and a true appreciation of traditional sites that boarder the Navy facility, PMRF practices great care and stewardship in protecting those things of great cultural importance and value to Kauai's people.

In my dual role as a local government employee, and as a recognized cultural practitioner, I was invited recently, to witness operational exercises aboard the Pacific fleets newest Aircraft Carrier, The USS Ronald Reagan. Amazed by my 24 hr. visit aboard that ship, only then, did I understand the full impact of the freedom and protection we enjoy as citizens of the United States of America, as the Navy, diligently stands watch through exercises conducted with PMRF and other Naval facilities here in Hawaii.

It is important to recognize the many ways our lives are positively impacted by our neighbors at PMRF.

Thank you for allowing me a moment to voice my support for the Pacific Missile Range facility and the Navy, as a good neighbor, partner and protector of us all. 1

Respectfully submitted,

Robbie Kaholokula
Tourism Specialist, OED County of Kaua'i

COMMENT NUMBER
D-W-0096

09/17/2007 14:31 8085234642 WASTEWATER PAGE 01

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
1000 ULUOHIA STREET, SUITE 308, KAPOLEI, HI 96707
TELEPHONE: (808) 692-5159 FAX: (808) 692-5113 WEBSITE: http://www.co.honolulu.gov

MUFI HANNEMANN
MAYOR

ERIC S. TAKAMURA, Ph.D, P.E.
DIRECTOR

KENNETH A. SHIMIZU
DEPUTY DIRECTOR

ROSS S. TAMIMOTO, P.E.
DEPUTY DIRECTOR

IN REPLY REFER TO:
PRO 07-063

September 17, 2007

via fax: 808-335-4520

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kauai, Hawaii 96752-0128

ATTN: HRC EIS/OEIS

Subject: Hawaii Range Complex, Dept. of the Navy
Draft EIS/Overseas EIS, July 2007

We have reviewed the subject Draft EIS/OEIS transmitted to us via your letter dated 19 Jul 2007, and have the following comments:

In section 3.4.1.7, p. 3-199, the report states that "Of the 13 environmental resources considered for analysis ... utilities ... are not addressed." This is a concern to our Department because we have existing underwater pipelines in the vicinity of the various Navy operating areas. These pipelines include our ocean outfalls from our wastewater treatment plants (WWTP) at Waianae, Honouliuli, and Kailua, each of which extend over 1 mile offshore, and our wastewater pressurized force mains under Pearl Harbor. These are critical pipelines that need to be appropriately protected from potential adverse impacts from Navy operations. Of particular concern to us is the potential impacts of the Navy's Ewa Training Minefield on our existing outfall pipe from the Honouliuli WWTP. 1

Should you have any questions, please call Jack Pobuk, CIP Program Coordinator, at 768-3464.

Sincerely,

Eric S. Takamura, Ph.D., P.E.
Director

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

1	COMMENT NUMBER
	D-W-0097
HAWAI'I RANGE COMPLEX DEIS/OEIS JULY 2007 SIERRA CLUB, MOKU LOA GROUP COMMENTS by Cory Harden for Sierra Club, P.O. Box 1137, Hilo, Hawai'i 96721 808-968-8965 mh@interpac.net	
INTRODUCTION Thank you for the opportunity to comment on the Navy's Hawai'i Range Complex DEIS.	
In our judgment, environmental impacts on Hawai'i may be far greater than described in the DEIS.	1
Huge amounts of material will fall into Hawaiian oceans--sinking vessels, exploded missiles, live bombs, live mines, live ordnance, sonobuoys, parachutes, chaff, propellent, chemicals, and more. Cumulative impacts appear to be under-estimated.	2
Contaminants from Navy actions may affect cetaceans. The EIS statement, that the Navy has insufficient information to evaluate how they are affected, is itself insufficient. The Navy has the duty to research and disclose effects of contaminants it produces.	
The Navy proposes using sonar at volumes which may injure or kill marine animals. Other noise, from detonations and ship engines, will only add to rising levels of underwater noise from all sources. The impacts, particularly for sonar, again appear seriously under-estimated.	3
We are puzzled that the Navy concludes its actions, added to Stryker actions, will not have significant impacts, although Stryker impacts alone are acknowledged to be significant.	4
The EIS should disclose any planned military use of Superferry, and of depleted uranium and other radioactive materials, and thoroughly evaluate impacts.	5, 13
The EIS reports on Navy removal of debris from the Northwest Hawaiian Islands. We commend this effort. The EIS should also report on hazardous military debris at former military sites and underwater dump sites throughout the Hawaiian Islands. Cumulative impacts should be evaluated, and plans for prompt cleanup should be outlined, in the EIS.	6
We are concerned about impacts on native Hawaiians from restriction of access to religious and cultural sites.	7
Impacts of more noise events on humans and terrestrial wildlife appear to be understated.	8
At the national level, we are extremely concerned by exemption of Navy sonar use from the Marine Mammal Protection Act, and ongoing efforts to exempt military actions from environmental laws. In addition, allegations of tampering with scientific results by a USFWS official cast doubt on USFWS recommendations in this EIS.	9 10
We urge the Navy to revise the EIS so it reflects the full impacts of Navy actions.	

2	COMMENT NUMBER
	D-W-0097 (cont.)
GENERAL SIERRA CLUB COMMENTS *For all impacts that are minimized and/or mitigated, state what impacts afterwards will be--significant or less than significant.*	11
When impacts are stated to be insignificant, give evidence to support the statement.	
Where and how will depleted uranium and/or radioactive materials be used?	5
Is information on depleted uranium and/or other radioactive materials being withheld because it is classified?	
Consider spelling Hawaiian words correctly--e.g. "Hawai'i" and "Kaua'i"	12
__Superferry__ *Describe formal or informal plans to use Superferry for military operation, including a "Westpac Express" type use, missile launches, and/or satellite launches.*	
If there are such plans, evaluate impacts, including: • *Risk to whales and other marine life from collision and noise* • *Need for an Endangered Species review* • *Impacts on native species* • *Risk of spreading invasive species*	
Describe how Superferry, Matson vessels, Horizon Lines, and other carriers operating in Hawai'i would be used under the Voluntary Intermodal Sealift Program and USTRANSCOMM. • *What circumstances trigger use under VISA?* • *Who makes the decision to commence VISA use?* • *What recourse is there for citizens who disagree with the decision?* • *What is the procedure for returning vessels to civilian use?*	14
Superferry has been called "militarily useful". Would it be "militarily useful" to the Navy? [Quote from testimony by Maritime Administrator Sean Connaughton, March 15, 2007, before the Subcommittee on Seapower and Expeditionary Forces of the Committee on Armed Services of the U.S. House of Representatives]	
Would Superferry carry any Navy personnel, equipment, or vehicles like the Westpac Express? "With [John] Lehman's expertise, the Superferry plans to operate a Westpac Express, essentially to carry military equipment and ferry vehicles from Oahu to the Big Island on a daily basis." [Lehman joins Superferry project, Pacific Business News, March 28, 2005]	
How is Superferry different from the Joint High Speed Vessel, Theatre Support Vessel, and Littoral Combat Ship? Could Superferry be converted to any of these?	13
LINE-BY-LINE SIERRA CLUB COMMENTS	
EXECUTIVE SUMMARY __p. ES-9 lines 12-19__ This "At Sea Policy" sets forth how the Navy would update and upgrade its compliance witH the body of environmental law which applies to these exercises and training--at sea and at the Navy's range complexes….Training, including joint and combined exercises, does not include actual combat operations, operations in direct support of combat, or other activities conducted primarily for purposes other than training. *How are non-training activities evaluated for compliance with environmental law and/or effects on the environment?*	15

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

3

p. ES-24 lines 31`-33 Potential cumulative impacts resulting from other relevant projects…combined with the Proposed Action…were determined to be less than significant.
See comments re. p. 5-16.

p. 1-17 to 1-18
RELATED ENVIRONMENTAL DOCUMENTS
RELEVANT ENVIRONMENTAL DOCUMENTS BEING PREPARED CONCURRENT WITH THIS EIS/0EIS
Where are the cumulative impacts of these, plus the HRC action, analyzed? 16

p. 2-46 lines 20-21 Some…[underwater] targets would be removed following the exercise. Others…would be destroyed in place and are not recoverable.
p. 2-48 lines 37-38 …anchors [for electronics packages] would remain on the seafloor.
How will this affect marine life and water quality? 2

p. 2-57 line 3 Pohakuloa will receive two Joint Threat Emitters…
What type of signals will be used, and what are health effects on military personnel and residents? 17

p. 3-289 to 304
The description of the affected environment on Hawai'i Island appears far less thorough than in the Stryker EIS.
Description of the newly acquired 23,000 acre Keamuku area should be included.

p. 3-289 *The description of Kawaihae Pier/Offshore should include information on the underwater shark heiau. This is from the National Park Service website:* 4
http://www.nps.gov/history/history/online_books/kona/history7e.htm
PU'UKOHOLA HEIAU NHS • KALOKO-HONOKOHAU NHP •PU'UHONUA O HONAUNAU NHP
A Cultural History of Three Traditional Hawaiian Sites
on the West Coast of Hawai'i Island by National Park Service
Hale-o-Kapuni Heiau
1. Shark Heiau
Submerged just offshore below Mailekini Heiau are the ruins of what is believed to have been another temple, which local lore relates was dedicated to the shark gods. The ancient Hawaiians believed in animal helpers and protectors, half god and half human, who relayed their counsels through the lips of some medium who became for the moment possessed by their spirit. These 'aumakua were served and worshipped by particular families, this duty being passed down through the generations. Martha Beckwith points out that "On the coast, sharks are the particular object selected for veneration."
In her discussion of 'aumakua, Beckwith states that sometimes specific individuals are worshiped, such as particular sharks that are recognized as individuals and are expected to calm the seas or provide bountiful catches for their keeper, and sometimes all the species of a class are venerated as being representative of the 'aumakua. She quotes Joseph S. Emerson as saying that each locality along the coast of the islands had a "special patron shark whose name, history, place of abode, and appearance were well known to all frequenters of that coast." Shark gods were invoked with specific prayers, and temples were erected for their worship. According to Emerson there were several well-known shark gods worshiped at various places in the islands. Among these were Uukanipo, two great sharks who were twin brothers, and another called Kaaipai, all of whom lived at Kawaihae. The first two lived at Kamani and were regularly fed. When the king wished to see them, their keeper hung two bowls of 'awa from a forked stick to attract them. Kaaipai was kept by a couple living at Puako in Kawaihae who often went hungry because the taro plant did not grow there. Their shark would capsize boats carrying food and take the cargo to his cave. He would then appear in a dream to the couple and tell them where to find it.

COMMENT NUMBER
D-W-0097 (cont.)

4

p. 3-296 *The table of listed species for Pohakuloa does not include 'Akaipola'au, which was included in the special status and protected species list of the Stryker EIS [Appendix I-1 p. 2]* 18

Chapter 4 Noise sections for all locations
How many sonic booms are expected and where? Evaluate the impacts for each location and the entire range. 8

p. 4-13 BIOLOGICAL RESOURCES--OPEN OCEAN
SONAR
Specify frequencies, in Hertz, of Navy sonar, current and future. Evaluate impacts of these frequencies on marine life, including fish and marine mammals. 19

How often does the Navy use, and plan to use, the SOFAR channel? Evaluate impacts on marine life.

The Navy says it won't use sonar over 235 dB. But at 110 to 120 dB, some marine animals already show avoidance behavior. How will the far louder 235 dB affect marine animals? 40

Include evaluation of evidence linking March 1998 LFAS tests off Kona with whales departing the test area and engaging in other abnormal behaviors, which led to lawsuits by Hawai'i County Green Party and Body Glove to stop the testing.

Include status, and summary of issues, for unresolved lawsuits re. sonar: Earthjustice May 2007, California Coastal Commission March 2007, Natural Resources Defense Council March 2007, appeal of August 2003 Federal court ruling limiting deployment of LFA sonar, and any others. 41

Include information from these documents in evaluation of effects of sonar on marine life. (If you would like me to send documents not enclosed, please let me know.)

- *Analysis of melon-headed whale aggregation in Hanalei Bay, July 2004, Mobley et. al.*
- *Assessment of Acoustic Exposures on Marine Mammals in Conjunction with USS Shoup Active Sonar Transmissions in the Eastern Strait of Juan de Fuca and Haro Strait, Washington, 5 May 2003, NMFS Office or Protected Resources, January 21, 2005 (copy enclosed)*
- *Declaration of Brandon Southall in U.S. District Court, Central District of California, Western Division (copy enclosed)*
- *"Gas and Fat Embolic Syndrome" Involving a Mass Stranding of Beakerd Whales (Family Ziphiidae) Exposed to Anthropogenic Sonar Signals, Fernandez et. al. (copy enclosed)*
- *Hawaiian Melon-headed Whale (Peponacephala electra) Mass Stranding Event of July 3-4, 2004, Brandon L. Southall, Robert Braun, Frances M.D. Gulland, Ashley D.Heard, Robin W. Baird, Sarah M. Wilkin, and Teri K. Rowles, NOAA Technical Memorandum NMFS-OPR-31, April 2006, http://www.cascadiaresearch.org/robin/Southall_et_al_Peponocephala.pdf*
- *Joint Interim Report, Bahamas Marine Mammal Stranding Event of 15-16 March 2000, December 2001, U.S. Department of Commerce and Secretary of the Navy, http://anon.org/documents/Interim_Bahamas_Report.pdf*
- *An unusual encounter with a mixed school of melon-headed whales…and rough-toothed dolphins…at Rota, Northern Marinanas Islands, Jefferson, Fertl, Micheal, and Fagin, 2006 (copy enclosed)*

COMMENT NUMBER
D-W-0097 (cont.)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

5	COMMENT NUMBER
	D-W-0097 (cont.)
p. 4-152 Yearly Marine Mammal Exposures From all ASW *Use easily understood language. Replace--* • *"dose function behavioral" with "harassment level"* • *"TTS" with "significant behavioral effects level"* • *"PTS" with "injury level"*	20
Make data easy to understand by adding • *numbers of animals in Hawai'i (given on p. 3-29 so readers must flip back and forth.)* • *percentage of animals that will be experience harassment, significant behavioral effects, and injury level exposures* • *numbers expected after mitigation for harassment, significant behavioral effects, and injury level exposures*	21
We are extremely concerned by the predicted numbers of harassment, behavioral effects, and injury exposures. Even lower-level exposures may affect feeding, mating, calf-rearing, and other activities. For example, for the 4500 or so humpback whales in Hawai'i, about 35,000 annual harassment exposures are predicted. would this mean 2 exposures every 3 months for one whale? When even more exposures are added from non-Navy sources, what are the cumulative effects on this endangered species?	22
p. 4-179 line 18 Hazardous Wastes *Under Alternative 2, how much will the amount of hazardous wastes and chemical byproducts increase? What new ones will be produced?*	23
p. 4-179 line 19 Used hazardous materials and chemical byproducts generated at sea are not considered to be hazardous wastes until offloaded in port. *Describe laws and/or regulations covering disposal of hazardous wastes and chemical byproducts from ships at sea.* *If the Navy dumps materials at sea which would be considered hazardous wastes when offloaded in port, what regulations and/or laws would be violated? How would the public be informed? Describe current and planned procedures to prevent such dumping.*	46
p. 4-179 line 21 Used and excess hazardous wastes will continue to be managed in compliance with OPNAVINST 5090.1b (2003) *Describe management of hazardous wastes in lay-person language.*	47
p. 4-179 line 23-24 Hazardous wastes will be offloaded upon reaching port in Hawaii… *What hazardous wastes and chemical byproducts cannot be handled in Hawai'i? What is done with them?*	48
p. 4-179 line 1 Chaff Chaff is a thin polymer with an aluminum coating… *How long does it take for these materials to decompose?*	49, 50, 51 24
Under the No-Action Alternative, it is estimated that…about 4, 700 packages of chaff [will be released per year] over the Open Ocean Area. *How much will be released under Alternative 2, and from all branches of the military, in one year?* *What is the weight of one package? About how many fibers does it contain and what size?* *For the largest planned chaff release, what size ocean area will it drop into?*	49 50
The [chaff] fibers may be…ingested by marine life, but the fibers are non-toxic… *Evaluate effects on marine, terrestrial, and avian life from ingested fibers that may fill the digestive tract so the animal dies of starvation.*	51

6	COMMENT NUMBER
	D-W-0097 (cont.)
…the widely spaced releases [of chaff] will have no discernable effect on the marine environment. *What is the combined amount and cumulative effects combined with Air Force, Army, and other parties' use of chaff? Do the cumulative effects violate the Clean Air Act?*	49
Is chaff legally considered to be litter?	
How are chaff cartridges, pistons, and endcaps disposed of?	24
How long does chaff remain in the environment? [Chaff] "probably remains in the environment for long periods of time, i.e., at least on the order of years." *Environmental Effects of Radio Frequency (RF) Chaff Released during Military Training Exercises" by Farrell and Siciliano*	
Can weathered chaff be inhaled? "additional data is necessary to better define the extent to which chaff breaks up during deployment and whether it can be reduced to respirable sizes (PM 10 or PM 25) during weathering in the environment. Likewise, because there is no data on the effects of respirable chaff particulates on lung tissue, Hullar et al. (1999) suggested that additional studies be conducted to provide the type and quality of information required to better determine the risks associated with human exposure to chaff.'" *Ibid.*	
How will chaff affect protected species in Hawai'i? "An August 1997 report for the U.S. Air Force Air Combat Command…cites potential effects on wildlife through ingestion, inhalation, or skin contact; on species, habitat conditions, and aesthetics through settling in the water; and on water quality….few studies of the effects of chaff on wildlife have been conducted, and the report found no data on chaff's decomposition process under different environmental conditions (arid, alkaline, wet, acidic) or inside the digestive systems of animals…" *DoD Management Issues Related to Chaff, 09/22/98, GAO/NSIAD-98-219* "Surface-feeding or bottom-feeding animals and fish may ingest chaff, but this only affects a few individual animals and has a low impact on species populations except in the case of protected species." *Ibid.*	
Is chaff suspected of affecting lightning in Hawai'i? "Chaff…may affect lightning within storms." *Ibid*	
Over what areas is chaff expected to spread? Will it fall on the Northwest Hawaiian Islands? "chaff can spread over several hundreds of miles and stay in the air for up to a day…" *Ibid.*	
Will chaff in Hawai'i affect climate research? "chaff may cause inaccurate weather data to be archived for long-term climate research studies…" *Ibid.*	
Will chaff lead to underestimating storms in Hawai'i? "If chaff reduces lightning, it could cause forecasters to underestimate the severity of storms…" *Ibid*	
Include the following information, or more recent information if available, in the EIS-- "An August 1997 report for the U.S. Air Force Air Combat Command…notes that the literature addressing the effects of chaff on water quality and aquatic habitats is limited and that there has been no systematic analysis of chemical changes in soils exposed to	

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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various concentrations of chaff." *Ibid*

Does any chaff currently or formerly used in Hawai'i, by any branch of the military, contain lead?
" DOD continues to retain lead-based chaff in its inventory even though this type of chaff has not been manufactured since 1987 and is reportedly no longer in use." *Ibid*

Evaluate the effects of chaff on power generation and electrical equipment in Hawai'i.
"It has been reported that chaff has also caused power outages and damaged electrical equipment…" *Ibid*

Does chaff used in Hawai'i contain fiberglass?
"fiberglass chaff persists in the environment…" *Ibid*

What further studies have been done on chaff, and what are the results, since this statement was written?
"Studies by DOD and others, including some carried out years ago, continue to create questions in the public's mind about the health and environmental effects of chaff. Department records indicate that DoD has not systematically followed up on these reports to determine the merits of any outstanding question or the costs and benefits of addressing them. While none of the studies we reviewed demonstrated significant operational or environmental effects of chaff, 9 of the 10 reports cited gaps in information on potential effects. Six of the nine made no recommendations but cited missing data, suggested additional studies or long-term monitoring, or cited possible long-term chronic effects. Three reports recommended additional studies covering chaff toxicity, long-term exposure, weathering, or other study areas. However DOD has not reviewed the recommendations and information gaps cited in the reports in a comprehensive and systematic way to assess their merits for further actions." *Ibid.*

Evaluate the effects of chaff on air traffic control radar and weather radar.
"chaff can affect safety by interfering with air traffic control radar…chaff can also affect weather radar observations… *Ibid.*
The [TV] weatherman pointed to a doppler of what looked like widespread rain over the islands and said something like, 'This looks like rain, but it's military chaff.' *e-mail from a friend*
"The TV Hawaii Weather people (I am not sure which channels as I have seen it more than once) have been REPORTING off and on in the past weeks or so…that this large green area of activity over Oahu and the ocean. is not weather, it is 'Military Chaff'."
e-mail from another friend

25 — p. 4-198 *Re debris from missile interceptions…what is the total weight and volume of debris expected to fall from the largest missile? Over how large an area?*

43 — p. 4-199 lines 9-11 …development and testing of Nuclear, Biological, or Chemical material simulants…[in missiles] were analyzed in the *Programmatic Environmental Assessment, Theater Missile Defense Lethality Program…*
This information should be included in this EIS.

44 — p. 4-199 lines 12-13 The only proposed chemical simulant that might be included as part of the No-Action Alternative…will be…TBP…
Include information that TBP may affect the central nervous system in humans.
What substances might be included for Alternative 2?

42 — p. 4-203 lines 3-4 The low probability of debris capable of affecting a population of a particular bird species should exempt the missile tests from the take prohibitions. (U.S. Department of the

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Navy, 2007.)
Has an agency other than the Navy officially agreed with this determination?

45 — p. 4-203 lines 6-8 Regular marine debris removal has been conducted within the Northwest Hawaiian Islands…through a multi-agency effort…in collaboration with, among others, the Navy…
This information on removal of debris is relevant to the EIS. So is information on lack of removal of military hazards on hundreds of former military and other sites throughout Hawai'i. See comments re. p. 5-2 and p. 5-20, and my 8-29-07 comments.

p. 4-442 ENVIRONMENTAL CONSQUENCES, POHAKULOA
Evaluate potential for Army and Navy actions to stir up dust containing small particles of depleted uranium, and risks to soldiers and civilians.

27 — p. 4-444 line 25 The total number of training operations that affect airspace could increase by approximately 48 percent above the No-action Alternative.
Give more detail on how possible conflicts with commercial and private air traffic would be handled.

p. 4-444 line 22 & 41 Airspace--Pohakuloa Training Area…use of three aircraft carriers during a Major Exercise…*How many more aircraft carriers compared to now? How many more over flights of Hawai'i Island and where?*

28 — p. 4-445 to 4-447 Environmental Consequences--Biological Resources--Pohakuloa Training Area
p. 4-454 to 4-455 Environmental Consequences--Biological Resources--Bradshaw Army Airfield
Consider Navy impacts plus Army impacts--see comments re. p. 5-16 CUMULATIVE IMPACT ANALYSIS.

10 — *These sections cite USFWS studies and decisions several times. But the USFWS Deputy Assistant Secretary, Julie MacDonald, resigned May 1, 2007, after reports of her abusing staff and tampering with science. Several endangered species decisions overseen by her are being reviewed. USFWS statements and studies referenced in the DEIS that came under her tenure should also be reviewed.*

29 — p. 4-447 line 29 Up to three Strike Groups would visit the area [Pohakuloa] for up to 10 days per exercise. *How many times a year would this occur? What are the impacts on biological resources when added to Army impacts?*

7 — p. 4-448 lines 1-2 Approximately 30 percent of PTA has been surveyed for cultural resources, and approximately 300 archaeological and traditional Hawaiian sites have been identified…
Does this include Keamuku?

p. 4-448 lines. 16-18 The Army will continue to provide Native Hawaiians with access to traditional religious and cultural properties, in accordance with the American Indian Religious Freedom Act and EO 13007, on a case-by-case basis.
We are concerned by the restriction of access to sites important to Native Hawaiian religion and culture.

p. 4-448 lines 21-30 Training operations and Major Exercises…could increase the potential for impacts to occur to cultural resources in sensitive areas…if alteration to the roads and trails is necessary [which may impact cultural resources], coordination with the Schofield Barracks Cultural Resources Manager would be completed prior to the changes.
Determination of whether alteration is necessary, and analysis of impacts, should be included in the Final EIS--not done later with no environmental analysis or public oversight.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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30
p. 4-450 to 4-451 *Noise analysis appears inadequate. Noise levels may not increase, but the number of noisy events will. This section should analyze, in the level of detail used in the Stryker EIS, noise effects on residents from Navy and Army actions combined. People as far away as Laupahoehoe already complain of hearing explosions from Pohakuloa.*

p. 4-451 *Specify how much more training will occur.*
line 17 …an increase of approximately 9 percent…
In USWEX? RIMPAC? Other continuing training operations?
Line 28-29 Under Alternative 2, the tempo of training operations would be increased and the frequency of training operations could also increase…the number of training operations would increase…
Specify changes in tempo, frequency, and number.

ENVIRONMENTAL CONSEQUENCES, BRADSHAW AIRFIELD

31
p. 4-452 lines 14-15 The use of hazardous materials and generation of hazardous waste at this site would be in accordance with applicable regulations.
Analysis appears insufficient. Specify type, quantity, use, precautions, and disposal methods for each hazardous material.

32
p. 4-452 lines 17-21 There would be no impact to socioeconomic, transportation…
Will service personnel leave the base?
Will service personnel and equipment use civilian roads?

33
p. 4-453 lines 24-45 Helicopter raids will involve approximately six helicopters over a 2- to 6-hour period.
How often?

34
p. 4-455 lines 9-13 Compliance with the PTA INRMP and Ecosystem Management Plan during these increased training operations should minimize the effects on vegetation, as well as limit the potential for introduction of weed plant species. The risk of impacting threatened or endangered plants could be minimized by continuing to locate training operations away from areas with native, threatened, or endangered species whenever possible.
Analysis seems inadequate. Specify anticipated effects on vegetation, and how much training will be in areas with native, threatened, or endangered species, by Navy as well as Army.

p. 4-455 lines 15-21 There is additional suitable habitat nearby for birds such as the endangered 'io and nene to use if they temporarily leave the area affected by an increase in training operations…An increase in training operations is unlikely to adversely affect the long-term well-being, reproduction rates, or survival of these native or listed birds or other forms of wildlife in the area.
We are concerned that constant disturbance by actions of Navy and Army will affect wildlife.

ENVIRONMENTAL CONSEQUENCES, KAWAIHAE PIER
p. 4-457 lines 7-16 The following resources are not addressed because the proposed alternatives have no potential to adversely affect such resources: …cultural resources… Kawaihae Pier has no prehistoric and historic artifacts, archaeological sites historic buildings or structures, or traditional resources that could be affected by HRC training operations.
See comments for p. 3-289.

CONFLICTS WITH FEDERAL, STATE, AND LOCAL LAND USE PLANS, POLICIES,AND CONTROLS FOR THE AREA CONCERNED

35
p. 4-461 Effects on listed species are the subject of consultations with the USFWS and NMFS.
Details on results of the consultations should be included in the EIS. See also comment re. p. 445.

10

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p. 4-462 *Information on National Marine Sanctuaries Act compliance status should be added.*

Ch. 5 CUMULATIVE IMPACTS

36
Add analysis of these--
- *All military sites in Hawai'i--*
  - *1-current sites*
  - *2-past sites, official and used unofficially by the military*
  - *3-sites with hazardous materials from past military actions, on land and underwater within 10 miles of land*

For 2 and 3, include name of site, location, level of hazard, and date when cleanup will be completed.

- *Plans to shift forces to Pacific regions*
  Stryker SEIS, p. 1-6 General Shinseki added, "I would say if you look at the brigade identifications and locations, geographically they're postured towards the Asia Pacific theatre…This is adding a little balance and looking at the importance, the growing interest and challenges in the Asia Pacific theater…"

37
- *Additional Navy vessels planned for Pearl Harbor*
- *C-17s in Kona*
- *PTA 1010 Land Acquisition*
- *Consolidated command and range control building at PTA*
- *Relocation of Kilauea Fire Station to PTA*
- *RTLP Range Development Plan*
- *Superferry (civilian and any planned military use)*
- *Theater Support Vessel and TSV pier use [mentioned in Stryker EIS]*
- *Saddle Road construction*
- *Waimea to Kawaihae Highway…*
- *Former Waikoloa Maneuver Area and Nansay Sites UXO Cleanup…*
- *Kawaihae Deep Draft Harbor*
- *Recreational uses of Kawaihae Harbor*
- *Pier 4 construction at Kawaihae*
- *Freight use of Kawaihae Harbor*
- *Proposed telescopes on Mauna Kea--Thirty Meter Telescope, Next Generation Large Telescope, etc.*

p. 5-15 ENVIRONMENTAL CONTAMINATION AND BIOTOXINS Insufficient information is available to determine how, or at what levels and in what combinations, environmental contaminants may affect cetaceans…Specific information regarding the potential effects of environmental contamination on marine mammals in the Hawaiian Islands is not available, and therefore cumulative effects can not be adequately assessed.
What about effects on other marine animals and plants?
The Navy should conduct research on effects of contaminants it is adding to the oceans.

p. 5-16 CUMULATIVE IMPACT ANALYSIS

39
How will Navy actions, added to Stryker and other Army impacts, affect the environment? Where mitigation is proposed, how effective will it be after Navy impacts are added to Stryker and other Army impacts? Stryker EIS excerpt below.

> p. 9-21 [Statewide] Cumulative impacts…would occur in all resource areas…Significant cumulative impacts would occur in the following resource areas: Land use, biological, cultural, and human health and safety hazards.

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than significant levels.

p. 8-164 The Proposed Action would significantly impact sensitive species and sensitive habitat from construction and training activities….mitigation…would substantially reduce the impacts but not to less than significant levels.

The palila bird, three other wildlife species, and 19 plant species will be affected.

p. 8-165 *Significant Impacts Mitigable to Less than Significant…Impact from the spread of non native species on sensitive species and sensitive habitat.*

CUMULATIVE/ BIOLOGICAL RESOURCES [statewide]
p. 9-43 Nonnative]species] introductions are estimated to occur now at a million times the natural rate… Several factors contribute to stress in the marine environment in Hawaiian waters, including acoustic pressures and increasing interference with marine wildlife from tourism and recreation. Hawaiian waters have been identified as "acoustic hot spots" (NRDC 1999), i.e., ecologically significant and exposed to high levels of human-made noise.

p. 9-43 to 9-44 *Impacts from fire on sensitive species and sensitive habitat* …the Army has made the conservative determination that…impacts may not be reduced to a less than significant level…cumulative impacts from fire on sensitive vegetation and habitat are considered to be significant.

p. 9-44 to 9-45 *Impacts on sensitive species resulting from the spread of nonnative species*…the overall cumulative impact from the spread of non-native species from projects listed in Table 9-1 and 9-2 in association with the Proposed Action would be significant.

p. 9-45 *Impacts on marine wildlife and habitat*…A temporal cumulative impact could occur, where combined traffic from LSVs and TSVs could, over time, cause harm to marine wildlife…Because of the speculative nature of TSV implementation and the potential to implement existing regulations or SOPs to reduce impacts…the Army concludes that the cumulative impacts on marine wildlife and habitat is less than significant.

Will Superferry be a TSV? If so, does this conclusion change?

p. 9-46 *Loss and degradation of sensitive species and habitat.* The cumulative impact on sensitive species that would result from project-related habitat loss and degradation would be significant.

p. 9-49 *Summary* In light of historic, ongoing, and reasonably foreseeable future actions, the Army concludes that the addition of this project would result in a significant cumulative impact on biological resources.

p. 5-20 lines 10-13 CULTURAL RESOURCES Implementation of the No-action Alternative, Alternative 1, or Alternative 2 in conjunction with the cumulative actions listed in Table 5.2-1 [which includes Stryker] would not result in significant impacts to cultural resources.
This statement appears to contradict statements on Hawai'i island cultural resources from the Stryker EIS [below.] Reconcile the two EISs. Where mitigation is proposed, how effective will it be after Navy impacts are added to Stryker and other Army impacts?

p. 8-202 Facility and range construction…would directly damage or destroy unidentified archaeological resources or would indirectly damage them by contributing to soil erosion…mitigation measures…will reduce the severity of the impact but not to less than

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AIR QUALITY This section says nothing about air quality. How will Navy actions, added to Stryker and other Army impacts, affect air quality? Where mitigation is proposed, how effective will it be after Navy impacts are added to Stryker and other Army impacts? Stryker EIS excerpts below.

p. 8-55 …the overall level of PM 10 generated by wind erosion would increase…Given the…increase in overall PM 10 levels, the uncertainties associated with any estimate of potential wind erosion conditions, and public perceptions of the potential magnitude of this impact, the Army considers wind erosion from the WPAA to be a significant air quality impact…The Army will develop and implement a DuSMMoP…*but does not say if impact will be reduced to less than significant. Hi'o soil scientist Yusuf Tamimi predicted even worse effects.*

p. 8-58 …fugitive dust from vehicle travel on unpaved roads at PTA is considered a significant but mitigable to less than significant impact.

p. 5-17 BIOLOGICAL RESOURCES
Evaluate cumulative effects on marine life from underwater noise. Include noise from current and proposed Navy actions, combined with increasing levels of other human-created underwater noise. Include noise from sonar, propulsion systems, explosions, seismic guns, drilling, and other sources.

How will Navy actions, added to Stryker and other Army impacts, affect biological resources? Where mitigation is proposed, how effective will it be after Navy impacts are added to Stryker and other Army impacts? Stryker EIS excerpts below. Re. reefs, note that almost half of Hawai'i's reefs are at risk, and Hawai'i's are the worst in the Pacific, according to a 1998 World Resources Institute study.

p. 8-141 There is a coral reef area of management concern…in the PTA ROI. Located at Kawaihae Harbor, this reef is identified as at risk both from extensive development at the commercial harbor and from recent and continued development a the small boat harbor. While the main issue affecting this reef is harbor construction, other causes of decline for this reef system include interruption of long-shore transport due to harbor development, consequent siltation of Pelekane Bay, and close proximity to important cultural sites (i.e.Pu'u Kohola Heiau) that causes incrased recreational use and human presence…Any harbor construction impacts would be addressed in a separate NEPA document…there are other coral reefs in the coastal waters of the PTA ROI…[e.g.] Puako Reef…

p. 8-160 to 8-162 *Impact 1: Impacts from fire on sensitive species and sensitive habitat.* Wildfire is a great threat to flora and fauna communities at PTA. An increase in construction and training at PTA would increase the likelihood of wildfires…The use of various types of ammunition, weapon systems, and pyrotechnics during military training increases the risk of wildfire ignition…Federally listed species are known to occur…throughout PTA and the WPAA…Species that occur within the surface danger zones of the proposed ranges could be affected by munitions during the operation of the proposed ranges. In addition to vegetation loss, major adverse ecological effects of wildland fires include reduced watershed stability, soil erosion, increased risk of weed invasion, and loss of native habitat. Increased fire frequency would affect the structure, composition, and function of ecosystems…The spread of nonnative species that results from wildfires in considered a significant impact…

p. 8-162 Impacts from fire on sensitive species including federally listed species are expected to be significant…mitigation will substantially reduce the impacts but not to less

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significant levels.

p. 8-200 …mitigation measures…will reduce the severity of the impact [on historic buildings] but not to less than significant levels.

p. 8-202 …mitigation measures…will reduce the severity of the impact [of construction on archaeological resources] but not to less than significant levels.

Table 8-24 on p. 8-183 *shows almost 400 archaeological sites on PTA, Keamuku, and the PTA Trail*
p. 8-202 …mitigation measures…will reduce the severity of the impact [of training on archaeological resources] but not to less than significant levels.

p. 8-203 Native Hawaiians consider range and training activities inappropriate and disrespectful uses of the land that disturb and change the character and feeling of spiritual places.
p. 8-204 …mitigation…will reduce the severity of…impacts on ATIs [areas of traditional importance]

p. 8-204 …mitigation measures…will reduce the severity of the impact [of road construction on archaeological resources] but not to less than significant levels.

p. 8-205 *Impacts on archaeological sites from road use.* Impacts on sites along PTA Trail…could include erosion and possible vandalism or human access……[as with] sites within the WPAA…mitigation…will reduce the severity of the impact to less than significant levels.

p. 8-205 *Impacts on archaeological sites from construction of the ammunition storage facility*…there is a potential for a significant impact.

CUMULATIVE/ CULTURAL RESOURCES [statewide]
p. 9-50 …the Army determines that the cumulative impact on cultural resources is significant.

p. 9-51 …the overall effect of increased training, reduced access, and continued development throughout O'ahu and Hawai'i will result in substantial alteration and restriction of native use of traditional areas and the potential destruction of numerous archaeological sites.

p. 5-20 lines 29-35 GEOLOGY AND SOILS Implementation of the No-action Alternative, Alternative 1, or Alternative 2 in conjunction with the cumulative actions listed in Table 5.2-1 [which includes Stryker] would not result in significant impacts to geology and soils within the region of influence…Erosion is a naturally recurring issue, but it is not heavily exacerbated by military operations.
This statement appears to contradict statements on Hawai'i island geology and soils from the Stryker EIS [below.] Reconcile the two EISs. Where mitigation is proposed, how effective will it be after Navy impacts are added to Stryker and other Army impacts?

p. 8-125 *Impact 1a: Soil loss from mounted and uncounted maneuver training in PTA*…the INMRP identifies denudation of vegetation, major soil erosion, and severe windblown dust problems associated with maneuver training in Range 10. ATTACC modeling found that the Proposed Action would result in degradation of land condition to a "severe" condition on average…The impact on soils is considered to be significant because it could result in additional major soil erosion, such as described for Range 10.

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The mitigation measures…will substantially reduce the impact but not to less than significant.

p. 8-126 to 8-127 *Impact 1b: Soil loss from mounted and uncounted maneuver training in the WPAA*…The results of the ATTACC modeling for the WPAA indicate that the Proposed Action would result in degradation to a "severe" land condition…soil erosion by water during short duration storm events could result in significant local redistribution of eroded soil. Wind erosion of exposed soil would likely result in gradual removal of soils from areas where vegetation is damaged…the impact on erosion and soil loss is considered significant…The mitigation measures…would substantially reduce the impact but not to less than significant.

p. 8-127 *Impact 1c: Soil loss from construction and use of PTA Trail* During construction, erosion by both wind and water could occur…This impact is considered potentially significant. After construction [there could be flooding, washouts, and severe soil erosion]…This is considered a significant impact. The mitigation…would substantially reduce the impact, but not to less than significant.
Hilo soil scientist Yusuf Tamimi predicted even worse effects for all three.

CUMULATIVE/GEOLOGY AND SOILS [statewide]
p. 9-42 In areas of the PTA where soils can be thin and fragile, the effects of soil loss may be irreversible…the cumulative impacts associated with the proposed project are significant.

p. 5-20 lines 39-42 HAZARDOUS MATERIALS AND WASTE Implementation of the No-action Alternative, Alternative 1, or Alternative 2 in conjunction with the cumulative actions listed in Table 5.2-1 [which includes Stryker] would not result in cumulative impacts associated with the use of hazardous materials within the region of influence.
How will depleted uranium and other radioactive materials used by the Navy, added to Army DU found at Schofield and Pohakuloa and suspected at Makua Valley, affect residents and the environment?
Evaluate cumulative impacts of hazardous materials and waste from all past, present and proposed military sites and actions in Hawai'i.

p. 5-21 lines 26-29 HEALTH AND SAFETY Implementation of the No-action Alternative, Alternative 1, or Alternative 2 in conjunction with the cumulative actions listed in Table 5.2-1 [which includes Stryker] would not result in significant impacts to health and safety within the region of influence.
This statement appears to contradict statements on Hawai'i island health and safety from the Stryker EIS [below.] Reconcile the two EISs. Where mitigation is proposed, how effective will it be after Navy impacts are added to Stryker and other Army impacts?

p. 8-218 Ammunition presents a significant risk of soil contamination…
p. 8-220 …regulatory and administrative measures…will reduce the…impacts…to less than significant.

p. 8-221 Recent soil studies of the PTA ranges…[reveal] elevated levels of lead in the soils, above USEPA Region IX residential and industrial PRGs…The presence of lead may cause additional soils to become contaminated due to vehicle and equipment movement and soil deposition.

p. 8-222 to 8-223 PTA is particularly susceptible to fire…A wildfire along the trail or at the ranges could damage animal and plant communities, damage cultural resources, and contribute to soil erosion by removing vegetation…Under…mitigation, there would be

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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less than significant impacts involving wildfires.

CUMULATIVE/ HUMAN HEALTH AND SAFETY HAZARDS [statewide]
p. 9-53 TO 9-54 *Ammunition* …the cumulative impact is considered significant due to the 25 percent increase in ammunition included in the Proposed Action.

p. 9-54 *Unexploded ordnance* …there would be a significant cumulative impact regarding UXOs.

p. 5-21 lines 37-40 LAND USE Implementation of the No-action Alternative, Alternative 1, or Alternative 2 in conjunction with the cumulative actions listed in Table 5.2-1 [which includes Stryker] would not affect land use within the region of influence…
This statement appears to contradict statements on Hawai'i island health and safety from the Stryker EIS [below.] Reconcile the two EISs. Where mitigation is proposed, how effective will it be after Navy impacts are added to Stryker and other Army impacts?

CUMULATIVE/ LAND USE [statewide]
p. 9-23 the total area to be acquired by the Army statewide is 25,686 acres. These acquisitions would increase the state-wide decline in farmland since 1978 from one percent to 2.7 percent…in the State of Hawai'i, there is an ongoing loss of agricultural land due to development. In light of historic, ongoing, and reasonably foreseeable future actions the Army concludes that the cumulative impacts would be significant.

p. 5-22 lines 4-7 NOISE Implementation of the No-action Alternative, Alternative 1, or Alternative 2 in conjunction with the cumulative actions listed in Table 5.2-1 [which includes Stryker] would not incrementally affect noise within the region of influence.
This statement appears to contradict statements on Hawai'i island noise from the Stryker EIS [below.] Reconcile the two EISs. Where mitigation is proposed, how effective will it be after Navy impacts are added to Stryker and other Army impacts?

p. 8-76 Small arms firing…might remain audible…up to 2 miles…
p. 8-77 Detonations of high explosive ordnance can produce high noise levels at distances of several miles…Use of blank ammunition and simulator devices in the WPAA area may potentially create noise impacts within the Waiki'i Ranch development and the Kilohana Girl Scout Camp…noise from ordnance use at PTA would be a significant but mitigable impact…
Some residents are still concerned about noise just from the Stryker.

p. 5-23 lines 3-6 TRANSPORTATION Implementation of the No-action Alternative, Alternative 1, or Alternative 2 in conjunction with the cumulative actions listed in Table 5.2-1 [which includes Stryker] would not represent a significant increase in average daily traffic on island roadways…In regards to the Hawaii Superferry…it is not anticipated that increased vessel traffic from this commuting vessel would contribute to the cumulative effects…
Describe any planned military use of Superferry and evaluate the cumulative impacts.
Evaluate cumulative effects of land traffic from Superferry.
When Navy impacts are added to Stryker and other Army impacts, how will civilian traffic be affected? From Stryker EIS--

p. 8-99 …before the PTA trail is constructed all SBCT military vehicles would use public roadways to access PTA….there would be noticeable delays…

p. 6-1 Mitigation Measures
Evaluate the effectiveness of mitigation measures. Which impacts will be reduced to less than significant? Which impacts will still be significant?

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p. 6-14 ..the Acoustic Thermometry of Ocean Climate (ATOC) experiment conducted in the mid-1990s.Whales observed during the trials were found to be distributed nominally further from the [low-frequency sound] source when it was active than when it was not…ATOC and the North Pacific Acoustic Laboratory are not being considered in this Draft EIS/OEIS.
Why are ATOC and the North Pacific Acoustic Laboratory left out?
Where was the ATOC experiment conducted?
Describe the North Pacific Acoustic Laboratory and its possible relevance to this EIS.

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COMMENT NUMBER
D-W-0098

The Senate
STATE CAPITOL
HONOLULU, HAWAII 96813
September 17, 2007

Public Affairs Office
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752-0128

Attention: HRC EIS/OEIS

Subject: **URGENT** – 30 Day Extension Request
Hawai'i Range Complex NEPA Draft EIS

To Whom It May Concern:

1 Because of the size and complexity of the Hawai'i Range Complex NEPA Draft EIS, I would like to respectfully request a 30 day extension for the public review and comment period.

Because of numerous other pressing issues during the past 30 days, neither I nor my staff has had the opportunity to adequately review, analyze and comment on this important document. In addition, I have received several requests from constituents in my district who are also requesting a 30 day extension period for review and comment.

Thank you in advance for whatever assistance you are able to offer in extending the public review and comment period.

Sincerely,

Gary L. Hooser
Majority Leader
Hawaii State Senate
7th Senatorial District – Kaua'i & Ni'ihau

mm: GLH

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COMMENT NUMBER
D-W-0099

09/17/2007 15:37 808-338-1619 KIKIAOLA LAND CO PAGE 01/01

Roland D. Sagum III
Kauai, Hawaii 96765

September 14, 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kauai, Hawaii 96752

Subject: **Letter in Support of Hawaii Range Complex Draft EIS/OEIS**

1 This letter is in strong support to the existing activities and enhanced modifications to the Hawaii Range Complex on Kauai. The U.S. Navy, in partnership with various private and public entities, have made significant contributions to improving the quality of life of our citizens, while leading West Kauai's emergence as a sophisticated employer, and learning center of the Pacific. The facility has maintained a leadership role in research, development, and training in technologies that are deployed to defend the United States. It attracts companies that are willing to educate and train our citizens that they may attain high-technology positions with salaries that are comparable to mainland counterparts. The Hawaii Range Complex has provided our citizens with many new and exciting opportunities that augment our agriculture and farming industries.

Secondly, they have demonstrated a sustained commitment to protect the environment, preserve cultural resources, and improve the social conditions of our people. They have participated in County discussions that explore affordable housing and other economic development issues. The presence of the Hawaii Range Complex provides our youth with some realization and assurance that if they go to the mainland for college, there is a very likely the possibility of a job that pays well should they decide to move home.

Lastly, I have personally seen and experienced members from the PMRF volunteering at elementary and high school functions on various technology based programs. The U.S. Pacific Command provides tens of thousand of dollars to the Kauai Schools to educate our youth. However, in addition to financial support, they also routinely provide volunteer labor and support, such as Habitat For Humanity, AYSO soccer, and a multitude of children programs.

Sincerely,

Roland D. Sagum III

Ltr of Support for Hawaii Range Complex.doc

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

2007-09-15 19:42 >> P 1/1

9-15-07

PACIFIC MISSILE RANGE
P O BOX 128
KEKAHA HI 96752

I AM STRONGLY AGAINST USING SONAR IN OUR WATERS DUE TO THE KNOWN HARM IT DOES TO OUR MARINE MAMMALS.

PLEASE STOP.

THANK YOU
Valerie Weiss
VALERIE WEISS

KAPAA HI

COMMENT NUMBER
D-W-0100
1

August 21, 2007

Aloha, Mr. Clements,

I am writing to you to express my complete opposition to the Navy's request to expand sonar testing and military exercises in the area of the Hawaiian Islands and Papahanaumokukea. I believe that the Navy's acitivities so far have been destructive for the marine ecosystem and especially for the animals who are aversely affected by sonar; to expand these activites would only expand the negative effects. This is especially unconscionable to consider in the area of Papahanaumokukea, a very singular and fragile reserve that is a world treasure. Whatever beliefs Americans may have about the need for increased national security, keeping our planet healthy is our greatest responsiblity since there will be no life at all for future generations if we do not care for, preserve and protect the environment. The Federal Government has declared Papahanaumokukea as a Marine Sanctuary, which means that all Americans, including the military, are responsible to ensure its environmental integrity and balance. Performing war games, military exercises, and tests that involve noise and chemical pollution and radioactive substances are not ways to fulfill this responsibility; they do the opposite. Since I gather you live here on Kaua'i, you have an understanding of just how special our islands are, and I urge you to help the Navy to find other ways to meet their needs for practice and research than to wreck havoc on the multitide of life around us in the Pacific.

Sincerely,
Maria Walker

Kapa'a, HI

COMMENT NUMBER
D-W-0101
1

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0102

9/10/07

PMRF
PO Box 128
Kekaha, HI 96752

To Whom it May Concern,
Re: Increased Military Exercises in Hawaii.

I am deeply and profoundly opposed to any increased militarization of the islands of Hawaii. Rather than making us safer, any plans to amplify military presence make us a bigger target. The Navy's land grab of the Mana plain at PMRF was bad enough – bigger war games compounds that travesty. 1

Sincerely,
Evelyn de Buhr

Kilauea, HI

COMMENT NUMBER
D-W-0103

August 29, 2007

Save the Whales!

Dear National Marine Fisheries Service members:

Some goals are worth the sacrifice it takes to accomplish them. I do not believe that allowing more practice for the Navy is an adequate reason to harm, and possibly kill, many whales, dolphins, and other marine life.

The military is already using sonar and underwater explosives for war games around the Hawaiian Islands. It is hard to measure the damage that may already have been done to our marine animals because there is no guarantee that the dead animals will beach, but it is clear that if they increased the intensity of sonar and frequency of the games the results would be fatal to many of our underwater friends.

Why would you ignore the fact that sonar testing, at much lower levels, has already proved to have killed whales in the Bahamas? Humpback whales are endangered and rely on our islands for a safe place to mate and give birth. Take that away from them, and their species may not even survive. 1

It is one thing to simply acknowledge that whales are a life form and deserve to live, but living in Hawaii you cannot help to have a personal relationship with the humpbacks. Every year, during February and March (the peak of the humpbacks mating season in Hawaii), my dad and I take out our kayaks to be with them in the ocean. The last time we went we paddled out and sat for hours waiting for them. They were far away, but having a joyous time. Their joy was expressed so loudly underwater that we could hear it from our spot above the glittering blue water. When I jumped in, the sound was overwhelming. It was so obvious that I was intruding into their world, and yet when they

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0103 (cont.)

finally did approach close enough to be seen, they welcomed us with breaches and slaps. If you have not been lucky enough to experience a humpback up close, you should do so before making the decision that could kill them out completely.

I do not believe that the need is great enough to justify killing our marine life. The Navy is already practicing war games in Hawaiian waters. I believe they should stick to the status quo, although even that is not ideal for our whales. Is it necessary to increase the practice of our military? What are we even preparing to fight for?

Sincerely,

Inanna Carter, age 15

Haiku, Hawaii

COMMENT NUMBER
D-W-0104

Admiral Robert f. Willard
Commander U.S. Pacific Fleet
250 Makalapa Drive
Pearl Harbor, HI 96860

September 12, 2007

Dear Admiral

Sonar/Marine Animals

I strongly urge the Navy to discontinue further plans for the use of sonar testing off the *entire* Southern California coast. 1

There is no denying that sonar has been the cause of many whale deaths since being implemented in other areas. Additionally, it is disorienting and detrimental to other marine species, all of which are already under severe decline.

True, our country's borders need protection. However, we already have the most advanced, superior military in the world and the vast majority of our citizens feel secure. It is long overdue to allow the non human citizens of our planet the freedom to live in peace.

Respectfully

Steve Tyler

Orange, CA

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0106

Hawaii Range Complex Environmental Impact Statement
Public Hearing Input Form

Please record your comments concerning the Hawaii Range Complex Draft EIS/OEIS on this form. Please include your name and address. You may submit this form by:

1) placing it in the comment box at tonight's meeting
2) mailing it to: PMRF Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

All comments must be received no later than Sept. 17, 2007 to be included in the response to comment section of the Final EIS/OEIS.

Name: Jennifer S. Ho

Address:* Hilo HI

Comments:

1 I understand that tonights forum is not ment to address the publics' concerns regarding Low frequency sonar, depleted uraneum, the Stryker Brigade) or the militarys obligations. Since there is no planned forum, I want the public to be given the opportunity to let our concerns be addressed by such a forum held soon. Your time and ours will not be wasted if you give the opportunity to address these obvious needs.

Thank you.

2 Also I wish the military, a well organized & disciplined body would work to stop the real threats of *pollution, alien species invasion & loss of fishing through *dead zones. That would be a true heroic & worthwhile accomplishment — much more needed than the threat of imagined war

* If you provide your mailing address, we will add you to our mailing list to receive future notices about this EIS/OEIS.

COMMENT NUMBER
D-W-0107

JAY R. MILLER
FORMER JUDGE

Portsmouth, Rhode Island

August 23, 2007

Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawai'i 96752-0128

Sent by Fax and U.S. Mail

RE: Prevent Naval Wargames in Hawaii

Dear Mr. Clements:

In recognition of the importance of the Hawaiian islands to the world's natural resources, the U.S. established the Papahanaumokuakea Marine Monument. Here threatened monk seals survive and coral reefs are "protected" from destruction. Science, and our own good wisdom, tell us to protect marine areas for the welfare of the planet, which is our own welfare as well.

1 Laws exist to protect what is good and "sacred" to people, and to our Earth, and as a Judge, it is my responsibility to enforce them. What the U.S. Navy intends to do, expand its wargames in the Hawaiian Islands, is contrary to existing law, science and wisdom. The NWHI Marine Monument, State Refuge and the Humpback Whale Sanctuary exist to protect those areas from interference, and the Navy's plan is the most heinous interference imaginable. We cannot allow the Navy's plan to use active sonar. The "wargames" will spread toxic chemicals, which not only will injure wildlife and human beings but will also negatively effect sacred, cultural sites of native Hawaiians.

Sincerely,

Jay Miller

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0108

Ali'i N v Mu? Edmund Keli'i Silva, Jr.

E malama i ka mana'o'i'o

September 17, 2007

Pelekikena George W. Bush
Ka Hale Ke'oke'o
1600 Pennsylvania Avenue
Washington, D.C. 20500

Subject: NEPA Programs Hawai'i Range Complex EIS/OEIS

Aloha Pelekikena Bush:

I am Kanaka Maoli. My 'Ohana (family) is Hawai'i's highest royal lineage in existence today. Due to the failure of the Kamehameha I dynasty, it is my lineage that is Hawai'i's most senior lineage with the responsibility to correct things. The Kamehameha I dynasty up to Lili'uokalani eventually failed in its once promising administration of the Kingdom. Kalakaua, who was of the last of the Kamehameha I dynasty, appointed his wife's Kawananakoa nephews as prospective successors.

But because Lili'uokalani lost the Kingdom in her lifetime, the Kawananakoa clan never materialized as successors.

Today, if a monarchial entitlement is considered, then it must fall upon the highest lineage found in Hawai'i that is capable of the responsibility – not the Kamehameha I or Kawananakoa.

I have the blessings of my family, the Kupunas, and House of Nobles. **I am King.**

Royal Chambers, Ka Pu'uhonua O Na Wahi Pana O Hawai'i Nei
1760 Mahani Loop Honolulu, Hawai'i 96819
hmkingdomofhawaii@gmail.com

COMMENT NUMBER
D-W-0108 (cont.) 1

In my capacity I speak. The Kingdom of Hawai'i is a non-aligned nation and does not support further desecration of our lands. Hawai'i is not a staging ground for any Military training nor does it support the philosophy of U.S. Military Commanders or the U.S. President about terrorist threats to these islands. We are a peaceful people and seek only pono (righteous) relationships with any other nation.

Our lands and seas have been spoiled by greed, power, lust and vanity. Therefore, to subject our 'aina (lands) to further suffering is to subject all of us to suffering as well.

Consider this case in point. The island of Kaho'olawe was a training ground for the U.S. military. The U.S. military finally stopped bombing the island and promised to clean up all the explosives left behind. After hundreds of millions of dollars spent, the Navy left. The island and the waters around it are still filled with pollution and dangerous ordinance. We still have years of work to do to clean up the U.S. military's mess. This is a known fact. So why would I, in all consciousness, think that the Navy or any military organization will have sympathy or respect for Hawai'i, the archipelago, its indigenous animals and plant life, or its indigenous people?

I represent our kupuna kahiko and the multitude of peoples of like minds who do not trust or support the EIS/OEIS to give out honest answers. Socrates once said: "Justice is given to those that can pay for it." The same is true for those who can lobby for what they know is unjust for political gain, power and money.

Furthermore, history speaks clearly to our minds and to our hearts of these known facts. It is that history of distrust I acknowledge in my soul as truth. Therefore, as a Hawaiian born to this land, I strongly urge the Navy and all U.S. Military Branches of Services to break off from causing the lands and seas of Hawai'i further suffering through their military operations and training and to stand down.

As a courtesy, I am requesting my Ali'i Mana'o Nui to send a copy of this letter to the appropriate person within the U.S. Navy to be included in the comments on the current EIS/OEIS proceeding.

Aloha pumehana,

Edmund K. Silva, Jr.
Nou Ke Akua Ke Aupuni O Hawai'i

cc: Ali'i Mana'o Nui
Celestial Council
House of Nobles

Royal Chambers, Ka Pu'uhonua O Na Wahi Pana O Hawai'i Nei
1760 Mahani Loop Honolulu, Hawai'i 96819
hmkingdomofhawaii@gmail.com

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

09/17/2007 12:11 8082464921 DAVID & NINA'S MANA- PAGE 01/01

Nina Monasevitch

Lihue, HI

September 17, 2007

PMRF
PO Box 128
Kekaha, HI 96753-0128
808-335-4520

TO WHOM IT MAY CONCERN:

Thank you for sending me the Draft Environmental Impact Statement / Overseas Environmental Impact Statement dated July 2007. I have read the document and am alarmed at the lack of scientific peer review. I therefore believe the EIS/OEIS to be invalid, based on lack of proper science.

I do not support any military expansion of the Missile Range facility.

The war games and training exercises that PMRF engages in, especially the active and passive mid and low frequency sonar systems kill cetaceans. This is fact. With over 20 species of marine mammals documented in Hawaii's waters, I find it unconscionable and irresponsible that any sonar exercises are practiced in Hawaii's waters. I ask that all sonar activities be stopped permanently in Hawaii and all oceans where cetaceans are present.

Any expansion of the military in Hawaii is unnecessary, unscientific, and not pono.

I ask that you take an honest look at the truth of your soul. You cannot have power, control and security at the expense of a healthy eco-system. What are you protecting if there is not a sustainable planet to live on? The oceans and its eco-system are the largest component of our global climate. Let's create balance and health in our environment, in our society, in our government, in ourselves. Let's demilitarize and focus on Peace.

Mahalo and Aloha,

Nina Monasevitch

COMMENT NUMBER
D-W-0109
1

HAWAI'I RANGE COMPLEX DEIS/OIES JULY 2007
Comments by Cory Harden (as an individual) Hilo, Hawai'i

GENERAL COMMENTS

<u>Improve clarity</u>

I found this EIS for more difficult to understand than three others I've read.

Highly technical language is used when lay-person language could be used instead. For example, the chart on p. 4-152, "Yearly Marine Mammal Exposures From all ASW" uses "dose function behavioral" instead of "harassment level," "TTS" instead of "significant behavioral effects level," and "PTS" instead of "injury level." 1

Language appears to minimize events--for example, "missile intercept" with no explanation of the size of the resulting explosion, the amount of debris created, and the size of the area where debris would fall. 2

Conclusions from related facts are not drawn where they should be. On the contrary, related facts (like the number of incidents of whale harassment, and the number of whales) are presented many pages apart. 3

Information is presented piecemeal.

- *To understand impacts of Alternative 2, you have to go back and read No Action and Alternative 1 impacts sections, then try to remember them all while reading about Alternative 2.*
- *Impacts are not evaluated across the entire Hawai'i Range Complex, but separately for each geographic area.*

I had to keep reading and re-reading sections and flipping back and forth to get the entire picture. It seemed like you had to read the entire EIS to understand any one section.

Suggestions to increase clarity:

- *In each section, start by describing impacts of Alternative 2, then do Alternatives 1 and the No-Action Alternative.* 4
- *For Chapter 4, add a section organized like the Cumulative Impacts section, by subject (airspace, biological resources, etc.) For each subject, describe combined impacts on all geographical areas (open ocean, NW Hawaiian Islands, Kaua'i, etc.) The Stryker EIS did this and it was extremely helpful.*
- *Use lay-person language wherever possible*

<u>Evaluate legal authority over land use</u>

<u>Appendix I, p. 1</u> …Public Law 103-150…is not applicable to the disposition of ceded lands at PMRF or support sites…

<u>p. 4-461, lines 5-7</u> [Navy plans] do not conflict with…Federal, State, regional, or local plans, policies, or legal requirements.

Do Federal, State, regional, and local governments in Hawai'i have legal authority, since the 1893 overthrow of the Kingdom of Hawai'i was "illegal", per P.L. 103-150?

<u>Evaluate cumulative impacts of U.S. occupation of Hawai'i, military presence, and proposed Navy actions</u> on native Hawaiians and the nation of Hawai'i 5

- *Include impacts on native Hawaiian spiritual life, culture, connection with the land, self-determination, civil rights, language, wealth, emotional and physical health, and safety (hazards on former and current bases, and risks from Hawai'i becoming a target for enemies of the U.S.)*

COMMENT NUMBER
D-W-0110

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0110 (cont.)

6

- Include data showing native Hawaiians, compared to other ethnic groups in Hawai'i, suffer from--
  low incomes (1)
  high unemployment rates (1)
  high rates of dependence on government assistance programs (1)
  high risk of homelessness (1)
  high rates of health problems (1)
  highest incarceration rates (1)
  decreasing population in Hawai'i (though increasing outside of Hawai'i) (1)
  shortest life expectancy (2)

(1) OHA Datebook 2006
(2) Life and death in Hawaii: ethnic variations in life expectancy and mortality, 1980 and 1990, Braun KL, Yang H, Onaka AT, Horiuchi BY, Center on Aging, University of Hawaii, Honolulu

7

Identify past and present violations of national and international laws by--
- The unilateral annexation of Hawai'i by a U.S. congressional joint resolution on July 7, 1898, so Hawai'i could be used for a military base to fight the Spanish in Guam and the Philippines
- past, present, and planned use of Hawaii's land to further the military objectives of the U.S. occupiers
-

- Refer to legal instruments which allow or disallow U.S. military presence in the nation of Hawai'i, including but not limited to--
  1-international, Federal, and State laws
  2-international, Federal, and State court decisions
  3-international treaties

8

Evaluate effects of waste in ocean
Do a map, showing estimated amount and location, for one typical year, of all waste the Navy will put into the ocean--missiles, sonobuoys, torpedoes, gunnery rounds, parachutes, chaff, flares, sewage, graywater, hazardous materials, radioactive materials, etc.

Evaluate combined effects of all waste on marine life.

Improve evaluation of cumulative impacts
Chapter 5, Cumulative Impacts, does not appear to be a thorough evaluation.

Describe any past, current, and planned military use of Slice and Swath vessels and evaluate impacts
The description below is from the Envirowatch website http://www.envirowatch.org/slicepg.htm

> ... special project conducted by the United States Office of Naval Research in Arlington, VA, involving the development of the Slice and Swath vessels in Hawaiian waters. The project is funded by 15 million dollars from the Department of Defense, acquired by Hawaii's Senator Daniel Inouye. These super-fast vessels are reported to travel up to 31 knots while maintaining a 14 foot draft under the surface with their twin hulls (Slice). Our initial investigation of the vessels and their use show that they were not presented to the public as either a government or military project and, in fact, have been served up as the future interisland ferry with "possible military applications"...Rear Admiral Paul Gaffney II of the Office of Naval Research oversaw the development for the Navy in a public/private partnership.
>
> In an article in the Honolulu Star Bulletin, 12/8/97, Steven Loui, President of Pacific Marine & Supply Company, the builder of the vessel stated, "Slice was designed, built and tested in less than four years at a cost of 14.5 million which makes it one of the fastest, least expensive, advanced-craft development programs ever conducted by the office of Naval Research. Potential uses for Slice include as a missile launch pad, patrol boat, test-range support craft, helicopter support, and search and rescue". He also hopes to continue building [testing] Slice ships here for export worldwide.
>
> A review of the final Environmental Impact Statement and Management Plan for the Hawaiian Islands Humpback Whale National Marine Sanctuary found that the use of the Swath and Slice Vessels, or their development, was not disclosed in Appendix F "List of Military Activities in Hawaii"...
>
> ...On or about March 18, 1998, the National Marine Fisheries Service interviewed the Captain of the Slice after he reported a collision between the Slice and a whale or other large marine mammal. Of even greater concern is that NMFS is covering up the fact by not prosecuting the Navy or vessel operator after documenting the incident, nor have they considered future impacts and compliance with NEPA, which requires an analysis of potential environmental effects of major federal actions within U.S. territorial waters. We've also learned that NMFS only response to the incident was to write up an internal memorandum regarding the matter.
>
> In March, during the Navy's SURTASS LFA (Surveillance Towed Array Sonar System Low Frequency Active) System testing, a dead humpback whale calf washed up on Lahi Lahi Point, Waianae, on the Island of Oahu. The National Marine Fisheries Service (NMFS), the Hawaii Department of Land and Natural Resources (DLNR), and the Navy were quick to dismiss LFSA testing as the cause of death, though they did not disclose that the machines were being calibrated before the official start date and that the calibrations could also have had an impact on whales...
>
> When we requested biological opinions or other assessments issued by NMFS regarding the Swath and Slice project the response was "We are working with the Navy on this". When we filed a FOIA with the Navy, requesting such information we received telephone calls from the Pacific Division, Naval Facilities Engineering Command, Environmental Planning Division advising " we don't know what the vessel Slice is and we have no information on such a vessel"...

COMMENT NUMBER
D-W-0110 (cont.)

LINE-BY-LINE COMMENTS
p. ES-3 lines 21-22 *In the history of the Navy in Hawai'i, include how Navy got access to Hawai'i--by illegal actions of U.S. government*

p. 4-448 lines 16-18 The Army will continue to provide Native Hawaiians with access to traditional religious and cultural properties, in accordance with the American Indian Religious Freedom Act and EO 13007 on a case-by-case basis. *This is insufficient.*

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-W-0111

International Ocean Noise Coalition

www.oceannoisecoalition.org

September 17, 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128, Kekaha, Kauai,
Hawaii 96752-0128

ATTN: HRC EIS/OEIS

Re: Draft Environmental impact Statement/Overseas Environmental impact Statement Federal Register Notice August 3, 2007 (Volume 72, Number 149)], Pages 43251-43252

On behalf of the International Ocean Noise Coalition and its affiliate the Hawaii Ocean Noise Coalition, we submit the following comments on the Draft Environmental impact Statement/Overseas Environmental Impact Statement (DEIS) for the Hawaii Range Complex (HRC) for the period of July 2008 through July 2013.

We are alarmed that the Navy, despite the overwhelming evidence supporting a precautionary approach to the introduction of anthropogenic noise into our oceans, is persisting in planning for the proliferation of ocean noise. This is in total conflict with recognized international environmental practice that promulgates the United Nations Rio Declaration of 1992, which passed through consensus by over 100 member nations, including the United States.

The Navy insists on using selective science and desktop modeling to generate assumptions that cannot be applied in the real and dynamic marine environment, yet dismiss or choose to ignore empirical evidence and calls for caution from the international community.

The mitigation methods proposed by the Navy are woefully inadequate and are not in line with those used by other navies. Our specific concerns follow.

Sound exposure thresholds

In the DEIS, the Navy proposes exposing hundreds of thousands of marine mammals to levels of sonar much higher than levels that are known to have caused the stranding and death of whales in the Bahamas in 2000. The whales in the Bahamas stranding died when exposed to between 150 and 160 dB of mid-frequency sonar. Yet the Navy asserts in the DEIS that permanent threshold shift (PTS) and tissue damage will not occur until an exposure level above 215 dB is reached. This argument flies in the face of reason and the best empirical evidence we have. 1

The Navy's argument that behavioral disruption won't occur until above 195 dB (its threshold for Temporary Threshold Shift (TTS)) is equally untenable. Firstly, TTS is not an appropriate 2

COMMENT NUMBER: D-W-0111 (cont.)

indicator of behavioral disruption. It occurs only after much higher exposure levels than more appropriate measurements of behavioral disruption. For example, a published study (Nowacek et al, 2004) indicates that Atlantic right whales stopped foraging and swam rapidly to the surface when exposed to a mid-frequency alarm of 154 dB. NOAA, NMFS parent agency reportedly characterized this response as "profound."[1] 2

Additionally, several published studies of harbor porpoises indicate avoidance of mid-frequency sounds at levels well below 140 dB. A study sponsored by the Norwegian navy found that mid-frequency sonar caused killer whales to change their dive pattern and rapidly flee an area at a maximum pressure level of 150 dB (Kvadsheim et al, 2006).

The best available scientific evidence simply does not support the Navy's thresholds and clearly supports the necessity for lower thresholds. In fact, the Navy's 195 and 215 dB thresholds are quite shocking in view of the scientific literature. 3

Stranding data

The Navy commonly argues that it has used sonar for decades without systemic declines in marine mammal populations. This has no meaningful basis since NMFS' stock assessments indicate that no meaningful information on abundance trends is available. 4

Furthermore, if animals are injured or killed around Hawaii the probability of anyone finding their bodies is very remote. Most bodies will sink, be eaten by sharks, or be carried away by the strong currents around Hawaii. If animals do happen to strand the probability of their being found is very low given the many hundreds of miles of unmonitored beaches and the fact that no one was looking. Thus the lack of strandings associated with active sonar use or other anthropogenic noise use is not evidence that animals have not been injured or killed from that use in the past.

Auditory damage is not the only risk 5

The Navy disingenuously dismisses non-auditory impacts in marine mammals. It assumes that the only risk created by sonar use is auditory damage or PTS which it argues occurs at or above 215 dB. This flies in the face of the scientific evidence and the consensus of leading marine mammal scientists. It is well accepted that the primary threat posed by sonar is not direct tissue damage causing deafness but the fact that cetaceans react to sound at much lower levels in behavioral ways that can indirectly cause injury and death.

Scientists agree that sonar can cause a behavioral reaction in that whales (especially beaked whales) panic in response to active sonar and come to the surface too quickly thereby suffering "the bends." The DEIS mentions this phenomenon as a "hypothesis" and states that per Cox et al, 2006, it needs further investigation. It then continues by concluding that rapid ascent would be unlikely to produce the "bends" in beaked whales because they dive deep and remain at depth for long periods and so, per Fahlman et al. (2006) have reduced nitrogen saturation. The

[1] Letter from Rodney F. Weiher, Ph.D., NEPA Coordinator, NOAA, to Keith Jenkins, Naval Facilities Engineering Command Atlantic, Jan. 30, 2006 per letter from NRDC to Steve Leathery and Michael Payne, NMFS, May 24, 2006.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0111 (cont.)

6 converse is true – a rapid ascent from such whales would be and has been lethal. The evidence is that mid-frequency active sonar can kill beaked whales at exposure levels well below the Navy's proposed thresholds for behavioral disruption.

For beaked whales the science indicates that an appropriate and precautionary threshold is a pressure level below 160 dB as indicated by data from the Bahamas stranding (Hildebrand, 2005). A consensus exists in the scientific community that the formation of gas bubbles in tissue, most likely from rapid surfacing in response to sound pressure levels much lower than those that cause tissue damage directly is the most plausible cause of the deaths of beaked whales exposed to noise. Hawaii has been identified as one of the world's 23 known "key areas" for beaked whales (McLeod and Mitchell, 2006) and they will be placed at direct risk from the proposed action.

7 Additionally, the harmful effects of active sonar, in addition to physical injury and death from stranding, include behavioral disruption, habitat displacement and interference with mating, calving, nursing, feeding and communication. Such disruptions can have significant implications for the survival of marine animal populations. The Navy also does not adequately address in the DEIS, the cumulative effects of ocean noise produced by the large number of exercises (1,145 using active sonar alone) around the Hawaiian Islands on the above behaviors.

Geographic issues

8 There are steep seamounts off the Hawaiian Islands which provide a concentrated haven for marine life. To the west of the island of Hawaii there are a number of sea mounts and these waters are also characterized by regular cyclonic eddies which increase productivity and are likely to result in greater densities of cetaceans. These areas should be avoided during sonar use.

The steep seamounts provide important habitat for short-finned pilot whales and three species of beaked whales. Beaked whales are known to be especially sensitive to sonar and their habitat should be avoided in any well-intentioned mitigation plan. Hawaii's oceanic conditions are quite similar to areas where mass strandings have occurred in the past and, thus, it is very risky to conduct war games using sonar around these islands.

Population level impacts

9 The DEIS uses abundance estimated for near shore marine mammals based on aerial surveys (Mobley et al 2000, Mobley et al 2001). These estimates are then used to predict the numbers of affected animals using the Navy's modeling techniques.

Estimates based on estimates can hardly be categorized as good science, especially for deep-diving marine mammal species which are hard to observe and are likely the most susceptible to noise. Furthermore behavioral impacts, including the disruption of foraging or the displacement of marine mammals, could have population level effects especially when the impacts are repeated. Certainly it appears that a single sonar exercise in the Bahamas resulted in the death or displacement of a population of beaked whales in the area. Yet the Navy is only concerned with species-level impacts.

COMMENT NUMBER
D-W-0111 (cont.)

Dr. Robin Baird, a marine mammal scientist who has conducted extensive research on whale and dolphin populations of the Hawaiian Islands and whose abundance data is used in the DEIS, notes the genetic studies of all species studied so far around the Hawaiian Islands have indicated that these animals are reproductively differentiated from animals elsewhere in the tropical Pacific (Chivers et al, 2001; Martien et al, 2005; Andrew et al, 2006). In the case of spinner and bottlenose dolphins there appears to be multi- population structures within the Hawaiian Islands with genetic differences among populations and no evidence of movements of individuals among the four main groups of islands. Yet the Navy states that the abundance estimates can be based for most populations on the entire Hawaiian Exclusive Economic Zone. 9

Based on genetic and photo ID evidence (Baird et al 2002, 2003, 2006) there are likely small, reproductively isolated odontocete populations around each island. Thus, it is likely that the Navy has strongly underestimated the proportion of some populations that may be taken by the action and consequently the probability of population level impacts is significantly higher than discussed in the DEIS.

Of particular concern is the potential population-level impacts on melon-headed whales. NMFS most recent stock assessment (Caretta et al, 2006) sets the level of potential biological removal for Hawaiian melon-headed whales at 14 whales per year. By comparison, at least 150 melon-headed whales were embayed off Kauai during the 2004 RIMPAC exercises. Had efforts to lead the whales back to sea not been successful, the loss could potentially have been over ten times greater than what, according to NMFS, the Hawaiian stock can annually absorb. This is a very serious issue that has not been adequately considered. 10

Mitigation

The DEIS does not include even those few additional mitigation measures it agreed to include during the RIMPAC 2006. The Navy's proposed mitigation measures are ineffective and inadequate. There are no dedicated marine mammal observers and the Navy's paltry description of its 'marine species awareness training' does not appear adequate. Many of the marine mammal species are deep diving and remain beneath the surface for more than an hour.

Whales are difficult to spot in rough water and windy weather and are almost impossible to spot at night. Thus visual detection is very inadequate. Passive acoustic detection is only effective when whales are vocalizing which not all whales do and is only effective at certain frequencies. We do not agree with the Navy's 'mitigation safety zone' of 1,000 yards (175 db RL) and contend that active sonar impacts can occur beyond this isopleth and beyond the field of view of an observer on a ship.

The Navy cannot have much confidence in its marine mammal detection methods since it allows for the eventualities of animals getting as close as 200 yards from the sonar dome. However, if a marine mammal is detected within 1,000 yards of the sonar dome the Navy says that the sonar will be reduced by 6dB from 235 to 229 dB. This is still incredibly loud and many thousands times more intense than the sonar that killed the whales in the Bahamas incident.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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Similarly a reduction of 10 dB will be made if an animal is observed within 500 yards of the dome. The Navy will only cease operation of the sonar if a marine mammal is observed within 200 yards of the dome. Whales have been injured and killed at greater distances from the source than 200 yards. The Navy will not slowly ramp up transmissions to allow whales to leave the area before the sonar is intensified, citing operation impediment as the reason.

In the DEIS the Navy appears to have selected training sites where active sonar will be used based entirely on its own operational needs and convenience. It does not make allowances for marine mammal escape routes or require that ships avoid embayments, even though NMFS concluded the Navy's sonar use in 2004 was the "plausible, if not likely, contributing factor" in the causation of Hanalei Bay, Kaua'i incident in which 150-200 melon headed whales 'milled' in an unusual manner in the shallows of Hanalei Bay for over 28 hours.

Other navies use more effective mitigation procedures.

The NATO Undersea Research Center requires much stricter measures for the protection of marine mammals during high intensity active sonar use. Sonar test sites are selected only after an environmental assessment has considered known marine mammal habitat and noise propagation. Sonar test sites are selected to avoid enclosed areas and coastal areas with complex steep sea bed topography. Ship tracks are planned to provide marine mammal escape routes and avoidance of embayments. Operations are suspended if marine mammals enter the safety zone which is defined as the area ensonified to 160 dB for large whales. The safety zone for endangered species, or for Cuvier's beaked whales is twice the above-mentioned safety zone.

The Australian Navy also takes more cautious and significant steps to minimize harm to marine life from sonar exercises. It has seasonal and geographic restrictions on the use of the mid-frequency sonar system at its highest power levels. It avoids transmissions with source levels greater than 210 dB within 30 nautical miles off certain coastlines during times when whales are likely to be present and uses lower power levels in conditions that may produce surface ducting or embayments. The Australian Navy also avoids seamounts and monitors a 4,000 yard safety zone for 30 minutes prior to sonar transmission. Similarly it maintains this 4,000 yard safety zone during active sonar transmissions and institutes immediate shut-down procedures if a marine mammal is detected within the safety zone.

The U.S. Navy can and has complied with the Australian Navy's mitigation methods, for example during Operation Talisman Saber in 2007. Therefore for the Navy to be aware of the existence and implications of more stringent mitigation methods, to have implemented them and then to not use them elsewhere is unsatisfactory.

The Navy has in the past employed more effective mitigation measures in Hawaiian waters than it is proposing in this DEIS. In RIMPAC 2006 the Navy adopted larger marine mammal safety zones, had at least one dedicated marine mammal observer, implemented restrictions on exercises involving the use of active sonar taking place in channels between islands with steep underwater topography and instituted a reduction of power levels in conditions of low visibility. These improved mitigation procedures in RIMPAC 2006 were only implemented after the courts deemed the Navy's proposed mitigation to be inadequate.

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The Navy should be adhering to much stricter mitigation methods in use by other navies for similar exercises and to include those that the U.S. Navy when required to, has used before. These stricter mitigation methods should include restrictions on active sonar use to avoid seasonal migrations such as the migration of endangered humpback whales into the US Hawaiian Islands Humpback Whale National Marine Sanctuary and avoiding seamounts and other sensitive habitats frequented by marine mammals, especially vulnerable beaked whales. 11

We appreciate the opportunity to submit these comments and look forward to them being addressed in full.

Sincerely,

Marsha L. Green

Marsha Green
North American Representative

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

References

Andrews, K. R., Karczmarski, L., Au, W.W.L., Rickards, S.H., Vanderlip, C.A., and Toonen, R.J. (In press) Patterns of genetic diversity of the Hawaiian spinner dolphin (Stenella longirostris), Atoll Research Bulletin.

Baird, R.W., Gorgone, A.M. and Webster, D.L. (2002) An examination of movements of bottlenose dolphins between islands in the Hawaiian Island chain. Report prepared under Contract NO. 40JGLNF110270 for the National Marine Fisheries Service Southwest Fisheries Science Center, La Jolla, Calilfornia.

Baird, R.W., McSweeney, D.J., Webster, D.L., Gorgone, A.M., and Ligon, A.D. (2003) Studies of odontocete population structure in Hawaiian waters: results of a survey through the main Hawaiian Islands in May and June 2003. Report prepared under Contract No. AB133F02-CN-0106 for the National Marine Fisheries Service, NOAA.

Baird, R.W., Schorr, G.S., Webster, D.L., Mahaffy, S.D., Douglas, A.B., Gorgone, A.M., and McSweeney, D.J. (2006) A survey for odontocete cetaceans off Kauai and Niihau, Hawaii during October and November 2005: evidence for population structure and site fidelity. Report prepared under Order No. AB133F05SE5197 for National Marine Fisheries Service Pacific Islands Fisheries Science Center, Honolulu, Hawaii.

Caretta, J.C., Forney, K.A., Muto, M.M., Barlow, J. Baker, J., Hanson, B. and Lowry, M.S. (2006) U.S. Pacific Marine Mammal Stock Assessments: 2005, NOAA Tech. Memo. NOAA TML-NMFS-SWFSC-388.

Chivers, S.J, LeDuc, R.G. and Baird, R.W. (2003) Hawaiian island populations of false killer whales and short-finned pilot whales revealed by genetic analyses. P.32 in Abstracts of the 15th Biennial Conference on the Biology of Marine Mammals, 14-19 December 2003, Greensboro, North Carolina.

Cox, T.M., et. al., Why beaked whales? Report of workshop to understand the impacts of anthropogenic sound. 2006 J. Cetacean Res. Manag. (7), 177 -187.

Fahlman, A., A. Olszowka, B. Bostrom, and D. R. Jones, 2006. Deep diving mammals: dive behavior and circulatory adjustments contribute to bends avoidance. Respiratory Physiology and Neurobiology. 153:66-77.

Hildebrand, J.A. (2005) Impacts of anthropogenic sound. In Marine mammal research: conservation beyond crisis. Edited by J.E. Reynolds, III Perrin, W. F., Reeves, R. R., Montgomery, S. and Ragen, T. J. Johns Hopkins University Press, Baltimore, Maryland. Pp. 101-124.

Kvadsheim, P., Benders, F. Miller, P., Doksaeter, L., Knudson, F. Tyack, P., Nordlund, N., Lam, FP., Samarra, L. K. and Gode, O.R. (2006) Herring, killer whales and sonar. 3S-2006 cruise report with preliminary results prepared for Norwegian Defense Research Establishment, Maritime Systems, Norway.

MacLeod, C.D.and Mitchell, G. (2006) Known key areas for beaked whales around the world. J. Cetacean Management and Research 7(3): 309-322.

Martien, K., Baird, R. W., and Robertson, K. (2005) Population structure of bottlenose dolphins around the main Hawaiian Islands. Paper presented to the Pacific Scientific Review Group, January 2005.

Mobley, J. R., Spitz, S.S., Forney, K. A., Grotefendt, R., and Forestell, P.H. (2000) Distribution and abundance of odontocete species in Hawaiian waters: preliminary results of 1993-98 aerial surveys. National Marine Fisheries Service Southwest Fisheries Science Center Administrative Report LJ-00-14C.

Mobley, J.R., S.S. Spitz, and R. Grotefendt, 2001. Abundance of humpback whales in Hawaiian waters: Results of 1993-2000 aerial surveys, Report prepared for the Hawaii Department of Land and Natural Resources and the Hawaiian Islands Humpback Whale National Marine Sanctuary, NOAA, U.S. Department of Commerce.

Nowacek, D.P., Johnson, M. P. and Tyack, P. L. (2004) North Atlantic right whales (Eubalaena glacialis) ignore ships but respond to alerting stimuli. Proceedings of the Royal Society of London, B 271, 227-231.

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COMMENT NUMBER

D-W-0112

ANIMAL WELFARE INSTITUTE

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September 17, 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
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Attention: HRC EIS/OEIS
By email: deis_hrc@govsupport.us

Re: Draft Environmental Impact Statement/Overseas Environmental Impact Statement
Federal Register Notice Vol. 72, Number 149, Page 43251-43252

Dear Sir or Madam:

The Animal Welfare Institute (AWI) appreciates the opportunity to submit the following comments on the Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS/OEIS) for the Hawaii Range Complex.

In view of the evidence related to the impacts of human-generated undersea noise, including active sonar use, on marine animals[1] and the international action and calls for pre-caution[2] over

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[1] The Navy is aware of the literature on behavioral and auditory impacts of undersea noise on marine mammals and other species. It includes W.J. Richardson et al., Marine Mammals and Noise (1995); National Research Council, Ocean Noise and Marine Mammals (2003); P. Tyack, "Behavioral Impacts of Sound on Marine Mammals," Presentation to the U.S. Marine Mammal Commission Advisory Committee on Acoustic Impacts on Marine Mammals (February 4, 2004); Whale and Dolphin Conservation Society, Oceans of Noise (2004); M. Jasny, Sounding the Depths II: The Rising Toll of Sonar, Shipping, and Industrial Ocean Noise on Marine Life (2005); A. Fernández et al., "'Gas and Fat Embolic Syndrome' Involving a Mass Stranding of Beaked Whales (Family Ziphiidae) Exposed to Anthropogenic Sonar Signals," 42 Veterinary Pathology 446 (2005); Vidal Martin et al., "Mass Strandings of Beaked Whales in the Canary Islands," in Proceedings of the Workshop on Active Sonar and Cetaceans 33 (P.G.H. Evans & L.A. Miller eds., 2004); Jepson, P. D. et al., "Gas bubble lesions in stranded cetaceans," Nature 425: 575-576 (2003); International Whaling Commission, 2004 Report of the Scientific Committee, Annex K at Tab. 1; M. Jasny, Sounding the Depths II at Tab. 1-3; McCauley, R., J. Fewtrell, and A.N. Popper, "High intensity anthropogenic sound damages fish ears," Journal of the Acoustical Society of America 113: 638-42 (2003); Bart, A. N., Clark, J., Young, J. and Zohar, Y., "Underwater ambient noise measurements in aquaculture systems: a survey," Aquacultural Engineering 25: 99-110 (2001); Engås, A., S. Løkkeborg, E. Ona, and A. V. Soldal, "Effects of seismic shooting on local abundance and catch rates of cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*)," Canadian Journal of Fisheries and Aquatic Sciences 53:2238-2249 (1996); Frantzis, A. 1998. Does acoustic testing strand whales? Nature (London), 392: 29; and Balcomb, K.C., and Claridge, D.E. 2001. A mass stranding of cetaceans caused by naval sonar in the Bahamas. Bahamas J. Sci. 8(2): 1-8.

[2] In recent years the international community has begun to recognize the significance of anthropogenic ocean noise in relation to its impacts on marine life. In July 2005, the UN Secretary General prominently included the problem of ocean noise in a report to the General Assembly listing anthropogenic underwater noise as one of five "current major threats to some populations of whales and other cetaceans," and including noise as one of the ten "main

COMMENT NUMBER

D-W-0112 (cont.)

the introduction of anthropogenic noise into our oceans, we strongly urge the Navy to reconsider its planned action. The Navy should demonstrate a serious commitment to the protection of marine life by: a) ceasing actions involving the introduction of high intensity anthropogenic noise into the ocean in areas where there are known populations of marine animals, including designated protected areas, migration routes, and breeding, mating and feeding areas; b) reducing the output levels of its active sonar to the minimum practicable level; and c) committing to meaningful mitigation measures that assure the strongest protections for marine animals.

Active Sonar Use Harms Marine Life

There is a growing list of stranding events coincident with active sonar use - Spain (2005), North Carolina (2005), Hawaii (2004), Canary Islands (2004, 2002, 1991, 1989, 1988, 1985), Washington State (2003), Virgin Islands (1999), Bahamas (2000), Madeira (2000), Greece (1996), and Japan (1990, 1989, 1987, 1979, 1978, 1968).[3] In the DEIS/OEIS the Navy admits to active sonar use being the causative factor in five of these cases - Canary Islands (2004, 2002), Bahamas (2000), Madeira (2000), and Greece (1996).

Despite the overwhelming evidence that active mid-frequency sonar use has caused deaths in marine mammals, the Navy is planning on increasing its mid-frequency active sonar use around

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current and foreseeable impacts on marine biodiversity" on the high seas. Specific references from this and other fora recognizing and/or addressing the problems of anthropogenic ocean noise include: Report of the Secretary General, Oceans and the Law of the Sea, § 183 and 286 (A/62/) (advanced and unedited text) (March 12, 2007); General Assembly Resolution, Oceans and the Law of the Sea, § 107 (A/61/222) (Nov. 2006); Report on the work of the United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea (A/61/156) (July 17, 2006); Report of the Ad Hoc Open-Ended Informal Working Group to study issues relating to the conservation and sustainable use of marine biological diversity beyond areas of national jurisdiction, § 38 (March 2006); General Assembly Resolution, Oceans and the Law of the Sea, § 84 (A/60/30) (November 2005); Report of the Secretary General, Oceans and the Law of the Sea, § 159 and 147 (A/60/63/Add.1) (July 15 2005); Commission Proposal for a Directive of the European Parliament and of the Council establishing a framework for Community Action in the field of Marine Environmental Policy, COM(2005)505 (Oct. 24 2005); Revised Draft of the Proposal reflecting the Political Agreement of the Council (Environment) on 18 December 2006, New Article 2(a), § 7; IUCN/World Conservation Union 2004: Resolution 053, "Underwater Noise Pollution" (Nov. 2004); European Parliament 2004: Resolution B6-0018/2004 (October 21, 2004); International Whaling Commission 2004: Report of the Scientific Committee, at § 12.2.5 and Annex K – Report of the Standing Working Group on Environmental Concerns; ACCOBAMS 2004: Second Meeting of Parties, Res. 2.16, "Assessment and Impact Assessment of Man Made Noise"; Arctic Treaty Consultative Meeting 2004: Informational Paper 056, "An Update on Some Issues Surrounding Noise Pollution," at 7; ASCOBANS 2003: Fourth Meeting of Parties, Res. 5, "Effects of Noise and of Vessels."

[3] In the DEIS/OEIS the Navy states that the "Center for Naval Analysis has compiled the history of naval exercises taking place off Japan and found there to be no correlation in time for any of the stranding events presented Brownell et. al. (2004)." Brownell et. al. (2004) is a paper which correlated beaked whale strandings to US Naval active sonar use in an area of Japan where there is a major US Naval base and significant US Navy ship activity. The Navy cannot claim that there is no correlation without producing the substantiating document – the report by the Center for Naval Analysis.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

the Hawaiian Islands[4] and reducing the scope of mitigation measures that it has used for the same sonar use in Hawaiian waters in the past.[5]

The Navy's analysis of acoustic impacts to marine mammals is through modeling based on abundance estimates which were largely determined from aerial surveys, a difficult way to count marine mammals, especially relatively small animals and those that dive for prolonged periods such as beaked whales – the very animals thought to be most susceptible to anthropogenic ocean noise. Modeling based on estimates is an inexact science that cannot accurately predict every eventuality in the real world. However, using its modeling, the Navy predicts that for each year its active sonar use in the preferred action will cause: 63,468 marine mammals to be behaviorally impacted; 1,788 marine mammals to experience temporary deafness; and one humpback whale and one striped dolphin to be exposed to active sonar at levels sufficient to cause permanent deafness (a deaf cetacean is a dead cetacean). In addition the Navy predicts that its planned use of explosives at sea will cause a further 61 marine mammals to experience temporary deafness.

The Navy claims that its modeling predictions are before mitigation measures are put in place, 1
but the proposed mitigation measures are severely flawed as outlined below and cannot be relied upon to prevent harm.

These predicted numbers are very low, given the large number of exercises (1,145 per year using active sonar) and the abundance, density, social behaviors of certain species and the
unpredictability of animals. Even NMFS is skeptical of the Navy's numbers, advising it to 2
"consider scientific uncertainty and potential for mortality." The Navy, therefore, has revised the predicted number of animals to be severely impacted or killed to 20. It is alarming that the Navy is being so cavalier with the lives of sentient beings.

Furthermore, we take issue with the thresholds the Navy is using to predict behavioral 3
disturbance and permanent deafness. The Navy is using 195 dB (re 1 μPa2-s) as the threshold below which it says behavioral reaction will occur and 215 dB (re 1 μPa2-s) as the threshold for permanent deafness (PTS), with temporary deafness (TTS) occurring between the two. These numbers are based on Navy-funded studies involving a few captive animals of a couple of species, including terrestrial animals, who were also presumably habituated to noise.

In the wild, animals display wide variety, just as humans do, with not only different species exhibiting different hearing capabilities, but also different ages, different sexes, and even merely different individuals of the same species displaying different sensitivities to noise. The empirical

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[4] The Navy's preferred Alternative in the DEIS/OEIS is Alternative Two whereby it will perform 1,145 exercises per year that involve active sonar use – a total of 5,179 hours of active sonar use which equates to 14 hours per day. This does not even include the research, development, test, and evaluation (RDT&E) operations in the Range.

[5] The Navy used more stringent mitigation measures to those it proposes in the DEIS/OEIS during RIMPAC 2006 because of a settlement on a Temporary Restraining Order issued on July 3, 2006 (Settlement Agreement, United States District Court, Central District of California, No. CV06-4131-FMC (FMOx), July 7, 2006.)

evidence proves that these threshold levels are too high since animals have stranded and died at received levels a thousand times lower than 190 dB.

The animals in the Bahamas 2000 stranding incident in which 17 animals of various species 4
stranded and died because of the Navy's mid-frequency active sonar use were exposed to received noise levels of 150-160 dB.[6] The Navy discounts this incident saying that a unique confluence of circumstances existed, namely, an unusual bathymetry, a strong surface duct, a constricted channel with little egress, the repeated presence of active sonar over prolonged periods and the presence of whales. These circumstances are by no means unique and could readily recur simultaneously during the 5,179 hours of active use per year that is proposed by the Navy in the DEIS/OEIS.

The Navy also repeatedly mentions the lack of marine mammal strandings associated with its use of mid-frequency active sonar in Hawaiian waters in the 40 or so years that it has been using the technology. Not all affected animals beach. The vastness of the ocean and availability of
predators significantly reduce the chances of affected animals being found and reported. For the 5
Navy to equate absence of evidence with evidence of absence is flimsy and disingenuous.

The Navy's revised take authorization request, per NMFS' recommendation, is for harassment to 26 species of marine mammals, including 7 seven endangered species in addition to causing serious injury and/or death of 2 bottlenose dolphins, 2 sperm whales, 2 melon-headed whales, 2 pantropical spotted dolphins, 2 pygmy killer whales, 2 short-finned pilot whales, 2 striped dolphins, 2 Cuvier's beaked whales, 2 Longman's beaked whales, and 2 Blainesville's beaked
whales. These numbers – which are likely grossly underestimated because of the reasons stated 6
above - are unacceptable when the animals are dying for the sake of practice exercises.

Mitigation Measures

The Navy's mitigation methods are woefully inadequate. They are non-dedicated human 7
observers backed up with passive acoustic monitoring. These methods are not good enough to spot and then react to every single animal, every single time, within range of the moving sonar noise. Whales are diving animals, with some of the most vulnerable species, beaked whales, spending over an hour at depth.

Passive acoustic monitoring is only adequate for vocalizing animals within range and then only 8
at certain frequencies. The Navy intends to use the active sonar day and night. During hours of inclement weather, poor sea states and darkness, human observers are virtually useless and so the only mitigation method will be passive acoustic monitoring which as stated is only effective for vocalizing animals within range and at certain frequencies. The Navy should not be using active sonar during periods of darkness and poor visibility.

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[6] Hildebrand, J.A. (2005) Impacts of anthropogenic sound. In Marine Mammal Research: conservation beyond crisis. Edited by J.E. Reynolds, III, Perrin, W. F., Reeves, R. R., Montgomery, S. and Ragen, T. J. Johns Hopkins University Press, Baltimore, Maryland. Pp. 101-124.

COMMENT NUMBER: D-W-0112 (cont.)

Even if an animal is spotted and reported within 1,000 yards of the sonar dome the sonar will not be stopped but will be turned down by a mere 6 decibels to 229 decibels – still over 100 million times more intense than the Navy's human diver standard of 145 decibels and over a million times more than the noise level received by the animals in the Bahamas incident of 2000.

9

According to the Navy's proposed mitigation measures, the sonar will only be shut down when an animal is spotted within 200 yards of the sonar dome. By the time the sonar has traveled that far, it will already have been ensonified for many minutes with noise equivalent to that which caused the Bahamas whales to strand and die. To shut off the sonar when an animal is observed and reported at 200 yards will already be too late.

Other Marine Species

10

The DEIS/OEIS gives scant attention to non-mammal marine species with regard to noise impacts. The Navy claims that fish and sea turtles (*all of whom are endangered*) will be negligibly impacted because they cannot hear mid-frequency active sonar. The inability to hear a noise does not mean it cannot cause harm.

11

Non-auditory effects of mid-frequency active sonar on fish and sea turtles are not discussed. The Navy does admit that underwater detonations will kill and injure some fish but states that the "abundance and diversity of fish within the Hawaiian Range Complex will not measurably decrease." It does not discuss the existence of distinct populations of fish within the Complex area and the population level impacts of its noise.

12

The mitigation methods likely do not apply to fish or turtles because a human observer could not possibly spot a turtle let alone a school of fish from the deck of a Navy vessel at even a yard, since turtles surface with their nostrils and fish don't tend to surface at all. Similarly fish and turtles don't vocalize and so wouldn't be detected with the passive acoustic monitoring equipment. To apply mitigation measures for fish and turtles would place an additional burden on the Navy and so rather than undertaking this burden, the Navy conveniently dismisses the significance of turtles and fish.

Exclusion Areas

13

The Hawaii Range Complex includes the Papahanaumokuakea Marine National Monument, designated in June 2006 because of its diverse and unique marine life (7,000 marine species, one quarter of which are found only in the Hawaiian Archipelago). The Navy should not perform the action within the boundary of the Monument.

14

Similarly the Navy should adhere to similar restrictions in the Hawaiian Humpback Whale Sanctuary at times of the year when the whales are likely to be present.

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We urge the Navy to desist in its quest to circumvent laws enacted to protect marine life, flout international standards and rewrite science to satisfy its own ends. Thank you for your consideration.

Sincerely,

Cathy Liss
President

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0113

JUAN WILSON **ARCHITECT**

Hanapepe HI

Public Affairs Office
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12 September 2007

Testimony on: The Hawaii Range Complex Draft EIS

Look around. Check the beaches for shells. Take a close look at the reefs. Talk to commercial fishermen. If you have been reading accounts on planetary health you probably know it already. The oceans are dying. It is a big deal not only for us in Hawaii but for all life on earth.

Over the last generation, almost 90% of the large food fish have been strip-mined from the seas. Vast tracks of the ocean north of Hawaii are clogged with floating plastic garbage from the mainland USA and Asia. Even a minor rise in ocean temperature will devastate what is left of the planets delicate reef systems.

The US Navy is the most powerful instrument of destruction in the world. In the face of the collapse of the world economy during the coming energy crisis; in the face of the emerging disaster of chaotic climate change; in the face of the overburdening of the planet's capacity to sustain our numbers... shouldn't the Navy reevaluate its priorities?

That our senior naval personnel could propose expanding the death and destruction of life on this planet, at this critical time, hardly seems credible. Don't they not know what is at stake?

1 The real enemy is not a potential ballistic missile 2000 miles downrange, it is the death of the planet. It is time for the Navy to cease and desist its deadly operations in the Pacific. Stop trying to turn Hawaii into the Mordor of *Lord of the Rings*.

Instead, take this Draft EIS and head back to San Diego and Washington DC. Face the real enemy! Go back to the drawing boards and come up with a new strategy that responds to our actual predicament and addresses the real foundations of global security - support and restore ocean vitality. Address our future and stop shadow boxing with fears and phantoms of the past. Our lives depend on it.

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COMMENT NUMBER
D-W-0113 (cont.)

Three Islands and an Imperial Navy

Ecologically, we are past a turning point. There are fewer options before us and little tolerance for bad judgment. We have to get plans right this time because there won't be another. This applies to the Navy's proposed plans for the future of Hawaii. To date, the Navy has had an abysmal history regarding the treatment of islands throughout the world's oceans. And we are talking about the treatment of our allies, not our enemies.

1) BIKINI ISLAND:
After World War Two the native Micronesian population was removed from the islands of Bikini Atoll by the Navy. Between 1946 and 1958, as part of the Pacific Proving Grounds, the islands of the atoll were the site of more than twenty nuclear weapons tests. Beginning in 1952 the tests included the atmospheric and submersed detonation of hydrogen bombs. In 1968 the US Navy declared Bikini Island habitable and started bringing Bikinians back to their homes. In 1978, however, the islanders had to be removed again when strontium-90 in their bodies reached life threatening levels. The failed attempted cleanups have cost hundred of millions of dollars.

2) VIEQUES ISLAND:
During World War II, the Navy purchased about two thirds of Vieques Island (a part of the territory of Puerto Pico). Many residents, who had no title to the land they occupied, were evicted. After the war, the Navy used Vieques as a firing range and testing ground for bombs, missiles, and other weapons. It was the most important Atlantic Ocean range facility for the US and NATO. The continuing postwar "occupation" drew protests from the local community angry about environmental impact of weapons testing. Protests came to a head in 1999 when island native was killed by a bomb dropped during a target practice. A campaign of civil disobedience began. As a result, in 2003, the Navy reluctantly withdrew from Vieques.

3) KAHOOLAWE ISLAND:
Here in Hawaii we have faced military occupations as well. After the attack on Pearl Harbor, the U.S. Army declared martial law throughout Hawaii and took control of Kahoolawe Island. For six decades, under Navy oversight, thousands of tons of ordinance bombarded the island in training exercises. In 1994, after decades of pressure from Hawaiian groups, the Navy agreed to transfer title of Kahoolawe to the State of Hawaii. Although the Navy spent $400 million and ten years on a a required cleanup, uncounted unexploded bombs and shells still remain on the island. Many items have washed down gullies and still others lie underwater offshore. The Navy turnover was completed in 2003, but the cleanup was never finished, leaving Kahoolawe a deadly and toxic landscape to this day.

Page 2

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0113 (cont.)

Kauai and Hawaii Range Complex

As part of the world's only "Super Power", the Hawaiian Islands are the strategic center of US military operations in the Pacific Ocean. Hawaii is the command and control hub for an area covering almost half of the world. Pearl Harbor may be the center of attention, but Kauai island plays an important role as the command backup for Pearl and as the tracking, sensing and communication coordinator for activity throughout the Pacific Ocean. On Kauai, the nerve center is the Pacific Missile Range Facility (PMRF) and it is crucial to the operation of the Navy's Hawaii Range Complex (HRC) covering over two-and-a-half million square miles.

The Navy is proposing a major upgrading and expansion of the Hawaii Range Complex. This is in order to do more research, development, testing and evaluation (RDT&E) of military systems and weapons. The HRC is the largest and most elaborate weapons range in the world, and we are at the center of it.

The range extends past Midway and includes all of Hawaii and the Northwest Islands. To get approval for the range expansion the Navy has to estimate how much damage they will cause the environment and demonstrate what efforts they will make to reduce that damage to "acceptable" levels. In July they published the Draft Environmental Impact Statement for public review and comment. It comprises three volumes as big as Honolulu phonebooks.

With the upgraded range the Navy has planned over one-hundred-and-forty RDT&E projects. Many are for the development of new weapons systems like Antisubmarine Warfare, Advanced Hypersonic Weapons, Missile Defense, Electronic Warfare and Directed Energy Lasers.

Many of these programs will be run from the PMRF. Three that are of great concern to me are:

1) MID-FREQUENCY SONAR

2 The Navy says that the increased tempo and frequency of training operations includes as many as five-thousand hours of mid-frequency active tactical sonar and the associated DICASS sonobuoy, MK-48 torpedo, and dipping sonar. Underwater detonations are possible during several programs. All this will destroy

3 uncountable numbers fish and sea mammals. There is little mitigation that can be done when these systems are used.

2) EXPEDITIONARY ASSAULT ACTIVITIES

4 In its EIS the Navy says that before Expeditionary Assault Activities landing routes and beach areas will be surveyed for the presence of sensitive wildlife. An exercise will be halted if marine mammals are detected on the target area. The operation will foster the reestablishment of native vegetation. What it really sounds like the Expeditionary Assault will tear up the beaches and dunes between Poli Hale and Barking Sands. This is literally an assault directly on Kauai.

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3) DIRECTED ENERGY LASER WEAPONS

5 Worse is the Directed Energy Laser Weapons Program. These are chemical lasers in which use hydrogen fluoride, a corrosive material which can be made to release a powerful burst of infrared radiation. The laser can be focused and aimed as a weapon (death ray). These laser can generate least 25 megawatts of energy that could destroy a missile 2,000 miles away. For the scale of this realize 25 megawatts is half the electrical power generating capacity of Kauai. The firing of this weapon also destroys the lasing device and contaminates its site with hydrogen fluoride. A thousand foot radius danger zone, that could close the state park, will persist for days.

6 The Navy has not told us what effect on the environment hydrogen fluoride waste will have. What if there is a heavy rain and runoff after a test? What effect on coral reefs and offshore marine life would there be from hydrogen fluoride contaminated

7 runoff into the ocean? What efforts will guarantee the safety of people using the access road to Poli Hale State Park after a test?

8 In its Navy's EIS executive summary it simply says, "Appropriate remedial procedures would be taken before initiation of potentially hazardous laser operations on PMRF". That's it?!! That is unacceptable.

The conclusion we must draw

The people of Kauai learned an important lesson recently when the Superferry tried to force itself down our throats. This was after the Hawaii Supreme Court overturned the Maui Circuit Court and required a statewide Environmental Assessment.

When the Superferry jumped the gun on service to avoid a temporary restraining order blocking the commencement of operations it struck a nerve on Kauai. Itt was a slap in our face, and Kauai responded. Surfers, canoers and swimmers swam out to stop the ferry with their bodies. It was a iconic and reminiscent of a dedicated individual blocking the path of a line of armored tanks in Tiananmen Square.

The Superferry, and its supporters, now have the choice of implementing martial law on Kauai as they mow down juveniles on surf boards or changing how they do business.

The military (navel) connection to the Superferry is too obvious to hide. Sean Connaughton, the admnistratrator of the Maritime Administration ("the fourth arm of defense") swore in a declaration that:

"The Alakai (Superferry) is a vessel that has considerable military utility, in view of its speed and cargo capacity... The military utility of the Alakai could be

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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diminished if the vessel is not operated in normal commercial operations. Consequently, the military readiness of the Nation could be diminished if the Alakai is precluded from sustaining normal commercial operations."

9 It seems odd that the development of a fleet of Littoral Combat Vessels (WestPac Express-like Superferries) stationed in Hawaii with an Expeditionary Attack Force (the Stryker Brigade) is never mentioned in the HRC EIS. Won't there be coordination with broader Navy activities like RIMPAC? Do you not have plans for this new component of military readiness to play a part in the expanded HRC?

We know the Navy is avoiding a real examination of the implications of what it proposes to do because no one in their right mind would let you do it. You go through the motions of the legal process only to get to do what you want. In human psychology study they label that as sociopathic behavior.

The people of Hawaii won't fall for the "big lie", dog & pony shows or public relations stunts anymore. Yelling "Nine-One-One" does not ring any alarm bells that send people scrambling for the exits to sign blank checks. Now what do you do? Now the Navy has a choice. You can either;

1) Continue on a destructive path that hastens the death of our planetary oceans. To do so you will have to to reveal the iron fist under the dress white glove. What people will be alarmed by is your willingness to use of overwhelming force to do what you want. What is left of your support will evaporate.

2) Pause. Reach a deeper understanding of what heroic role the Navy and HRC might play in the immense challenges facing all of life in the oceans. Then, act accordingly. Modify your current plans. Coordinate with other agencies and international bodies (NASA, NOAA, SEATO, the UN, etc.) on an emergency program to save life in the Pacific Ocean. Then come back to us with a real plan.

The choice is yours - Life or Death.

JUAN WILSON
LICENSED PROFESSIONAL ARCHITECT
NO. 10138
HAWAII, U.S.A.

Juan Wilson - Architect-Planner

Kona District, Hanapepe Valley, Kauai
Hawaiian Islands

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Kahului, Maui, Hawaii 96732

September 14, 2007

Public Affairs Officer
Pacific Missile Range Facility
Attention: HRC EIS/OEIS
P.O. Box 128
Kekaha, Kauai, Hawaii 96752-0128

Dear Commander, Pacific Missile Range Facility,

1 Aloha! I thank you for the opportunity to provide a limited 3 minutes of public testimony at your Hawaii Range Complex Draft Environmental Impact Statement/Overseas Environmental Impact Statement hearings on O'ahu, Maui, and Hawaii Islands. I am submitting my formal comments to your HRC DEIS/OEIS with letters dated September 8, 2007 to the Kaho'olawe Island Reserve Commission and July 1, 1998 to Senator Daniel Inouye for formal inclusion and consideration into your Administrative Record of Decision.
*

I thank you for the work you do for our community and Nation. I thank you for your time, patience, and consideration in this matter. You may contact me anytime at 330-2896.

Me Ke Aloha Ha'aha'a,

Manuel Wayne Makahiapo DeCosta Kuloloio

* Are the statements of Navy contractors, Conrad Erkelens and Joe Mobley contained in the Maui News the next day after your Maui hearings the official position and statements of the US Navy? Why do you allow them to comment when Erkelens and Mobley were Pacific Fleet and Office of Naval Research through Scripps employees, respectively. The Inouye letter is for people with attitudes like Erkelens and Mobley should start saving whales for once as a "social scientist" as if his views are objective.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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September 8, 2007

Mr. Sol P. Kaho'ohalahala
Executive Director
Kaho'olawe Island Reserve Commission
811 Kolu Street, Suite 201
Wailuku, Maui, Hawaii 96793

RE: COMMUNITY and PUBLIC COMMENT, September 11, 2007 KIRC Agenda

Dear Executive Director Kaho'ohalahala and Commission Members,

Aloha! Recently, there has been a disturbing trend in our government's facilitation of the public involvement process here in Hawaii. No oral, public testimony whatsoever was permitted by the US Navy and US Army in its public scoping sessions of the Hawaii Range Complex and 5th Stryker Brigade Combat Team, respectively, so I thank you for the privilege and opportunity to timely participate in the decision making process after receiving your meeting notice on September 7th. Strikingly, an often quoted spokeswoman for the Protect Kaho'olawe 'Ohana was a hired facilitator for the Army's January 30, 2007 Public Scoping Meeting at Kawananakoa School, O'ahu. This is an egregious insult to a long list of injuries where elders were arrested in public forums and unable to hold opposition signs. Official press releases by Senator Inouye posed serious doubt into the honorable intentions of the US Army to public stakeholders that do not have a formal decision-making role, as DOD stakeholders and regulating agencies do with authority to issue permits, licenses, and regulatory approvals as well as those responsible for protecting significant resources.

The United States Department of the Navy through the Commander, Pacific Missile Range Facility has prepared a Draft Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS) on the Navy's Hawaii Range Complex (HRC) for decision by the Assistant Secretary of the Navy (Installations & Environment). At recent public hearings held on O'ahu, Maui, and Hawaii, neither one politician nor any governmental entity(Federal, State, County) testified, therefore one is unable to discern the position of consulted stakeholders because the oral/written comments by consulted agencies and interested public in the DEIS/OEIS section is blank. I am formally requesting the position of the Commission on the acceptability, "good-faith" sensitivity, and cultural appropriateness of the "Shallow-water Minefield Sonar Training Range" 3 Nautical miles off of Kealaikahiki.

I have continuously come before the Commission to protest the PMRF's littoral training range within the Kaho'olawe Reserve and Hawaiian Islands Humpback Whale National Marine Sanctuary. At the time, the US Navy and its selected contractors would not fulfill its promise, contractual and statutory, in the Kaho'olawe Island UXO clearance removal. The Sanctuary is a joke. Is a "Wahi Pana" and "Pu'uhonua" that is Kaho'olawe, in Kanaloa, an appropriate and compatible, contiguous land and ocean use for weapons

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training? A Presidential declaration and a Hawaiian Ph.D. scholar's opinion isn't needed for one to feel in one's na'au that Hanalei Bay like Kanapou, Kamohio, Waikahalulu, and Hanakanai'a is a Hawaiian sactuary and that all our marine ancestors noted in the Hawaiian cosmogonic creation history, Kumulipo, including but not limited to koholā and nai'a should not be molested and harassed beneath the surfaces, as if hidden from view and inspection equates to insignificant, inconsequential impacts. Am I to trust the so-called "neutral, independent, scientific findings" of marine researchers of Scripps, Woods Hole, Kane'ohe bay institutionally indebted on the military and academic funding trough?

At the height of the recent Hawaiian resistance movement and through the efforts of the Pele Defense Fund, my father attended many Federal Facilities Environmental Restoration Dialogue Committee (FFERDC) meetings in Washington, DC. In its final report, the FFERDC stated, "Trust is an essential factor in establishing working relationships between community members and DOD personnel. When trust exists, community members are more likely to understand and even accept decisions that may go against their desires. When it does not exist, community members often view all decisions and actions with suspicion. Related concepts that influence trust in decision-making processes are two-way communications or dialogue, access to documents, inclusion, accountability, integrity, respect, follow-through, good faith effort, and sincerity. To build trust, DOD personnel must not only agree to take certain actions but also follow through on implementing them and communicating the results within reasonable time frames. Beyond that, a military or community entity must be willing to accept, acknowledge, and apologize for promises that were never carried out, mistakes made, or indiscretions that have been brought to light. It can be difficult to build trust and show commitment without demonstrating the integrity and honesty such codes of conduct require."

At the Hawaii Range Complex public hearing on August 29th at Waiakea High School, I acknowledged the presence of Mr. Jim Albertini of Malu Aina Farms in the audience. Earlier, he had testified on the US Navy's role in the overthrow of the Hawaiian Nation, contamination of Pearl Harbor, and broken promises on Kaho'olawe Island. Later, in my testimony I thanked Mr. Albertini for providing me food and lodging while in the company of Marion Kelly and Maivan Lam, Hawaiian Land Tenure Scholar and International Legal Counsel, respectively, to attend a Pele Defense Fund demonstration of geothermal exploration at Wao Kele 'O Puna. I recall climbing over the barbed wire fence and offering ho'okupu barefoot, walking on a wet, recently bulldozed ā'ā clearing. The blisters/sprains endured on Makahiki processions from Haki'oawa to Keanakeiki paled in comparison to the excruciating razor cuts at Wao Kele 'O Puna. So, I was overcome with joy to read a story on Uncle Palikapu with the return of Wao Kele 'O Puna. In the same article, Senator Inouye apologized for his role in Wao Kele 'O Puna just as he apologized for his role in H-3 at a Maui Economic Development Board meeting

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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following a US Senate Defense Appropriations Committee visit to Kaho'olawe with Chief of Staff/Counsel Charles J. Houy.

Is it unreasonable to allow the "best of the best" technologies to train during wartime to also expect the same efforts in remediation of sacred, habitable lands and surrounding waters that is Kanaloa, a Hawaiian seafaring deity? Does the Hokule'a, Mo'olele, Hawaii Loa, Hokualakai, and Iosepa consider the use of Kealaikahiki and our Hawaiian Archipelago in this manner acceptable? What good does relishing and basking in the ceremony of a name in Papahānaumokuakea when its perceived sacredness is culturally violated by weapons testing initiated from the shores of our brothers and sisters in the Marshall Islands which were exponentially destroyed in comparison to Kaho'olawe.

Following the events 6 years ago today, Commission members publicly stated that as a result of "national security" interests I should temper my demand that the US Navy, Pacific Division Naval Facilities Engineering Command, and Parsons/UXB be held legally accountable for its failed performance on the Kaho'olawe Island Reserve UXO Clearance Contract Award, a diminished promise from President Eisenhower's Executive Order. If you invoke "national security" on the Hawaii Range Complex issue, remember that this same rationale was forced upon the good works of the Protect Kaho'olawe 'Ohana and this Commission would not be in existence today. If there is no interest in addressing this "issue", then perhaps the constituents of this Commission could summon the courage to dissolve. The role, responsibility, and integrity of the Protect Kaho'olawe 'Ohana and resultant Kaho'olawe Island Conveyance and Reserve Commissions extended beyond the confines of Hawaii but internationally offering hope and promise of a true pu'uhonua, a peaceful refuge here at home.

I apologize to those who educated me and sustained me throughout for not being able to do more to protect Kaho'olawe. I apologize for demanding that the KIRC issue a formal statement of the final UXO clearance numbers so that Commission Members, Staff, and all local agencies finally stop and desist with offering "off the cuff" clearance results as if it didn't extraordinarily matter to people like me. I apologize to no one for demanding a formal investigation outside the Navy regarding the Kaho'olawe Island UXO Clearance Procurement. Senator Inouye's Chief of Staff Gen. Alex Lum threatened me with FBI investigation through KIRC Executive Director Keoni Fairbanks via my father. I don't expect an apology, but I will never forgive them whatsoever for my love of Kaho'olawe.

Before you let the U.S. Army into Kanapou, explain to me how UXO in a Molokai recycling landfill, supposedly rendered safe during a clearance operation and required to be 'demilled' with explosive residue removed through thermal treatment/steam cleaned, was confused to be potentially explosive and detonated. It's as if Kaho'olawe, PACDIV NAVFACENGCOM Contracting Officer James Putnam's model for worldwide UXO clearance , never ever happened. A continuing insult as if one is to trust what's going on at Waikoloa, Waikane, Makua, and Schofield. What a joke. Parsons is in your

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Kaho'olawe Island Reserve Commission, Hawaii Range Complex,
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Basecamp; Parsons is building the Stryker Brigade training areas. If I recall, former DLNR Chairman and KIRC member Peter Young sat at the single digit table of Parsons for Heather Guigni's release of her film on Senator Inouye fronting the USS Missouri with then Senior Ranking Senate Defense Appropriations Chairman Ted Stevens. At my own expense and to acknowledge my aloha for Senator Inouye's good works, I also was in attendance and introduced my best friends to dignitaries there notwithstanding that we were at table 99 of 100. To add insult to injury with Alex Lum representing Senator Inouye, Peter Young testified to a select crowd of Parsons/UXB Team representatives and owners in early 2004 at the Hilton Hawaiian Village that the clearance was a success though he had never been to Kaho'olawe just yet. I was offended. I have had the privilege to accompany every DLNR Chairman since Bill Paty to Kaho'olawe aboard Uncle Bobby Lu'uwai's *Pualele* including Keith Ahue, Judge Mike Wilson, Timothy Johns, and Gil Coloma-Agaran. While I sat at Table 2 with Interim Chairman Allan Smith at President Bush's October 2003 fundraiser at the Hilton Hawaiian Village, I remained prayerful he took the opportunity to visit Kaho'olawe even if by helicopter. There is no excuse for Interim Chairman Laura Thielen to visit Kaho'olawe, if not already, because her mom Aunty Cynthia played an integral role in the PKO's efforts.

Finally, following on Uncle Henry Hildebrand's concerns during the Kaho'olawe Clearance Program public involvement process contained in the Administrative Record, I want the KIRC to formally petition the US Navy and US Army if depleted uranium was ever utilized on Kaho'olawe. Admiral Fallon was CNO when DU use was acknowledged on Vieques; the question remains why not on Kaho'olawe also and the potential irreparable exposure of all stakeholders and to our environment.

Me Ke Aloha Ha'aha'a,

Manuel Makahiapo Kuloloio

CC: Governor Linda Lingle
Maui County Mayor Charmaine Tavares
US Senator Daniel Akaka
US Representative Maize Hirono
US Representative Neil Abercrombie
Hawaii Senate President Colleen Hanabusa

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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MANUEL MAKAHIAPO KULOLOIO

Kahului, Maui, Hawai`i

July 1, 1998

Honorable Daniel Inouye
United States Senate
Washington, D.C. 20510

Dear Senator Inouye:

I am writing this letter because of my concern for the apparently unsatisfactory situation regarding the restoration of Kaho`olawe Island (U.S. Navy Solicitation Number N62742-95-R-1369). My colleagues and family are very grateful for the extraordinary efforts that you went through to acquire the money for the this project. All Hawaiians and particularly native Hawaiians are forever indebted to you.

I must explain to you "up front" that I write this letter as a member of the Protect Kaho`olawe Ohana and as a paid member of the Lockheed Martin Team that submitted a proposal in the competition for the award of the restoration contract. I was intimately involved in the lengthy, expensive and complicated process that this team followed to create its response to the Pacific Division, Naval Facilities Engineering Command (PACDIV) Request for Proposal (RFP). I am, however, no longer employed by Lockheed Martin and the Company has no involvement whatsoever in this correspondence. My knowledge of the technical, timing and financial aspects of what I write in the following lines is therefore firsthand.

I gain my perceptions, however, of what I and most of my friends believe is an unsatisfactory and unwholesome situation from newspaper articles, rumor, and hearsay with a scattering of firsthand and verifiable information. There are, however, enough warning bells, regardless of the source and validity of my information to cause me to write this letter in an effort to have agencies <u>outside the Navy</u> investigate the entire Kaho`olawe procurement process to include the 1995 Model Cleanup.

My concerns and request for a formal investigation lie in the following major areas:

1. The number of acres and the type of clearance the Navy and the contractor say can be cleared with the money available.

2. The delay in beginning cleanup work on the island and lack of competence to complete the project within statutorily mandated time limits.

1

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3. The involvement of the local community and and benefits that should derive from this contract.

4. Allegations of undue influence from retired Navy Flag Officers.

The number of acres and the type of clearance the Navy and the contractor say can be cleared with the money available.

When the Lockheed Martin Team first formed, we discussed the approach we believed the Navy wanted in this procurement. We agreed that they were looking for innovation, a new higher technical standard for Unexploded Ordnance (UXO) clearance, close cooperation with the KIRC and PKO, and most importantly -- an organization and approach that would vastly improve on the performance and waste associated with the 1995 Kaho`olawe Model Cleanup.

Officially, PACDIV has stated that the Model procurement achieved its goals. I worked for the contractor, however, and I am intimately familiar with the mismanagement and waste of money that transpired. PACDIV still refuses to release the cost data associated with this contract.

We believed the Navy wanted a 100% RFP compliant proposal that would be able to meet technical specifications and time limits, and most importantly, do the job [a complete cleanup -- 29,000 acres, surface (tier I) and subsurface (tier II)] with the money available. Our proposal did this. To do so we were required to develop an approach totally different from that used by the contractor on the Model Cleanup.

Our first effort was to determine what was needed to meet technical specifications which were quite clear in the RFP: Clearance certified to a probability of detection of at least 85% with a confidence level of 90%. We put the technical resources available to us from Lockheed Martin and our team mates, AETC and GTL to work on the specification problem. We quickly determined the technical approach used on the Model Cleanup would not meet RFP specifications without post-processing of signals from whatever anomaly detection sensors were used (primarily the EM-61). We developed, at considerable expense, computer algorithms to use in processing signals from an array of sensors.

We then conducted a test on Maui (soil conditions similar to Kaho`olawe) at a cost of $150,000.00 to validate our technical approach. To ensure validity and credibility, the test was placed under the technical direction of Captain Bill Bacon, USN (Ret.), former Commanding Officer of the EOD Technical Center Indian Head, MD. We were confident that he would develop valid test data that would be understood and believed by the Navy. This was a very professional test with a formal engineering plan and a totally unbiased approach. UXO targets were buried in accordance with

2

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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specifications defined in the RFP Statement of Work. I know this because my father and I were paid to arrange for the site location, leasing the equipment, supervising the seeding of anomalies and griding of the site. We were present and observed the entire nine-day test. Our results indicated that our system approach (using post-processing) had the following benefits:

		Pd	False Alarms
1. Without Post-processing:	EM-61	80%	2.3
2. With Post-processing	EM-61	91%	<1

Interestingly and inexplicably, the winning contractor [Parsons/UXB(P/UXB)], has recently convinced PACDIV that they do not need to use post-processing with the EM-61. This decision is also on the heels of recent a Defense Science Board announcement that "post-processing offers the potential of reducing false alarms, therein reducing the cost of Tier II remediation costs by more than 50%".

Additionally, lane spacing effected performance. To satisfy the specification of Pd = 0.85 with 90% confidence, the maximum possible lane spacing at the Maui test site using the EM-61 with post-processing was three feet. On the Model cleanup, the contractor never used less than four feet -- which says that even the 80% Pd was not achieved. Given that PACDIV is going to certify or already has certified safe some areas (the road) of the Model Cleanup, the current contractor intends to continue to use the same protocol (four foot lanes, no post-processing). This means they will not be specification compliant (something less than 80%). This roughly translates 1,125 anomalies missed -- assuming three per acre at the RFP 25% Tier II requirement of 7,500 acres means they will miss 3 X 7,500 X .05 = 1,125 potential items of UXO.

This above estimate of 1,125 anomalies missed is conservative since the Pd without post-processing was reduced from 0.91 to 0.75 at our Maui test for the Model Cleanup lane spacing of four feet. Therefore, Model Cleanup lane spacing with our post processing would yield 2,250 anomalies. Assuming equivalent degradation in non post-processed data at four foot lane spacing results in Pd = 0.66 or 7,500 X 3 X (0.85-0.66) = 4,275 anomalies at four foot lane spacing without post-processing of the type our team used on the Maui Test.

With the approach proposed by Lockheed Martin, all stake holders would be safer, and twice as much remediation could be accomplished. I hope this explains the incredulity among the local and UXO community when this contract was awarded to (P/UXB) and the technical approach that PACDIV has blessed for this contract.

When I was debriefed by Lockheed Martin officials who attended the PACDIV debrief, I asked what hard and validated technical data the source selection/evaluation committees had received from the winning team to assure them that they could meet

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the 85% Pd with a 90% confidence level specifications. We were told that the technical evaluation team leader gave the following answer: "We all sat around a table and discussed the company and decided whether or not we thought they could do it."

The RFP required a price for a sample cleanup project that included a relatively small number of acres. Our team price for the sample project was approximately $700,000.00. We used our technical approach (validated by Captain Bacon on Maui) which included post processing (as recommended by the Defense Science Board) and other proven innovations such as an integrated command, control and communications system for managing field related activities. The Navy discounted our approach and should-costed us up to approximately $2,000,000.00 using their data developed from the Model Cleanup's archaic "mag and flag" technical approach.

It is quite easy, therefore, to see why the Navy and current contractor are saying they can only clear 11,000 surface acres. They are using WWII Model Cleanup technology and data that the they can easily validate with Model Cleanup records and in their mind avoid potential risk and criticism by using new (though proven) technology from a world class team. A team backed by a $30B a year company that contractually obligated itself to a cleanup as specified in the RFP -- 29,000 acres tier I and 25% tier II down to four/ten feet as specified with the funds available by November 2002.

I am concerned therefore that:

1. The contract was awarded to a company that did not validate their claims to meet RFP probability/confidence specifications and from what we hear and see today they if fact cannot perform to the only real technical specification in the RFP. This translates to me into a clearance that we cannot trust to be safe. The contractor and the Navy have stated publicly that they cannot perform the subsurface (tier II) clearance at all. The original intent of the Title X legislation supporting the clearance was to ensure "meaningful safe use" of Kaho`lawe. This will not not happen unless the current plan is significantly modified.

2. The Navy had a technical approach proposed that met specifications and a world class corporation that signed up and contractually bound itself to clearing the total acreage (tier I and tier II) as specified in the RFP, and other applicable regulatory/statutory documents (State of Hawaii MOU, Federal Legislation) with the funds available ($285M). This is in stark contrast to the current contractor and Navy officials who are repeatedly stating in public forums that they can only clear 11,000 surface (tier I) acres and, of course, want more money.

The delay in beginning cleanup work on the island and lack of competence to complete the project within statutorily mandated time limits.

4

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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The RFP required that documentation be completed and clearance begin on Island 285 days after contract award. That contractually binding time has passed and cleanup still has not started -- only the initial surveys that commenced on June 29. The Navy and the current contractor have also stated publicly that the island cannot be cleared by November 2002. This date is a statutory and RFP requirement that the Navy has ignored by awarding this contract to a contractor who predictably could not meet these time requirements. The Navy also took an inordinately long time to award the contract.

Meanwhile, the appropriated money continues be rapidly spent with questionable results without anyone holding the Government contract administrator and selected contractor accountable. This includes the inability to maintain harmony and trust among their subcontractors causing threatened lawsuits from companies such as Biogenesis. The contractor's results thus far are a predictable repeat of their Model cleanup performance.

In addition, the Navy is allowing the contractor relief from low ball pricing such as the hourly rate for Explosive Ordnance Disposal (EOD) technicians. We bid a fair and reasonable rate required to attract these uniquely skilled personnel. The current contractor has not been able to hire at the rates they bid and the Navy has given them relief by allowing them to raise rates with the Government paying. This is unfair to the other bidders.

I am concerned therefore that:

1. The Navy is allowing the current contractor to miss the contractually binding start date for cleanup on the Island -- with no apparent penalty. I was involved in document preparation for the Lockheed Team and we had drafts prepared at our own expense well before award announcement so that there would be no delays in getting started on the Island.

2. The statutory requirement of completing cleanup by 2002 appears to have been dismissed in a rather cavalier manner by the Navy I know that our team bid contractually committed us to completing cleanup within five years of contract award -- primarily due to our technical approach, and our operational and logistical solution to the RFP requirements. Why is the Navy allowing this contractor to abrogate its contractually binding bid regarding completion time without any penalty or default action. Who is holding the Navy accountable for permitting this to happen?

The involvement of the local community and and benefits that it should derive from this contract.

In contrast to the partnering philosophy referenced repeatedly throughout the RFP, the Navy continues to make important decisions without any meaningful involvement by the KIRC and other stake holders. Correspondence in volume from the KIRC and

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PKO is available that details the disappointment of these organizations and some of their individual members with the Navy's partnering performance (not platitudes) -- beginning with not allowing the KIRC a role in contractor selection and continuing with ignoring the land use plan and a host of other continuing outrages. This discontent includes numerous letters from me to the Navy. Is there no one to hold the Navy responsible? Allowing (in spite of our complaints) the contractor to continue to amass a host of abrogations that are in violation of contractually binding commitments is most egregious.

The Lockheed Martin Team made made an extraordinary, expensive and sincere effort to include local stake holders in their proposal effort. It included commitments to pay some of the representatives out of Company profit during the life of the contract. We were told by Lockheed Martin officials that during the debrief they were told by the Navy that it was not the contractors business to become involved in cultural matters and that allowing such organizations a role would distract form contract performance. The Lockheed Martin team was actually graded down for including such organizations as the EKF. A true partnership of all stake holders as our Team envisioned would certainly have helped avoid the apparently deplorable state of the contract as it currently stands.

It also appears that the local community and specifically native Hawaiians are receiving no benefits from the contractor. The RFP appeared to put heavy emphasis on what the winning contractor would be willing to do regarding benefits beyond jobs and a sizable payroll to be spent at local businesses. I know that Lockheed Martin committed to returning a surprisingly large amount of profit to the local community through a separate company designed to assist start up companies and established companies in Hawaii with product and proprietary technology/information development (Hawaii Ventures Corporation). As far as I know, the current contractor has done nothing and does not plan anything that will require money to be spent.

We were told that no points were allocated or awarded for economic development commitments to any contractors in the proposal evaluation process. Stating in the RFP that this was a sensitive procurement and return to the community was important and then ignoring it in the evaluation process can only be characterized as disingenuous.

I am concerned therefore that:

1. The Navy has not and does not intend to have a meaningful partnership with the KIRC or any other local stake holder. They will continue with their singular management of this contract with no one to hold them accountable for statutory requirements or poor management. A repeat of the Model Contract..

2. The Navy will not hold the contractor accountable for commitments made in the RFP (if any) regarding benefits for the local community. The larger question is that if

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-W-0115 (cont.)

no benefits were promised, why did the Navy not require a commitment from the winning contractor commensurate with their competitors?

Allegations of undue influence from retired Navy Flag Officers.

This allegation came form rumor and is not verified by any official source. I am only relating this to you because of all of the other perceived irregularities in this procurement. I believe it is healthy to put them all to rest if not true.

It is rumored that the recommendation that left Hawai`i was to award the contract to a team other than P/UXB. The direction that came back from NAVFAC Headquarters in Washington was to award the contract to Parsons/UXB. The reason for this change, allegedly, was intervention on behalf of Parsons by two retired Admirals (Hays and Estes) at the highest Navy levels.

I am concerned therefore that:

There is a possibility that procurement integrity was breached by such undue influence.

The bottom line is that there is a general perception that this procurement for which we in the native Hawaiian community have such bright hopes is in jeopardy. There is a belief that the Navy made a serious mistake in the award of this contract to Parsons/UXB and is unwilling to admit it because of the embarrassment and criticism that could follow.

We do not believe the Navy would criticize, penalize, or default this contractor for performance -- regardless of how egregiously unsatisfactory it might be. Some third party needs to thoroughly investigate this entire process to determine if any irregularities occurred and further determine the competence of the Navy to continue to administer this contract -- particularly in regards to the technical management.

In this regard, PACDIV is openly advertising Kaho`olawe as the model for all future competitive large UXO remediation procurements. Little do they know that such public comments are fodder for ridicule by the UXO technical community and others familiar with what really happened in the selection process and performance to date on this procurement.

Last July, after the shock and incredulity of learning the contract had been awarded to the same companies that had performed so badly on the Model Contract, we promised Lockheed Martin management representatives that we would give the P/UXB Team our support and do nothing disruptive for a year. We agreed to this because of the importance of good and harmonious performance to the restoration of the Island and to support the Lockheed Martin policy of not protesting DoD procurement award decisions.

COMMENT NUMBER

D-W-0115 (cont.)

We have now observed almost one year of what appears to be questionable performance by the contractor PACDIV selected and questionable management of the contract by the Navy. Our disappointment has increased with each passing month and our patience is wearing very thin.

Please help us in allaying the general perception that this procurement is in serious trouble.

A hui hou,

Manuel M. Kuloloio

Manuel Makahiapo Kuloloio

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER D-W-0116

Tesitimony is support of the US Navy
August 23, 2007
Bob McDermott
Executive Director of the Honolulu Council of the Navy League

The United States Navy has recently submitted a draft environmental impact statement to assess the potential environmental impacts associate with Hawaii Range Complex (HRC). Public comment on this document is encouraged and will be accepted until September 17th, 2007. The area under study is spreads out from the state in a sort of giant rectangle from the north to the west covering 235,000 nautical miles of open ocean area (including sub-surface) and associated special use airspace above and around the Hawaiian Islands and a 2.1 million nautical mile of total operational area of sea and airspace.

The study is required by the national environmental policy act which congress enacted in 1969, know as NEPA. The purpose of the EIS is to disclose significant environmental impacts so that the public and decision makers are aware of these impacts and any proposed alternatives. This study was exhaustive in its detail and coverage.

1 The Navy is well aware of the fragile environment and the possible effect of sonar, radar, and other training devices that may impact marine life. That is why they plan exercises to avoid major marine mammal concentration areas whenever possible. The navy is truly dedicated to protecting marine mammals as evidenced by the ten million dollars it spends annually on marine mammal research.

2 There is no doubt that Navy training creates or affects some marine life, but the critical point is that Naval training is only a very small part of a much larger picture. Many other external factors are in the ocean at any given time; these include volcanic eruptions, lighting strikes, supertankers, offshore drilling and others. These factors combined with pollution, commercial shipping, fisher entanglements, disease, parasite infection, ship strikes, trauma and other natural factors lead to a rate of approximately 3,500 strandings of marine mammals every year on US shores alone, according to NOAA.

In conclusion, does naval training have any impact on marine life? Yes. To a minimal extent, especially when one considers the risk benefit ratio involved with ensuring our national security.
3 However, the Navy is taking aggressive steps to protect marine mammals and other sea life and avoid engagement with them whenever possible and exhibiting sound environmental stewardship with our precious ocean resources. The Navy League of United States Honolulu Council supports the United States Navy's continued use of the HRC for training and testing as the military commanders and the President see fit.

Bob McDermott is a Marine Veteran and current executive director of the Navy League here in Honolulu;, the Navy league is a 501 (c) 3 charity founded by Teddy Roosevelt in 1902, there primary mission is support of the Sea Services through education.

COMMENT NUMBER D-W-0117

Hawaii Range Complex
Environmental Impact Statement
Public Hearing Input Form

Please record your comments concerning the Hawaii Range Complex Draft EIS/OEIS on this form. Please include your name and address. You may submit this form by:

1) placing it in the comment box at tonight's meeting
2) mailing it to: PMRF Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

All comments must be received no later than Sept. 17, 2007 to be included in the response to comment section of the Final EIS/OEIS.

Name: HOWARD SHARPE – REPRESENTING MYSELF!

Address:* , WAILUKU HI

Comments: I am totally against the Navy's "WAR GAMES" in Hawaiian waters, especially the ear-piercing sonar side of it. Our marine birds and mammals have bellies full of plastic – having their brains blown and blasted by sonar is the ultimate insanity of man's inhumanity to nature. I consider it a criminal act. 1

In my opinion, our navy is over-prepared, and our greatest enemy is ourselves. I'd like to see their future efforts in cleaning up and preventing further toxic wastes, in finding workable solutions to the innumerable problems facing our oceans – . . Remember ~~the~~ water and air flows freely, everywhere, and pollution elsewhere eventually reaches here. 2

Mahalo

* If you provide your mailing address, we will add you to our mailing list to receive future notices about this EIS/OEIS.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-W-0118

THOMAS NAKAGAWA

WAILUKU, HI

27 AUG2007

UNITED STATES NAVY DRAFT ENVIRONMENTAL IMPACT STATEMENT ON THE USE OF MID-FREQUENCY SONAR IN THE HAWAIIAN ISLAND HUMPBACK WHALE MARINE SANCTUARY AND THE NORTHWEST HAWAIIAN ISLANDS.

ALOHA,

☛ MY NAME IS THOMAS NAKAGAWA. I WAS BORN AND RAISED HERE ON MAUI.

☛ I AM HERE TONIGHT TO VOICE MY CONCERN AND OBJECTION TO THE USE OF MID-FREQUENCY SONAR TESTING PROPOSED BY THE UNITED STATES NAVY.

☛ OURS IS AN OCEAN PLANET.

☛ I AM HERE TO RAISE MY VOICE FOR THOSE WHOSE VOICES GO UNNOTICED; THE CITIZENS OF OUR OCEANS. FROM THE MAGNIFICENT GIGANTIC BLUE WHALE TO COUNTLESS SPECIES DOCUMENTED, AND THOSE YET TO BE DISCOVERED; TO THE MICROSCOPIC SINGLE CELLS AND LARVAE OF OCEAN ANIMALS. THE OCEAN IS FULL OF LIFE SOUNDS.

☛ MANMADE NOISE POLLUTION FROM SUPERTANKERS, COMPRESSED AIR CANNONS AND NOW THE 165 db SONAR DROWN OUT THE CRIES OF THOSE MARINE ANIMALS IN DISTRESS. 1

☛ THERE IS A "KILL ZONE" WHICH WILL RESULT IN THE IMMEDIATE DEATH OF ORGANISMS, AND LIKE A NUCLEAR WEAPON, A LARGER ZONE OF INJURY AND DISABILITY WHICH CAN ULTIMATELY RESULT IN DEATH.

☛ THE PROPOSED USE ON THE SONAR WITHIN THE HAWAIIAN ISLAND HUMPBACK WHALE MARINE SANCTUARY AND THE NORTHWEST HAWAIIAN 2

COMMENT NUMBER: D-W-0118 (cont.)

ISLAND ARCHIPELAGO (NOW A NATIONAL MARINE REFUGE) WILL ENDANGER OR DISRUPT NORMAL MARINE BEHAVIOR, BREEDING AND CALVING FOR THE HUMPBACK WHALES AND UNKNOWN EFFECTS ON THE ENDANGERED HAWAIIAN MONK SEALS, AND HAWKS BILL TURTLES. COUNTLESS FISHES AND 3
INVERTEBRATES WILL ALSO SUFFER THE EFFECTS OF THIS SUPER BOOM BOX.

☛ PLEASE CONSIDER THE SERIOUS IMPACT OF THE PROPOSED TESTING NOT 4
ONLY ON THE OCEAN LIFE BUT HAWAII'S ECONOMY. IF THE WHALES DESERT THE HAWAIIAN ISLAND HUMPBACK WHALE MARINE SANCTUARY WATERS, IF THE REEFS ARE SONICALLY CLEANED OF LIFE; IF THE FISHES ARE DRIVEN FROM THEIR HABITAT WE LOSE MANY OF OUR VALUABLE TOURIST ATTRACTIONS.

☛ PELAGIC FISHES WHOSE POPULATIONS ARE ON A DECLINE, TUNAS, BILLFISH, 5
WHALE SHARKS, etc. WILL ALSO BE AFFECTED BY THE NOISE; POSSIBLY DISTURBING MIGRATION ROUTES, BREEDING AND SPAWNING INSTINCTS.

☛ OBSERVATIONS WORLD WIDE SEEM TO LINK HIGH POWERED SONAR WITH 6
MARINE STRANDINGS. THESE ARE THE VISIBLE EFFECTS; WHAT ABOUT THE ORGANISMS THAT WE DO NOT SEE WHO ARE ALSO AFFECTED?

☛ ADDITIONAL RESEARCH ON THE EFFECTS OF HIGH POWERED SONAR TO OUR MARINE ENVIRONMENT IS NEEDED BEFORE WE RELEASE THE HOUNDS OF HELL..

"OH, HEAR US AS WE CRY TO THEE FOR THOSE IN PERIL ON THE SEA..."

MAHALO,

THOMAS NAKAGAWA

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0119

Anita Winther

I am opposed to sonar testing and underwater explosives around the 1
Hawaiian Islands and in the Northwest Hawaiian Islands National
Monument. The initial plan was bad enough, and now the Navy and
National Marine Fisheries Service has expanded their war games practice to
1,145 exercises around the Hawaiian Islands including the US Hawaiian
Humpback National Marine Sanctuary and the Northwest Hawaiian Island
National Monument.

Recent sonar testing linked marine mammal strandings to include: 9
Canary Islands in 1985, 1988, 1989, 1991, 2002, 2004 Total reported 44 whales
Greece 1996 12 beak whales
Virgin Islands 1999 4 whales
Spain 2000 3 beak whale
Bahamas 2000 and 2002 3 whales including one humpback 150-160 decib
Washington State 2003 11 porpoises
Alaska 2004 6 whales
Hanalei Bay, Hawaii 2004 200 melon headed whales stranded, one dead
Yokosuka Japan (where a US Naval base is) 2004 Multiple strandings
North Carolina 2005 34 strandings of three different species of whales

The Navy and National Marine Fisheries Service have now admitted that
they realize they will be killing mammals. They say humans can survive 145 2
decibel sonar but the Navy will be testing 235 decibels which is one billion
times more energy that 145 decibels. There are a lot of divers in the
Hawaiian waters. Two thirds of the North Pacific Humpback whales (which
are on the endangered list) come to Hawaii to give birth and mate. We only
have about 1200 monk seals, found nowhere else in the world, on the
critically endangered list. ~~The majority of them are in the Northwest
Hawaiian Islands National Monument.~~ We have critically endangered 6
hawksbill turtles (50 nesting females left). There are many other species of
whales, dolphins, and other mammals on the endangered list here in Hawaii
and endemic to Hawaii. The Navy admits that underwater detonations will 3
kill fish, but says we have plenty to spare.

The National Marine Fisheries Service and the Navy are ignoring the Marine Mammal Protection Act, Endangered Species Act, National Environmental Policy Act, Federal Protection for NWHI, and many more Federal Agencies created to protect our waters.

COMMENT NUMBER
D-W-0119 (cont.)

The Navy should not test during whale season. They should go further 7
away from land, stay out of the Humpback Whale National Marine
Sanctuary, stay out of NWHI National Monument, stop sonar when
marine mammals are spotted, notify people where and when they will
be testing, no underwater detonations in our waters. These mammals
don't belong to the United States. They are for the people of the world
to enjoy. The US Navy is setting such a bad example for the world.
Don't play your war games in Hawaiian waters.

not just turn it down ~~more than~~ 6 decibels

From what I understand, you have a 2 year exemption from the EIS and have done several exercises this year — causing 1 dead whale in Kikei. Are you counting that one on your "take" list? 8

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0120

Statement of Lanny Sinkin
August 29, 2007 Public Hearing

Here, tonight, you represent the United States Government.

I appear tonight as Ali'i Mana'o Nui (Chief Advocate and Spiritual Advisor) to Ali'i Nui Mōʻī (King) Edmund Keli'i Silva, Jr. of the Kingdom of Hawai'i.

The real question that should be of concern to you tonight should be how the Navy's behavior reflects on the reputation of your government. As a general matter, the Navy behavior I have observed since 1998 can best be characterized as arrogant, lawless, and disrespectful.

Examples of arrogance are:

coming into the waters of the Kingdom without permission;

thinking that you have the only definition of national security that has any validity and everyone else should just get out of your way;

intimidating Congress into changing any laws that prevent you from doing exactly what you want to do, regardless of whether or not those laws are the product of common sense and intelligent debate;

not considering yourself accountable for the harms you inflict on our 'aina through your exercises and operations disrupting the marine environment and depositing your radioactive materials and other pollutants on the land; and

believing that God is on your side, so you can ultimately do no wrong.

Examples of lawlessness are:

pretending that the illegal overthrow of the Kingdom government never happened and that the illegal US annexation of the Kingdom lands and people is acceptable;

refusing to implement the mitigation measures adopted by the California Coastal Commission for your sonar exercises off the California coast;

having to be constantly sued to gain your compliance with environmental laws;

ignoring the will of the tens of thousands of people in these islands who rose up against your using high intensity sonar in our waters; and

violating the laws of nature by destroying ecosystems and threatening species, including the Human species, with extinction.

1

COMMENT NUMBER
D-W-0120 (cont.)

Examples of disrespectfulness are:

treating the Hawaiian people as irrelevant and the Hawaiian environment as expendable;

coming to our island to test your low frequency sonar on the Humpback Whales during their breeding and birthing season;

ignoring the evidence gathered by people on this island that showed the Humpback Whales fled from your test area almost as soon as you turned on the low frequency sonar in 1998; 1

treating the sacred sites of indigenous people as invisible in your decision-making processes; and now

ignoring all the effort that went into creating the Northwest Hawaiian Islands Monument and the Humpback Whale Marine Mammal Sanctuary by pursuing live fire bombing and missile interception, increasing the use of high-intensity sonar, and otherwise inflicting your military madness on areas designated as safe havens.

These are a few examples of how you are earning a reputation for being arrogant, lawless, and disrespectful.

Your attitudes and your actions make abundantly clear why nothing short of complete independence will ensure these islands are truly cherished and protected. Under such half measures as the Akaka Bill, we will be left without any real authority over the waters that you, as representatives of the occupying power, so willfully abuse.

I am not here to comment on your draft EIS. I know that the entire EIS process is simply an exercise to you. You conduct this exercise solely to escape from legal oversight. You will do what you will do because you have made yourselves who you are. 2

We offer a place known for ho'oponopono. One meaning of that healing process is acknowledging when you do something wrong. From that acknowledgement comes a healing process that brings you back into alignment with the Natural World and makes you an agent of peace within the Human Family. When you are finally ready to put down your weapons and start your healing process, we will be here to help you. In the meantime, we will not waste your time and ours by continuing to participate in pre-determined processes like this one. 3

Aloha.

Lanny Sinkin
Ali'i Mana'o Nui

Hilo, Hawai'i

2

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-W-0121

Keaukaha Community Association
Environmental Co-Chair
Hans Mortensen

Hilo, Hawaii 96720

Department of The Navy
Commander
United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii 96860-3131

August 29, 2007

Dear Sir:

I would like to submit my comments and concerns in regard to the Department of The Navy's Draft EIS/OEIS to evaluate some environmental effects on our community of Keaukaha.

Concern: Environmental impact generated from increased military presence on the surrounding communities of Hilo International Airport, including the Department of Hawaiian Home Lands community of Keaukaha. **1, 2, 3**

We understand that on the island of Hawaii, impact areas will be at the Pohakuloa Training Area and the Bradshaw Army Airfield

We believe that the Hilo Airport will be impacted also. We believe that the current negative effects from the noise and air pollution at Hilo Airport will be intensified.

We are concerned that increased military presence at the Hilo Airport will increase the adverse effects of the airport on our community.

Some of the concerns that we have are noise generated by aircraft, ground equipment that service the aircraft, and equipment that are transported by the aircraft. Some examples of aircrafts are heavy transport jets, aircraft refuelers, fighter jets, and helicopters. **1**

Some examples of negative impacts include, but are not limited to, noise pollution, air quality, **2**
and concerns of aircraft crashes and accidents impacting our community. The possible increase **3**
of heavy transporter jets, aircraft refuelers, fighter jets, and helicopters can produce an increase in toxins that are released into the air that will decrease air quality and increase airport noise pollutants. Thank you for your consideration.

Sincerely,

Hans K. Mortensen

Hans Mortensen
Keaukaha Community Association
Environmental Co-Chair

COMMENT NUMBER: D-W-0122

Hawaii Range Complex
Environmental Impact Statement
Public Hearing Input Form

Please record your comments concerning the Hawaii Range Complex Draft EIS/OEIS on this form. Please include your name and address. You may submit this form by:

1) placing it in the comment box at tonight's meeting
2) mailing it to: PMRF Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

All comments must be received no later than Sept. 17, 2007 to be included in the response to comment section of the Final EIS/OEIS.

Name: Shelley Stephens

Address:* Pahoa, HI.

Comments: Pohakuloa: DU Violation of original lease - Atomic simulators only; need cost of D.U. clean-up. also Kahoolawe Water lens is cracked, please address w/ funds from Army Corp. of Engineers. M-I Appendix - Heavy Metals: ø EIS need EIS on H.M. firing
* See "Cost of Clean-up vs. Fair Market Value of Land." Contact DLNR Hilo office. Also, Ocean Mining ø allowed in Hawaiian Archipelago nor International Waters under Article 147 #2 Section B
A. Kupuna of Lilepue Ohana Request to Retrieve Bones (IWI) ea. Report Filed w/ Washington.

Shelley Stephens
daughter of First Mate Alexander Lamar Stephens

B. * Memorandum to all DoD
Must contact/communicate w/ Native HI - Groups/organization. **1**

* If you provide your mailing address, we will add you to our mailing list to receive future notices about this EIS/OEIS.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0123

We, the Sirius Institute on behalf of the Cetacean Commonwealth are here today to ask this: What are we going to do to assure the wellbeing of Cetacea, of all their kind?

As I read these very technical pages and terms and conditions the thought comes: What if these were your children we were doing this to. Or some of your many thousands of requested 'incidental takes' include your mother, or uncle or dad or sister or brother or great great great grandmother or great great great grandfather? Could you harvest those you love so dearly in the name of anything?

3

Or that these takes are going to be taking place during the most critical time of any mammal mother's life, her gestation and birthing times and in her own Humpback Whale Sanctuary.

All these takes are important to the life of the pod - to the continuity of cultural information and practices nearly as ancient as the oceans, their home. As well as the continuation of these people of the seas.

Could you keep scientifically saying, "It is all for science so we know this?" I think 'ZERO' would be your heartfelt answer and that is what we are looking to breech here – hearts. Opening them to our common humanity and making choices for a different future together.

1

COMMENT NUMBER
D-W-0123 (cont.)

Could you continue to say we need to protect ourselves against our enemies when we could be working together to find other ways to be together. We could make aloha a way of life for the world.

Perhaps we can all take a stand today that we would prefer by far to live in a more harmonious world where the need for bigger and badder means of taking life, our own and the Earth's are gone;where we can live and enjoy life in all its complexity, and wonder, here to help care for earth and each other.

Does it matter how damaging the sonar is? As important, is that it is necessary or so we think.

What is really damaging is the thought that it is necessary and keeps co-creating a world where this warfare mentality is acted out daily. Look around at the vastly immense resources that are being bled of our lives daily to maintain this thinking and reality. Everyone alive today would have enough to live a productive, healthful, supported life were our resources to be applied to the art of harmony.

Learning from the most ancient of conscious, largest brained life forms we hope to relearn how to live together, how to restore our home and how to reach to the stars together when we are ready to go a journeying.

2

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-W-0123 (cont.)

One component of this is the establishment of the 'interspecies birth cohort project' a community out reach project of the Cetacean Commonwealth and the Sirius Institute as well as others.

We are linking up with the global pod of parents and their 'dolphin/whale' children to work with each other, share information, connections, experiences and especially breakthroughs in communications between Humans and Cetacea.

As we take steps to assure the wellbeing of Cetacea we will be taking steps towards creating a thriving global culture that is respectful of all life, Human, Cetacean and others.

Respectfully,

Star Newland

On behalf of the

Cetacean Commonwealth

and Sirius Institute

August 29, 2007, Hilo, Hawai'i

www.planetpuna.com; 808 896 8658.

3

COMMENT NUMBER

D-W-0123 (cont.)

Star Newland
Cetacean Commonwealth
P.O. Box 1645
Pahoa, Hawai'i 96778

P. Michael Payne, Chief
Permits, Conservation and Education Division, Office of Protected Species
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910-3225

E-mail: PR1.062306A@noaa.gov

Re: Docket No. 070703226¨C7226¨C01; I.D. 062206A

Globalize by learning about each others' people, customs, similarities, countries is the tag on the Discovery channel. It speaks to the essence of our work - to learn about other cultures, specifically the Cetacean culture.

In the Spirit of Aloha:

Dear Michael,

I am addressing Docket No. 070703226¨C7226¨C01; I.D. 062206A on behalf of the Cetacean Commonwealth ... WE want to reach out and meet the Heart of the National Marine Fisheries Service just as we reached out and met the Heart of the Navy and NOAA. See: Below and also www.planetpuna.com. 1

As you must know this is the International Year of the Dolphin out of the United Nations and United Nations Environment Programme.
We are working on establishing the International Decade of First Contact with Cetacea. What can we learn now and in the years to come, is our quest. One thing for sure is that the only way we will learn anything is through their continued presence in sufficient numbers. We can only learn

4

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0123 (cont.)

anything as we assure the wellbeing of the Cetacea.

I want, and have dedicated day after day, for years of my life, a world where the kinds of interactions and relationships described below continue and thrive. We want to expand and extend the scope of the Delphic Tradition brought forward. We invite you to the table, to be part of this marvelous cocreation with the oldest, most sentient biggest brained lifeforms on this world.

Our work and positions are partially stated in the following article which appeared in the ezine 'The Daily Galaxy -News from Planet Earth & Beyond', an eclectic text and video presentation of fascinating, often irreverent, news and insights on science, technology, and popular culture (music, film, events).

June 26, 2007
Cetacea: Mind-Bending Theories About the Planet's "Other" Intelligent

The year 2007 has been declared as Year of the Dolphin by the United Nations and United The year 2007 has been declared as Year of the Dolphin by the United Nations and United Nations Environment Programme. But what do we really know about these incredible creatures? In 1967, acoustics expert Wayne Batteau developed a technique based on ultrasounds to communicate with domesticated dolphins. At the origin of the study, the US Navy cryptically decided to classify the results as top secret.

Partly because their brains are roughly the same size as humans, and are similarly or superiorly complex (although differently evolved in structure), some marine biologists have speculated that dolphins, and other Cetaceans, are at least as intelligent as humans, and could have several unknown communicative abilities, that surpass human understanding.

Critics say that if dolphins were as smart as us there'd be more evidence of it. But what type of evidence would suffice? The fact that Cetaceans are suffering from (rather than creating) the kind of environmental suicide that humans indulge in, offers little proof of inferiority.

It is known that the prehistoric predecessors of Cetaceans were land animals who returned to the sea where there was relatively little fear of large

COMMENT NUMBER
D-W-0123 (cont.)

predators and an abundant food supply. Dolphins seem to have rich communicative powers among themselves and are very playful. It is also known that dolphins can use tools and teach their children how to use tools. Dolphins are one of the few animals other than humans known to mate for pleasure rather than strictly for reproduction. They form strong bonds with each other, which leads them to stay with their injured and sick. Dolphins also display protective behavior towards humans, by keeping them safe from sharks, for example.

Historically, humans have long reported an affinity with dolphins, including joint cooperative fisheries in ancient Rome and other interactions. A modern human-dolphin fishery still takes place in Laguna, Santa Catarina, Brazil.

However, humans are known to benefit from dolphins in more intangible ways, as well. One example of a little understood benefit comes from an ongoing study conducted at The AquaThought Foundation, a privately funded research organization dedicated to the exploration of human-dolphin interaction. Their research shows several significant trends that have emerged in the analysis of samples collected before and after human/dolphin interactions.

According to their research, the human subject's dominate brain frequency drops significantly after dolphin interaction. Also observable is a period of hemispheric synchronization (the brainwaves emitted from both the left and right hemispheres of the brain are in phase and of similar frequency). Also, in many instances the background EEG became more evenly distributed within the spectrum. It is believed that this phenomenon may have some sort of therapeutic effect on an individual's emotional, or physical health.

Other institutes that study dolphins, and other Cetaceans, have reported a myriad of differing perspectives and beliefs, which range from heart-warming to downright bizarre.

The Hawaii based Sirius Institute, known for sending live humpback whalesongs into deep space, says their primary goals is for the reestablishment of interspecies communications with the biggest, most complex brains on the planet.

One of their projects is an interspecies birth cohort, a group of children who would be birthed with dolphins and raised somewhat together in order to

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-W-0123 (cont.)

study the development of communications between the close-knit groups.

These open-minded Cetacea advocates point out that like humans, the Cetaceans transmit information culturally across generations, have the largest brains, and are the longest lived of all species. They would like humans to officially recognize the order Cetacea as a "people". They believe that step is necessary for their preservations, as was historically necessary to stop genocide of humans. One example is the Australian aboriginal people, who were legally classed as "game animals" until 1967 when they won their "rights as human beings" in a court action.

While Cetaceans aren't likely to take mankind to court, it has been suggested that they are willing to communicate with us—possibly in a form that WE are too stupid to cognitively interpret.

Is it possible that someday man or dolphin will have figured out a way to effectively communicate? While the concept seems strange, and fantastic—it's worth remembering that it wasn't that long ago when no one thought space travel was possible. At the present, enormous amounts of money, focus and energy is poured into our search for intelligent extraterrestrial life. Maybe we should be simultaneously supporting efforts to communicate with intelligent life on our own planet.

After all, it might be good practice for the future. If we someday do make contact with intelligent alien life, how would we communicate? Surely extra-terrestrials will have evolved with a much different intellectual/physical capabilities than us. Even if a particular alien life form is as intelligent or even possesses far superior cognitive abilities—that doesn't mean we'll have compatible biological systems for true communication. How will we overcome those physical and intellectual communication barriers? Learning to more effectively communicate and understand differently evolved life forms on our planet may provide important insights into possible future interactions with life beyond planet Earth.

http://www.aquathought.com/
http://www.planetpuna.com/siriusa/NewDolphinization.htm
http://ninemsn.australiatests.com/mag/dolphin-1.asp?v=42

Posted at 12:05 AM in Marine Biology

7

COMMENT NUMBER

D-W-0123 (cont.)

Aloha Rebecca,
I want to say mahalo for coming to see us Sept. 16 at the scoping meeting.
I was asked to write up my experience for the STOP LFAS network and my friend Cheryl Magill.
I thought you would like to see what I wrote.

Aloha,
Star Newland
Founding Partner
Sirius Institute
Cetacean Commmonwealth
www.planetpuna.com
808 896 8658

Star meets the Navy ... September 16, 2006

It started with a prayer as I drove over the Saddle Road en route to meet the Navy in Hilo, Hawai'i at their scoping meeting September 16.
My prayer was a mother's prayer, and a soon to be grandmother's prayer as I await the birth of my first grandchild.
I wanted to meet the heart of the Navy; I wanted to know who are the people behind the word Navy.
As I meditated on this, many thoughts, feelings and then tears of release came. Even now as I am writing this feelings come over me and tears flow again.

I felt that somewhere in this gigantic organization there had to be heart, much like my own, that simply wants life to continue, to get better for us all, to put behind us this man-made lunacy we call war, to live in domestic harmony; to live in a Cetacean Human shared culture, which Mike and I and others are creating now along with the rest of what we call 'the new and improved new world order'.

Because of the very, very heated headline stories at this time where it appeared we were going to have nuclear attacks and on and on, my prayers were to meet the individuals who like myself were willing to draw their line in the sand saying this stops here and now. I am pulling back from the brink. We have a life and a world we want to continue; there are many of us who

8

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

love life, love our world, love ourselves and species and want to create and perpetuate a new paradigm like the one above.

A parking attendant for the event was our friendly greeter, there were signs on the way into the meeting which was well laid out, it was easily accessible and there was free parking.

I asked in my prayer to meet those like myself there and as soon as I had signed in I went straight for these two men in the back with the Missile Range display. Quickly I jumped right into my subject and spoke of my desire to meet folks there who shared the same dream or vision of our future. Within minutes these two men agreed they would much rather a world like that than the one we were in now. Heartened by this I knew I was in the right place. I left them to explore the rest of this event.

As it turns out there was a format that allowed us to meet, person to person, face to face and then heart to heart. I went around to listen to discussions, ask questions, and by the end of the evening I found a biologist who had read and understood several books which were influential to me, who shared a spiritual side akin to my own; the Missile Range commander who spoke eloquently of his love of the oceans, its life and how these RIMPAC exercises have been conducted for over 20 years and there had been a pretty low incidence of harm. His sincerity convinced me that had there been serious issue they would have known and personally seen to it that something was done. It was he who graciously put his neon green domestic harmony ribbon on just below his medals. Talk about community outreach - I was delighted and amazed at the warmth of these folks and their openness.

Then there was the marine biologist who was so knowledgeable about many stranding incidents and had local details we had yet to hear about, like how the humpbacks come up to the ship when the mid frequency sonar was put on and dolphins come to ride the bow waves when the sonar is put on.

We were met by an enthusiastic response from many members of their group towards the interspecies birth cohort project, where human babies are born with dolphins, spend lots of time together as we observe how communications develop between them. This was considered by the late Dr. John C. Lilly as the most likely way for us to break through the communications barrier. This has yet to be done. It is one of the key community outreach projects of the Cetacean Commonwealth.

COMMENT NUMBER

D-W-0123 (cont.)

When I posited the likelihood that we would discover a means to communicate with them and perhaps the information the Navy was getting from using sonar we could get from the Cetacea they got very excited. Of course the Cetacea would likely make it available to everyone. That is true transparency. The idea that we Humans could enter into a treaty relationship with the Cetacean Commonwealth was enthusiastically received by their counsel.

We entered many pages of comments and testimony about our work to get these projects on board with the Hawaii County Puna district development plan, the State 2050 Sustainability conference; projects like the Human Dolphin habitat, beliefs about Cetacea and plans to secure their status as a Peoples through the United Nations, establishment of embassies at the water's edge. Our feeling is that once that recognition is established we would have the communications handled, then the issues of protecting their homelands, so to speak, is dealt with at a whole different level, the State Department level.

Clearly the people we met that afternoon on hand to represent the Navy were of a high caliber. There were other folks there too – I only met about 15, including a lady that I had just seen at Governor Lingle's International Leadership Conference for Women. We had that in common and it helped sharing that bond. Dr. Mike Hyson met as many and spoke with them about more technical details. He can give you his report.

Afterwards we got together to compare notes and ask each other "Did we see what we saw? Did we just meet the heart of the Navy?" We agreed that we felt something important had just taken place. It was so strong for me I felt the Earth must have tilted.

We liked these folks and offered them our help to make more secure the wellbeing of Cetacea, the oceans and life as we want it to be. At the end of the day I felt elated. We had established common ground. I felt that what I had just witnessed ranked as one of the most important days of my life.

In the Spirit of Aloha,
Star Newland
Founding Partner

COMMENT NUMBER

D-W-0123 (cont.)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-W-0123 (cont.)

Sirius Institute
www.planetpuna.com

Subject: RE: Star meets the Navy ...
Date: Wed, 27 Sep 2006 12:07:20 -1000
From: "Hommon, Rebecca CIV NAVREGHAWAII Counsel"
<rebecca.hommon@navy.mil
To: "Star Newland" <starnewland@yahoo.com>

Thanks for sharing your words and thoughts. Your comments are very much appreciated.

This was so important a meeting that Dr. Michael Hyson, Research Director, Sirius Institute, and I went to Barking Sands base to meet with Captain Mark Darrah, (at his invitation) and Information Officer, Tom Clements, October 16 for a tour. (We since returned to listen to live whalesongs last spring.) You may recall the earthquake came October 15, while we were down the road from our meeting. Following are a few of the points we covered, as best as I recall:

How can we make use of dolphin assisted, conscious and attended births a project of global stature so that we make the establishment of interspecies communications a reality.

Captain Mark Durrah said when we call the forum to gather together stakeholders for the protection and preservation of Cetacean life on this earth he will get the Navy to the table.

How can we civilians establish and maintain an open, friendly, fair witness relationship with the Navy and other large organizations

We are inviting you too, as protectors of the National Marine Fisheries Service to join us in the gathering of the forum; that we may, together with the Others find ways to fulfill our manifest destiny; that we would learn from each other, be of assistance to each other and ultimately reestablish our

deep relationship one to another.

Because we value Cetacea as important and precious as ancestors starting in a long ago time and place, we felt it was important to commemorate those who have fallen at the hands of Humans in their genocide. These words appeared on www.planetpuna.com, Memorial Day, 2007.

In Memorium and Celebration of Cetacea
by

Star Newland

A Proclamation

The Cetacean Commonwealth
Addresses the Earth and Her Peoples

Calling Moratorium on Memorial Day

by

Michael Hyson

In Memorium and Celebration of Cetacea

Puna, Hawai'I

May 28, 2007

We bring greetings and Aloha celebrating and declaring our agreement to

COMMENT NUMBER

D-W-0123 (cont.)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-W-0123 (cont.)

seek out harmonious relations one to another including Humans, Cetacea and Extraterrestrials.

The Cetacean Commonwealth realizes this on behalf of the UNÆs 2007 International Year of the Dolphin, in order to restore harmonious relations among humans, first we must restore harmonious relations with our Ancient Ones, the People of the Sea, our ancestors.

We are here to remind you of a time soon to come when we will have reestablished right relations with each other; when prophecy long told among our people speaks of when we will have rejoined to bring forward the Delphic tradition and involve the many who would join with us to promote common ideals of aloha, unity with life, life affirming actions and so on.

Henceforth, let it be known that we, the undersigned, resolve to live in harmony with each other and are calling the moratorium on this Memorial Day May 28, 2007, as we honour the lives and memory of the many of both our kind, Cetacea and Human, who have passed on in war and otherwise.

We agree to seek the wellbeing and ancient relationship between each species restored thus bringing harmony to our worlds.

Signatories to participate as a member of each species committed to make a difference by their thoughts and actions.

Star Newland on Behalf of the Cetacean Commonwealth
Founding Partner
Sirius Institute

A Proclamation

The Cetacean Commonwealth

Addresses the Earth and Her Peoples

Calling Moratorium on Memorial Day

COMMENT NUMBER

D-W-0123 (cont.)

May 28, 2007

Long have the Cetacea swum the seas of Earth and helped and aided Humans.

For at least 18,000 years humans have hunted them. Throughout this history, as with all hunting cultures, the prey was honored, as in Japan where coastal villages had temples dedicated to the whales. We honor all whaling people's and forgive humanity's collective lack of awareness that is now ended.

In this UN Year of the Dolphin, the dolphins are currently losing millions per year to pollution, fishing, drive fisheries, nets, high-intensity sonar, geological mapping, and other hazards. The great whales are at 1% of their former numbers and some are still hunted.

In the West, the bodies of whales fed, and clothed us, and their oil lit the lamps of many cities. Yet whales were still honored. Whale oil anointed the kings and the popes (who still wear the stylized whale head symbolic of the ancient water-god Oannes or Dagon).

On Memorial Day, 2007, we honor all our dead, Human and Cetacea.

We call for a full moratorium on whaling of all kinds.

We also call for a new beginning based on new understanding and appreciation of who the Cetacea are to Humans.

Many indigenous cultures including Hawai'ians, Maori of New Zealand, the Zulu, Tibetan, Eskimo, the west coast natives of North America and the Mirning people of Australia, all say whales are their ancestors.

This is now supported by findings showing the dolphin genome is contained in the human genome and the Cetacea and Homonids (the primate group consisting of humans, bonobos, chimps, gorillas and oranutangs) share nerve cells called spindle cells.

The various findings that humans are semi-aquatic add more support.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0123 (cont.)

The whales are our ancestors; we are related.

Early peoples along the Nile, Yangtze, Indus and Ganges rivers likely interacted with the freshwater dolphins in those rivers, as they do today in the Amzon basin and elsewhere. This interaction contributed to the development of civilization.

Indeed, China, Greece, Babylon & Sumer, e.g., attribute the founding of their civilizations to aquatic beings like Oannes.

There was partnership with the dolphins especially in ancient Greece, where they fished together with the Greek fishermen even sharing their sacramental brews with the dolphins; there are stories of dolphins guiding the ships; rescuing people; and befriending children.

The Greeks felt the dolphin was the most divine form of creation, and killing a dolphin equivalent to murder.

We term this this partnership with the Cetacea and knowledge of their nature as "the Delphic Tradition". This is typified by the ancient Greeks with their "philadelphia" – or philos delphia or "love of dolphins".

philos - love of; the root Del means either "brother" or "dolphin".

Western cultures largely forgot the Delphic Tradition; for the last 2000 years - it was maintained by indigenous peoples, and in legends, reports and stories that have come down to us.

The Delphic Tradition Brought Forward

With modern research into genetics, communication, therapy, and underwater birth with the Cetacea, comes fuller recognition of our deep mutual connections. We are reaching an understanding that confirms the ancient knowledge. Cetaceans are self-aware, sentient, and have brains comparable to, or up to seven times larger, than humans.

This implies the Cetacea have comparable or superior intelligence making them the most intelligent beings on Earth. They have been shown to have complex language, cultural transmission, tool use and other cultural traits.

COMMENT NUMBER
D-W-0123 (cont.)

During our extended aquatic human evolution, we developed several aquatic structures such as our noses and tears and made beneficial partnerships with fresh-water and ocean dolphins, traditions which were preserved by the Greeks and still survive in several places on the Earth, including Hawai'i. In all these instances, the Cetacea are a harmonizing, civilizing influence.

Now that we have rediscovered this, we can honor our Cetacean ancestors and re-create our partnerships through joint Cetacean-Human projects involving communication, birthing, therapy and other areas.

We can soon communicate with beings who have lived in harmonious societies for millennia - bringing new perspectives, knowledge and technology to land-locked humans. This is part of The Delphic Tradition Brought Forward.

It is time to give recognition of the Cetacea as intelligent sentient beings and include them under human laws.

We are now on the verge of spacefaring. It is time we restore proper relations with the extraterrestrials of our own oceans – the people's of the sea, our ancestors and go on together in loving respect and harmony.

WE appreciate your attention to our pleas to find other ways to relate to us. Perhaps, you could deliver the utmost just verdict of all, to recognize it is time to call a moratorium on all of this Sonar and that perhaps, just perhaps Humans can dedicate time and effort to finding ways to communicate with us so you can learn what WE have to offer, how to live upon Earth in harmony, in a world restored together into our paradise, once again.

In the Spirit of Aloha,

Star Newland
Founding Partner
Sirius Institute

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-W-0123 (cont.)

TrackBack

TrackBack URL for this entry:
http://www.typepad.com/t/trackback/2145844/19567894

Listed below are links to weblogs that reference Cetacea: Mind-Bending Theories About the Planet's "Other" Intelligent Life :
Comments

Issue forth an energy of love and harmony for all life especially to your human family .. your whale and dolphin species for they are human in spirit also ... as a wave of slaughter and then beaching is about to begin as they cry out to humanity to look at itself ... for aeons of time your whales and dolphins have been guardians ... holding the planetary energy grid whilst they await for you to come online ... know you that whales are the oversouls of dolphins .. and dolphins as a whole are the earth's soul (black box recorder) holding all of earth's memory ... when your whale species become extinct ... so too will your dolphins ... your earth and yourselves ...

this is a message from a future now ...
Blue from Auraphim (Oraphim)
- The Centre of Light in Arcturus "

Posted by: Maria | July 02, 2007 at 02:08 AM

May be as intelligent....that is the key. We (humans) alter our environment by use of tools and weapons. In a water world the marine mammals are at a distinct dis-advantage. We are the lords of creation on this planet until we destroy ourselves and evolution can again work its magic and another species arise to take our place...again and again and again.

Posted by: Scott | July 02, 2007 at 04:56 PM

This is followed by my letter to Cheryl Magill, of STOP LFAS group, a dear friend and supporter of our work. It came about after meeting the Navy folks at a scoping meeting in Hilo last September. It is addressed to Rebecca Hommon, CIV NAVREGHAWAII Counsel.

COMMENT NUMBER

D-W-0123 (cont.)
2

As a last minute note – last year at the scoping meeting we submitted several pages about this perspective as well as oral testimony and after looking over the draft document we failed to see any specific reference to these areas. How is that and how then can this be a thorough document of the position of the people?

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0124

August 29, 2007
Hilo Hi.

Hawaii Range Complex
Environmental Impact Statement
Public Hearing Input Form

Please record your comments concerning the Hawaii Range Complex Draft EIS/OEIS on this form. Please include your name and address. You may submit this form by:

1) placing it in the comment box at tonight's meeting
2) mailing it to: PMRF Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

All comments must be received no later than Sept. 17, 2007 to be included in the response to comment section of the Final EIS/OEIS.

Name: Lynn Nakkim

Address:* Hilo, HI (Keaukaha).

Comments: I am concerned and dismayed that The U.S. Navy insists upon this plan to do sonar exercises in the Hawaiian Range Complex in Hawaiian Islands. I have read the environment impact analysis of impacts on "Biological Resources". ~~the~~ I think it is a very bad, very irresponsible choice for the Navy to proceed despite these destructive effects.

1

The fact that sonar caused the beaching and subsequent death of eleven whales in the Bahamas Islands in 2000 should be all the proof you need that you must not do sonar testing in areas where whales congregate. The Hawaii Range Complex is not a suitable area for sonar testing. It is just a guess, but I estimate that whales have been congregating in Hawaiian waters for at least 50,000 years. Clearly they got here first.

The Navy's attitude can be expressed succinctly in how they categorize whales.

*If you provide your mailing address, we will add you to our mailing list to receive future notices about this EIS/OEIS.

COMMENT NUMBER
D-W-0124 (cont.)

In THE ENVIRONMENTAL Statements they are grouped along with Seaweed, coral, humuhumunukunukuapuaa, crabs, and corals as "BIOLOGICAL RESOURCES."

Well, I think the seaweed will be fine. But for the whales, the impact of sonar sounds is more than just breaking their eardrums — it is terrorism against ~~whales~~ in the open ocean to use high frequency sonar and mid frequency sonar in the zone of testing. ~~I think you can go test your sonar where seaweeds congregate~~ We are taught "DO" SONAR. But not here — OR IF YOU MUST ~~~~ TESTING HERE, THEN ONLY DO IT FROM JULY 1 Through ~~December~~ 1.

Whales are way more than a "biological resource"; and what you do may drive the whale away from these islands altogether. I am here to represent them in this meeting room because they are just too far from the ocean for them to represent themselves.

My father worked for the Navy at Pearl ~~I am not at~~ Harbor for 37 years, beginning in 1941.

I understand defence, and I am here to Defend the whales, since a few attacker posters about Navy efforts to rescue albatross and monk seals will not compensate for these threats they present, though their unnecessary exercise, to torment and kill whales of all kinds, dolphins, and other sensitive, intelligent ~~mammals~~ mammals who live underwater.

One officer here today at told me that Navy must conduct these tests because "it is the law." I want to remind you that there is a HIGHER LAW, AND KILLING AND TERRIFYING WHALES + DOLPHINS IS

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0125

COMMENTS ON NAVY HAWAI'I RANGE COMPLEX DEIS/OEIS
for draft EIS hearing 8-29-07, Waiakea High School

Cory Harden, Sierra Club, Moku Loa group P.O. Box 1137, Hilo, Hawai'i 96721
mh@interpac.net 808-968-8965

Sierra Club, Moku Loa group, has serious concerns about past, present, and proposed Navy actions in the Hawaiian Islands.

First, on sonar, the Navy should not receive the blanket permit it is seeking. 1

Sonar has been linked to whales dying from the bends after "boiling to the surface in panic". (1) Earthjustice says "intense sonar sounds can rupture marine mammals' hearing organs and result in strandings or death." (2) Sonar can interfere with marine mammals' ability to "navigate, hunt, take care of their offspring and avoid predators." (3)

Earthjustice in Honolulu just "filed a court motion to stop the Navy from using high-powered sonar in an exercise this November". (4) Federal judges have shut down sonar or mandated increased precautions several times, including 2006 in Hawai'i, and this month in California.

In the California case, the Navy itself predicted permanent injury from sonar to almost 500 Cuvier's beaked whales--when only about 1000 may be left off the U.S. West Coast.

Taking precautions to protect marine life during sonar use would not reduce Navy ability to respond to actual threats, says the Natural Resources Defense Council.

When I sought expert opinions on sonar, I was told "this is a delicate issue" because over half of the marine mammal research in the U.S. is funded by the Navy.

In 2002, scientists funded by the Navy made negative comments on an EIS. An Office of Naval Research official phoned and chastised them, then e-mailed a colleague "I think they had some inkling that they might be about to take our money and make themselves look good to the enviros too." (5)

Second, Navy actions, added to other military actions in Hawai'i, will cause large cumulative impacts. 2
Depleted uranium was found at Schofield and at Pohakuloa and is suspected at Makua Valley. The Navy accidentally fired DU into the hills above Aiea in 1994. It was never found.

COMMENT NUMBER
D-W-0125 (cont.)

Future plans for the Army's Stryker will cause severe soil erosion and dust, increase wildfires, impact sensitive species, spread non-native species, bring noise from helicopters and explosions, destroy archaeological and Native Hawaiian cultural resources, and restrict native Hawaiian access to traditional sites.

Past and current military actions have left almost 800 contaminated military sites in Hawai'i. One site is Pearl Harbor Naval Complex, which itself contains about 750 contaminated sites. Almost 5 million gallons of low level radioactive waste were discharged into Pearl Harbor in the 1960s and 1970s. More than 8000 tons of chemical munitions were dumped off O'ahu about 1940 to 1970.

It seems there is little money for cleanup of past hazards, but plenty of money to fund a shift in forces to coastal and Pacific areas that will bring even more hazards.

Third, debris and chemicals will fall on the Northwest Hawaiian Islands from missile flights and intercepts. Amounts are small, but there is growing evidence that these islands serve as a nursery and reservoir for fish, sea turtles, and birds in the main Hawaiian islands. The islands also have deep cultural significance for Native Hawaiians. The presidential proclamation that gives the islands protection as a monument requires the military to avoid adverse impacts there as much as possible. 3

Fourth, a high-ranking official in the U.S. Fish and Wildlife Service reportedly tampered with scientific work, and resigned in May. Fish and Wildlife statements cited in the EIS which came under her tenure, should be re-evaluated. 4

In conclusion, we urge the Navy to address past, present, and future hazards, to protect our islands, wildlife, and oceans.

References
(1) "Judge bans Navy from using sonar off Southern California," by Kenneth Weiss, Los Angeles Times 8-7-07
(2) "Stop the sonar, groups ask Feds," by Robert Shikina, Honolulu Star-Bulletin 8-24-07
(3) "Navy won't share sonar data," Honolulu Advertiser, 3-21-07
(4) "Stop the sonar, groups ask Feds," by Robert Shikina, Honolulu Star-Bulletin 8-24-07
(5) "Deadly Sonar" by Peter Canby, OnEarth, spring 2007

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

YAHOO! MAIL

Print - Close Window

Date: Wed, 22 Aug 2007 03:33:49 GMT

From: "KAHEA" <kahea-alliance@hawaii.rr.com>

To: "Helen Anne Schonwalter" <maui_jewels@yahoo.com>

Subject: Expanded Naval Wargames Threaten the NWHI and the Public's Health

KAHEA:The Hawaiian-Environmental Alliance

Save the Whales, Stop the Sonar

Aloha Helen Anne,

The Navy wants to expand its wargame-playground to include the Papahanaumokuakea Marine Monument in the Northwestern Hawaiian Islands! Your help is needed to prevent serious harm to this unique, delicate ecosystem, and the wider Hawaiian Islands.

Tuesday is the first day of public hearings on the environmental impacts of expanded naval exercises in the Hawaiian Islands. The Navy's proposal includes **live-fire bombing and missile interception over the NWHI Monument, significantly increased use of high-intensity active sonar in the Monument and the Humpback Whale Sanctuary, and increased bombing exercises at ranges contaminated with depleted uranium.**

The Navy's wargames are dangerous and pose serious risks to the welfare of our imperiled ocean resources, especially the delicate and highly protected Northwestern Hawaiian Islands. The National Marine Fisheries Service (NMFS) - the federal agency charged with protecting our oceans - held that the Navy's use of active sonar was the most likely reason 150 melonhead whales attempted to beach themselves in Hanalei Bay in 2004. Yet, **NMFS supports the Navy's proposal to expand use of active sonar and other harmful activities in the Hawaiian Islands, even though the Navy refuses to abide by meaningful mitigation protocols to minimize the injuries its actions inflict.**

Take Action!

Instructions:
Click here to take action on this issue or choose the "Reply to Sender" option on your email program.

Tell-A-Friend:
Visit the web address below to tell your friends about this.
Tell-a-Friend!

What's At Stake:
Talking Points Continued:

The Navy repeatedly mentions the lack of marine mammal strandings associated with its use of mid-frequency active sonar in Hawaiian waters in the 40 or so years that it has been using the technology. This is false. In 2004, in the middle of the Navy's bi-annual RIMPAC exercises, 150 melon-head whales attempted to strand themselves in Hanalei Bay; one calf was found dead. NMFS concluded that the Navy's use of high-intensity active sonar was the most likely cause of that rare stranding event. Moreover, it is highly unlikely that a marine

8/26/2007 12:

COMMENT NUMBER
D-W-0126
1

This is unacceptable. Hawai'i's residents and our environment deserve better!

Help make the message clear to **the Navy that it must abide by U.S. and state environmental laws, employ reasonable mitigations, and decrease - not increase - wargames in the Hawaiian Islands**. Please take a few minutes to read this action alert and learn how you can send a personalized message to the Navy and NMFS demanding an end to the wargames.

Mahalo nui for your support in protecting Hawai'i's unique cultural and natural heritage.

Here are four ways you can help:
1. Attend a public hearing in your area (times and locations listed below),
2. Send written comments to decisionmakers at the Navy and NMFS through this Action Alert,
3. Sign our petition supporting a 145 decibel limit on human-made ocean noise in state waters, and
4. Pass this information on to everyone you know!

Info on the Public Hearings:

On Kaua'i
Tuesday, August 21, 2007
Kauai War Memorial Convention Hall
4191 Hardy St. in Lihue

On O'ahu
Thursday, August 23, 2007
McKinley High School
1039 South King St. in Honolulu

On Maui
Monday, August 27, 2007
Baldwin High School
1650 Kaahumanu Ave. in Wailuku

On Hawai'i
Wednesday, August 29, 2007
Waiakea High School
155 West Kawili St. in Hilo

Written comments are due to NMFS by August 31, 2007 at:

Michael Payne, Chief
Permits, Conservation and Education Division
Office of Protected Resources, National Marine Fisheries Service
1315 East-West Highway
MD 20910-3225

mammal harmed by active sonar would ever be found in Hawai'i because our oceans are so vast. Injured marine animals in Hawai'i are most likely eaten by predators or carried away by the strong currents. So, the fact that more stranded marine animals have not been found is not proof that no marine animals are affected by the Navy's active sonar.

Naval exercises pose an unacceptable risk to our fragile coral reefs. Bleaching events, coral disease, and changing ocean temperatures are all causing our coral reefs - the foundation of our oceans - to die at alarming rates. The U.S. heeded these warning signs and set aside the NWHI as the world's largest, most protected marine preserve in the world. Naval activities should abide by the U.S.'s policy to protect the NWHI and specifically its unique coral reef ecosystems. Contamination from missile debris, as well as damage from waves knocking around large shrapnel pieces on the reefs are so far outside accepted practices in the NWHI that they should be prohibited.

The Navy's mitigation methods are woefully inadequate. Observers onboard ships cannot see marine animals that rarely surface, if at all (beaked whales can spend an hour below the surface; turtles surface with only their nostrils) and passive listening sonar cannot identify marine animals that do not vocalize. Even if an animal is spotted within 1,000 yards of the ship, the Navy will only reduce the sonar ping by a mere 6 decibels, to 229 decibels, which is still over 100 million times more intense than the Navy's human diver standard of 145 decibels and over a million times more intense than the noise level that killed the whales in the infamous Bahamas incident of 2000. This is unacceptable and violates 50 CFR sec. 404.9(c) of the Monument regulations

8/26/2007

COMMENT NUMBER
D-W-0126 (cont.)
2
3

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

Email: PR1.050107N@noaa.gov.

Written comments are due to the U.S. Navy by September 17, 2007 at:

Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawai'i 96752-0128

Email: Fax: 808-335-4520

Take Action

Send a letter to the following decision maker(s):
Chief Michael Payne
Mr. Tom Clements

Below is the sample letter:

Subject: Expanding Naval Wargames in Hawaii is Unacceptable

Dear [decision maker name automatically inserted here],

The world recognizes Hawai'i hosts unique and fragile marine environments crucial to the overall health of our oceans. The U.S. acknowledged the importance of protecting Hawai'i's oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands. This is the primary foraging grounds of last few remaining Hawaiian monk seals, home of rare cold water coral reefs,

The Navy's proposal to significantly increase wargames in the Hawaiian Islands directly undermines the policies of the federal and state governments to protect the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary. The Navy's plan to use active sonar that harms marine mammals, spread toxic chemicals that undermine the public's health, and jeopardize cultural sites sacred to Native Hawaiians is completely unacceptable and cannot be allowed.

Sincerely,

Helen Anne Schonwalter

Take Action

requiring the Navy to avoid adverse impacts to Monument resources. The Navy must adopt meaningful mitigation protocols.

4 The Navy's use of acoustic modeling to predict the impact to marine mammals from its harmful active sonar is inadequate because it fails to consider actual, historic data on marine animal stranding and disturbance events associated with active sonar. These data are far better indicators of the likely consequences of using active sonar in Hawaiian waters than computer models.

The Navy claims marine mammals do not change their behavior when exposed to 195 decibels or less of active sonar. Yet, marine animals have beached and died after receiving noise levels far lower than this. The Navy and NMFS must alter their standards to conform to empirical data on stranding and disturbance events.

The Navy and NMFS acknowledge that mid-frequency active sonar harms marine wildlife (although not in Hawai'i), yet they propose to increase the level and frequency of exposure to marine animals, instead of decrease it. The Navy and NMFS should respect state and federal efforts to ensure the long-term survival of marine ecosystems by prohibiting harmful military activities.

Expanded naval wargames jeopardize Hawai'i's fish stocks. Fish are primary source of food and income in the Hawaiian Islands. Unfortunately, Hawai'i's fish stocks are severely depleted. In effort to counteract decades of overfishing, state and federal agencies have banned residents from catching some of the most popular fish. 5 The Navy ignorantly claims that fish will be negligibly impacted by expanded naval exercises because they cannot hear mid-frequency active sonar. Not only does the Navy's EIS fail to adequately

COMMENT NUMBER: D-W-0126 (cont.)

discuss the non-auditory effects of mid-frequency active sonar on fish, but it flippantly admits that while underwater detonations will kill and injure some fish, the "abundance and diversity of fish within the Hawaiian Range Complex will not measurably decrease." This is untrue. The combined affect of intensely loud sound and increased underwater explosions will drive away what few fish the Hawaiian Islands still have. This is an unacceptable consequence of expanded naval exercises.

The Navy's proposal is inadequate because it fails to identify the resources and mechanisms required by 50 CFR sec. 404.9(d) of the Monument Regulations "for the purpose of taking appropriate actions to repsond to and mitigate the harm and, if possible, restore or replace the Monument resource or quality." How much of the Navy's budget for these exercises will be used to remedy the harm these wargames pose to the NWHI?

Public Hearing Dates:

On Kaua'i
Tuesday, August 21, 2007
Kauai War Memorial Convention Hall
4191 Hardy St. in Lihue

On O'ahu
Thursday, August 23, 2007
McKinley High School
1039 South King St. in Honolulu

On Maui
Monday, August 27, 2007
Baldwin High School
1650 Kaahumanu Ave. in Wailuku

On Hawai'i
Wednesday, August 29, 2007
Waiakea High School
155 West Kawili St. in Hilo

Campaign Expiration Date:
September 17, 2007

COMMENT NUMBER: D-W-0126 (cont.)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0127
1

DEPARTMENT OF PARKS AND RECREATION

CITY AND COUNTY OF HONOLULU

KAPOLEI HALE • 1000 ULUOHIA STREET, SUITE 309 • KAPOLEI, HAWAII 96707
TELEPHONE: (808) 692-5561 • FAX: (808) 692-5131 • INTERNET: www.honolulu.gov

MUFI HANNEMANN
MAYOR

LESTER K.C. CHANG
DIRECTOR

DANA TAKAHARA-DIAS
DEPUTY DIRECTOR

August 15, 2007

Mr. L. M. Foster
Director, Fleet Environmental
Department of the Navy
Commander
United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii 96860

Dear Mr. Foster:

Subject: Draft Environmental Impact Statement/Overseas Environmental Impact Statement (Hawaii Range Complex)

Thank you for the opportunity to review and comment on the subject Draft Environmental Impact Statement.

The Department of Parks and Recreation has no comment and as the proposed action will not impact any program or facility of this department, you are invited to remove us as a consulted party to the balance of the EIS process.

Should you have any questions, please contact Mr. John Reid, Planner at 768-3017.

Sincerely,

LESTER K. C. CHANG
Director

LKCC:mk
(220605)

COMMENT NUMBER
D-W-0128
1

Kailua-Kona, HI 96745
29 August 2007

Re: Hawaii Range Complex
Draft Environmental Impact Statement/
Draft Overseas Environmental Impact Statement

I wish to focus on the Level A* and Level B** harassment and the danger to scuba divers due to the mid-frequency sonar (3.5-7.5 kHz) operating at 235 decibels. Use of mid-frequency sonar in Hawaiian waters at 235 dB, as planned, may decimate the beaked whale population without us able to count bodies. And what about our highly endangered monk seals? ***

The EIS makes a totally fallacious statement when it says that there is no indication of any adverse impact on beaked whales from exposure to sonar use for 30 years in Hawaiian waters. Just because there have been no visible/apparent strandings in Hawaii, does not mean that the Beaked Whales were not injured. Previously studied pods of beaked whales disappeared the year following the beaching in the Bahamas. It is assumed they died without beaching, or completely left the area, after exposure to sonar.

On March 15, 2000 17 cetaceans of 4 species, including Cuvier's beaked *whales, stranded themselves in the Bahamas right after the Navy conducted* a sonar test during an anti-submarine warfare Gap Exercise using mid-frequency sonar. The National Marine Fisheries Service and the Navy considered the strandings to be "highly likely" linked to the sonar tests. High-decibel sonar tests in other parts of the world have also coincided with *stranded whales, but the Bahamas' whales showed the first clear sign of* internal damage that might have been linked to the tests. And the stranded whales may only have been the tip of the iceberg. Subsequently, Earthwatch teams sighted no Cuvier's beaked whales in the Bahamas. I've printed a website for your use, if you want to further study these statements further. *See: http://www.earthwatch.org/site/pp.asp?c=dsJSK6PFJnH&b=1849941*

In order to protect the highly endangered monk seals, beaked whales, and all other marine mammals, the Navy will need to operate so that the received levels do not represent harassment. This means operating the mid-*frequency sonar at greatly reduced power levels MUCH LOWER than 235 dB.*

I call the Navy's attention to the workshop organized by Dr. Roger Gentry of NMFS in May, 2002 which examined theoretical reasons why Cuvier's beaked whales beached. At this workshop, Dr John Potter built on the work of Navy sponsored *scientist Drs Crum and Mao, showing the likely culprit was due to* sound activation of bubbles in the animal's blood, rather than resonance of air cavities in the animal or panic. A troubling conclusion of the theoretical work was that the sound level at which this occurs was very low; only a small received-level could induce the bends in the animal. Beaked whales

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

2

were stranded after very modest received levels: 145 to 150 dB. Coincidently, Navy scuba divers had a "very severe aversion" to the low frequency sonar at 148 dB. See details at:
http://www.surtass-lfa-eis.com/DiverStudies/index.htm

Beaked whales will have a very severe aversion to sonar at 148 dB and even lower levels. While the Navy can order scuba divers out of the water during sonar tests, whales and monk seals are not so lucky. The Navy needs to come up with a safe received-level of their sonar signal for Cuvier's Beaked *whales and monk seals that will avoid even Level B harassment for monk* seals and Level A harassment for Beaked whales. To achieve this, the Navy needs to operate the mid-frequency sonar at a greatly reduced power level or not at all.

Sincerely

Duane Erway
____

* Level A harassment is defined as, "any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild."

** Level B harassment is defined as, "any act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering."

*** "The Hawaiian monk seal (Monachus schauinslandi) is in crisis: the population is in a decline that has lasted 20 years and only around 1200 monk seals remain. Modeling predicts the species' population will fall below 1000 animals in the next five years. Like the extinct Caribbean monk seal and the critically endangered Mediterranean monk seal, the Hawaiian monk seal is headed to extinction if urgent action is not taken. Implementation of this plan, adequate resources, and improved coordination and cooperation provide hope that the species decline can be reversed. The population is so in decline that NMFS can't calculate a meaningful Potential Biological Removal (PBR) rate that allows the Monk Seal population to survive. The PBR defines the number that may be killed by other than natural causes, without compromising the OSP." (From the August, 2007 NMFS report.)
Details at:
http://www.nmfs.noaa.gov/pr/pdfs/recovery/hawaiianmonkseal.pdf

COMMENT NUMBER
D-W-0128 (cont.)

1

Kingdom of Hawai i
Sovereign Nation of God

Majesty Akahi Nui, Trustee
Postal Box 2845
Moku aina O Wailuku, Mokupuni O Maui,
Ke Aupuni O Hawai I

Kingdom of Hawai'i

NOTICE OF OFFICIAL PROTEST OF US NAVY LOW/MID FREQUENCY SONAR EXERCISES IN HAWAIIAN WATERS WITH EXHIBIT "A" HAWAIIAN ISLAND ALLODIAL LAND TITLE DEED AND WRIT OF PROHIBITION AND COMMON LAW LIEN WITH AN ORDER TO RECIEVE AN ANSWER OF TRUE AND LAWFUL DOCUMENTED FACTS OF EVIDENCE OF JURISDICTION WITHIN (7) SEVEN DAY(S) 1

I, Majesty Akahi Nui, Trustee of the Kingdom of Hawaii Nation Ministry Trust and Lineal Descent Sovereign Heir and King of the Hawaiian Islands, indigenous aboriginal inhabitants Na Kanaka Maoli Hawai'i nationals and Hawaiian citizens of the lawful independent nation, am of 100% royal lineage of Liloa (k) and Akahi-a-Kuleana (w) formally issue this, NOTICE OF OFFICIAL PROTEST OF US NAVY LOW/MID FREQUENCY SONAR EXERCISES IN HAWAIIAN WATERS WITH EXHIBIT "A" HAWAIIAN ISLAND ALLODIAL LAND TITLE DEED AND WRIT OF PROHIBITION AND COMMON LAW LIEN WITH AN ORDER TO RECIEVE AN ANSWER OF TRUE AND LAWFUL DOCUMENTED FACTS OF EVIDENCE OF JURISDICTION WITHIN (7) SEVEN DAY(S)

DEPARTMENT OF THE NAVY, COMMANDER, UNITED STATES PACIFIC FLEET

Page 1

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Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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COMMENT NUMBER

D-W-0129 (cont.)

Public Affairs Officer Pacific Missile Range Facility, United States National Marine Fisheries Service, Michael Payne, US DEPARTMENT OF DEFENSE, STATE OF HAWAII, STATE OF HAWAII DEPARTMENT OF PLANNING, and 1 THROUGH 1000 John Does and Jane Does. In the matter of the ownership and jurisdiction of soil of the Hawaiian Islands, and the Pacific Ocean, SEE Bureau of Conveyance document numbers: Deeds 2002-005573 *through* 2002-005574 (Oahu)[1], Deeds 2002- 005579 *through* 2002-005580 (Maui)[2], 2002-005577 *through* 2002-005578 (Hawai'i)[3], and 2002-005575 *through* 2002-005576 (Kauai)[4]. You are now prohibited from any further low and mid frequency active sonar exercises, on the Kings word and based on STATE OF HAWAII'S authority being drawn from the government of the United States Refer to Senate Bill Public Law 103-150, November 23rd, 1993, a joint action by the Legislative and Executive Branches of United States- the only bodies authorized to make war by the U.S. Constitution and the War Powers Act of 1973 - which *binds* the United States, through tacit approval, to an *undeclared war* (see LON page 255), an *unjust war* (see LON page 262), an *offensive war* (see LON page 236), and an *irregular and unjust war* (see LON page 258. "*an irregular and unlawful war, which is more properly called* BRIGANDAGE (definition: "*robbery and banditry as perpetuated by a band of robbers*" Blacks Law Dictionary). *Undertaken without any right, and even without apparent grounds, it can give rise to no lawful effects, nor confer any rights upon the author of it. A Nation that is attacked by enemies of this sort is not under any obligation to observe towards them the rules belonging to formal war; it may treat them as outlaws.*" LON page 258.

The United States is guilty of and continues to be guilty of **BRIGANDAGE** and all U.S. officials in Hawaii, including military, federal, state, county, and local, are serving as **outlaws** in the eyes of international law. (See LAWS OF NATIONS cont….). **My position as King to the land and people, Na Kanaka Maoli, as well as all subjects of any ethnic background is clear to all thoho can see.**

I shall endeavor to fill the grant of sovereignty over the Nation with the help and support of all those who reside upon and within the Kingdom of Hawai'i Nation, SEE LAWS OF NATIONS § 245. Government of

Besides the *eminent domain*, the sovereignty gives a right of another nature over all public, common, and private property, — that is, the empire, or the right of command in all places of the country belonging to the nation. The supreme power extends to everything that passes in the state, wherever it is transacted; and, consequently, the sovereign commands in all public places, on rivers, on highways, in deserts, &c. Every thing that happens there is subject to his authority.

WHEREAS by the grace of God, the Kingdom of Hawaii is still in existence today (See: LARSEN -V- HAWAIIAN KINGDOM, IN THE PERMANENT COURT OF ARBITRATION, Thursday, 7th of December 2000, CASE NO 99001, Peace Palace, The Hague, The Netherlands. On page 167 at

[1] STATE OF HAWAII Bureau of Conveyances Recorded Doc No(s) 2002-005573 thru 2002-005574

[2] STATE OF HAWAII Bureau of Conveyances Recorded Doc No(s)2002- 005579 thru 2002-005580

[3] STATE OF HAWAII Bureau of Conveyances Recorded Doc No(s) 2002-005577 thru 2002-005578

[4] STATE OF HAWAII Bureau of Conveyances Recorded Doc No(s)2002- 005575 thru 2002-005576

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COMMENT NUMBER

D-W-0129 (cont.)

lines 28 to 30 of the transcripts, [Professor James Crawford] The President. "The Hawaiian Kingdom does not exist solely in the opinion of Mr. Larson. **It exists.**" Emphasis added) **The Kingdom of Hawai i is not a conquered nation (See Official Protest of Queen Liliuokalani to Washington D.C., See also U.S. Public Law 103-150, SEE LAWS OF NATIONS)**

WHEREAS His Royal Hawaiian Majesty Akahi Nui, the Trustee of the Kingdom of Hawaii Nation Ministry Trust and Lineal Descent Sovereign of Hawaii, domiciled on Mokupuni O Maui, Ke Aupuni O Hawaii , whose POSITIVE IDENTITY and VENUE, GENEALOGY AND LAWFUL RIGHT TO THE THRONE and CROWN is without lawful challenge and ESTABLISHES with recourse, the one the true KINGDOM OF HAWAI I NATION and the ONLY LAWFUL MONARCHY OF THE KINGDOM (See Registrar's Office, commonly referred to as the State of Hawaii Department of Land and Natural Resources Bureau of Conveyances" by the unlawful STATE OF HAWAII, Doc. No. 93-060570) possesses DIPLOMATIC IMMUNITY recognized internationally.

WHEREAS, His Royal Majesty Akahi Nui, Sovereign Heir to the Crown and Throne of Hawaii (Doc. No. 93-060570 Public Notary Second Judicial Circuit, and Document Number 92-162874) rightfully possesses ownership and Allodial Title to the real property described in Docket Numbers; Oahu T.M.K. (1)-1 through 9- ALL ALL ALL, Maui T.M.K. (2)- 1 through 6-ALL ALL ALL, Hawaii T.M.K. (3)- 1 through 9-ALL ALL ALL, Kauai T.M.K. (4) 1 through 5 ALL ALL ALL (See Registrar's Office, commonly referred to by the unlawful STATE OF HAWAII as the State of Hawaii Department of Land and Natural Resources Bureau of Conveyances, Allodial Land Title Doc No(s): 2002-005573 Thru 2002-005574, 2002-005575 Thru 2002-005576, 2002-005577 Thru 2002-005578, 2001-005579 thru 2002-005580)

WHEREAS The creation of the unlawful "STATE OF HAWAII" by United States agents, officials and citizens is ultimately rooted in an act of ***undeclared, unjust, offensive, and an irregular and unjust war*** (see U.S. Public Law 103-150, See LAWS OF NATIONS, See The U.S. Constitution, Section 8, Article 1: To define and punish Piracies and Felonies committed on the high Seas, and **Offences against the LAWS OF NATIONS** (emphasis added), and is not a lawful governing entity or STATE, but rather a *creature* of the United States, having no legitimate authority or jurisdiction over the people or lands of the Hawaiian Islands, the creation of which by the United States was effected in severe violation of the Treaty of 1849 between the United States of America and the Kingdom of Hawaii. **No notice of termination of this treaty was ever made in accordance with the terms specified in Article XVI of the December 20, 1849 treaty between the United States and the Kingdom of Hawaii, therefore this treaty is still legally binding AND ALL U.S. LAW IMPOSED IN HAWAII IS INFERIOR.**

Article VI of the U.S. Constitution provides that the "Constitution and the laws of the United States which shall be made in Pursuance thereof, and all Treaties made, or which shall be made, under the Authority of the United States, shall be the supreme Law of the Land; and the Judges in every State shall be bound thereby, any Thing in the Constitution or Laws of any state to the contrary notwithstanding."

SEE:U.S. Constitution, Section 8, Article 1: To define and punish Piracies and Felonies committed on the high Seas, and **Offences against the LAWS OF NATIONS** (emphasis added)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-W-0129 (cont.)

WHEREAS "*He who violates his treaties violates at the same time the Law of Nations, for he shows contempt for that fidelity to treaties which the Law of Nations declares sacred. He is doubly guilty, in that he does an injury both to his ally and to all Nations and the human race as well. On the observance and fulfillment of treaties depends the mutual security of States, and no dependence could be placed upon future agreements, if past ones were not observed. All Nations have the right to check a Nation which shows a contempt for his treaties, which violates them and treads them underfoot. Such a Nation is a public enemy which attacks the foundations of the common peace and security of Nations. The sovereign who fails to keep his promises on clearly trivial grounds deserves to be treated as an enemy of the human race.*" LON page 188.

WHEREAS **The United States further *admits* in U.S. Public Law 103-150 that "the indigenous Hawaiian people never directly relinquished their claims to their inherent sovereignty as a people or over their national lands to the United States, either through their monarchy or through a plebiscite or referendum;" (Emphasis added) That *admission* by the United States Congress and President in 1993 <u>completely invalidates: the 8/21/59 Statehood election</u> (see UN Charter, Article 73); <u>the Newlands Joint Resolution signed on July 7, 1898 by President McKinley</u> which purports to provide for the annexation of Hawaii and the subsequent purported ceding of 1,800,000 acres of crown, government and public lands of the Kingdom of Hawaii by the so called Republic of Hawaii, and purporting the authority to immediately cease all treaties existing between Hawaii and foreign nations, and replace them with United States treaties with such nations; the <u>United States Congressional ratification of the purported cession and Congressional vesting of title to the lands in Hawaii in the United States</u> (all of which has been established to be <u>BRIGANDAGE);</u> the April 30, 1900 <u>Organic Act</u> signed by President McKinley which purported to provide a government for the territory of Hawaii which further purported to define the political structure and powers of the newly established so called Territorial Government and it's relationship to the United States; and the <u>Hawaiian Homes Commission Act of 1920.</u> Again, all invalid and in fact, <u>BRIGANDAGE.</u>** "*an irregular and unlawful war, which is more properly called* **<u>BRIGANDAGE</u>** (definition: "*robbery and banditry as perpetuated by a band of robbers*" Blacks Law Dictionary). *Undertaken without any right, and even without apparent grounds, **it can give rise to no lawful effects, nor confer any rights upon the author of it.**"* LON page 258, emphasis added.

WHEREAS **In the matter of Kingdom of Hawaii Nation Ministry Trust Allodial Land Title Island Deed BOC Doc No(s): 2002-005573 Thru 2002-005574, 2002-005575 Thru 2002-005576, 2002-005577 Thru 2002-005578, 2002-005579 Thru 2002-005580; ALSO DESCRIBED AS: Oahu T.M.K. (1)-1 through 9- ALL ALL ALL, Maui T.M.K. (2)- 1 through 6-ALL ALL ALL, Hawaii T.M.K (3)- 1 through 9- ALL ALL ALL, Kauai T.M.K. (4) 1 through 5 ALL ALL ALL; His Royal Majesty Akahi Nui Lineal Descent Sovereign Heir of the Hawaiian Islands and Trustee of the Kingdom of Hawaii Nation Ministry Trust hereby gives you formal NOTICE that the soil and Sea belonging to the Kingdom of Hawaii Nation Ministry Trust and the subjects of H.R.M. Akahi Nui, King of the Hawaiian Islands ARE OUTSIDE THE JURISDICTION of the United States and unlawful STATE OF HAWAII, and <u>YOU ARE HEREBY ORDERED on the King's word and based on the STATE OF HAWAII'S authority being drawn from the government of the United States (see U.S. Senate Bill Public Law 103-150, November 23rd, 1993), my position as King to the land and people, for the good of the common welfare of the public, and for the preservation of the nation (SEE LAWS OF NATIONS), TO ANSWER WITH TRUE AND LAWFUL DOCUMENTED FACTS OF EVIDENCE OF JURISDICTION WITHIN SEVEN (7) DAYS , OR A JUDGEMENT OF</u>**

COMMENT NUMBER

D-W-0129 (cont.)

<u>AFFIRMATION OF DEFAULT WILL BE RENDERED AGAINST YOU AND YOU WILL BE HELD LIABLE.</u>

SEE LAWS OF NATIONS ;
§ 11.§ 18. § 20.§ 22., (19) See Book 1. chap. xxiii. § 283, as to the duty of all nations to prevent the violation of the law of nations. — C., § 23.§ 38.§ 39.§ 40.§ 41.§ 42., § 43.§ 45. §45.§ 49.§ 50.§ 58.§ 53.,§ 160.§ 162. § 191. Attacking the glory of a nation is doing her an injury., § 204. § 244. Eminent *domain* annexed to the sovereignty., § 245.§ 255.§ 278.,
SEE LAWS OF NATIONS BOOK III;
§ 4. It belongs only to the sovereign power.(137)
§ 5. Defensive and offensive war.,
§ 26. What is in general a just cause of war.,
§ 27. What war is unjust.,
§ 28. The object of war.,
§ 30. Proper motives.,
§ 33. War undertaken merely for advantage.,
§ 34. Na-,
§ 35. How defensive war is just or unjust.,
§ 37. How an offensive war is just in an evident cause.,
§ 45. Another case more evident. ,
§ 51. Declaration of war.(142)
§ 57. Defensive war requires no declarations.,
§ 66. What is lawful war in due force.,
§ 67. It is to be distinguished from informal and unlawful war. ,
§ 68. Grounds of this distinction.,
§ 69. Who is an enemy.(147)
§ 70. All the subjects of the two states at war are enemies.,
§ 71 . and continue to be enemies in all places.
Enemies continue such wherever they happen to be. The place of abode is of no consequence here. It is the political ties which determine the character. Whilst a man continues a citizen of his own country, he is the enemy of all those with whom his nation is at war. But we must not hence conclude that these enemies may treat each other as such, wherever they happen to meet. Every one being master in his respective country, a neutral prince will not allow them to use any violence in his territories.,
§ 83. When a nation is allowed to assist another.
In order, now, to judge of the morality of these several treaties or alliances, — of their legitimacy according to the law of nations, we must, in the first place, lay down this incontrovertible principle, that *It is lawful and commendable to succour and assist, by all possible means, a nation engaged in a just war; and it is even a duty incumbent on every nation, to give such assistance, when she can give it without injury to herself. But no assistance whatever is to be afforded to him who is engaged in an unjust war*. There is nothing in this which is not demonstrated by what we have said of the common duties of nations towards each other. (Book II. Ch. I.) To support the cause of justice when we are able, is always commendable: but, in

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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COMMENT NUMBER

D-W-0129 (cont.)

assisting the unjust, we partake of his crime, and become, like him, guilty of injustice.,
§ 86. Tacit clause in every warlike alliance.,
§ 87. To refuse succours for an unjust war is no breach of alliance.,
§ 89. It never takes place in an unjust war.
As the most solemn treaties cannot oblige any one to favour an unjust quarrel (§ 86): the *casus fœderis* never takes place in a war that is manifestly unjust. ,
§ 90. How it exists in a defensive war.,
§ 98. Or who are in an offensive alliance with him.,
§ 99. How a defensive alliance as-
Even a defensive alliance made expressly against me, or (which amounts to the same thing) concluded with my enemy during the war, or on the certain prospect of its speedy declaration, is an act of association against me; and if followed by effects, I may look on the party who has contracted it as my enemy. The case is here precisely the same as that of a nation assisting my enemy without being under any obligation to do so, and choosing of her own accord to become my enemy. (See § 97).
§ 103. Neutral nations.[151]
§ 119. Passage of troops through a neutral country.,
§ 120. Passage to be asked. ,
§ 121. It may be refused for good reasons.,
§ 135. A passage may be refused for a war evidently unjust.,
§ 138. The right to weaken an enemy by every justifiable method.,
§ 139. The right over the enemy's person. ,
§ 160. Principles of the right over things belonging to the enemy.[164]
§ 161. The right of seizing on them.,
§ 162. What is taken front the enemy by way of penalty.,
§ 164. Booty.,
§ 165. Contributions.
§ 183. An unjust war gives no right whatever.,
§ 184. Great guilt of the sovereign who undertakes it.,
§ 185. His obligations.,
§ 186. Difficulty of repairing the injury he has done.,
§ 187. Whether the nation and the military are bound to any thing.,
§ 195. Whether the nation and the military are bound to any thing.,
§ 204. Definition of the right of postliminium[173],
§ 206. How it takes effect.,
§ 212. Whether this right extends to their property alienated by the enemy.,
§ 217. Why always in force for prisoners.,
§ 219. How the rights and obligations of prisoners subsist.,
§ 225. Source of the necessity of such an order.,
§ 227. Precise meaning of the order., (179),
§ 230. Volunteers. The noble view of gaining instruction in the art of war, and thus acquiring a greater degree of ability to render useful services to their country, has introduced the custom of serving as volunteers even in foreign armies; and the practice is undoubtedly justified by the

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COMMENT NUMBER

D-W-0129 (cont.)

sublimity of the motive. At present, volunteers, when taken by the enemy, are treated as if they belonged to the army in which they fight. Nothing can be more reasonable: they in fact join that army, and unite with it in supporting the same cause; and it makes little difference in the case, whether they do this in compliance with any obligation, or at the spontaneous impulse of their own free choice.,
§ 266. From what authority they emanate. ,
§ 287 Foundation of the sovereign's rights against the rebels.,
§ 288. Who are rebels.,
§ 289. , Popular commotion, insurrection. sedition.,
§ 296. Conduct to be observed by foreign nations.,
SEE LAWS OF NATIONS BOOK IV.;
§ 5. Of the disturbers of the public peace.,
§ 6. How far war may be continued.,
§ 14. Whether peace can be made with an usurper,
§ 38. How many ways a treaty of peace may be broken. ,
§ 39. By a conduct contrary to the nature of every treaty of peace.,
§ 43. Justifiable self-defence is no breach of the treaty. ,
§ 46. 3. By the violation of any article.,
§ 47. The violation of a single article breaks the whole treaty.,
§ 54. Right of the offended party against him who has violated the treaty.,
§ 57. Every sovereign,
(See LAWS OF NATIONS Cont…)

SEE also ALL international Treaties and Conventions between the United States and the Kingdom of Hawai i. See LAWS OF NATIONS:

§ 245. Government of
Besides the *eminent domain,* the sovereignty gives a right of another nature over all public, common, and private property, — that is, the empire, or the right of command in all places of the country belonging to the nation. The supreme power extends to everything that passes in the state, wherever it is transacted; and, consequently, the sovereign commands in all public places, on rivers, on highways, in deserts, &c. Every thing that happens there is subject to his authority.

WHEREAS, The Hawaiian Archipelago, the lands before the invasion of 1893. We claim a twelve-mile territorial sea and a 200-mile exclusive economic zone, in accordance with customary international law and the Law of the Sea Treaty of 1982.[5]

WHEREAS the Kingdom of Hawaii Constitution of 1864, Article XXXLVIII states "All laws now in force in this Kingdom shall continue and remain in full effect until altered or repealed

[5] United Nations Convention on the Law of the Sea, opened for signature Dec. 10, 1982, U.N. Doc. A/CONF.62/122, *reprinted in* 21 I.L.M. 1261 (1982).

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

by the legislature; such parts only excepted as are repugnant to this Constitution. All laws heretofore enacted, or that may hereafter be enacted, which are contrary to this Constitution, shall be null and void." (Emphasis added)

WHEREAS the Kingdom of Hawaii Constitution of 1864, Article XXXIX: King's Land and Property
"The King's private lands and other Properties are inviolable." (Emphasis added).

WHEREAS The U.S. Constitution, Section 8, Article 1: To define and punish Piracies and Felonies committed on the high Seas, and **Offences against the LAWS OF NATIONS (emphasis added).**

SEE LAWS OF NATIONS BOOK I CHAP. XX. OF PUBLIC, COMMON, AND RIVATE PROPERTY
§ 237. The revenues of the public property are naturally at the sovereign's disposal.
As soon as the nation commits the reins of government to the hands of a prince **[It is a matter of history that King KAMEHAMEHA THE GREAT united the Hawaiian Islands into one8 Kingdom in 1795. SEE ALSO CROWN, GOVERNMENT, AND FORT LANDS, ENUMERATED L 1848, P. 22, C. C. p. 374. AN ACT RELATING TO THE LANDS OF HIS MAJESTY THE KING AND OF THE GOVERNMENT.]**, it is considered as committing to him, at the same time, the means of governing. Since, therefore, the income of the public property, of the domain of the state, is destined for the expenses of government, it is naturally at the prince's disposal, and ought always to be considered in this light, unless the nation has, in express terms, excepted it in conferring the supreme authority, and has provided in some other manner for its disposal, and for the necessary expenses of the state, and the support of the prince's person and household. Whenever, therefore, the prince is purely and simply invested with the sovereign authority **[SEE the fundamental law of Hawaii, THE FIRST CONSTITUTION OF HAWAII Granted by Kamehameha III, October 8, 1840 states "The prerogatives of the King are as follows. He is the sovereign of all the people and all the chiefs. The kingdom is his. He shall have the direction of the army and all the implements of war of the kingdom. He also shall have the direction of the government property-the poll tax-the land tax-the three days monthly labor, though in conformity to the laws. He also shall retain his own private lands, and lands forfeited for the non-payment of taxes shall revert to him." The 1840 Constitution of Hawaii was agreed to by the Nobles on the 8th day of October in the year of our Lord 1840, at Honolulu, Oahu. (Emphasis added)]**, it includes a full discretional power to dispose of the public revenues. The duty of the sovereign, indeed, obliges him to apply those revenues only to the necessities of the state; but he alone is to determine the proper application of them, and is not accountable for them to any person.

Affirmation of Mokupuni O Oahu and Palmyra,
Mokupuni O Maui, Molokai, Lanai, and Kahoolawe
Mokupuni O Hawaii
Mokupuni O Kauai and Niihau

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D-W-0129 (cont.)

Bureau of Conveyances Doc No(s): Deeds 2002-005573 *thru* 2002-005574 *(Oahu)* T.M.K.(1)-1Through 9 -ALL-ALL-ALL, [6] Deeds 2002- 005579 *thru* 2002-005580 (Maui) T.M.K. (2)-1 Through 6- ALL-ALL-ALL[7], 2002-005577 *thru* 2002-005578 (Hawai'i) T.M.K. (3)-1Through 9-ALL-ALL-ALL[8], and 2002-005575 *thru* 2002-005576 (Kauai) T.M.K. (4) 1Through 5-ALL-ALL-ALL[9]

L 1848, p 22 C.C. p. 374[10]

SEE ALSO SEE LAWS OF NATIONS BOOK I CHAP. XX.
OF PUBLIC, COMMON, AND PRIVATE PROPERTY
§ 238. The nation may grant him the use and property of its common possessions.
The nation may invest the superior with the sole use of its common possessions, and thus add them to the domain of the state. It may even cede the property of them to him **[SEE CROWN, GOVERNMENT, AND FORT LANDS, ENUMERATED L 1848, P. 22, C. C. p. 374. AN ACT RELATING TO THE LANDS OF HIS MAJESTY THE KING AND OF THE GOVERNMENT.]**. But this cession of the use of property requires an express act of the proprietor, which is the nation. It is difficult to found it on a tacit consent, because fear too often hinders the subjects from protesting against the unjust encroachments of the sovereign.

SEE LAWS OF NATIONS BOOK I CHAP. XX.
OF PUBLIC, COMMON, AND PRIVATE PROPERTY
§ 242. Of the sovereign who has this power.
In other states, where the sovereign possesses the full and absolute authority, it is he alone that imposes taxes, regulates the manner of raising them, and makes use of them as he thinks proper, without giving an account to anybody…."

WHEREAS the fundamental law of Hawaii, THE FIRST CONSTITUTION OF HAWAII Granted by Kamehameha III, October 8, 1840 states "The prerogatives of the King are as follows. He is the sovereign of all the people and all the chiefs. The kingdom is his. He shall have the direction of the army and all the implements of war of the kingdom. He also shall have the direction of the government property-the poll tax-the land tax-the three days monthly labor, though in conformity to the laws. He also shall retain his own private lands, and lands forfeited for the non-payment of taxes shall revert to him.

[6] STATE OF HAWAII Bureau of Conveyances Recorded Doc No(s) 2002-005573 thru 2002-005574

[7] STATE OF HAWAII Bureau of Conveyances Recorded Doc No(s)2002- 005579 thru 2002-005580

[8] STATE OF HAWAII Bureau of Conveyances Recorded Doc No(s) 2002-005577 thru 2002-005578

[9] STATE OF HAWAII Bureau of Conveyances Recorded Doc No(s)2002- 005575 thru 2002-005576

[10] CROWN, GOVERNMENT, AND FORT LANDS, ENUMERATED L 1848, P. 22, C.C. p. 374. AN ACT RELATING TO THE LANDS OF HIS MAJESTY THE KING AND OF THE GOVERNMENT.

COMMENT NUMBER
D-W-0129 (cont.)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-W-0129 (cont.)

He shall be Chief Judge of the Supreme Court, and it shall be his duty to execute the laws of the land, also all decrees and treaties with other Countries, all however in accordance with the laws." (Emphasis added).

WHEREAS DEPARTMENT OF THE NAVY, COMMANDER, UNITED STATES PACIFIC FLEET, Public Affairs Officer Pacific Missile Range Facility, United States National Marine Fisheries Service, Michael Payne, US DEPARTMENT OF DEFENSE, STATE OF HAWAII DEPARTMENT OF PLANNING, and 1 THROUGH 1000 John Does and Jane Does HAVE NOT BEEN AUTHORIZED by His Royal Hawaiian Majesty Akahi Nui, Lineal Descent Sovereign Heir and King of the Hawaiian Islands and Trustee of the Kingdom of Hawaii Nation Ministry Trust.

WHEREAS the Kingdom of Hawaii Constitution of 1864, Article L: King's Liability "The King cannot be sued or held to account in any Court or Tribunal of the Realm." (Emphasis added).

WHEREAS the Kingdom of Hawaii Constitution of 1864, Article XXXVII: Martial Law "The King, in case of invasion or rebellion, can place the whole Kingdom or part of it under Martial Law." (Emphasis added).

WHEREAS I, His Royal Majesty Akahi Nui Lineal Descent Sovereign Heir and King of the Hawaiian Islands, and Trustee of the Kingdom of Hawaii Nation Ministry Trust, hereby give formal NOTICE to the DEPARTMENT OF THE NAVY, COMMANDER, UNITED STATES PACIFIC FLEET Public Affairs Officer Pacific Missile Range Facility, United States National Marine Fisheries Service, Michael Payne, US DEPARTMENT OF DEFENSE, STATE OF HAWAII DEPARTMENT OF PLANNING, and 1 THROUGH 1000 John Does and Jane Does., TO ALL WHOM IT MAY CONCERN, KNOWN AND UNKNOWN:

NOTICE TO PRINCIPLE IS NOTICE TO AGENT, NOTICE TO AGENT IS NOTICE TO PRINCIPLE:

DEPARTMENT OF THE NAVY, COMMANDER, UNITED STATES PACIFIC FLEET Public Affairs Officer Pacific Missile Range Facility, United States National Marine Fisheries Service, Michael Payne, US DEPARTMENT OF DEFENSE, STATE OF HAWAII DEPARTMENT OF PLANNING, and 1 THROUGH 1000 John Does and Jane Does. TO ALL WHOM IT MAY CONCERN, KNOWN AND UNKNOWN YOU ARE HEREBY ORDERED TO ANSWER WITH LAWFUL FACTS OF EVIDENCE OF JURISDICTION WITHIN SEVEN (7) DAYS OR A JUDGEMENT OF AFFIRMATION OF DEFAULT WILL BE RENDERED AGAINST YOU AND YOU WILL BE HELD LIABLE.

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I, Majesty Akahi Nui demand to challenge all of the named above DEPARTMENT OF THE NAVY, COMMANDER, UNITED STATES PACIFIC FLEET Public Affairs Officer Pacific Missile Range Facility, United States National Marine Fisheries Service, Michael Payne, US DEPARTMENT OF DEFENSE, STATE OF HAWAII DEPARTMENT OF PLANNING, and 1 THROUGH 1000 John Does and Jane Does.

ATTENTION: NOTICE TO AGENT IS NOTICE TO PRINCIPLE, TO ALL WHOM IT MAY CONCERN KNOWN AND UNKNOWN, All Members, All Personnel, Boards, Councils, Corporation Counsels, Appointees, Administrations, Administrators, Directors, Commissions, Committees, Subcommittees, Contractors, Staff, Divisions, Offices, Officers, Departments, Agents, Agencies, Sections, Entities, and 1 Through 1000 John Does and Jane Does:

I, Majesty Akahi Nui, Lineal Descent Sovereign Heir of the Hawaiian Islands and Trustee of the Kingdom of Hawaii Nation Ministry Trust, demand to challenge all of the named above DEPARTMENT OF THE NAVY, COMMANDER, UNITED STATES PACIFIC FLEET Public Affairs Officer Pacific Missile Range Facility, United States National Marine Fisheries Service, Michael Payne, US DEPARTMENT OF DEFENSE, STATE OF HAWAII, STATE OF HAWAII DEPARTMENT OF PLANNING, and 1 THROUGH 1000 John Does and Jane Does. DEMAND to receive a lawful and true documented evidence of facts of jurisdiction within seven day(s) dated from day, hour, minute, and seconds of receiving this true and lawful document OR A JUDGEMENT OF AFFIRMATION OF DEFAULT WILL BE RENDERED AGAINST YOU AND YOU WILL BE HELD LIABLE.

The FACTS AND EVIDENCE of GENOCIDE COMMITTED by United States of America, United Nations and the illegitimate STATE OF HAWAII and COUNTIES to our NATION PAST PRESENT REPEATEDLY. January 16, 1893 The Seed of Poisonous Tree of Doctrine (unlawful overthrow committed by U.S. and the U.S. military force.(4) Executive Council S.B. Dole , J.A. King, P.C. Jones, W.O. Smith, who administered the Executive Departments of their unlawful Government which consisted of these members S.B. Dannon, A. Brown, L.A. Thurston, F.F. Morgan, J. Emmeluth, H. Waterhouse, J.A. McChesney, F. Wilhelm, W.R. Castle, W.G. Ashey, W.C. Wilder, C. Bolte, has planted the POISONOUS TREE OF DOCTRINE and it bears POISONOUS BRANCHES and FRUITS the *illegitimate* Provisional Government, *illegitimate* Republic of Hawai'i, *illegitimate* Territory of Hawaii, and now the *illegitimate* state of Hawai'i perpetuates the Poisonous Fruits of the Poisonous Tree of Doctrine a criminal act. The laws of the STATE OF HAWAII, and the COUNTY ORDINANCES are the poisonous fruits practiced by every Attorney's, Judges, Justices, Courts, and all those that are affiliated with their laws.

Whereas the indigenous Na Kanaka Maoli (Hawaiian) people never directly relinquished their claims to their inherent sovereignty as a people or over their national lands to the United States. (U.S.P.L. 103-150 11/23/93)

Whereas the well-being of the indigenous Na Kanaka Maoli Hawaiian people is intrinsically tied to their deep feelings and attachment to the land. (U.S.P.L. 103-150). The indigenous Na Kanaka Maoli were the original inhabitants of the island archipelago, Hawai'i. Na Kanaka Maoli (Hawaiian

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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people's) oral traditions are passed on through chants, legends, myth and *mo'oku'auhau* or genealogies, and trace the origins of the ancient ancestors. Na Kanaka Maoli are a part of nature and nature is a part of them. In Na Kanaka Maoli language term which expressed this harmonious fundamental relationship was *lokahi*, unity. Related terms expressing this fundamental relationship was *"aloha'aina,"* love the land *"malama' aina"* care for and protect the land. *Aloha'aina*, love the land, aloha in *Ke akua*, love of God, *aloha kekahi i kekahi*, love one another, expresses the three precepts which formed the core of Na Kanaka Maoli philosophy, world view and belief system. It is important for a Na Kanaka Maoli to sustain supportive, nurturing and harmonious relations with the land, Akua and each other, particularly our 'ohana or extended family. Na Kanaka Maoli traced their lineal ancestry to historical figures and ultimately, through them, to various deities and god of the land, ocean, forest and nature. The land and all nature was the source of existence for Na Kanaka Maoli not only as the origin of humanity, but also as the source of natural resources for day-to-day subsistence. Na Kanaka Maoli related to the land as an ancestor and dear friend giving its various moods at different times of the year; nurturing it with loving care. They did not possess or own the land or its abundant resources. This was inconceivable. Instead, they maintained steward ship over it planting and fishing according to the moon phased and the changes from rainy to dry seasons. The traditional Na Kanaka Maoli access to the resources they would need for subsistence and to allow for steward ship over the land to the lineal descendants associated with particular ancestral and *akua*.

The recognition of the Kingdom of Hawai'i was always in existence[11]. The U.S. invasion in 1893. By virtue of its sovereign integrity as a member of the international community, Hawai'i had exclusive jurisdiction over its nationals within its defined territory, i.e., the Hawaiian Islands, the authority over such process by which the United States of America and her creation, the state of Hawai'i, now asserts its jurisdiction over the indigenous Na Kanaka Maoli, Hawaiian citizens acting within the Hawaiian territory are several:

1- the laws of nations including treaties, and customary international laws.

2- internal laws of sovereign nations.
3- the United Nations Charter and subsequent U.N. acts to carry out the terms of the charter.

Both of these nations were recognized in the international community as sovereign. Among the attributes of sovereignty were the exclusive right of a state to govern and exercise jurisdiction over its own citizens within its territories.[12]

Sovereignty remain in effect for states unless and until certain circumstances occur which properly changes the relationship between such states and other states or changes the relationship citizens and

[11] This memorandum uses the term Kingdom of Hawaii and a number of other terms to refer to as the nation of Hawaii, the Hawaiian Kingdom, Hawaiian nation. The term nation here is not meant to be in derogation of the full international rights and privileges of those entities termed "states" or "nation-states" in international law but instead should be read with equal status with those.

[12] Schooner Exchange v. McFaddon 11 U.S. 116, 135 (1812)

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D-W-0129 (cont.)

territories to existing states.

What are the those circumstances which were appropriate to have affected the change in lawful relationship between four international bodies the Kingdom of Hawai'i, the United States of America, Indigenous Na Kanaka Maoli, (Hawaiian citizens) and Hawaiian territory? The continued exercise of U.S. jurisdiction over Hawai'i is unlawful.

A. Under Traditional International Law Principles

a. January 16,1893, the nation of Hawai'i was recognized as a sovereign and independent nation equal in international rights as other similarly recognized nations of the world. The Hawaiian nation had treaties and executive agreements with other nations and peoples, including the United States of America, Belgium, Bremen, Denmark, France, the German Empire, Great Britain, Hamburg, Hong Kong, Italy, Japan, Netherlands. New South Wales, Portugal, Russia, Samoa, Spain, Swiss Confederation, Sweden, Norway and Tahiti.[13]

b. The United States of America was equally recognized as a sovereign and independent nation equal in international rights as other states of the international community.

c. The laws of nations which included both international customary laws and the treaties in existence between the nation of Hawai'i and the United States of America were binding upon these two nations regarding their conduct towards one another.[14]

d. The United States of America conspired to overthrow the Hawaiian nation and committed aggression against the nation of Hawai'i in violation of international law.[15]

e. As a direct consequence of the U.S. misconduct, a puppet regime was established in Hawai i, denominated first, the Provisional Government, and later the Republic of Hawai'i.[16]

f. The Provisional Government and the Republic of Hawai'i were not governments of the people, by the people, or for the people but were primarily the creatures of the minority Anglo-Saxons who believed in the doctrine of divine right of the minority to govern the majority.[17]

g. The United States of America executed treaties of annexation with *de facto* governments

[13] Digression from the Spirit of Self-Determination and Hawaiian Sovereignty pp. 5-6

[14] See Grover Cleveland's Message to the joint houses of Congress, December 18, 1893

[15] Cleveland's Message, infra, U.S. Acknowledgment and Apology for the Overthrow of the Kingdom of Hawai'i, S.J. Res. 19, 103d Congress, 1st Sess, PL 103-150 (107 Stat 1510) 1993

[16] See note 3 pp. 14-15

[17] See infra at pp13-14

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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promoted and supported by the United States of America, i.e., first, the Provisional government in 1893, and the Republic of Hawai'i in 1897.[18]

h. Queen Lili'uokalani wrote letters of protest to president Benjamin Harrison and to the President-elect Grover Cleveland who was about to take office. When President Grover Cleveland took office, he rejected the request of the Provisional Government to annex Hawaii. The majority of the Na Kanaka Maoli petitioned United States against annexation of their nation. The heading on Hui Aloha 'Aina's petition read: PALAPALA HOOPII KUE HOOHUI AINA "Petition Protesting Annexation"[19]

i. On November 1896 William McKinley, a Republican, was elected president of the United States, replacing the Grover Cleveland. McKinley was inclined to annexing Hawaii. In early 1897 McKinley agreed to meet with a committee of annexationists, L. Thurston, F. Hutch, and W. Kinney. In June 1897 McKinley signed treaty of annexation with representatives of the Republic of Hawaii.

B. Under Internal Laws of the United States of America

a. Both treaties of annexation were never consented to by two-thirds (2/3rds) of those presented in the United States Senates as required of all treaties in accordance with the U.S. Constitution.[20]

b. The organic act presumptively extending U.S. citizenship (sec. 4) to Hawaiian citizens and descendants of them as well as asserting jurisdiction over the territory (sec.2) and citizens of Hawai i was not properly grounded in that it was based upon the previous resolution on 1898 of annexation of Hawai'i (The Newlands Resolution, infra note).[21]

c. Subsequent applications of laws by the United States of America upon citizens and activities engaged within the territorial limits of Hawai'i were based upon a presumption of appropriate taking of jurisdiction over Hawaiian citizens and Hawaiian territories. These applications of law are only as valid as the foundations provided by the joint resolution of annexation of 1898[22] and the Organic Act of 1900. But if the instrument of annexation is illegitimate, all subsequent acts founded on the initial act are equally unlawful.

<u>Fruit of Poisonous Tree Doctrine bears the poisonous fruits</u>

18 See note 3 pp. 13-14

19 Ku'e: The Hui Aloha 'Aina Anti-Annexation Petitions 1897-1898, compiled by Nalani Minton and Noenoe K Silva

20 U.S. Constitution Art. 2. Sec. 2

21 See note 3 pp. 12-15

22 Newlands Resolution of July 7,1898; 30 Stat. 750; 2 Supp. R.S. 895

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D-W-0129 (cont.)

<u>you shall be known by your fruits</u>

What is happening to United States of America "in God we Trust" and its *de facto* state of Hawaii.

C. Under U.N. Process of Decolonization

a. Independent of the historical international relationship between the nation of Hawai'i and the United States of America by virtue of the U.S. membership in the United Nation specifically, under Article 73 of the U.N. Charter, the U.N. Charter obligated the United States of America and other metropolitan states found in similar circumstances, as a matter of sacred trust, to ***bring about self-government*** of people within territories.

b. The United States of America has continued assertion of jurisdiction over Hawai'i territory and its citizens,[23] Unknown to most of the people in Hawai'i, in 1946 under the charter of the United Nations at Article 73, the United States was charged with bringing self-government to Hawai'i.[24]

c. The Hawai'i "statehood" vote, the U.S., reported to the U.N. that it "had met its responsibility" under Article 73. Believing this to be true, the U.N. General Assembly by Resolution 1469 (XIV) in 1959 relieved the United States of America of further responsibility to report to the U.N. on Hawai'i.

The U.N. General Assembly subsequently adopted its <u>Declaration on the Granting of Independence to colonial Countries and People</u>, (GA Res. 1514 (XV) 14 of December

1960) and formed the Special committee On The Situation with regard to the Implementation of the Declaration on the Granting on Independence to Colonial Countries and People. That declaration and the activities of the special committee reflect that the actions taken by the United States in Hawai'i did *not* meet the standard of self-governance required under Article 73. The exercise of self-determination in Hawai'i has not been accomplished. The plebiscite taken in 1959 failed to meet the requirements of the exercise of self-determination for at least two reasons; the U.S. government altered the "self" in defining who qualified to participate in the process, and limited the choices which the people should have *had only to a form of integration within the United States of America (territorial status or statehood), not to independence.*[25]

<u>CHRONOLOGICAL FACTS OF STATEHOOD</u>

23 See note 3 pp. 16-22

24 <u>Principles Which Should Guide embers in Determining Whether of not an obligation Exists to transmit the Information, Called for in Article 73 (e) of the Charter of the United Nations,</u> Annex

25 The Admission Act of March 18, 1959, Pub Law 86-3, 73 Stat 4.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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D-W-0129 (cont.)

On August 21, 1959, Hawaii *illegitimately* became a fiftieth state when U.S. President Dwight Eisenhower declared that "the procedural requirements imposed by the Congress on the State of Hawaii to entitle that state to admission into the Union have been complied with in all respects."

While the colonial establishment has subsequently annually celebrated August 21 as a State holiday, only since about 1990, have we Kanaka Maoli begun to learn that the 1959 Statehood process was a fraud.

In 1946, at the time of the founding of the United Nations (UN), Hawaii was placed on the UN List of Non-Self-Governing Territories (colonies) eligible for decolonization as a consequence of the U.S.'s forced annexation of Hawaii in 1898.

According to the UN Charter, Chapter XI, Article 73, the U.S., as the administering (colonizing) power in Hawaii, had a sacred trust... to ensure, with due respect for the culture of the people concerned, their political, economic, social and educational advancement... and to assist them in the progressive development of their free political institutions." The U.S. intentionally failed to fulfill this "sacred trust" responsibility to the colonized Kanaka Maoli people.

Instead, aware that the UN was under pressure to refine a decolonization process that was to become General Assembly Resolution (UNGAR) 1514 in 1960, the U.S. moved to ensure that Hawaii (and Alaska) would be incorporated as states of the Union before 1960.

March 12, 1959, the U.S. Congress passed the Hawaii Statehood Admission Act (PL.86-3), before a vote on the issue by the colonized Kanaka Maoli people, in violation of the Kanaka Maoli right to self-determination.

Later, on June 27, 1959, a Statehood Plebiscite in Hawaii posed only one option on the ballot: immediate statehood. The colonial establishment trumpeted statehood as "equal opportunity and autonomy." The only other (unstated) option was for Hawaii to remain as a territory. No reference was made to two other options-independence or free association-as provided by UNGAR 742 of 1953.

All U.S. citizens in Hawaii, including U.S. military personal, were permitted to vote, instead of only the colonized Kanaka Maoli people who were the only island residents eligible for the exercise of self-determination and who comprised only 16 percent of the resident population. The vote outcome was as predicted with a large majority in favor of immediate statehood.

On September 17, 1959, unknown to the general public, the U.S. misinformed the UN the "Alaska and Hawaii had attained full measure of self-government as admitted states."

On December 12, 1959, without public announcement, the misinformed UN General Assembly approved Resolution 1469 noting that " the people of Alaska and Hawaii have effectively exercised their

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right to self-determination and clarified some specific features, conditions and outcomes of the UN decolonization process:

The subjection of peoples to alien subjugation, domination and exploitation constitutes a denial of fundamental human rights, is contrary to the Charter of the UN and is an impediment to the promotion of world peace and cooperation.

All peoples have the right to self-determination; by virtue of that right they freely determine their political status and freely pursue their economic, social and cultural development.

Inadequacy of political, economic, social and educational preparedness should never serve as a pretext for delaying independence.

All armed action or repressive measures of all kinds directed against dependent peoples shall cease in order to enable them to exercise peacefully and freely their right to complete independence and the integrity of their national territory shall be respected.

Immediate steps shall be taken, in Trust and Non-Governing Territories or all other territories which have not yet attained independence, without any conditions or reservations, in accordance with their freely expressed will and desire, without any distinction as to race, creed or color, in order to enable them to enjoy complete independence and freedom. Any attempt aimed at the partial or total disruption of the national unity and the territorial integrity of a country is incompatible with the purposes and principles of the Charter of the United Nation.

The colonized Kanaka Maoli in particular have never been publicly informed of the foregoing historical events. This history does not appear in textbooks and is not taught as part of the core curriculum in the island colonial schools.

C. STATEMENT OF CASE:

a. The U.S. is obligated to conduct itself in international affairs in accordance with international law.

The U.S. Constitution has incorporated treaties of the United States of America with other states as "the Supreme Law of the Land; and the Judges of every State shall be bound thereby[26]." The U.S. Constitution explicitly recognized the validity of international law when it conferred to Congress the right to define and duty to punish offenses against the law of nations.[27] The United States Supreme Court has already stated that it must take judicial notice of international customary law.[28]

"The United States has concluded that it has a trust obligation to indigenous Hawaiians because

26 U.S. Constitution, Art. VI.

27 U.S. Constitution, Art. 1 sec.8 Piracies & felonies-10

28 The Paquete Habana; the Lola 175 U.S. Reports 677 (1900)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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D-W-0129 (cont.)

it bears a responsibility for the destruction of their government and the unconsented and uncompensated taking of their lands. U.S Solicitor General Seth Waxman to the U.S. Supreme Court"[29]

While international law may differ from municipal, internal or domestic laws in that internal laws have a system of enforcement while the enforcement of international law is uncertain at best, the fact that a law is enforceable doesn't make it law. Rather, the fact that it is law demands its obedience, whether enforceable by arms or by moral conscience.[30] Grover Cleveland, in addressing the joint houses of the U.S. Congress, declared that:

The considerations that international law is without a court for its enforcement, and that obedience to its commands practically depends upon good faith, instead of upon the mandate of a superior tribunal, only give additional sanction to the law itself and

brand any deliberate infraction of it not merely as a wrong but as a disgrace.

The U.S. Constitution itself requires courts to view treaties as part of the Supreme Law of the Land[31] Furthermore, it is a fundamental doctrine of International Law that a state may not excuse itself for violations of international law on the basis that its municipal constitution or laws permitted violations of such international laws.[32]

Thus, every court in the United States is obligated to look beyond the mere legislative pronouncements of the Congress and hold up these transactions of the U.S. government with regards to Hawai'i against the backdrop of international law and the Constitution of the United States.[33]

B. The transactions engaged in by the U.S. in its dealings with Hawai'i in accordance with international law in its pattern of conduct attempting to annex Hawai'i to the U.S..

The United States had formally recognized Hawai'i as an international personality, recognizing the Nation of Hawai'i as a sovereign, independent nation state. The treaty of Friendship, Commerce, Navigation and Extradition (hereafter FCN&E) proclaimed November 9, 1850, declared, "There shall be perpetual peace and amity between the United States and the King of the Hawaiian Islands, his heirs

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29 Ka wai Ola o OHA vol 16, number 8, 'Aukake 1999 pg. 1 & pg.9

30 See Fitzmourice, " The Foundations of the authority of International Law and the problem of Enforcement," 19 Modern L. Rev. 1, 1-2, 8-9 (1956); Weston, Falk and D'Amato, International Law and World Order, West Publishing Co. 1980 p. 116 et seq.

31 U.S. Constitution Art. VI

32 Werner Levi, Contemporary International Law: A Concise Introduction. Westview Press, Colorado, 1979 at p. 25; Article 13, Declaration of Rights and duties of States adopted by the International Law Commission 1949; The Judgment at Nuremberg, 1 international Military Tribunal, of the Major War Criminals 171 (1947).

33 See also Schooner Exchange v. McFadden, 11 U.S. 116, 135 (1812)

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and his successors.[34] The U.S. was to violate this treaty time and again.

By 1873, U.S. Minister to Hawai'i Henry Pierce, bent on annexation, informed U.S. Secretary of State Fish that annexation would be achieved only if "...the planters, merchants and foreigners... will induce the people to overthrow the Hawaiian Government, establish a republic, and then ask the United States for admittance into its Union"[35] The U.S. government was not limited to merely writing letters between high officials. On January 15, 1873, Major General and commander of the United States Army Military Division of the Pacific, John Schofield, (formerly Secretary of War) and Brigadier General B.S. Alexander of the Corps of Engineers, arrived in Hawai'i pretending to be on a vacation. Instead, they were spies to report about "the defense capabilities of [Hawai'i] different ports and their commerce facilities, and to examine any other subjects that may occur to you as desirable, in order to collect all information that would be of service to the Country in the event of war with a powerful maritime nation. They submitted a secret report on the great value of Pearl Harbor as a port to provide a safe harbor to protect several hundreds ships. This report was kept secret until 1897 when it was declassified to support annexation in Congress.[36]

By 1882, the U.S. President administration was engaged in encouraging the destabilization of the Hawaiian government through discussion with Lorrin Thurston. The Arthur administration assured Thurston that the U.S. government would look with great favor to an annexation treaty should there be a revolt and overthrow of the Hawaiian monarchy and a new government formed.

The U.S. government subsequently sent to Hawai'i annexationist John L. Stevens, as its Minister Plenipotentiary. Stevens was well known as an annexationist. As editor of the Kennebec Journal, for time, in partnership with U.S. Secretary of State Blaine, he and Mr. Blaine wrote numerous articles for the annexation of Hawai'i.[37] On March 8, 1892, he requests instructions from Blaine on how far he may deviate from established international rules and precedents in order to advance the goal of destabilization and annexation of Hawai'i.[38]

By 1892, U.S. Harrison administration, itself, as on the same course as the Arthur

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34 Art. 1 p. 908 William M. Malloy, Treaties Conventions, International Acts, Protocols and Agreements between the United States of America and Other Powers 1176-1909, Vol. 1, Washington, Government Printing Office, 1910.

35 Letter from Pierce to Fish, February 17, 1873, house Executive Document, 53 Congress 2nd Session, Washington, D.C. 1895, hereinafter cited as the Blount Report, p. 153; Rich Budnick, Stolen Kingdom; an American Conspiracy, Aloha Press 1992, pp.36 & 37.

36 Budnick at p. 37&38; Blount Report at pp. 153, 154, & 158.

37 P. Laenui, "Three Days in January" The Overthrow if the Hawaiian Monarchy, a companion booklet to a Nine Hour Radio Broadcast of the Event of the Century, Hawaiian National Broadcast Corporation, Honolulu, 1993 at 12.

38 Ibid at 10. Blount Report p. 182.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

administration 10 years earlier, encouraging Thurston toward the destabilization of Hawai'i.[39] On the 17th of January, 1893, through the connivance of the U.S. Minister plenipotentiary, with Thurston, the Hawaiian monarch was forced to yield her authority to the U.S. government by the aggression of the U.S. military upon Hawaiian soil.[40]

Every one of these acts was in violation of international law, both as a matter of customary international law[41] as well as the FCN&E treaty. They were also in contradiction to the much earlier declaration of the U.S. President to the Congress on December 31, 1842, recognizing Hawai'i independence and pledging never to take possession of Hawai'i.[42]

In Article 6(a) of the Nuremberg Charter, we find Crimes Against Peace; namely, planning, preparation, initiation or waging of a war of aggression, or a war in violation of international treaties, agreements or assurances, or participation in a common plan or conspiracy for the accomplishment of any of the foregoing.[43]

The United Nations General Assembly at its first session in 1946 recognized the principles set out in the Nuremberg Charter.[44]

The United States committed crimes against peace under the law of nations by planning and implementing the use of force to overthrow the Hawaiian monarch without any provocation by her official representatives. United States President Cleveland in addressing the joint houses of Congress on December 18, 1893, stated it accurately when he said, "candid and thorough examination of the facts will force the conviction that the Provisional Government owes its existence to an armed invasion by the United States." The United States Congress, in its apology bill signed by President Clinton on November 23, 1993, was equally explicit when it stated:

"On January 14, 1893 John L. Stevens...the U.S. minister ...conspired with a small group of non-Hawaiian residents of the Kingdom of Hawai'i, including citizens of the United States, to overthrow the

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[39] Gavin Daws, Shoal Of Time; A history of the Hawaiian Islands, U.H. Press, 1974, p. 266.

[40] President Grover Cleveland's Message to the Congress of the United States on December 18, 1893, Executive Doc. No. 47, 53rd Congress, 2nd Session, House of Representative; Apology Bill, PL. 103-150; Liliu'okalani, Hawaii's Story by Hawaii's Queen, Tuttle Press, Tokyo 1965

[41] "acts of aggression constitutes international crimes against the human species." Unanimous resolution of 18 February 1928 of 21 American republics at the Sixth (Havana) Pan-American Conference. International Law & World Order, Note 20, supra, at p, 155; By 1893, acts of aggression were already contrary to international law in the Americas and in the South Pacific. Kazi Aktar Hamid, Self-Determination; The Case Study of Hawai'i, Dissertation for the degree of the Doctor of Laws (LL.) 4 November 1991, University of Ottawa, p. 246-247.

[42] Dispatch from Pageot, French representative in Washington, to Guizot, French minister of Foreign Affairs, no. 55, June 11, 1844, AMAE (Paris), Etats Unis, Vol. C

[43] Judicial Decisions, International Military Tribunal (Nurenberg). Judgment and Sentences; 41 American Journal of International Law 174 (1947).

[44] U.N. General Assembly Resolution 95 (1), U.N. Doc. A/6. At 188 (1946).

indigenous and lawful government..."[45] The U.S. Congress concede that the government of the Kingdom of Hawai'i was the lawful government at that time, and that an official agent of the United States government conspired to overthrow the government of Hawai'i. The United States government is bound by the actions of its agents, of its ministers.[46] The President was bound by the actions of the minister. The United States government conspired to overthrow the lawful government of the Kingdom of Hawai'i, which was an internationally illegal act at the time it was done, and is currently acknowledged by President Clinton and congress.

The next paragraph continues, "pursuant to the conspiracy... naval representatives called armed forces to invade the sovereign Hawaiian nation on January 16, 1893, and to position themselves near the Hawaiian government buildings and the (Iolani) Palace to intimidate the Queen Liliu'okalani and her government."[47] Congress significantly calls an invasion an invasion. That is what it was, a clearly illegal act, an invasion in violation of treaties and international agreements, an invasion in violation of international law, and an invasion in violation of the United States Constitution the overthrow of a lawful government.

Under the international law when you have a violation of treaties of this magnitude, the World Court has ruled that the only appropriate remedy is restitution.[48] The Kingdom of Hawai'i, that is our independent nation state. This is the appropriate remedy.

The Public Law goes on from here, reciting the sorry history of what happened, the establishment of the provisional government.[49] Well, that is not entitled to any legitimacy at all. It was

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[45] Apology Bill, PL. 103-150, Cleveland's Message, infra, U.S Acknowledgment and Apology for the Overthrow of the Kingdom of Hawai'i, S.J. Res. 19, 103d Congress, 1st.Sess, PL. 103-150 (107 Stat. 1510) 1993.

[46] See Nuclear test case (Austl. V. Fr) 1974 I.C.J. 252 (Dec.20). Where the International Court held that: It is well recognized that declaration made by way of unilateral acts, concerning legal or factual situations, may have the effect of creating legal obligations. Declaration of this kind may be, and often are, very specific. When it is in the intention of the state making the declaration that it could become bound according to it's terms, that intention confers on the declaration the character of a legal undertaking, the State being thenceforth legall required to follow a course of conduct consistent with the declaration. All undertaking of this kind. If given publicly, and with an intent to be bound, even though not made within the context of international negotiations, Is binding. *Id.* at 267.(holding France bound to statements made be government ministers). *But* see personnel Management v. Richmond, 496 U.S. 414 (1990) ("The united States is neither bound nor stopped by acts of it's officers or agents in entering into an arrangement or agreement to do or cause to be done what the law does not sanction or permit.")

[47] Overthrow of Hawai'i Resolution, Public Law No.103-150, 1993 U.S.CC.A.N. (107 Stat.) 1510.

[48] Case concerning the Factory at Chorzow,1928 P.C.I.J. (ser. A) No.17, at 47 (Sept. 13). *But see* J. Patrick Kelly, *The Changing Process of International Law and the Role of the World Court,* 11 Mich. J. International Law 129, 159 (Fall 1989) ("actual practice indicates that compensation is now governed by the doctrine of unjust enrichment rather than a right of restitution").

[49] "Whereas, on the afternoon of January 17, 1883, a Committee of Safety that represented the American and European sugar planters, descendants of missionaries, and financiers disposed the

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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imposed by raw, naked, and brutal military force, at the point of a bayonet, (gunboat diplomacy), just as was practiced in many other countries, only here now Congress has finally admitted this.

The next paragraph points out that the establishment of this provisional government was without the consent of the Native Hawaiian people or the lawful government of Hawai'i, and violated all of the international treaties and agreements.[50] So under international law, you would not call this provisional government. You would call it a government of military occupation. That is, we had military forces here and then we had a civilian arm of the military occupying regime.

The occupied Palestinian lands where the Israeli occupying forces have set up a civilian arm if their military occupation authorities to administer the civil affairs of the Palestinian people.[51] The negotiations centered around the withdrawal of the civilian military occupation arm, and the withdrawal of the military occupation forces themselves.[52] The September 13, 1993 agreement calls for the dissolution of the civilian occupation arm and then the withdrawal of the military occupation forces themselves.[53]

Therefore, this "provisional government " referred to in the Public Law is really the civilian arm of a military occupation force. That was the predecessor to the current government of Hawai'i that administers to us. Again, following the implications of that law, the state government of Hawai'i occupies a similar position to that provisional government. The federal military forces here keeping it in power.

We then come to the statement by our precious so loved Queen Liliu'okalani, "that I yield to the superior force of the United States of America,"[54] She made it very clear that this statement and her

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Hawaiian monarchy and proclaimed the establishment of a provisional government." Overthrow of Hawai'i Resolution, Public Law No. 103-150. 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1510-11.

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"Whereas, the United States minister thereupon extended diplomatic recognition to the Provisional government that was formed by the conspirators without the consent of the Native Hawaiian people to the lawful government with Hawaii and in violation of treaties between the two nations of international law." Overthrow of Hawai'i Resolution, Public Law No. 103-150, 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1510-11.

51

See J. Timothy McGuire, *International Law and the Administration of Occupied Territories: Two Decades of Israeli Occupation of the West Bank and Gaza Strip,* 8 Emory International Law Rev. 383 (1994).

52

See David I. Schulman, *The Israeli-PLO Accord on the declaration of Principles on Interim Self-Government Arrangements; The First Step Toward Palestinian Self-Determination,* 7 Emory International Law Rev. 739 (Fall 1993); Gumar Halley, *Issues Confronting the return of Palestinian Arab Refugees After the 1993 Declaration of Principles on Interim Self-Government Arrangements,* 8 Geo. Immigr. *L.J.149 (1994)*

53

Declaration of Principles on Interim Self-government Arrangements. Sept. 13, 1993. 1st.-PLO, art. VI, 32 I.L.M. 1524, 1527.

54

Overthrow of Hawaii Resolution Public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510 1511.

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later abdication were procured under duress and force. It could not be treated by anyone as a valid surrender of sovereignty by the Native Hawaiian people at all and she made that very clear in this language. She was simply bowing to superior power, but NOT as a matter of right or of law.[55]

In a parallel case communicating with the World Court, the Owen-Stoltenberg plan[56] to partition the republic of Bosnia and Herzegovina, was concluded, by means of threats and duress, compulsion and coercion. It was therefore invalid, under international law and the Vienna Convention on the Law of Treaties.[57] Our Queen Liliu'okalani a very powerful person, and preserving the rights of her people under duress, she committed an act now seen as "under extreme duress."

The law goes on, with Congress admitting that [w]ithout the active support and intervention by the United States... the insurrection...would have failed for lack of popular support and insufficient arms.[58] And in 1893 "the minister raised the flag and declared Hawai'i to be a protectorate of the United States."[59] They did not protect anything, did they? Was there a need to protect Hawai'i from itself, from its own people? Who was threatening Hawai'i at that time? It was the United States. They needed protection from the United States, so this is absurd. Hence, The occupation was entitled to no legal validity at all at the time and is not now. That is basically what Congress is saying.

The Blount Report states that "military representatives had abused their authority and were responsible for the change in government."[60] Again, this is further admission that the United States acted illegally under international law. The implication then. of these admissions by Congress, by the Blount Committee, is that there must be restitution.[61] Na Kanaka Maoli (Hawaiian) people, Na Po'e O Hawai'i have a right to be returned to the situation they were in, as of January 17, 1893. The federal government disciplined the minister and forced him to resign his commission. The overthrow should be reversed. The President could have done it if he wanted to; he just did not do it.

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See Case Concerning Application of the Convention on the Prevention and Punishment of The Crime of Genocide (Bosnia & Herzpgpvina v. Yugoslavia), 1993 I.C.J. 325 (Sept. 13).

56

See Alan C. Laifer, Note, *Never Again? The Concentration Camps in Bosnia Herzpgovina; A legal Analysis of Human Rights Abuses, 2 New Eur. L. Rev, 159, 187 (Spring 1994)*

57

" A treaty is void if its conclusion has been procured by the threat or use of force on violation of the principles of international law embodied in the Charter of the United Nations." Vienna Convention of the Law of Treaties, *supra* note 12, at art. 52.

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Overthrow of Hawaii Resolution, Public Law No. 103-150, 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1512

59

Overthrow of Hawai'i Resolution, Public Law 103-150, 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1512.

60

Id. ("Presidential established investigation conducted by Congressman James Blount into the events surrounding the insurrection and overthrow").

61

See Nark A. Inciong, Note, *The Lost Trust; Native Hawaiian Beneficiaries Under the Hawaiian Homes Commission Act,* 8 Ariz. J. Int'l & Comp. L. 174, 191 n.34 (1991) ("The Blount Report ... found that the overthrow ... had been illegal ... and that Liliu'okalani [should] be restored to power").

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President Cleveland's message to congress admitted all this. "An act of war, committed with the participation of a diplomatic representative of the United States and without authority of Congress."[62] The President clearly admitted that this was illegal behavior of the most heinous type. A "substantial wrong" was done, calling for the restoration of the Hawaiian monarchy.[63] The United Nations Charter.[64]

The Newlands Joint Resolution[65] provided for the annexation of Hawai'i in 1893. Where is the authority for this? There is none. They stole the land, the country, displaced the government, and now they have annexed it. This very issue was addressed by the Nuremberg Tribunal in 1945, where German Nazi government tried to maintain that some of the annexations of foreign territory that it had undertaken before and during the Second World War were entitled to legal recognition. The Nuremberg Tribunal itself in 1945 said, "no annexations are valid prior to the conclusion of a peace treaty."[66]

The United States government and the President conceded that they engaged in acts of war, that they are occupying our land and that they put themselves at war with our people.[67] The United States annexation has no validity under international law. The U.S. have effectively, in this law, invalidated the entire annexation. The whole legal basis for it
now been invalidated.

The annexation of the land is invalid, then where does the title come from, who has title to the land? It is Na Kanaka Maoli (Hawaiian) people who retain title to the lands of Hawai'i, as a matter of international law. It is not the federal government, not the state government, but Na Kanaka Maoli (Hawaiian) people themselves. That is the implication here. The truth of the findings of facts and conclusions of law are now officially set forth by Congress.

"[T]he Newlands Resolution, the...Republic of Hawai'i ceded sovereignty over the Hawaiian

62 "Whereas , in a message to congress on December 18,1893, President Grover Cleveland reported fully and accurately on the illegal acts of the conspirators." Overthrow of Hawaii Resolution public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1511.

63 Overthrow of Hawai'i Resolution, public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1511.

64 U.N. Charter, art. 1,&2.

65 Newlands Resolution, Public Law No. 55, 30 Stat. 750 (1898).

66 "{I}t was held that, by 1939, the rules on belligerent occupation [that it does not transfer sovereignty] been recognized by all civilized nations and were regarded as being declatory of the law and customs of war." George Shwarzenberger. 2 international Law 165 (1965) (citing Nuremberg Judgment, International Military Tribunal, Cmd. 6964 at 65 (1946).

67 Overthrow of Hawai'i Resolution, Public Law 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510.

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D-W-0129 (cont.)

WHEREAS, It hath pleased His Most Gracious Majesty Kamehameha III, the King, after reserving certain lands to himself as his own private Property, to surrender and forever make over unto his Chiefs and People, the greater portion of his Royal Domain:

AND WHEREAS, It hath pleased our Sovereign Lord the King to place the lands so made over to his Chiefs and People, in the keeping of the House of Nobles and Representatives, or such person or persons, as they may from time to time appoint, to be disposed of in such manner as the House of Nobles and Representatives may direct, and as may best promote the prosperity of this kingdom and the dignity of the Hawaiian Crown Therefore, BE IT ENACTED by the House of Nobles and Representatives of the Hawaiian Islands, in Legislative Council assembled:

That, expressing our deepest thanks to His Majesty for this noble and truly royal gift, we do hereby solemnly confirm this great act of our good King, and declare the following named lands, viz.

WHEREAS: Common Law and Article 4, Section, liens at law supersede mortgages and equity liens, Drummond Cartilage Co. v. Mills, (1889) 74 N.S. 966; Hewitt v. William, 47 La, Am. 742 17 So. 269; McMahon v. Lundin, 58 N.W. 827, and may be satisfied only when a court of Common Law is called to convene pursuant to order of the ejected sheriff under Amendment 7 of the Bill of Rights. Such Common Law Court forbids the presence of any Judge of Lawyer the practice of any equity law, the ruling of the United States Supreme Court in Rich v. Braxton, 158 U.S. 375 specifically forbids judges from invoking equity jurisdiction to remove common law liens or similar "Cloud of Title." Further even if a preponderance of evidence displays the lien to be void or void able, the equity court still may not proceed until the moving party has proven that he asks for and comes "to equity with clean hands" trice v. Constock 121 Fed 620; West v. Washburn, 138 NY Supp. Any official who attempts to modify or remove this Common Law Lien is full liable for damages, U.S. Supreme Court, Butz v. Economou, US, 98 S. Ct. 2894; Bell v. Hood; 327 IS 678 Belknap v. Schild, 161 US 10; U.S. v, Lee, 106 US 196; Biven v. 6 Unknown Agents, 400 U.S. 862; Halperin v. Nixon (1979)US.(This lien is not dischargeable for 100 years and cannot be extinguished due to my death whether accidentally or purposely, or by my heirs, assigns or executors.) Articles 41 and 42 of the Kingdom of Hawai i 1852 Constitution; Common Law Sign into Law by His Majesty Kamehameha III. Vol. II the third Act Chapter 1 Section IV on the 7th day of September 1847. NOW THEREFORE; If said lien shall be will and truly paid according to its tenor to the lienor of rescinded by the lienor herein named, then this Title shall be void, otherwise all right, title, interest, use and full control of the hereto described property will remain in Full Force and Effect Forever to the lienor herein named or his or heirs and/or assigns.

TO HAVE AND TO HOLD, the above lien in Ancient Land Title, Allodial Land Title unto the said Kingdom of Hawaii Nation Ministry Trust.

WHEREFORE, I, His Majesty Akahi Nui, hereunto set my hand, and caused the Great Seal of the

GOVERNMENT.

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Hawaiian Islands to be affixed this day of
In this Holy Year of Iesu Kristo 2007 .

Majesty Akahi Nui

His Royal Hawaiian Majesty Akahi Nui
Lineal Descent Sovereign Heir and King of the Hawaiian Islands
and Trustee of the Kingdom of Hawai I Nation Ministry Trust

Kingdom Of Hawaii]
] Affixed:
Mokupuni O Maui]

On this day of 2007. before me, personally appeared Majesty Akahi Nui to me known to be the person described in and who executed the foregoing instrument. The Lawful NOTICE OF OFFICIAL PROTEST OF US NAVY LOW/MID FREQUENCY SONAR EXERCISES IN HAWAIIAN WATERS WITH EXHIBIT "A" HAWAIIAN ISLAND ALLODIAL LAND TITLE DEED AND WRIT OF PROHIBITION AND COMMON LAW LIEN WITH AN ORDER TO RECIEVE AN ANSWER OF TRUE AND LAWFUL DOCUMENTED FACTS OF EVIDENCE OF JURISDICTION WITHIN (7) SEVEN DAY(S)
Majesty Akahi Nui has set his hands, and caused the Great Seal of the Hawaiian Islands to be affixed to this instrument.

NOTARY PUBLIC

Lissa A. Messenger
PRINT NAME

MY COMMISSION EXPIRES:__________

The law goes on to state; "Where, the Newlands Resolution effected the transaction between the Republic of Hawai'i and the United States government.[82] The Newlands Resolution is entitled to no validity at all, since it is based on an illegal invasion, a violation of treaties, and a violation of the principle of *pacta sunt servanda.*[83]

Many numerous and repeated violations of law have accrued as a result of this.

82 Overthrow of Hawai'i Resolution, Public Law, No. 103-150 1993 U.S.C.C.A.N. (107 Stat.)1510, 1512.

83 *See* Martin Hession, *The legal framework of European Community in International Environmental Agreements,* 2 New Eur. L. Rev. 59, 103 (Spring 1994)

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27

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Congress admits that "the indigenous Kanaka Maoli (Hawaiian) people never directly relinquished their claims to ... inherent sovereignty... through a plebiscite or a referendum."[84] The U.N. General Assembly subsequently adopted its Declaration on the Gantion of Independence to Colonial Countries and peoples, (GA Res. 1514 (XV) of 14 December 1960) and formed the Special Committee On The Situation with regard to the Implementation of the Declaration on the Granting of Independence of Colonial Countries and Peoples. That declaration and the activities of the special committee reflect that the actions taken by the United States in Hawai'i did meet the standard of self-governance contemplated under Article 73. The exercise of self-determination in Hawaii [Hawai'i] has not been accomplished. The plebiscite taken in 1959 failed to meet the requirements of the exercise of self-determination for at least two reasons; the U.S. government altered the "self" in defining who qualified to participate in the process, and limited the choices which the people should have had only to a form of integration within the United States of America (territorial status or statehood), not to independence.[85] The vote is meaningless, as a matter of international law and of United States domestic law. Pursuant to the principle of self-determination in article 1, Paragraph 2 of the United Nations Charter.[86]

The Public Law more admissions "Whereas, the long-range economic and social changes in Hawai'i over the nineteenth and early twentieth centuries have been devastating to the population and to the health and well-being of the Hawaiian people."[87] A survey done in Hawai'i in 1994 the Hawaiian people rank number 1 in poverty, ill health, homelessness, and imprisonment. The Hawaiian people have been subjected to the international crime of Genocide, as determined and defined by the 1948 Genocide Convention,[88] and the 1987 Genocide Convention Implementation Act,[89] the Proxmire Resolution. That was one of the findings of the San Francisco Tribunal. The key findings held here concerning Hawai'i *Ka Ho'okolokolonui Kanaka Maoli.*

In the International Court of Justice, they have been convinced that Genocide is going on in Bosnia-Herzegovina,[90] There is no reasonable doubt my next step is the World Court. GENOCIDE has

84 Overthrow of Hawai'i Resolution, Public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1512.

85 U.N. Charter art. 73, The Admission Act of March 18, 1959, Public Law 86-3, 73 Stat. 4.

86 U.N. CHARTER art. 1 paragraph 2

87 Overthrow of Hawaii Resolution, public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1511.

88 Convention on the Prevention and Punishment of the Crime of Genocide, January 12, 1951, 78 U.N.T.S. 277.

89 Genocide Convention Implementation Act of 1987, Public Law no. 100-106, 102 stat.3045 (1987).

90 *See* Case Concerning Application of the Convention on the Prevention and Punishment of The Crime of Genocide (Bosnia & Herzogovina v. Yugoslavia, 1993 I.C.J. 325 (Sept. 13.)

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being practiced by the United States government against Na Kanaka Maoli Hawaiian People. This will take my people, Na Kanaka Maoli back to the creation of a nation and will bring protection for Na Kanaka Maoli (Hawaiian) people and the Hawaiian Citizens of Hawai'i. I, Majesty Akahi Nui, King of the Hawaiian Islands will not at all even consider what Secretary Babbitt is considering as the same status as Native Americans. My people are not even as close to the same status of a Native American. My people are Na Kanaka Maoli Hawai'i and the people not of the race are Hawaiian citizens.

"It is proper and timely for Congress to acknowledge the historic significance of the illegal overthrow."[91] It had no validity at all. The Resolution then addresses support for the reconciliation efforts.[92] Under international law for a violation of this nature, the remedy is restitution.[93] To set right the harm that has been done to restore the situation to what it had been before the violation in 1893. See the *Chorzow Factory case*.[94]

Section 1, acknowledgment and apology.[95] the law again repeats, "illegal overthrow." The significance of the various "whereas" clauses were "resolved by the Senate and House of Representatives of the United States of America, in Congress and Senate, and signed by the President."[96] This provision of the law recognizes the illegal overthrow and acknowledges the historical significance of this event which was ultimately the suppression of the inherent sovereignty.[97]

Paragraph 2 apologizes for the overthrow "with the participation of agents of the United States."[98] The U.S. government again is responsible for the actions of its ministers, Congress now calls these people "agents" Their illegal conduct, binds the United States government. The United States government is under an obligation to undo the harm that was done.

But even if the United States does not, I, Majesty Akahi Nui and my Na Kanaka Maoli (Hawaiian people) have our right to act to undo the *curse of injustice* in the World Court It is presently active in the World Court. The rest of the sentence reads, "the deprivation of the rights of Native Hawaiians to self-determination."[99]

Congress has conceded that the Native Hawaiian peoples have the right to self-determination.

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91 Overthrow of Hawaii Resolution, public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1511

92 *Id.*

93 Case concerning the Factory at Chorzow, 1928 P.C.I.J. (ser. A) No. 17, at 1 (Sept. 13).

94 *Id.*

95 Case concerning the Factory at Chorzow, 1928 P.C.I.J. (ser. A) No. 17, at 1 (Sept. 13).

96 *Id.*

97 *Id.*

98 *Id.*

99 *Id.*

Id.

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Self-determination of the people is under the U.N. Charter provides a rights to full sovereignty.[100]

Paragraph 4 expresses its commitment to acknowledge the ramifications.[101] the ramifications, and the implications, of the overthrow of the Kingdom of Hawai'i. The definition section, Congress defines Native Hawaiians as any individual who is a descendant of the aboriginal people, prior to 1778...occupied and exercised sovereignty, in the area that now constitutes the state of Hawai'i.[102] Our right to determine our political status, our government, through customary systems, and to freely pursue our economic, social, and cultural development in accordance with article 1 of both the International Covenant on Civil Political, Economic, Social, and Cultural Rights.[103] This affirms that the Kingdom of Hawai'i is still in existence. The descendants of the aboriginal people still lives which affirms the existence of the Kingdom of Hawai'i. The sovereign authority of these lands.

The illegitimate government has recognized me, Majesty Akahi Nui that I am a descendant of 1778 on 12th of March 1998. It is not the state or the federal government, but the Hawaiian people. The sovereignty is still and will always remain in the hands of my people Kanaka Maoli Hawai'i. The territory is the state. The Hawaiian Archipelago, the lands before the invasion of 1893.We claim a twelve-mile territorial sea and a 200-mile exclusive economic zone, in accordance with customary international law and the Law of the Sea Treaty of 1982.[104]

Congress has recognized *Na Kanaka Maoli Hawai'i* with sovereign powers. We are the original inhabitants and occupants of these islands. We have always been in possession of our land. Our sovereign nation the Kingdom of Hawai'i was always in existence because the race still lives *Na Kanaka Maoli Hawai'i (Hawaiian people)*.

Our rights under the Universal Declaration of Human Rights.[105]

"Men may change the laws of the land."
"They can not change the truth."
"May we pray for healing to the Hearts and Lands of our people."

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100 U.N. CHARTER art. 1, paragraph 2.

101 Overthrow of Hawaii Resolution, public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1511

102 *Id.*

103 *International Covenant on Civil Political, Economic, Social, and Cultural Rights*, G.A. Res. 2200 *(XXI), U.N. GAOR, 21st Sess., Supp. No. 16 at 49, U.N. Doc. A/6316 (1966).*

104 United Nations Convention on the Law of the Sea, opened for signature Dec. 10, 1982, U.N. Doc. A/CONF.62/122, *reprinted in* 21 I.L.M. 1261 (1982).

105 *Universal Declaration Of Human Rights*, G.A. Res 217 (III), U.N. Doc. A/810, at 71 (1948) *reprinted in 21 I.L.M. 1261 (1982).*

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WHEREOF, I, Majesty Akahi Nui, Sovereign Heir and King of the Hawaiian Islands and Trustee of the Kingdom of Hawaii Nation Ministry Trust have hereunto set my hand and caused the Great Seal of the Kingdom and Islands of Hawaii to be affixed this blessed twenty seventh day of the eighth month in the Holy year of Our Lord and Saviour Iesu Kristo Two Thousand and Seven.

In Sacred Trust I am;

Majesty Akahi Nui

His Royal Majesty Akahi Nui
Lineal Descent Sovereign Heir and King of Hawaiian Islands
& Trustee of the Kingdom of Hawaii Nation Ministry Trust

Kahi Wahine

Her Royal Highness Akahi Wahine
Minister of the Interior of the Kingdom of Hawaii
& Trustee of the KOH Nation Ministry Trust

Kingdom Of Hawaii]
] Affixed:
Mokupuni O Maui]

On this 27th day of August 2007. before me, personally appeared Majesty Akahi Nui to me known to be the person described in and who executed the foregoing instrument. The Lawful NOTICE OF OFFICIAL PROTEST OF US NAVY LOW/MID FREQUENCY SONAR EXERCISES IN HAWAIIAN WATERS WITH EXHIBIT "A" HAWAIIAN ISLAND ALLODIAL LAND TITLE DEED AND WRIT OF PROHIBITION AND COMMON LAW LIEN WITH AN ORDER TO RECIEVE AN ANSWER OF TRUE AND LAWFUL DOCUMENTED FACTS OF EVIDENCE OF JURISDICTION WITHIN (7) SEVEN DAY(S). Majesty Akahi Nui has set his hands, and caused the Great Seal of the Hawaiian Islands to be affixed to this instrument.

Lissa A. Messenger
NOTARY PUBLIC

Lissa A. Messenger
PRINT NAME

MY COMMISSION EXPIRES: 2020

COMMENT NUMBER
D-W-0129 (cont.)

Do you have a lawful governmental foundation and lawful jurisdiction over the Soil and Sea of the Hawaiian Islands and aboriginal Na Kanaka Maoli Hawai'i (Hawaiian people) by the *illegitimate* state of Hawai'i and its entities since January 16,1893 and to this present day in 2003? (Read Justice O Connor Opinion USSC) The apology letter from the U.C.C. (United Church Of Christ), U.S. P.L. 103-150 and the Japanese American Citizens League (JACL) 1992 National Convention RESOLUTION REAFFIRMING SUPPORT FOR THE RESTORATION OF HUMAN, CIVIL, PROPERTY AND SOVEREIGN RIGHTS OF HAWAII'S INDIGENOUS PEOPLE.

Yes ( ) Please explain in full with attached lawful documentation of original evidence truth of law.

No ( ) No Jurisdiction

Sworn Officials of the United States of America, being duly sworn on oath, deposes say; That the foregoing question is answered to the best of his or her knowledge and behalf.

signature

Print name

Position

Subscribed and sworn to before me thisday of, _____

Notary Public, *de facto* state of Hawai'i
My commission expires:

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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EXHIBIT "A"

COMMENT NUMBER

D-W-0129 (cont.)

33

Form P-64B
(REV. 1999)

STATE OF HAWAII—DEPARTMENT OF TAXATION

EXEMPTION FROM CONVEYANCE TAX

CLIP THIS FORM TO DOCUMENT TO BE RECORDED. DO NOT STAPLE.

DO NOT WRITE OR STAPLE IN THIS SPACE

HAWAII DEPT OF TAXATION
CONVEYANCE TAX EXEMPTION
APPROVAL

2 JAN 10 P4:08

BY Janice Y. Okamura
DIRECTOR OF TAXATION

TAX MAP KEY				
Z	S	PLAT	PARCEL	CPR NO.
6	1-6	ALL	ALL	

ISLAND Maui APT. NO. ________

NAMES OF PARTIES TO THE DOCUMENT (Please Type or Print)

SELLER(S) / TRANSFEROR(S) / GRANTOR(S), ETC.
Majesty Akahi Nui

PURCHASER(S) / TRANSFEREE(S) / GRANTEE(S), ETC.
Kingdom of Hawaii Nation Ministry Trust
Majesty Akahi Nui Trustee

DATE OF TRANSACTION: 7th January 2002

*Checkmark only one best applicable box and complete the related statement. Use Part I OR Part II but **NOT** both.*
For more information, see Instructions on reverse side.

PART I — If the exemption you are claiming is listed in this part, submit this form for approval to the Department of Taxation, Taxpayer Services Branch, at P. O. Box 259, Honolulu, Hawaii 96809-0259, or at 830 Punchbowl Street, Room 124, in Honolulu, before filing it with the Bureau of Conveyances. ***CAUTION:*** You **MUST** complete **DESCRIBE TRANSFER** if claiming any of the exemptions provided in **Part I.**

DESCRIBE TRANSFER: State the relationship between the parties and the reason for the gift or transfer (e.g., add to title to qualify for a loan) or correction or confirmation (e.g., error in description of property). Na Kanaka Maoli has never relinquish our rights to our LANDS.

1) THE CONVEYANCE INVOLVES AN ACTUAL AND FULL CONSIDERATION OF $100 OR LESS:
- ☑ A. GIFT
- ☐ B. TRUST — Transfer to or from a trust, which is not for a business purpose. (Grantor revocable living trusts, see Part II, line 2C below)
- ☐ C. OTHER — Explain. ________

2) THE ATTACHED DOCUMENT IS A (Check the appropriate box below). OF A DOCUMENT PREVIOUSLY EXECUTED. To be used only to correct a flaw when title is already vested and no consideration is paid or to be paid. Complete **DESCRIBE TRANSFER** above.
- ☐ A. Confirmation document. ☐ B. Correction deed.

3) ☐ THE ATTACHED DOCUMENT IS A QUALIFIED PARTITION DEED AND THE VALUE OF MY CO-OWNERSHIP IN THE PROPERTY AFTER PARTITION IS EQUAL IN VALUE TO MY CO-OWNERSHIP IN THE PROPERTY BEFORE PARTITION.
I have attached a separate continuation sheet which lists the names of each co-owner and their undivided interest in the real property and the value of that interest before partition and their proportionate interest and the value of that interest after partition.

PART II — If the exemption you are claiming is listed in this part, file this form directly with the Bureau of Conveyances.

1) THE ATTACHED DOCUMENT IS A TRANSFER BETWEEN:
- ☐ A. HUSBAND AND WIFE, and the nominal consideration is $ ________.
- ☐ B. MARITAL PARTIES in accordance with divorce decree or termination of reciprocal beneficiary relationship (termination), FC-D No. ________, and the nominal consideration is $ ________.
  If the conveyance is pursuant to a divorce or termination, the conveyance must be between the marital parties to the divorce or termination. Unless otherwise exempt, a sale or transfer to any other person or a sale or transfer not in strict accordance with the divorce decree or termination is taxed on the consideration paid or to be paid or the fair market value.
- ☐ C. RECIPROCAL BENEFICIARIES, and the nominal consideration is $ ________.
- ☐ D. PARENT AND CHILD, and the nominal consideration is $________.

2) THE CONVEYANCE INVOLVES AN ACTUAL AND FULL CONSIDERATION OF $100 OR LESS and is a:
- ☐ A. GIFT: ☐ between a grandparent and grandchild. ☐ between siblings.
  Unless otherwise exempt, a transfer between other related parties is taxable based on the amount of consideration paid or to be paid. Persons other than the above related individuals conveying property for consideration of $100 or less must use Part I.
- ☐ B. TESTAMENTARY GIFT BY TRUST - Transfer from a grantor to a testamentary trust or from a testamentary trust to a third party beneficiary.
- ☐ C. GRANTOR REVOCABLE LIVING TRUST - Transfer by a grantor to a grantor revocable living trust or from a grantor revocable living trust to the grantor, who is the primary beneficiary of the trust. List a claim for an exemption from tax for any other transfer involving a trust in Part I.

3) ☐ THE ATTACHED DOCUMENT IS IN FULFILLMENT OF AN AGREEMENT OF SALE FILED OR RECORDED IN LIBER PAGE ________ OR AS DOCUMENT NO. ________ FOR WHICH A STATE CONVEYANCE TAX WAS PAID. List the Liber and Page, Land Court Document Number, or Document Number.

4) ☐ THE ATTACHED DOCUMENT INVOLVES A TAX SALE FOR DELINQUENT TAXES OR ASSESSMENTS AND THE ACTUAL AND FULL CONSIDERATION IS $ ________.

(CONTINUE ON REVERSE SIDE. SIGNATURES ARE REQUIRED.)

JAN 10 2002

FORM P-64B

COMMENT NUMBER

D-W-0129 (cont.)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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FORM P-64B
(REV. 1999)

Page 2

If document will not be recorded, please provide: (1) land area; and (2) address or short legal description of property here: ____________

Please provide mailing address for assessment notice:

NAME: Kingdom of Hawaii Nation Ministry Trust | ADDRESS: u/d P.O. Box 2845 | ZIP: Wailuku

Please provide real property billing address, if different from assessment address:

NAME: Majesty Akahi Nui Trustee | ADDRESS: Maui Hawaii | ZIP

EXPLANATION AND INSTRUCTIONS FOR CONVEYANCE TAX CERTIFICATE FORM P-64B
CLIP TO DOCUMENT TO BE RECORDED. DO NOT STAPLE.

INFORMATION —

Form P-64B, "Exemption From Conveyance Tax" is used to report the conveyance of a real property interest specifically exempted from the Hawaii Conveyance Tax Law. This certificate must be appended or clipped to the document (i.e., deed, lease, sublease, assignment of lease, agreement of sale, assignment of agreement of sale, instrument, writing, and the like) and submitted to either the Department of Taxation or the Bureau of Conveyances, as the case may be, for approval.

This certificate shall be filed within 90 days after the date of transaction, and, in any event, prior to the recordation or filing of the document with the Bureau of Conveyances or the Land Court. The date of transaction is the date the document is executed, or the date of the last acknowledgment, whichever is later. The person subject to the tax (usually the seller), or a duly authorized representative, must sign the certificate. No document for which a certificate is required to be filed shall be accepted for recordation by the Bureau of Conveyances unless such certificate has been filed.

Use this certificate to exempt the following documents (which includes the related reference to the Hawaii Revised Statutes (HRS)) from the conveyance tax.

1) Documents that confirm or correct a document previously recorded or filed(sec. 247-6(b)(1), HRS);
2) Documents between a husband and wife, reciprocal beneficiaries, or parent and child, in which only a nominal consideration is paid (sec. 247-6(b)(2), HRS);
3) Documents in which a nominal consideration of $100 or less is paid or to be paid (sec. 247-6(b)(3), HRS);
4) Documents in fulfillment of an agreement of sale and where applicable, an assignment of agreement of sale, if the conveyance tax on the agreement of sale was previously paid when the agreement of sale was recorded (sec. 247-6(b)(4), HRS);
5) Documents involving a tax sale for delinquent taxes or assessments (sec. 247-6(b)(5), HRS);
6) Documents involving partition deeds among co-owners provided each exemption claimed declares each owner's undivided interest in the real property and the value of that interest before partition; and proportionate interest and the value of that interest after partition (sec. 247-6(b)(6), HRS);
7) Documents between marital partners or reciprocal beneficiaries who are parties to a divorce action or termination of reciprocal beneficiary relationship which are executed pursuant to an order of the court in the divorce action or termination of reciprocal beneficiary relationship (sec. 247-6(b)(7), HRS);
8) Documents involving conveyance from a testamentary trust to a trust beneficiary (sec. 247-6(b)(8), HRS); and
9) Documents involving conveyance from the grantor to a grantor's revocable living trust or from a grantor's revocable living trust to the grantor (sec. 247-6(b)(9), HRS).

See Tax Information Release (TIR) No. 89-11 for a discussion of the above exemptions. For a discussion on the purchase price on an agreement of sale, see TIR No. 89-12.

A conveyance tax certificate (either P-64A or P-64B) is not required for the following documents; instead, the documents may be recorded or filed directly with the Bureau of Conveyances or Land Court, as the case may be.

1) Documents executed prior to January 1, 1967 (sec. 247-3(1), HRS);
2) Documents given to secure a debt or obligation (sec. 247-3(2), HRS);
3) Documents in which the federal, State, or county governments are the only parties (i.e., both as transferor and transferee) (sec. 247-3(7), HRS);
4) Documents involving eminent domain proceedings (sec. 247-3(9), HRS);
5) Documents which only convey or grant easements (sec. 247-3(10), HRS);
6) Leases or subleases with full unexpired terms of less than 5 years (sec. 247-2, HRS);
7) Documents involving a merger or consolidation (sec. 247-3(15), HRS); and
8) Documents involving a dissolving limited partnership to its corporate general partner that owns at least 90% constructive ownership interest in the partnership (sec. 247-3(16), HRS).

Any approval by the Taxpayer Services Branch is subject to examination by the Director of Taxation under section 247-9, HRS.

INSTRUCTIONS —

TAX MAP KEY — Provide tax map key (TMK) of parcel(s) conveyed. For condominiums, list the condominium property regime (CPR) number next to the tax map key. If the document refers to several TMKs, attach a separate continuation sheet to report them.

ISLAND — Identify the island where the real property interest is located.

APARTMENT NUMBER — Furnish the apartment number where applicable.

NAMES OF PARTIES — List the names of all parties to the document. Attach a separate list if the names of the sellers/transferors/grantors and purchasers/transferees/grantees exceed the space provided.

DATE OF TRANSACTION — Enter the appropriate date as explained under *Information* above.

REPORTING OF REAL PROPERTY INTERESTS LOCATED ON OAHU OWNED OR ACQUIRED BY FOREIGN PERSONS — For more information, contact the City and County of Honolulu, Department of Finance, Real Property Technical Office at 842 Bethel Street, Honolulu, Hawaii 96813, (808) 527-5521 or (808) 527-5512.

SIGNATURE(S) — Required from the seller(s)/transferor(s)/grantor(s), purchaser(s)/transferee(s)/grantee(s), or their duly authorized representative. If there are several signatures, attach a separate continuation sheet to report them.

PART I AND PART II — Complete Part I or II but not both, that best describes the exemption claimed. Checkmark only one best applicable box and explain why in the space provided. Attach a separate sheet of paper if more space is needed.

If the exemption claimed falls under Part I, submit this certificate to the Department of Taxation, Taxpayer Services Branch, Room 124, Keelikolani Building, 830 Punchbowl Street, Honolulu, Hawaii, 96813, (808) 587-1577, for review and approval before filing with the Bureau of Conveyances. The review may take six (6) business days or longer from the date the documents are received by the Taxpayer Services Branch.

If the exemption appears in Part II, file the certificate directly with the Bureau of Conveyances at 1151 Punchbowl Street, Honolulu, Hawaii, 96813, or P.O. Box 2867, Honolulu, Hawaii, 96803-2867. For filing fee information, call (808) 587-0147.

REPORTING OF REAL PROPERTY INTERESTS LOCATED ON THE ISLAND OF OAHU THAT ARE OWNED OR ACQUIRED BY FOREIGN PERSONS.

Check the applicable box(es) if the transferor and/or the transferee is a foreign person. ☐ Transferor ☐ Transferee

Under Honolulu Ordinance No. 90-68, a "foreign person" is any individual who is not a U.S. citizen or an alien resident. The term applies to business enterprises organized under foreign law, or their principal place of business is in a foreign country, or 25% or more of the equity or ownership interest is foreign.

DECLARATION

I (We) declare, under the penalties prescribed for false declaration in section 231-36, Hawaii Revised Statutes (HRS), that this certificate (including accompanying schedules or statements) has been examined by me (us) and, to the best of my (our) knowledge and belief, is a true, correct, and complete certificate, made in good faith, for the actual and full consideration paid on the conveyance to which this certificate is appended, pursuant to the Conveyance Tax Law, chapter 247, HRS.

SIGNATURE(S) - Seller(s) / Transferor(s), Etc.

____

DAYTIME PHONE NO.: (___) ____ - ____

SIGNATURE(S) - Purchaser(s) / Transferee(s), Etc.

Majesty Akahi Nui

DAYTIME PHONE NO.: (808) 575-9095

FORM P-64B

COMMENT NUMBER

D-W-0129 (cont.)

35

SD
15DEC

R-743

STATE OF HAWAII
BUREAU OF CONVEYANCES
RECORDED

JAN 11, 2002 11:30 AM

Doc No(s) 2002-005579
Thru 2002-005580

/s/CARL T. WATANABE
ACTING
REGISTRAR OF CONVEYANCES

CONVEYANCE TAX: $0.00

REGULAR SYSTEM u/d LA

After Recordation Return by Mail ( ) Pickup (X)
Kingdom of Hawaii Trust
Majesty Akahi Nui Trustee
u/d P.O. Box 2845
Mokuaina O Wailuku, Mokupuni O Maui,
Ke Aupuni O Hawaii

T.M.K. 2-1 through 6 -All-All-All

Total Number of Pages: 16

DEED

WHEREAS: This indenture, made on this 7th day of January, 2002, by and between direct **Heir of Liloa ke kane O Akahi-a-Kuleana ke wahine hanau Umi-a-Liloa ke kane O Piikea-a-Piilani hanau Kumalaenuiaumi ke kane, Kalanikupuapaikalaninui ke kane O Akahinui ke wahine hanau Kaleiwohi ke kane Majesty Akahi Nui,** under duress P.O. Box 2845, Moku aina O Wailuku, Mokupuni O Maui, Ke Aupuni O Hawaii, hereafter referred to as the "GRANTOR", which expressions shall include his heirs, executors, administrators and assigns. The Kingdom of Hawaii Nation Ministry Trust, Majesty Akahi Nui Trustee, whose address is under duress P.O. Box 2845, Moku aina O Wailuku, Mokupuni O Maui, Ke Aupuni O Hawaii nei, hereinafter referred to as the "GRANTEE".

WITNESSETH:

WHEREAS: That the Grantor, hereby acknowledged, does hereby grant, convey, and forever unto the Grantee, as tenant in severalty, all his right, Allodial title and interest in the **Heir of Liloa ke kane O Akahi-a-Kuleana ke wahine hanau Umi-a-Liloa ke kane O Piikea-a-Piilani hanau Kumalaenuiaumi, Kalanikupuapaikalaninui ke kane O Akahinui ke wahine hanau Kaleiwohi,** described T.M.K. 2 - 1 through 6 - All - All - All, in Royal scion Names of Allodial Crown and Government Lands, Na Ahupuaa, Na Ili, Kingdom Government Lands, Allodial Districts on the Islands of Maui, Kahoolawe, Molokai, and Lanai more or less. (see exhibit "A") and Writ of Prohibition.

Page - 1

COMMENT NUMBER

D-W-0129 (cont.)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0129 (cont.)

By Grantor No. 1028 Royal Patent Declaration of Confirmation Majesty Akahi Nui.

TO HAVE AND HOLD the same, together with all improvements rights, easements, privileges and appurtenances thereon or thereunto belonging or appertaining or held and enjoyed therewith, unto the said Grantee as aforesaid, forever.

The terms "Grantor" and "Grantee", as and when used herein, or any pronouns used in place thereof, shall mean and include the masculine or feminine, the singular or plural number, individuals or corporations, and their and each of their respective successors, heirs, personal representatives and assigns, according to the context thereof.

IN WITNESS WHEREOF, the Grantors **Heir of Liloa ke kane O Akahi-a-Kuleana ke wahine hanau Umi-a-Liloa ke kane O Piikea-a-Piilani hanau Kumalaenuiaumi ke kane, Kalanikupuapaikalaninui ke kane O Akahinui ke wahine hanau Kaleiwohi ke kane, Majesty Akahi Nui Sovereign Heir** have executed these presents as of this 7th day of January, 2002.

Majesty Akahi Nui

Majesty Akahi Nui,
Sovereign Heir

STATE OF HAWAII)
) SS
COUNTY OF MAUI)

On this 7th day of January, 2002, before me personally appeared Majesty Akahi Nui, to me known to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same as his free act and deed.

Eileen Rockwell

EILEEN ROCKWELL
Print or Type
Notary Public, STATE OF HAWAII
My Commission expires: 02/06/04

COMMENT NUMBER
D-W-0129 (cont.)

No. 1028
Royal Patent
Declaration of Confirmation
Heir of Liloa, Akahi-a-Kuleana, Kalanikupuapaikalaninui, Akahinui,
Majesty Akahi Nui
Sovereign Heir

WHEREAS: The Heir of Liloa ke kane O Akahi-a-Kuleana ke wahine hanau Umi-a-Liloa ke kane O Piikea-a-Piilani ke wahine hanau Kumalaenuiaumi ke kane, Kalanikupuapaikalaninui ke kane O Akahinui ke wahine hanau Kaleiwohi, Majesty Akahi Nui Sovereign Heir. Allodial Land Titles have by his decision place unto the Kingdom of Hawaii Nation Ministry Trust an estate of Freehold Allodial, in and to the Land hereafter described, and whereas; Royal Scion Names of Allodial Crown and Government Lands, Na Ahupuaa, Na Ili, Kingdom Government Lands, and Allodial Districts on Islands of Maui, Kahoolawe, Molokai, and Lanai (see exhibit "A") Allodial Land Titles within described land commutation, relinquished by the heir of the estate.

THEREFORE, His Majesty Akahi Nui by the Grace of God, King of the Hawaiian Islands, by this Land Title, makes known to all men, that they have, for his successors, this day granted and given absolutely, life time living interest and lawful rights to all that described as follows:

Containing T.M.K. 2-1 through 6 - All - All - All Royal Scion Names of Allodial Crown and Government Lands, Na Ahupuaa, Na Ili, Kingdom Government Lands, and Allodial Districts on Islands of Maui, Kahoolawe, Molokai, Lanai, (see exhibit "A") Allodial Land Titles., more or less excepting and reserving to the Kingdom of Hawaii Nation Ministry Trust.

TO HAVE AND TO HOLD, the above granted Land in Allodial Land Titles unto the said Kingdom of Hawaii Nation Ministry Trust Majesty Akahi Nui Trustee.

IN WITNESSES WHEREOF, I His Majesty Akahi Nui, hereunto set his hands, and caused the Great Seal of the Hawaiian Islands to be affixed this 7th day of January 2002.

Majesty Akahi Nui

Majesty Akahi Nui
Sovereign Heir

KINGDOM OF HAWAII 1840 AKAHI NUI 25 MOKUPUNI SEAL

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

No. 1028

Royal Patent

Declaration of Confirmation

Heir of Liloa, Akahi-a-Kuleana, Kalanikupuapaikalaninui, Akahinui, Majesty Akahi Nui. Sovereign Heir

WHEREAS: The Heir of Liloa ke kane O Akahi-a-Kuleana ke wahine hanau Umi-a-Liloa O Piikea-a-Piilani ke wahine hanau Kumalaenuiaumi ke kane, Kalanikupuapaikalaninui ke kane O Akahinui ke wahine hanau Kaleiwohi ke kane, Majesty Akahi Nui. Sovereign Heir. Allodial Land Title have by his decision place unto the Kingdom of Hawaii Nation Ministry Trust an estate of Freehold Allodial, in and to the Land hereafter described, and whereas; Royal Scion Names of Allodial Crown and Government Lands, Na Ahupuaa, Na Ili, Kingdom Government Lands, and Allodial Districts on Island of Maui, Kahoolawe, Molokai, Lanai, (see exhibit "A") Allodial Land Title within described land commutation, relinquished by the heir of the estate.

THEREFORE, His Majesty Akahi Nui by the Grace of God, King of the Hawaiian Islands, by this Land Title, makes known to all men, that they have, for his successors, this day granted and given absolutely, life time living interest and lawful rights to all that described as follows:

Containing T.M.K. 2 - 1 through 6 - All - All - All, Royal Scion Names of Allodial Crown and Government Lands, Na Ahupuaa, Na Ili, Kingdom Government Lands, and Allodial Districts on Island of Maui, Kahoolawe, Molokai, Lanai (see exhibit "A") more or less excepting and reserving to the Kingdom of Hawaii Nation Ministry Trust.

TO HAVE AND TO HOLD, the above granted Lands in Allodial Land Title unto the said Kingdom of Hawaii Nation Ministry Trust.

IN WITNESSES WHEREOF, I His Majesty Akahi Nui, hereunto set his hands, and caused the Great Seal of the Hawaiian Islands to be affixed this 7th day of January ______ 2002.

Majesty Akahi Nui

Majesty Akahi Nui
Sovereign Heir

KINGDOM OF HAWAII
1840
AKAHI NUI
23
MOKUPUNI SEAL

COMMENT NUMBER

D-W-0129 (cont.)

Genealogy of Majesty Akahi Nui

Ulu ke kane O Kapunuu ke wahine hanau Nanaie ke kane O Kahaumokuleia ke wahine hanau Nanailani ke kane O Hinakinau ke wahine hanau Waikulani ke kane O Kekauilani ke wahine hanau Kuheleimoana ke kane O Mapunaiaala ke wahine hanau Konohiki ke kane O Hikaululena ke wahine hanau Wawena ke kane O Hinamahuia ke wahine hanau Akalana ke kane O Hinakawea ke wahine hanau Mauihope, Mauimua, Mauiakalana ke kane O Hinakealohaila ke whaine hanau Nanamaoa ke kane O Hinakapaekua ke wahine hanau Nanakulei ke kane O Kehaukuhonua ke wahine hanau Nanakaoko ke kane O Kohihiokalani ke wahine hanau Heleipawa ke kane O Kookookumaikalani ke wahine hanau Hulumanailani ke kane O Hinamaikalani ke wahine hanau Aikane ke kane O Hinahanaiakamalama ke wahine hanau Puna ke kane Hema ke kane O Ulamahahoa ke wahine hanau Kahai ke kane O Hinauluohia ke wahine hanau Wahieloa ke kane O Koolaukahili ke wahine hanau Laka ke kane O Hikawaelena ke whaine hanau Luanuu ke kane O Kapokulaiula ke whaine hanau Kamea ke kane O Popomaili ke wahine hanau Pohukaina ke kane O Huahuakapalei ke wahine hanau Hua ke kane O Hikimolulolea ke wahine hanau Pau ke kane O Kapohaakia ke wahine hanau Huanuikalalailai ke kane O Kapoea ke wahine hanau Paumakua ke kane O Manokalililani ke wahine hanau Haho ke kane O Kauilaianapa ke wahine hanau Palena ke kane O Hikiwainui ke wahine hanau Hanalaaiki, Hanalaanui ke kane O Mahuia ke wahine hanau Lanakawai ke kane O Kalohialiiokawai ke wahine hanau Laau ke kane O Kukamolimolialoha ke wahine hanau Pili ke kane O Hinaauaku ke wahine hanau Koa ke kane O Hinaaumai ke wahine hanau Ole ke kane O Hinamaileilii ke wahine hanau Kukohu ke kane O Hinakeuki ke wahine hanau Kaniuhi ke kane O Hiliamakani ke wahine hanau Kanipahu ke kane O Hualani ke wahine hanau Kalahumoku ke kane O Laamea ke wahine hanau Ikialaamea ke kane O Kalamea ke wahine hanau Kamanawa-a-Kalamea ke kane O Kaina ke wahine hanau Onokaina ke kane O Kuamakani ke wahine hanau Kua-i-makani, Kanahae ke kane O Kapiko ke wahine hanau Kuleana-a-kapiko ke kane O Keanianihooleilei ke wahine hanau Akahi-a-kuleana ke wahine Kanepahu ke kane O Alai-aka-ua-koko ke wahine hanau Kalapana ke kane O Makeamalamaihanae ke wahine hanau Kahaimoeleaikaaikupou ke kane O Kapoakauluhailaa ke wahine hanau Kalaunuiohua ke kane O Kaheka ke wahine hanau Kuaiwa ke kane O Kamuleilani ke wahine hanau Hukulani, Manaiea, Kahoukapu ke kane O Laaukapu ke wahine hanau Kaholanuimahu ke kane O Neula ke wahine hanau Kiha ke kane O Waea ke wahine hanau Liloa ke kane O Akahi-a-kuleana ke wahine

COMMENT NUMBER

D-W-0129 (cont.)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

hanau Umi-a-Liloa ke kane O Kulamea ke wahine hanau Kapunanahuanui-a-umi ke kane, Umi-a-Liloa ke kane O Makaalua ke wahine hanau Nohowaa-a-umi ke kane, Umi-a-Liloa ke kane O Kapukini ke wahine hanau Keliiokaloa ke kane, Keawenuiaumi, Umi-a-Liloa ke kane O Piikea-a-piilani ke wahine hanau Aihakoko, Kumalaenuiaumi ke kane O Kekaikaakuloulamiokahiki ke wahine hanau Makuakaumanamana ke kane O Kapohelemai ke wahine hanau I ke kane, Umi-a-liloa ke kane O Mokuahualeiakea ke wahine hanau Akahiilikapu ke wahine Kahakumakalina ke kane O Akahiilikapu ke wahine hanau Kawaihalaniwailuau ke wahine, Keliiokiohi ke kane O Amauakoko ke wahine hanau Akahikameenoa ke wahine, I ke kane O Akahikameenoa ke wahine hanau Kanekukailani ke wahine, Akahinui ke wahine, Mahiololi ke kane O Kanekukailani ke wahine hanau Umi-a-emoku ke wahine, Kauakehiakua ke kane O Umi-a-emoku 'ke wahine hanau Kanekapolei ke wahine, Kalanikupuapaikalaninui ke kane O Akahinui ke wahine hanau Kaleiwohi ke kane O Kailipakalua ke wahine hanau Pauelua ke kane O Kaluai ke wahine hanau Akahi ke wahine, Kalanimoku ke kane O Akahi ke wahine, Kikai ke kane O Akahi ke wahine hanau Nahuina ke kane, Kamakaia ke kane O Akahi ke wahine hanau Hanakahi ke kane, Pomaikai ke kane O Akahi ke wahine hanau Kahele ke kane, Kauhi ke kane, Kahope ke kane O Akahi ke wahine hanau Halemano ke kane, Waha ke kane O Akahi ke wahine hanau Kaluakini, Kapapu, Kaanaana, Kalama, Kaiama ke kane O Akahi ke wahine hanau Kekapu/Inoaole, Kapaa ke kane O Akahi ke wahine, Nahuina ke kane O Kawao ke wahine, Nahuina ke kane O Oulu ke wahine hanau Alale, Nahuina ke kane O Kamaliiwahine ke wahine hanau Kaluakini ke kane, Halemano ke kane O Pua Kaialiilii hanau Victoria Halemano ke wahine, William Kalei ke kane O Victoria Halemano ke wahine hanau Elizabeth Kalei ke wahine, Kunewa ke kane O Kaanaana ke wahine hanau Keoahu ke wahine hanau William Keoahu Akahi ke kane O Maria Kaahanui ke wahine hanau Akahi liilii ke kane, Paahaa, Akahi, Walahio, Waleo, Kino, Kawailanaliilii, Kaaiohi, Akahi ke kane O Malaea Kaawalauole ke wahine hanau Samuel Akahi ke kane O Elizabeth Kalei ke wahine hanau Samuel Akahi ke kane, Pauhao ke wahine, Momi ke wahine, Kenona ke wahine, Irene ke wahine, Harriet ke wahine, Edward ke kane, Akahi Nui ke kane O Grace Mokihana Gushiken ka wahine hanau James Kawika Akahi ke kane O Holly Ferreria ke wahine, Keoni Kaina Akahi ke kane O Elizabeth Kahae ke wahine, Haili Akahi Pua ke wahine, Kaulana Aulike Akahi ke wahine, Lopaka Akahi ke kane, Maui Lokelani Akahi ke wahine.

Mahalo Anakala Andrew Taki Akahi eha Mookuauhau

IN WITNESSES WHEREOF, I His Majesty Akahi Nui, hereunto set his hands, and caused the Great Seal of the Hawaiian Islands to be affixed this 7th day of January 2002.

COMMENT NUMBER

D-W-0129 (cont.)

STATE OF HAWAII)
) SS
COUNTY OF Maui)

On this 7th day of January, 2002, before me personally appeared Majesty Akahi Nui, to me known to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same as his free act and deed.

Eileen Rockwell

EILEEN ROCKWELL
Print or Type
Notary Public, STATE OF HAWAII
My Commission expires: 02/06/04

COMMENT NUMBER

D-W-0129 (cont.)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

EXHIBIT "A"

COMMENT NUMBER
D-W-0129 (cont.)

CROWN, GOVERNMENT, AND FORT LANDS, ENUMERATED
L. 1848, P. 22; C. C. p. 374
AN ACT RELATING TO THE LANDS OF HIS MAJESTY THE KING
AND OF THE GOVERNMENT

WHEREAS, It hath pleased His Most Gracious Majesty Kamehameha III., the King, after reserving certain lands to himself as his own private Property, to surrender and forever make over unto his Chiefs and People, The greater portion of his Royal Domain :

AND WHEREAS, It hath pleased our Sovereign Lord the King, to place the lands so made over to his Chiefs and People, in the keeping of the House of Nobles and Representatives, or such person or persons, as they may from time to time appoint, to be disposed of in such manner as the House of Nobles and Representatives may direct, and as may best promote the prosperity of this kingdom and the dignity of the Hawaiian Crown : Therefore, BE IT ENACTED by the House of Nobles and Representatives of the Hawaiian Islands, in Legislative Council assembled:

That, expressing our deepest thanks to His Majesty for this noble and truly royal gift, we do hereby solemnly confirm this great act of our good King, and declare the following named lands, viz:

CROWN LANDS

MAUI

Names of Lands	Ahupuaa	Districts
Ahoa	Ahupuaa	Kaanapali
Alamihi	Ahupuaa	Lahaina
Aweoweo	Ili in Ukumeheme	Ukumeheme
Honokowai	Ahupuaa	Kaanapali
Honomanu	Ahupuaa	Koolau
Ilikahi	Ahupuaa	Lahaina
Kahakuloa	Ahupuaa	Kahakuloa
Kauaula	Ahupuaa	Lahaina
Kealahou 1	Ahupuaa	Kula
Kealahou 2	Ahupuaa	Kula
Keanae	Ahupuaa	Koolau
Keokea	Ahupuaa	Kula
Kuholilea East	Ahupuaa	Lahaina

COMMENT NUMBER
D-W-0129 (cont.)

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

CROWN LANDS

MAUI

Names of Lands	Ahupuaa	Districts
Kuhua 1	Ahupuaa	Lahaina
Kuhua 2	Ahupuaa	Lahaina
Lapakea	Ahupuaa	Lahaina
Mala	Ahupuaa	Lahaina
Napili	Ahupuaa	Kaanapali
Olowalu	Ahupuaa	Olowalu
Opaeula	Ahupuaa	Lahaina
Polapola	Ahupuaa	Lahaina
Polipoli	Ahupuaa	Napoko
Polua	Ahupuaa	Kaanapali
Puehuehu 1	Ahupuaa	Lahaina
Puehuehu 2	Ahupuaa	Lahaina
Ukumeheme	Ahupuaa	Ukumehame
Waianae	Ahupuaa	Lahaina
Wailua	Ahupuaa	Hana
Wailua 1	Ahupuaa	Koolau
Wailua 2	Ahupuaa	Koolau
Wailuku	Ahupuaa	Napoko
Wainee 1	Ahupuaa	Lahaina
Wainee 2	Ahupuaa	Lahaina
Waiohonu	Ahupuaa	Hana
Waiokila	Ili in Kahakuloa	Kahakuloa

MOLOKAI

Names of Lands	Ahupuaa	Districts
Kalamaula	Ahupuaa	Kona
Palaau	Ahupuaa	Kona
Ualapue	Ahupuaa	Kona

COMMENT NUMBER

D-W-0129 (cont.)

GOVERNMENT LANDS

To be the private lands of His Majesty Kamehameha III., to have and to hold to himself, his heirs, and successors, forever; and said lands shall be regulated and disposed of according to his royal will and pleasure subject only to the rights of tenants,

AND BE IT FURTHER ENACTED, That we do hereby in the name of the Chiefs and People of the Hawaiian Islands, accept of the following lands, viz:

GOVERNMENT LANDS

MAUI

Names of Lands	Ahupuaa	Districts
Aapueo	Ahupuaa	Kula
Aapueo 3	Ahupuaa	Kula
Ahupau	Ahupuaa	Kula
Alae	Ahupuaa	Kipahulu
Halemano	Ahupuaa	Kipahulu
Hamakuapoko (½)	Ahupuaa East half	Hamakuapoko
Hanawana	Ahupuaa	Hamakualoa
Hanehoi 1	Ahupuaa	Hamakualoa
Hanehoi 2	Ahupuaa	Hamakualoa
Hoalua	Ahupuaa	Hamakualoa
Hokuula	Ahupuaa	Kula
Holowa	Ahupuaa	Hamakualoa
Honokala	Ahupuaa	Hamakualoa
Honokohau	Ahupuaa	Kaanapali
Honomaele (½)	Ahupuaa	Hana
Honopou	Ahupuaa	Hamakualoa
Kaehoeho	Ahupuaa	Kipahulu
Kaeo (½)	Ahupuaa	Houaula
Kahana 1	Ahupuaa	Kaanapali
Kahana 2	Ahupuaa	Kaanapali
Kahikinui	Ka Moku	Kahikinui
Kahili 1	Ahupuaa	Honuaula
Kahili 2	Ahupuaa	Honuaula
Kakalahale 1	Ahupuaa	Kipahulu
Kakalahale 2	Ahupuaa	Kipahulu
Kakanoni	Ahupuaa	Kipahulu
Kalena	Ahupuaa	Kipahulu
Kalenaiki	Ahupuaa	Kipahulu

COMMENT NUMBER

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Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
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GOVERNMENT LANDS

MAUI

Names of Lands	Ahupuaa	Districts
Kaloi	Ahupuaa	Honuaula
Kamaole	Ahupuaa	Kula
Kamehame 1	Ahupuaa	Kula
Kamehame 2	Ahupuaa	Kula
Kanaio	Ahupuaa	Honuaula
Kapalaia	Ahupuaa	Kula
Kapuaikini	Ahupuaa	Kipahulu
Kapunakea (½)	Ahupuaa	Lahaina
Kauau 1	Ahupuaa	Kula
Kauau 2	Ahupuaa	Kula
Kaumakani	Ahupuaa	Kipahulu
Kaunuahane	Ahupuaa	Honuaula
Kaupo	66 Ahupuaa Ka Moku	Kaupo
Kaupo	Na Ku o Kaupo i Koe I Keia mahele ana	Kaupo
Keahua	Ahupuaa	Kula
Kealakekua	Ahupuaa	Kula
Kealia	Ahupuaa	Kula
Kikoo	Ahupuaa	Kipahulu
Koali	Ahupuaa	Hana
Koanawai	Ahupuaa	Kipahulu
Koheilo 1	Ahupuaa	Kula
Koheilo 2	Ahupuaa	Kula
Kooka (½)	Ahupuaa	Lahaina
Koolau	District	Koolau
Kualapa	Ahupuaa	Honuaula
Kuholilea (½)	Ahupuaa	Lahaina
Kuiaha	Ahupuaa	Hamakualoa
Kukuiaio	Ahupuaa	Kula
Kukuiulaiki	Ahupuaa	Kipahulu
Maakaalae	Ahupuaa	Hana
Mahinahina 1	Ahupuaa	Kaanapali
Mahinahina 2	Ahupuaa	Kaanapali
Mahinahina 3	Ahupuaa	Kaanapali
Makawao	Ahupuaa	Kula
Maluaka	Ahupuaa	Honuaula
Maulili	Ahupuaa	Kipahulu
Moanui	Ahupuaa	Lahaina
Mohopilo 1	Ahupuaa	Honuaula

COMMENT NUMBER
D-W-0129 (cont.)

GOVERNMENT LANDS

MAUI

Names of Lands	Ahupuaa	Districts
Mohopilo 2	Ahupuaa	Honuaula
Mooiki	Ahupuaa	Honuaula
Mooloa	Ahupuaa	Honuaula
Moomuku	Ahupuaa	Honuaula
Naalae	Ahupuaa	Kula
Nailiilipoko 1	Ahupuaa	Kipahulu
Nailiilipoko 2	Ahupuaa	Kipahulu
Omaopio 6	Ahupuaa	Kula
Omaopio 7	Ahupuaa	Kula
Omaopio 8	Ahupuaa	Kula
Omaopio 9	Ahupuaa	Kula
Omaopio 10	Ahupuaa	Kula
Omaopio 11	Ahupuaa	Kula
Onau	Ahupuaa	Honuaula
Ouaoa	Ahupuaa	Hamakualoa
Paeahu 1	Ahupuaa	Honuaula
Paeahu 2	Ahupuaa	Honuaula
Paniau	Ahupuaa	Hamakuapoko
Papaa	Ahupuaa	Honuaula
Papaaea	Ahupuaa	Hamakualoa
Papaka	Ahupuaa	Honuaula
Pauwela	Ahupuaa	Hamakualoa
Peahi 1	Ahupuaa	Hamakualoa
Peahi 2	Ahupuaa	Hamakualoa
Popoloa	Ahupuaa	Kipahulu
Poponui	Ahupuaa	Kipahulu
Poulua 1	Ahupuaa	Hamakualoa
Poulua 2	Ahupuaa	Hamakualoa
Puahoowale (½)	Ahupuaa	Lahaina
Pulehu	Ahupuaa	Kula
Puuki (½)	Ahupuaa	Lahaina
Puunauiki (½)	Ahupuaa	Lahaina
Waikiu	Ahupuaa	Hana
Makaalae	Ahupuaa no Hana	Kipahulu
Wailamoa	Ahupuaa aoao ma Kaupo	Kipahulu
Waiokoa	Ahupuaa	Kula
Waipao	Ahupuaa	Honuaula
Wananalua 1	Ahupuaa	Hana
Wananalua 2	Ahupuaa	Hana

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

GOVERNMENT LANDS

MOLOKAI

Names of Lands	Ahupuaa	Districts
Ahaino (½)	Ahupuaa	Kona
Haulei	Ahupuaa	Koolau
Hawaluna	Ahupuaa	Koolau
Hipu	Ahupuaa	Kalae
Hoolehua	Ahupuaa	Kona
Kaamola 1	Ahupuaa	Kona
Kaamola 2	Ahupuaa	Kona
Kaamola 3	Ahupuaa	Kona
Kaamola 4	Ahupuaa	Kona
Kaamola 5 (½)	Ahupuaa	Kona
Kaamola 6 (½)	Ahupuaa	Kona
Kahananui (½)	Ahupuaa	Kona
Kahanui (½)	Ahupuaa	Kona
Kainalu	Ahupuaa	Koolau
Kalawao	Ahupuaa	Koolau
Kaluaaha	Ahupuaa	Kona
Kaluakoi 1	Ahupuaa	Kaluakoi
Kaluakoi 2	Ahupuaa	Kaluakoi
Kamanoni (½)	Ahupuaa	Kona
Kamiloloa (½)	Ahupuaa	Kona
Kawaikapu	Ahupuaa	Kona
Keanaokuino	Ahupuaa	Koolau
Lupehu	Ahupuaa	Kona
Mahulile	Ahupuaa	Koolau
Makakupaianui	Ahupuaa	Kona
Manienie	Ili in Waikolu	Koolau
Manowainui	Ahupuaa	Kalae
Moanui	Ahupuaa	Kona
Ohia 1 East	Ahupuaa	Kona
Onoulimaloo	Ahupuaa	Kona
Onouliwai	Ahupuaa	Kona
Pohakuloa	Ahupuaa	Koolau
Poniuohua	Ahupuaa	Kona
Poniuohua (½)	Ahupuaa	Kona
Pukoa 1	Ahupuaa	Kona
Pukoa 2	Ahupuaa	Kona

COMMENT NUMBER

D-W-0129 (cont.)

GOVERNMENT LANDS

LANAI

Names of Lands	Ahupuaa	Districts
Kaumalopua 1	Ahupuaa	
Kaumalopau 2	Ahupuaa	
Kaunolu	Ahupuaa	
Kealia 1	Ahupuaa	
Kealia 2	Ahupuaa	
Pawili	Ahupuaa	

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Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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D-W-0129 (cont.)

Kingdom of Hawai'i

Sovereign Nation of God

Majesty Akahi Nui
u/d P.O. Box 2845
Moku'aina O Wailuku, Mokupuni O Maui,
Ke Aupuni O Hawai'i

Kingdom of Hawai'i

KINGDOM OF HAWAII Majesty Akahi Nui Demandant(s), vs. UNITED STATES OF AMERICA STATE OF HAWAII, ALL COUNTIES 1 THROUGH 1000 JOHN DOES AND JANE DOES. Respondent(s)	]]]]]]]]]]]]]]]]]	DECLARATION OF THE FINDINGS OF FACTS AND ORDER TO RECEIVE AN ANSWER OF TRUE AND LAWFUL DOCUMENTED FACTS OF EVIDENCE OF JURISDICTION WITHIN (20) TWENTY DAY(S)

WRIT OF PROHIBITION WITH AN ORDER TO RECEIVE AN ANSWER OF TRUE AND LAWFUL DOCUMENTED FACTS OF EVIDENCE OF JURISDICTION WITHIN (20) TWENTY DAY(S)

COME NOW, the demandant(s), I, Majesty Akahi Nui, King of the Hawaiian Islands, aboriginal inhabitants Na Kanaka Maoli, and in behalf of my subjects, of

COMMENT NUMBER

D-W-0129 (cont.)

the lawful independent nation, **Heir of Liloa ke kane O Akahi-a-Kuleana ke wahine hanau Umi-a-Liloa ke kane O Piikea-a-Piilani hanau Kumalaenuiaumi ke kane, Keouakapuapaikalani ke kane O Akahinui ke wahine hanau Kaleiwohi ke kane,** am of 100% royal blue blood lineage. Formally issue This Lawful findings and facts of documented evidence that challenges the UNITED STATES OF AMERICA, STATE OF HAWAII AND ALL COUNTIES 1 THROUGH 1000 JOHN DOES AND JANE DOES.

The Seed of Poisonous Tree of Doctrine (unlawful overthrow committed by U.S. and the U.S. military force. (4) Executive Council S.B. Dole, J.A. King, P.C. Jones, W.O. Smith, who administered the Executive Departments of their unlawful Government which consisted of (14) members S.B. Dannon, A. Brown, L.A. Thurston, F.F. Morgan, J. Emmeluth, H. Waterhouse, J.A. McChesney, F. Wilhelm. W.R. Castle, W.G. Ashey, W.C. Wilder, C. Bolte, was planted and it bears branches The *illegitimate* Provisional Government, *illegitimate* Republic of Hawai'i, *illegitimate* Territory of Hawai'i and now The *de facto* state of Hawai'i the perpetuation from the Poisonous Fruits of the Poisonous Tree of Doctrine criminal act). We are also seeking recognition for our nation the Kingdom of Hawai'i from the foreign nations. The Kingdom of Hawai'i is of Na Kanaka Maoli (Hawaiian) people and has always been in existence as long as God permits our race to live. Our sovereignty comes from God.

Whereas the indigenous Na Kanaka Maoli (Hawaiian) people never directly relinquished their claims to their inherent sovereignty as a people or over their national lands to the United States. (U.S.P.L. 103-150 11/23/93)

Whereas the well-being of the indigenous Na Kanaka Maoli Hawaiian people is intrinsically tied to their deep feelings and attachment to the land. (U.S.P.L. 103-150)

- The indigenous Na Kanaka Maoli were the original inhabitants of the island archipelago, Hawai'i. Na Kanaka Maoli (Hawaiian people's) oral traditions are passed on through chants, legends, myth and ***mookuauhau*** or genealogies, and trace the origins of the ancient ancestors. Na Kanaka Maoli are a part of nature and nature is a part of them. In Na Kanaka Maoli language term which expressed this harmonious fundamental relationship was ***lokahi,*** unity. Related terms expressing this fundamental relationship was ***"aloha aina,"*** love the land ***"malama aina"*** care for and protect the land.
- ***Aloha aina,*** love the land, aloha in ***Ke akua,*** love of God, ***aloha kekahi i kekahi,*** love one another, expresses the three precepts which formed the core of Na Kanaka Maoli philosophy, world view and belief system. It is important for a Na Kanaka Maoli to sustain supportive, nurturing and harmonious relations with the land, Akua and each other, particularly our 'ohana or extended family.
- Na Kanaka Maoli traced their lineal ancestry to historical figures and ultimately, through them, to various deities and god of the land, ocean, forest and nature.
- The land and all nature was the source of existence for Na Kanaka Maoli not only as the origin of humanity, but also as the source of natural resources for day-to-day subsistence. na Kanaka Maoli related to the land as an ancestor and dear friend giving its various moods at different times of the year; nurturing it with loving care. They

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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did not possess or own the land or its abundant resources. This was inconceivable. Instead, they maintained steward ship over it planting and fishing according to the moon phased and the changes from rainy to dry seasons. The traditional Na Kanaka Maoli access to the resources they would need for subsistence and to allow for steward ship over the land to the lineal descendants associated with particular ancestral and ***akua.***

- The recognition of the Kingdom of Hawai'i was always in existence.[1] The U.S. invasion in 1893. By virtue of its sovereign integrity as a member of the international community, Hawai'i had exclusive jurisdiction over its nationals within its defined territory, i.e., the Hawaiian Islands, the authority over such process by which the United States of America and her creation, the state of Hawai'i, now asserts its jurisdiction over the indigenous Na Kanaka Maoli, Hawaiian citizens acting within the Hawaiian territory are several:

1- the laws of nations including treaties, and customary international laws.
2- internal laws of sovereign nations.
3- the United Nations Charter and subsequent U.N. acts to carry out the terms of the charter.

We begin from January 16, 1893, a time when there can be no debate of the legal international status of two states - Hawai'i and the United States of America.
Both of these states were recognized in the international community as sovereign. Among the attributes of sovereignty were the exclusive right of a state to govern and exercise jurisdiction over its own citizens within its territories.[2]
Sovereignty remain in effect for states unless and until certain circumstances occur which properly changes the relationship between such states and other states or changes the relationship citizens and territories to existing states.

What are the those circumstances which were appropriate to have affected the change in lawful relationship between four international bodies the Kingdom of Hawai'i, the United States of America, Indigenous Na Kanaka Maoli, (Hawaiian citizens) and Hawaiian territory? The continued exercise of U.S. jurisdiction over Hawai'i is unlawful.

A. Under Traditional International Law Principles

a. On January 16, 1893, the nation of Hawai'i was recognized as a sovereign and independent nation equal in international rights as other similarly recognized nations of the world. The Hawaiian nation had treaties and executive agreements with other nations and peoples, including the United States of America, Belgium, Bremen, Denmark, France, the German Empire, Great Britain, Hamburg, Hong Kong, Italy, Japan,

1 This memorandum uses the term Kingdom of Hawai'i and a number of other terms to refer to as the nation of Hawai'i, the Hawaiian Kingdom, Hawaiian nation. The term nation here is not meant to be in derogation of the full international rights and privileges of those entities termed "states" or "nation-states" in international law but instead should be read with equal status with those.

2 Schooner Exchange v. McFaddon 11 U.S. 116, 135 (1812)

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D-W-0129 (cont.)

Netherlands. New South Wales, Portugal, Russia, Samoa, Spain, Swiss Confederation, Sweden, Norway and Tahiti.[3]

b. As of January 16, 1893, the United States of America was equally recognized as a sovereign and independent nation equal in international rights as other states of the international community.

c. The laws of nations which included both international customary laws and the treaties in existence between the nation of Hawai'i and the United States of America were binding upon these two nations regarding their conduct towards one another.[4]

d. The United States of America conspired to overthrow the Hawaiian nation and committed aggression against the nation of Hawai'i in violation of international law.[5]

e. As a direct consequence of the U.S. misconduct, a puppet regime was established in Hawai'i, denominated first, the Provisional Government, and later the Republic of Hawai'i.[6]

f. The Provisional Government and the Republic of Hawai'i were not governments of the people, by the people, or for the people but were primarily the creatures of the minority Anglo-Saxons who believed in the doctrine of divine right of the minority to govern the majority.[7]

g. The United States of America executed treaties of annexation with *de facto* governments promoted and supported by the United States of America, i.e., first, the Provisional government in 1893, and the Republic of Hawai'i in 1897.[8]

h. Queen Lili'uokalani wrote letters of protest to president Benjamin Harrison and to the President-elect Grover Cleveland who was about to take office.

When President Grover Cleveland took office, he rejected the request of the Provisional Government to annex Hawaii.

The majority of the na Kanaka Maoli petitioned United States against annexation of their nation. The heading on Hui Aloha 'Aina's petition read: PALAPALA HOOPII KUE HOOHUI AINA "Petition Protesting Annexation"[9]

3 Digression from the Spirit of Self-Determination and Hawaiian Sovereignty pp. 5-6

4 See Grover Cleveland's Message to the Joint Houses of Congress, December 18, 1893, Richardson, A compilation of the messages and Papers of the President: 1789-1908, Vol. IX (1993)

5 Cleveland's Message, infra, U.S. Acknowledgment and Apology for the Overthrow of the Kingdom of Hawai'i, S.J. Res. 19, 103d Congress, 1st Sess, PL 103-150 (107 Stat 1510) 1993

6 See note 3 pp.14-15

7 See infra at pp13-14

8 See note 3 pp. 13-14

9 Ku'e:The Hui Aloha 'Aina Anti-Annexation Petitions 1897-1898, compiled by Nalani Minton and Noenoe K Silva

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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i. On November 1896 William McKinley, a Republican, was elected president of the United States, replacing the Grover Cleveland. McKinley was inclined to annexing Hawaii. In early 1897 McKinley agreed to meet with a committee of annexationists, L. Thurston, F. Hutch, and W. Kinney. In June 1897 McKinley signed treaty of annexation with representatives of the Republic of Hawaii.

B. Under Internal Laws of the United States of America

a. Both treaties of annexation were never consented to by two-thirds (2/3rds) of those presented in the United States Senates as required of all treaties in accordance with the U.S. Constitution.[10]

b. The organic act presumptively extending U.S. citizenship (sec. 4) to Hawaiian citizens and descendants of them as well as asserting jurisdiction over the territory (sec.2) and citizens of Hawai'i was not properly grounded in that it was based upon the previous resolution on 1898 of annexation of Hawai'i (The Newlands Resolution, infra note).[11]

c. Subsequent applications of laws by the United States of America upon citizens and activities engaged within the territorial limits of Hawai'i were based upon a presumption of appropriate taking of jurisdiction over Hawaiian citizens and Hawaiian territories. These applications of law are only as valid as the foundations provided by the joint resolution of annexation of 1898[12] and the Organic Act of 1900. But if the instrument of annexation is illegitimate, all subsequent acts founded on the initial act are equally unlawful.

Fruit of Poisonous Tree Doctrine bears the poisonous fruits
you shall be known by your fruits

What is happening to United States of America **"in God we Trust"** and its *de facto* state of Hawaii.

C. Under U.N. Process of Decolonization

a. Independent of the historical international relationship between the nation of Hawai'i and the United States of America by virtue of the U.S. membership in the United Nation specifically, under Article 73 of the U.N. Charter, the U.N. Charter obligated the United States of America and other metropolitan states found in similar circumstances, as a matter of sacred trust, to ***bring about self-government*** of people within territories.

10 U.S. Constitution Art. 2. sec.2
11 See note 3 pp. 12-15
12 Newlands Resolution of July 7, 1898; 30 Stat. 750; 2 Supp. R.S. 895

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b. The United States of America has continued assertion of jurisdiction over Hawai'i territory and its citizens,[13] Unknown to most of the people in Hawai'i, in 1946 under the charter of the United Nations at Article 73, the United States was charged with bringing self-government to Hawai'i.[14]

c. The Hawai'i "statehood" vote, the U.S., reported to the U.N. that it "had met its responsibility" under Article 73. Believing this to be true, the U.N. General Assembly by Resolution 1469 (XIV) in 1959 relieved the United States of America of further responsibility to report to the U.N. on Hawai'i.

The U.N. General Assembly subsequently adopted its Declaration on the Granting of Independence to colonial Countries and People, (GA Res. 1514 (XV) 14 of December 1960) and formed the Special committee On The Situation with regard to the Implementation of the Declaration on the Granting on Independence to Colonial Countries and People. That declaration and the activities of the special committee reflect that the actions taken by the United States in Hawai'i did ***not*** meet the standard of self-governance required under Article 73. The exercise of self-determination in Hawai'i has not been accomplished. The plebiscite taken in 1959 failed to meet the requirements of the exercise of self-determination for at least two reasons; the U.S. government altered the "self " in defining who qualified to participate in the process, and limited the choices which the people should have *had only to a form of integration within the United States of America (territorial status or statehood), not to independence*.[15]

CHRONOLOGICAL FACTS OF STATEHOOD

On August 21, 1959, Hawaii ***illegitimately*** became a fiftieth state when U.S. President Dwight Eisenhower declared that "the procedural requirements imposed by the Congress on the State of Hawaii to entitle that state to admission into the Union have been complied with in all respects."

While the colonial establishment has subsequently annually celebrated August 21 as a State holiday, only since about 1990, have we Kanaka Maoli begun to learn that the 1959 Statehood process was a fraud.

- In 1946, at the time of the founding of the United Nations (UN), Hawaii was placed on the UN List of Non-Self-Governing Territories (colonies) eligible for decoloniztion as a consequence of the U.S.'s forced annexation of Hawaii in 1898.

13 See note 3 pp. 16-22
14 Principles Which Should Guide Members in Determining Whether of not an obligation Exists to transmit the Information, Called for in Article 73(e) of the Charter of the United Nations, Annex to GA Res. 1541 (XV) of 15 December 1960
15 The Admission Act of March 18, 1959, Pub Law 86-3, 73 Stat 4.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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- According to the UN Charter, Chapter XI, Article 73, the U.S., as the administering (colonizing) power in Hawaii, had a sacred trust... to ensure, with due respect for the culture of the people concerned, their political, economic, social and educational advancement... and to assist them in the progressive development of their free political institutions." The U.S. intentionally failed to fulfill this "sacred trust" responsibility to the colonized Kanaka Maoli people.
- Instead, aware that the UN was under pressure to refine a decolonization process that was to become General Assembly Resolution (UNGAR) 1514 in 1960, the U.S. moved to ensure that Hawaii (and Alaska) would be incorporated as states of the Union before 1960.
- March 12, 1959, the U.S. Congress passed the Hawaii Statehood Admission Act (PL.86-3), before a vote on the issue by the colonized Kanaka Maoli people, in violation of the Kanaka Maoli right to self-determination.
- Later, on June 27, 1959, a Statehood Plebiscite in Hawaii posed only one option on the ballot: immediate statehood. The colonial establishment trumpeted statehood as "equal opportunity and autonomy." The only other (unstated) option was for Hawaii to remain as a territory. No reference was made to two other options-independence or free association-as provided by UNGAR 742 of 1953.
- All U.S. citizens in Hawaii, including U.S. military personal, were permitted to vote, instead of only the colonized Kanaka Maoli people who were the only island residents eligible for the exercise of self-determination and who comprised only 16 percent of the resident population. The vote outcome was as predicted with a large majority in favor of immediate statehood.
- On September 17, 1959, unknown to the general public, the U.S. misinformed the UN the "Alaska and Hawaii had attained full measure of self-government as admitted states."
- On December 12, 1959, without public announcement, the misinformed UN General Assembly approved Resolution 1469 noting that " the people of Alaska and Hawaii have effectively exercised their right to self-determination and clarified some specific features, conditions and outcomes of the UN decolonization process:
- The subjection of peoples to alien subjugation, domination and exploitation constitutes a denial of fundamental human rights, is contrary to the Charter of the UN and is an impediment to the promotion of world peace and cooperation.
- All peoples have the right to self-determination; by virtue of that right they freely determine their political status and freely pursue their economic, social and cultural development.
- Inadequacy of political, economic, social and educational preparedness should never serve as a pretext for delaying independence.
- All armed action or repressive measures of all kinds directed against dependent peoples shall cease in order to enable them to exercise peacefully and freely their right to complete independence and the integrity of their national territory shall be respected.
- Immediate steps shall be taken, in Trust and Non-Governing Territories or all other territories which have not yet attained independence, without any conditions or reservations, in accordance with their freely expressed will and desire, without any

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distinction as to race, creed or color, in order to enable them to enjoy complete independence and freedom.
- Any attempt aimed at the partial or total disruption of the national unity and the territorial integrity of a country is incompatible with the purposes and principles of the Charter of the United Nation.

The colonized Kanaka Maoli in particular have never been publicly informed of the foregoing historical events.
This history does not appear in textbooks and is not taught as part of the core curriculum in the island colonial schools.

C. STATEMENT OF CASE:

a. The U.S. is obligated to conduct itself in international affairs in accordance with international law.

The U.S. Constitution has incorporated treaties of the United States of America with other states as "the Supreme Law of the Land; and the Judges of every State shall be bound thereby[16]." The U.S. Constitution explicitly recognized the validity of international law when it conferred to Congress the right to define and duty to punish offenses against the law of nations.[17] The United States Supreme Court has already stated that it must take judicial notice of international customary law.[18]

- "The United States has concluded that it has a trust obligation to indigenous Hawaiians because it bears a responsibility for the destruction of their government and the unconsented and uncompensated taking of their lands. U.S Solicitor General Seth Waxman to the U.S. Supreme Court"[19]

While international law may differ from municipal, internal or domestic laws in that internal laws have a system of enforcement while the enforcement of international law is uncertain at best, the fact that a law is enforceable doesn't make it law. Rather, the fact that it is law demands its obedience, whether enforceable by arms or by moral conscience.[20] Grover Cleveland, in addressing the joint houses of the U.S. Congress, declared that:

> The considerations that international law is without a court for its enforcement, and that obedience to its commands practically depends upon good faith, instead of upon the mandate of a superior tribunal, only give additional sanction to the law itself and brand any deliberate infraction of it not merely as a wrong but as a disgrace.

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16 U.S. Constitution, Art. VI.
17 U.S. Constitution, Art. 1 sec.8 Piracies & felonies-10
18 The Paquete Habana; the Lola 175 U.S. Reports 677 (1900)
19 Ka wai Ola o OHA vol 16, number 8, 'Aukake 1999 pg. 1 & pg.9
20 See Fitzmaurice, "The Foundations of the authority of International Law and the Problem of Enforcement," 19 Modern L. Rev. 1, 1-2, 8-9 (1956); Weston, Falk and D'Amato, International Law and World Order, West Publishing Co. 1980 p. 116 et seq.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

The U.S. Constitution itself requires courts to view treaties as part of the Supreme Law of the Land[21] **Furthermore, it is a fundamental doctrine of International Law that a state may not excuse itself for violations of international law on the basis that its municipal constitution or laws permitted violations of such international laws.**[22]

Thus, every court in the United States is obligated to look beyond the mere legislative pronouncements of the Congress and hold up these transactions of the U.S government with regards to Hawai'i against the backdrop of international law and the Constitution of the United States.[23]

B. The transactions engaged in by the U.S. in its dealings with Hawai'i in accordance with international law in its pattern of conduct attempting to annex Hawai'i to the U.S..

The United States had formally recognized Hawai'i as an international personality, **recognizing the Nation of Hawai'i as a sovereign, independent nation state**. The treaty of Friendship, Commerce, Navigation and Extradition (hereafter FCN&E) proclaimed November 9, 1850, declared, "There shall be perpetual peace and amity between the United States and the King of the Hawaiian Islands, his heirs and his successors.[24]The U.S. was to violate this treaty time and again.

By 1873, U.S. Minister to Hawai'i Henry Pierce, bent on annexation, informed U.S. Secretary of State Fish that annexation would be achieved only if "...the planters, merchants and foreigners... will induce the people to overthrow the Hawaiian Government, establish a republic, and then ask the United States for admittance into its Union"[25] The U.S. government was not limited to merely writing letters between high officials. On January 15, 1873, Major General and commander of the United States Army Military Division of the Pacific, John Schofield, (formerly Secretary of War) and Brigadier General B.S. Alexander of the Corps of Engineers, arrived in Hawai'i pretending to be on a vacation. Instead, they were spies to report about "the defense capabilities of [Hawai'i] different ports and their commerce facilities, and to examine any other subjects that may occur to you as desirable, in order to collect all information that would be of service to the Country in the event of war with a powerful maritime nation. They submitted a secret report on the great value of Pearl Harbor as a port to provide a safe harbor to protect

21 U.S. Constitution Art. VI

22 Werner Levi, Contemporary International Law: A Cincise Introduction, Westview Press, Colorado, 1979 at p. 25; Article 13, Declaration of Rights and Duties of States adopted by the International Law Commission 1949; The judgment at Nuremberg, 1 International Military Tribunal of the Major War Criminals 171 (1947)

23 See also Schooner Exchange v. McFaddon, 11 U.S. 116, 135 (1812)

24 Art. 1 p. 908 William M.Malloy, Treaties Conventions, International Acts, Protocols and Agreements between the United States of America and Other Powers 1776-1909, Vol. 1, Washington, Government Printing Office, 1910.

25 Letter from Pierce to Fish, February 17, 1873, house Executive Document, 53 Congress 2nd Session, Washington, D.C. 1895, hereinafter cited as the Blount Report, p. 153; Rich Budnick, Stolen Kingdom: an American Conspiracy, Aloha Press 1992, pp.36 & 37.

several hundreds ships. This report was kept secret until 1897 when it was declassified to support annexation in Congress.[26]

By 1882, the U.S. President administration was engaged in encouraging the destabilization of the Hawaiian government through discussion with Lorrin Thurston. The Arthur administration assured Thurston that the U.S. government would look with great favor to an annexation treaty should there be a revolt and overthrow of the Hawaiian monarchy and a new government formed.

The U.S. government subsequently sent to Hawai'i annexationist John L. Stevens, as its Minister Plenipotentiary. Stevens was well known as an annexationist. As editor of the Kennebec Journal, for time, in partnership with U.S. Secretary of State Blaine, he and Mr. Blaine wrote numerous articles for the annexation of Hawai'i. [27] On March 8, 1892, he requests instructions from Blaine on how far he may deviate from established international rules and precedents in order to advance the goal of destabilization and annexation of Hawai'i.[28]

By 1892, U.S. Harrison administration, itself, as on the same course as the Arthur administration 10 years earlier, encouraging Thurston toward the destabilization of Hawai'i.[29] On the 17th of January, 1893, through the connivance of the U.S. Minister plenipotentiary, with Thurston, the Hawaiian monarch was forced to yield her authority to the U.S. government by the aggression of the U.S. military upon Hawaiian soil.[30]

Every one of these acts was in violation of international law, both as a matter of customary international law[31] as well as the FCN&E treaty. They were also in contradiction to the much earlier declaration of the U.S. President to the Congress on December 31, 1842, recognizing Hawai'i independence and pledging never to take possession of Hawai'i.[32]

> In Article 6(a) of the Nuremberg Charter, we find Crimes Against Peace; namely, planning, preparation, initiation or waging of a war of aggression, or a war in violation of international treaties, agreements or assurances, or participation in a common plan or conspiracy for the accomplishment of any of the foregoing.[33]

26 Budnick at p. 37&38; Blount Report at pp. 153, 154, &158.

27 P. Laenui, "Three Days in January" The Overthrow if the Hawaiian Monarchy, acompanion booklet to a Nine Hour Radio Broadcast of the Event of the Century, Hawaiian National Broadcast Corporation, Honolulu, 1993 at 12.

28 Ibid at 10. Blount Report p. 182

29 Gavin Daws, Shoal Of Time: A history of the Hawaiian Islands, U.H. Press, 1974, p. 266.

30 President Grover Cleveland's Message to the Congress of the United States on December 18, 1893, Executive Doc. no. 47, 53rd Congress, 2nd Session, House of Representative; Apology Bill, PL. 103-150; Liliu'okalani, Hawaii's Story by Hawaii's Queen, Tuttle Press, Tokyo 1965

31 "acts of aggression constitutes international crimes against the human species." Unanimous resolution of 18 February 1928 of 21 American republics at the Sixth (Havana) Pan-American Conference. International Law & World Order, Note 20, supra, at p. 155; By 1893, acts of aggression were already contrary to international law in the Americas and in the South Pacific Kazi Aktar Hamid, Self-Determination: The Case Study of Hawai'i, Dissertation for the degree of the Doctor of Laws (LL.) 4 November 1991, University of Ottawa, p. 246-247.

32 Dispatch from Pageot, French representative in Washington, to Guizot, French minister of Foreign Affairs, no. 55, June 11, 1844, AMAE (Paris), Etats Unis, Vol. C.

33 Judicial Decisions, International Military Tribunal (Nurenberg). Judgment and Sentences; 41 American Journal of International Law 174 (1947).

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The United Nations General Assembly at its first session in 1946 recognized the principles set out in the Nuremberg Charter.[34]

The United States committed crimes against peace under the law of nations by planning and implementing the use of force to overthrow the Hawaiian monarch without any provocation by her official representatives. United States President Cleveland in addressing the joint houses of Congress on December 18, 1893, stated it accurately when he said, "candid and thorough examination of the facts will force the conviction that the Provisional Government owes its existence to an armed invasion by the United States." The United States Congress, in its apology bill signed by President Clinton on November 23, 1993, was equally explicit when it stated:

"On January 14, 1893 John L. Stevens...the U.S. minister ...conspired with a small group of non-Hawaiian residents of the Kingdom of Hawai'i, including citizens of the United States, to overthrow the indigenous and lawful government..."[35] The U.S. Congress concede that the government of the Kingdom of Hawai'i was the lawful government at that time, and that an official agent of the United States government conspired to overthrow the government of Hawai'i. The United States government is bound by the actions of its agents, of its ministers.[36] The President was bound by the actions of the minister. The United States government conspired to overthrow the lawful government of the Kingdom of Hawai'i, which was an internationally illegal act at the time it was done, and is currently acknowledged by President Clinton and congress.

The next paragraph continues, "pursuant to the conspiracy... naval representatives called armed forces to invade the sovereign Hawaiian nation on January 16, 1893, and to position themselves near the Hawaiian government buildings and the (Iolani) Palace to intimidate the Queen Liliu'okalani and her government."[37] Congress significantly calls an invasion an invasion. That is what it was, a clearly illegal act, an invasion in violation of treaties and international agreements, an invasion in violation of international law, and an

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34 U.N. General Assembly Resolution 95(1), U.N. Doc. A/6. at 188 (1946).

35 Apology Bill, PL. 103-150, Cleveland's Message, infra, U.S Acknowledgment and Apology for the Overthrow of the Kingdom of Hawai'i, S.J. Res. 19, 103d Congress, 1st Sess, PL. 103-150 (107 Stat. 1510) 1993.

36 See Nuclear test case (Austl. v. Fr) 1974 I.C.J. 252 (Dec. 20). where the International Court held that:

It is well recognized that declaration made by way of unilateral acts, concerning legal or factual situations,may have the effect of creating legal obligations. Declaration of this kind may be, and often are , very specific. When it is the intertion of the State making the dexlaration that it chould become bound according to its terms, that intention confers on the declaration the character of a legal undertaking, the State being thenceforth legall required to follow a course of of conduct consistent with the declaration. All undertaking of this kind. If given publicly, and with an intent to be bound, even through not made within the context of international ngotiations, is binding.

Id. at 267. (holding France bound to statements made be government ministers). *But* see Personnel Management v. Richmond, 496 U.S. 414 (1990) ("The United States is neither bound nor estopped by acts of its officers or agents in entering into an arrangement or agreement to do or cause to be done what the law does not sanction or permit.")

37 Overthrow of Hawai'i Resolution, Public Law No.103-150, 1993 U.S.CC.A.N. (107 Stat.) 1510.

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invasion in violation of the United States Constitution the overthrow of a lawful government.

Under the international law when you have a violation of treaties of this magnitude, the World Court has ruled that the only appropriate remedy is restitution.[38] The Kingdom of Hawai'i, that is our independent nation state. This is the appropriate remedy.

The Public Law goes on from here, reciting the sorry history of what happened, the establishment of the provisional government.[39] Well, that is not entitled to any legitimacy at all. It was imposed by raw, naked, and brutal military force, at the point of a bayonet, (gunboat diplomacy), just as was practiced in many other countries, only here now Congress has finally admitted this.

The next paragraph points out that the establishment of this provisional government was without the consent of the Native Hawaiian people or the lawful government of Hawai'i, and violated all of the international treaties and agreements.[40] So under international law, you would not call this provisional government. You would call it a government of military occupation. That is, we had military forces here and then we had a civilian arm of the military occupying regime.

The occupied Palestinian lands where the Israeli occupying forces have set up a civilian arm if their military occupation authorities to administer the civil affairs of the Palestinian people.[41] The negotiations centered around the withdrawal of the civilian military occupation arm, and the withdrawal of the military occupation forces themselves.[42] The September 13, 1993 agreement calls for the dissolution of the civilian occupation arm and then the withdrawal of the military occupation forces themselves.[43]

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38 Case conserning the Factory at Chorzow, 1928 P.C.I.J. (ser. A) No. 17, at 47 (Sept. 13). *But see*
J. Patrick Kelly, *The Changing Process of International Law and the Role of the World Court*, 11 Mich. J. International Law 129, 159(Fall 1989) ("actual practice indicates that compensation is now governed by the doctrine of unjust enrichment rather than a right of restitution").

39 "Whereas, on the afternoon of January 17, 1883, a Committee of Safety that represented the American and European sugar planters, descendants of messionaries, and financiers disposed the Hawaiian monarchy and proclaimed the edtablishment of a provisional government." Overthrow
of Hawai'i Resolution, Public Law No. 103-150. 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1510-11.

40 "Whereas, the United States minister thereupon extended diplomatic recognition to the
Provisional government that was formed by the conspirators without the consent of The Native
Hawaiian people to the lawful governmentwith Hawaii and in violation of treaties between the two
nations of international law." Overthrow of Hawai'i Resolution, Public Law No. 103-150, 1993
U.S.C.C.A.N. (107 Stat.) 1510, 1510-11.

41 *See* J. Timothy McGuire, *International Law and the Administion of Occupied Territories: Two Decades of Israeli Occupation of the West Bank and Gaza Strip*, 8 Emory International Law
Rev. 383 (1994).

42 *See* David I. Schulman, *The Israeli-PLO Accord on the Declaration of Principles on Interim*
Self- *Government Arrangements; The First Step Toward Palestinian Self-Determination*, 7 Emory International Law Rev. 739 (Fall 1993); Gumar Halley, *IssuesConfronting the Return of Palestinian Arab Refugees After the 1993 Declarationof Principles on Interm Self-Government Arrangements*, 8 Geo. Immigr. L.J. 149 (1994).

43 Declaration of Principles on Interim Self-government Arrangements. Sept. 13, 1993. 1st.-PLO,
art. VI, 32 I.L.M. 1524, 1527.

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Therefore, this "provisional government " referred to in the Public Law is really the civilian arm of a military occupation force. That was the predecessor to the current government of Hawai'i that administers to us. Again, following the implications of that law, the state government of Hawai'i occupies a similar position to that provisional government. The federal military forces here keeping it in power.

We then come to the statement by our precious so loved Queen Liliu'okalani, "that I yield to the superior force of the United States of America,"[44] She made it very clear that this statement and her later abdication were procured under duress and force. It could not be treated by anyone as a valid surrender of sovereignty by the Native Hawaiian people at all and she made that very clear in this language. She was simply bowing to superior power, but NOT as a matter of right or of law.[45]

In a parallel case communicating with the World Court, the Owen-Stoltenberg plan[46] to partition the republic of Bosnia and Herzegovina, was concluded, by means of threats and duress, compulsion and coercion. It was therefore invalid, under international law and the Vienna Convention on the Law of Treaties.[47] Our Queen Liliu'okalani a very powerful person, and preserving the rights of her people under duress, she committed an act now seen as "under extreme duress".

The law goes on, with Congress admitting that [w]ithout the active support and intervention by the United States... the insurrection...would have failed for lack of popular support and insufficient arms.[48] And in 1893 "the minister raised the flag and declared Hawai'i to be a protectorate of the United States."[49] They did not protect anything, did they? Was there a need to protect Hawai'i from itself, from its own people? Who was threatening Hawai'i at that time? It was the United States. They needed protection from the United States, so this is absurd. Hence, The occupation was entitled to no legal validity at all at the time and is not now. That is basically what Congress is saying.

The Blount Report states that "military representatives had abused their authority and were responsible for the change in government."[50] Again, this is further admission that the United States acted illegally under international law. The implication then. of these admissions by Congress, by the Blount Committee, is that there must be

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44 Overthrow of Hawai'i Resolution Public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510 1511.

45 *See* Case Concerning Application of the Convention on the Prevention and Punishment of The Crime of Genocide (Bosnia & Herzpgpvina v. Yugoslavia), 1993 I.C.J. 325 (Sept. 13).

46 *See* Alan C. Laifer, Note, *Never Again? The Concentration Camps in Bosnia Herzgovina; A legal Analysis of Human Rights Abuses,* 2 New Eur. L. Rev, 159, 187 (Spring 1994).

47 " A treaty is viod if its conclusion has been procured by the threat or use of force on violation of the principles of international law embodied in the Charter of the United Nations." Vienna Convention of the Law of Treaties, *supra* note 12, at art. 52.

48 Overthrow of Hawai'i Resolution, Public Law No. 103-150, 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1512.

49 Overthrow of Hawai'i Resolution, Public Law 103-150, 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1512.

50 *Id.* ("Presidential established investigation conducted by Congressman James Blount into the events surrounding the insurrection and overthrow").

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restitution.[51] Na Kanaka Maoli (Hawaiian) people, Na po'e O Hawai'i have a right to be returned to the situation they were in, as of January 17, 1893. The federal government disciplined the minister and forced him to resign his commission. The overthrow should be reversed. The President could have done it if he wanted to; he just did not do it.

President Cleveland's message to congress admitted all this. "An act of war, committed with the participation of a diplomatic representative of the United States and without authority of Congress."[52] The President clearly admitted that this was illegal behavior of the most heinous type. A "substantial wrong" was done, calling for the restoration of the Hawaiian monarchy.[53] The United Nations Charter.[54]

The Newlands Joint Resolution[55] provided for the annexation of Hawai'i in 1893. Where is the authority for this? There is none. They stole the land, the country, displaced the government, and now they have annexed it. This very issue was addressed by the Nuremberg Tribunal in 1945, where German Nazi government tried to maintain that some of the annexations of foreign territory that it had undertaken before and during the Second World War were entitled to legal recognition. The Nuremberg Tribunal itself in 1945 said, "no annexations are valid prior to the conclusion of a peace treaty."[56]

The United States government and the President conceded that they engaged in acts of war, that they are occupying our land and that they put themselves at war with our people.[57] The United States annexation has no validity under international law. The U.S. have effectively, in this law, invalidated the entire annexation. The whole legal basis for it now been invalidated.

The annexation of the land is invalid, then where does the title come from, who has title to the land? It is Na Kanaka Maoli (Hawaiian) people who retain title to the lands of Hawai'i, as a matter of international law. It is not the federal government, not the state government, but Na Kanaka Maoli (Hawaiian) people themselves. That is the implication here. The truth of the findings of facts and conclusions of law are now officially set forth by Congress.

"[T]he Newlands Resolution, the...Republic of Hawai'i ceded sovereignty over the Hawaiian Islands to the United States."[58] But the Republic of Hawai'i [59]never had

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51 *See* Nark A. Inciong, Note, *The Lost Trust; Native Hawaiian Beneficiaries Under the Hawaiian Homes Commission Act*, 8 Ariz. J. Int'l & Comp. L. 174, 191 n.34 (1991) ("The Blount Report found that the overthrow ... had been illegal ... and that Liliu'okalani [should] be restored to power").

52 "whereas, in a message to Congress on December 18, 1893, President Grover Cleveland reported fully and accurately on the illegal acts of the conspirators." Overthrow of Hawai'i Resolution, Public Law No. 103-150, 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1511.

53 Overthrow of Hawai'i Resolution, public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1511.

54 U.N. Charter, art. 1, & 2.

55 Newlands Resolution, Public Law No. 55, 30 Stat. 750 (1898).

56 "[I]t was held that, by 1939, the rules on belligerent occupation [that it does not transfer sovereignty] been recognized by all civilized nations and were regarded as being declaratory of the law and customs of war." George Shwwarzenberger. 2 International Law 165 (1965) (citing Nuremberg Judgment, International Military Tribunal, Cmd. 6964 at 65 (1946)).

57 Overthrow of Hawai'i Resolution, Public Law 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510

58 *Id.* at 1510.

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sovereignty over the Hawaiian Islands. We have already determined the Republic of Hawai'i was the civilian occupying arm of a military occupation forces. Sovereignty remains in the hands of the displaced sovereign. This is black letter international law.[60]

"The Republic of Hawai'i ceded 1,800,000 acres of crown, government, and public lands of the Kingdom of Hawai'i, without the consent of or compensation to Na Kanaka Maoli (Hawaiian) people, or sovereign government.[61] The Republic had no authority to do this. The Republic of Hawai'i was a military occupation authority, the civilian arm, without any sovereign claims to the land under the laws of military occupation and the laws of war. So they had no power to cede anything. The title to the land rested and still rests, under international law, with the Kingdom of Hawai'i Na Kanaka Maoli (Hawaiian) people.

Our Kanaka Maoli Hawai'i, Hawaiian people of the Kingdom of Hawai'i cannot "trespass" on our own land. The trespassers are the state of Hawai'i, the land developers, the golf courses, and the resorts. What this fact does is point out that the whole situation is completely turned around on its head. It now changes the whole way that these U.S. and state authorities should be looking into this matter. The federal government is the trespasser and the criminal. The Kingdom of Hawai'i is Na Kanaka Maoli (Hawaiian) people asserting our rights under international law. This reversal of positions between who is the criminal and who are the VICTIMS, and between who is asserting their RIGHTS and who is violating our rights has been effectively conceded by Congress.

Universal Declaration of Human Rights.[62]

Article 25 of Declaration provides that "everyone has the right to a standard of living adequate for health, well-being of themselves and their family, including food, clothing, housing, medical care and necessary social services."[63] In 1994 a survey was done in the state. Na Kanaka Maoli (Hawaiian) people were ranked #1 as highest in poverty, ill health, homelessness, and imprisonment. The state of Hawai'i has no right to throw anyone of our Kanaka Maoli (Hawaiian) people out. Where is the governments right?
Article 18 of the Declaration provides that "everyone has the right to freedom of thought, conscience, and religion. This includes freedom to manifest his religion or belief in teaching, practice, worship, and observance."[64] The state of Hawai'i, real estate developers, or resort developers, has no right to destroy any of what our ancestors have created as Heiau to worship on our lands or burial sites to respect. Under Article 18.

"Whereas, the Congress...annexed Hawai'i...and vested title to the lands in Hawai'i in the United States.[65] This is clearly illegal. The annexation was invalid. The United

59 Mililani B. Trask, *Historical and Contemporary Hawaiian Self-Determination: A Native Hawaiian Perspective*, 8 Ariz. J. Int'l Comp. L. 77, 91-95 (1991).

60 "[A]nnexation of occupied territory is a violation of international law... Title to the territory in questionmust not change until there is complete subjection (*debellatio*) or a peace treaty has been put into effect." Gerhard Von Glahn, Law Among nations 768 (1992).

61 Overthrow of Hawai'i Resolution, Public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1512.

62 Universal Declaration of Human Rights, G.A. Res. 217 (III) U.N. GAOR, 3d Sess, 61.

63 *Id.* at art. 25.

64 *Id.* at art. 18.

65 Overthrow of Hawai'i Resolution, Public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1512.

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States cannot get title from the Republic of Hawai'i because the Republic of Hawai'i never had title in the first place. They had no sovereignty. They were nothing more than a military occupation power, and a military occupation power cannot validly transfer title to land. Again, black letter international law.[66] The occupying power cannot sell land legally. You cannot transfer land title. It does not make it lawful, but invalid. It's illegal. Occupying power cannot sell land legally. All transactions that were done, are all invalid. It is illegal. It's all arguably, they are obliged to leave, and not to stay.

The law goes on to state; "Where, the Newlands Resolution effected the transaction between the Republic of Hawai'i and the United States government.[67] The Newlands Resolution is entitled to no validity at all, since it is based on an illegal invasion, a violation of treaties, and a violation of the principle of *pacta sunt servanda*.[68] Many numerous and repeated violations of law have accrued as a result of this.

Congress admits that "the indigenous Kanaka Maoli (Hawaiian) people never directly relinquished their claims to ... inherent sovereignty... through a plebiscite or a referendum.[69] The U.N. General Assembly subsequently adopted its Declaration on the Gantion of Independence to Colonial Countries and peoples, (GA Res. 1514 (XV) of 14 December 1960) and formed the **Special Committee On The Situation with regard to the Implementation of the Declaration on the Granting of Independence of Colonial Countries and Peoples.** That declaration and the activities of the special committee reflect that the actions taken by the United States in Hawai'i did meet the standard of self-governance contemplated under Article 73. The exercise of self-determination in Hawaii [Hawai'i] has not been accomplished. The plebiscite taken in 1959 failed to meet the requirements of the exercise of self-determination for at least two reasons; the U.S. government altered the "self" in defining who qualified to participate in the process, and limited the choices which the people should have had only to a form of integration within the United States of America (territorial status or statehood), not to independence.[70] The vote is meaningless, as a matter of international law and of United States domestic law. Pursuant to the principle of self-determination in article 1, Paragraph 2 of the United Nations Charter.[71]

The Public Law more admissions "Whereas, the long-range economic and social changes in Hawai'i over the nineteenth and early twentieth centuries have been devastating to the population and to the health and well-being of the Hawaiian people."[72] A survey done in Hawai'i in 1994 the Hawaiian people rank number 1 in poverty, ill health,

66 "Belligerent, occupation does not transfer sovereignty. Instead it transfers to the occupant the authority to exercise some rights of sovereignty." Von Glahn, *supra* note 58 at 774. *See also*

67 Overthrow of Hawai'i Resolution, Public Law, No. 103-150 1993 U.S.C.C.A.N. (107 Stat.)1510, 1512.

68 *See* Martin Hession, *The Legal Framework of European Community in International Environmental Agreements*, 2 New Eur. L. Rev. 59, 103 (Spring 1994).

69 Overthrow of Hawai'i Resolution, Public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1512.

70 U.N. Charter art. 73, The Admission Act of March 18, 1959, Public Law 86-3, 73 Stat. 4.

71 U.N. CHARTER art. 1 paragraph 2

72 Overthrow of Hawai'i Resolution, Public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510, 1512.

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homelessness, and imprisonment. The Hawaiian people have been subjected to the international crime of Genocide, as determined and defined by the 1948 Genocide Convention,[73] and the 1987 Genocide Convention Implementation Act,[74] the Proxmire Resolution. That was one of the findings of the San Francisco Tribunal. The key findings held here concerning Hawai'i *Ka Ho'okolokolonui Kanaka Maoli*.

In the International Court of Justice, they have been convinced that Genocide is going on in Bosnia-Herzegovina,[75] There is no reasonable doubt my next step is the World Court. GENOCIDE has being practiced by the United States government against Na Kanaka Maoli Hawaiian People. This will take my people, Na Kanaka Maoli back to the creation of a nation and will bring protection for Na Kanaka Maoli (Hawaiian) people and the Hawaiian Citizens of Hawai'i. I, Majesty Akahi Nui, King of the Hawaiian Islands will not at all even consider what Secretary Babbitt is considering as the same status as Native Americans. My people are not even as close to the same status of a Native American. My people are Na Kanaka Maoli Hawai'i and the people not of the race are Hawaiian citizens.

"It is proper and timely for Congress to acknowledge the historic significance of the illegal overthrow."[76] It had no validity at all.

The Resolution then addresses support for the reconciliation efforts.[77] Under international law for a violation of this nature, the remedy is restitution.[78] To set right the harm that has been done to restore the situation to what it had been before the violation in 1893. See the *Chorzow Factory case*.[79]

Section 1, acknowledgment and apology.[80] The law again repeats, "illegal overthrow. " the significance of the various "whereas" clauses were "resolved by the Senate and House of Representatives of the United States of America, in Congress and Senate, and signed by the President .[81] This provision of the law recognizes the illegal overthrow and "acknowledges the historical significance of this event which was ultimately the suppression of the inherent sovereignty.[82]

Paragraph 2 apologizes for the overthrow "with the participation of agents of the United States.[83]The U.S. government again is responsible for the actions of its ministers,

73 Convention on the Prevention and Punishment of the Crime of Genocide, January 12, 1951, 78 U.N.T.S. 277.

74 Genocide Convention Implementation Act of 1987, Public law no. 100-106, 102 Stat. 3045 (1987).

75 *See* Case Concerning Application of the Convention on the Prevention and Punishment of The Crime of Genocide (Bosnia & Herzogovina v. Yugoslavia, 1993 I.C.J. 325 (Sept. 13.)

76 Overthrow of Hawai'i Resolution, Public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510. 1513.

77 *Id.*

78 Case Concerning the Factory at Chorzow, 1928 P.C.I.J. (ser. A) No. 17, at 1 (Sept. 13).

79 *Id.*

80 Overthrow of Hawai'i Resolution, Public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510. 1513.

81 *Id.*

82 *Id.*

83 *Id.*

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Congress now calls these people "agents" Their illegal conduct, binds the United States government. The United States government is under an obligation to undo the harm that was done. But even if the United States does not, I, Majesty Akahi Nui and my Na Kanaka Maoli (Hawaiian people) have our right to act to undo the ***curse of injustice*** in the World Court It is presently active in the World Court. The rest of the sentence reads, "the deprivation of the rights of Native Hawaiians to self-determination.[84]

Congress has conceded that the Native Hawaiian peoples have the right to self-determination. Self-determination of the people is under the U.N. Charter provides a rights to full sovereignty.[85]

Paragraph 4 expresses its commitment to acknowledge the ramifications.[86]
The ramifications, and the implications, of the overthrow of the Kingdom of Hawai'i.

The definition section, Congress defines Native Hawaiians as "any individual who is a descendant of the aboriginal people, prior to 1778...occupied and exercised sovereignty, in the area that now constitutes the state of Hawai'i.[87] Our right to determine our political status, our government, through customary systems, and to freely pursue our economic, social, and cultural development in accordance with article 1 of both the International Covenant on Civil Political, Economic, Social, and Cultural Rights.[88] This affirms that the Kingdom of Hawai'i is still in existence. The descendants of the aboriginal people still lives which affirms the existence of the Kingdom of Hawai'i. The sovereign authority of these lands.

I, Majesty Akahi Nui has been recognized by the illegitimate government that I am a descendant of 1778 on 12th of March 1998.

It is not the state or the federal government, but the Hawaiian people. The sovereignty is still and will always remain in the hands of my people Kanaka Maoli Hawai'i. The territory is the state. The Hawaiian Archipelago, the lands before the invasion of 1893.We claim a twelve mile territorial sea and a 200 mile exclusive economic zone, in accordance with customary international law and the Law of the Sea Treaty of 1982.[89]

Congress has recognized ***Na Kanaka Maoli Hawai'i*** with sovereign powers. We are the original inhabitants and occupants of these islands. We have always been in possession of our land. Our sovereign nation the Kingdom of Hawai'i was always in existence because the race still lives ***Na Kanaka Maoli Hawai'i*** *(Hawaiian people)*.
Our rights under the Universal Declaration of Human Rights.[90]

84 *Id.*

85 U.N. CHARTER art. 1, paragraph 2.

86 Overthrow of Hawai'i Resolution, Public Law No. 103-150 1993 U.S.C.C.A.N. (107 Stat.) 1510. 1513.

87 *Id.*

88 *International Covenant on Civil Political, Economic, Social, and Cultural Rights*, G.A. Res. 2200 (XXI), U.N. GAOR, 21st Sess., Supp. No. 16 at 49, U.N. Doc. A/6316 (1966).

89 United Nations Convention on the Law of the Sea, opened for signature Dec. 10, 1982, U.N. Doc. A/CONF.62/122, *reprinted in* 21 I.L.M. 1261 (1982).

90 *Universal Declaration of Human Rights*, G.A. Res. 217 (III), U.N. Doc. A/810, at 71 (1948), *reprinted in* 21 I.L.M. 1261 (1982).

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"Men may change the laws of the land." "They can not change the truth. "
"May we now bring healing to the hearts of our people, "
" I will prepare the throne for Our Coming King of Kings and Lord of Lords"

On this 7th day of the January month in the Holy Year of our Lord and Savior Jesus Christ Two Thousand and Two.

In Sacred Trust I am

Majesty Akahi Nui

Majesty Akahi Nui
Sovereign Heir

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NOTICE ORDER TO ANSWER WITHIN TWENTY (20) DAY(S)

Do you have a lawful governmental foundation and lawful jurisdiction over the aboriginal Na Kanaka Maoli Hawai'i (Hawaiian people) by the ***illegitimate*** state of Hawai'i and its entities since January 16,1893 and to this present day in 2002? (Read Justice O Connor Opinion USSC) The apology letter from the U.C.C. (United Church Of Christ), U.S. P.L. 103-150 and the Japanese American Citizens League (JACL) 1992 National Convention **RESOLUTION REAFFIRMING SUPPORT FOR THE RESTORATION OF HUMAN, CIVIL, PROPERTY AND SOVEREIGN RIGHTS OF HAWAII'S INDIGENOUS PEOPLE.**

Yes ( ) Please explain in full with attached lawful documentation of original evidence truth of law.

No ( ) No Jurisdiction

Sworn Officials of the United States of America, being duly sworn on oath, deposes say; That the foregoing question is answered to the best of his or her knowledge and behalf.

____
signature

____
Print name

____
Position

Subscribed and sworn to before me
this___day of_____________, _____

____
Notary Public, United States of America
My commission expires:_____

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MARINE MAMMAL COMMISSION
4340 East-West Highway, Room 905
Bethesda, MD 20814-4447

2 October, 2007

Public Affairs Officer
Pacific Missile Range Facility
PO Box 128
Kekaha, HI 96752-0128

Dear Sir:

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors, has reviewed the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS) provided by the Department of the Navy in support of its planned Navy Pacific Fleet training and defense-related research on the Hawaii Range Complex (HRC). The HRC consists of onshore as well as offshore areas covering 235,000 square nautical miles around the Hawaiian Islands, with an additional 2.1 million square-mile Temporary Operating Area of sea and air space. The HRC is a complex of instrumented ocean areas, airspace, ocean surface operation areas, targets, and land range facilities. The DEIS identifies three alternative levels of training and research-related activities and estimates the potential unmitigated and mitigated environmental effects from range-wide training and research, development, testing, and evaluation activities. Based on a finding of no significant adverse impacts, with mitigation, the Navy has submitted an application for a Marine Mammal Protection Act Letter of Authorization (LOA) to authorize the incidental take of marine mammals that may result from the implementation of the activities analyzed in the DEIS.

The HRC DEIS covers an unprecedented scope of effort and affected area in a document that is for the most part thorough and clear. Later in this letter we note a number of particularly difficult issues or concepts that have been described with considerable clarity and addressed with novel and improved measures. The Commission also has identified three major elements of the DEIS in need of reconsideration and revision.

RECOMMENDATIONS

The Marine Mammal Commission believes that the Final EIS/OEIS and associated request for an LOA under the Marine Mammal Protection Act require major revision with regard to the estimation of risk, the mitigation of that risk, and, perhaps most important, the evaluation of action alternatives. Therefore, the Marine Mammal Commission recommends that the Navy— 1, 2, 3

- create an alternative of reduced or no range use, and adequately document the likely consequences for national defense readiness, to be weighed against whatever reductions in environmental risk would be obtained by the no action or reduced action alternative; 1
- provide a comprehensive description of the proposed dose-response relationships and the manner in which they will be used; and 2

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- provide a comprehensive description of the various monitoring and mitigation measures that might be used, evaluate the performance of those measures taking into account existing marine mammal monitoring and mitigation data, and instigate planning to evaluate and address the strengths and shortcomings of the proposed measures. 3

RATIONALE

The three major areas of recommended revisions to the DEIS are as follows:

Action Alternatives—In the HRC DEIS the Navy takes the unusual, if not unprecedented, approach of treating the current ongoing level of training activity as the "no action" alternative, with two options of increased activity as alternatives 1 and 2. Typically a no action alternative refers to the consequence of not going forward with the requested action at all. Instead the Navy argues that all three proffered alternatives can be mitigated to zero effect, and therefore the environmental risk of choosing any of the options would be the same. We do not believe that the risk can be mitigated to zero (and will offer arguments in support of that perspective), in which case the consideration of an alternative that offers reduced environmental risk is essential to making an informed decision about the costs and benefits of all reasonably available alternatives. 4

The DEIS would benefit from a review of anticipated changes in Naval training that are being implemented for other reasons, but which might also affect the potential environmental risks. Cost savings and reduced manning goals are reasons other than environmental stewardship that have driven research and acquisition efforts by the U.S. Navy to reduce the time and money demands of training. Growing costs of fuel and the climatic consequences of large scale combustion of hydrocarbon fuels in military training are another emerging factor in considering the merits of alternatives, despite the well-established and widely accepted merits of realism in training. Such considerations should be described in the EIS to promote informed decisionmaking about alternatives and the relative environmental risks of each. 5

The Commission recognizes that a considerable amount of effort will be required to document both the Navy's ongoing efforts to reduce training cost and expense and its efforts to document the impact of any loss of training capability on readiness. However, we also believe that much of the needed information already exists within the Navy and could be relatively easily brought into the HRC EIS. For example, recent efforts by the Department of Defense to document for Congress the cost of lost training due to "encroachment" on range activities, such as the loss of the Vieques range, could provide this specific EIS with information on the potential impacts on readiness from lost HRC training opportunities. Similarly, existing documentation required to justify the costs of Navy research, development, testing and evaluation efforts to improve training also exist and should be useful in determining the trade-offs and feasibility of implementing alternative training procedures. 6

For these reasons, the Marine Mammal Commission recommends that the Navy create an alternative of reduced or no range use, and adequately document the likely consequences for national defense readiness, to be weighed against whatever reductions in environmental risk would be obtained by the no action or reduced action alternative.

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Risk Estimation Protocols—The Commission recognizes the considerable effort the Navy and the National Marine Fisheries Service have applied to the development of clear, scientifically based Level A acoustic risk criteria and commends the comparable effort to develop Level B risk criteria using dose-response relationships to better reflect the natural individual variability within a given population. However, a number of aspects of the risk estimation process are not well explained,

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specifically the means by which animal density data and sound field data are integrated to produce the sound exposure levels for risk evaluation, and the estimated effectiveness of mitigation measures on risk of either injury or behavioral harassment. The use of heuristic techniques such as time-invariant probabilistic two-dimensional representations of animal density, and the use of time averaging techniques for prolonged and intermittent sound exposure are among the features of this novel and complex risk estimation procedure that need to be explained in greater detail. This explanation should include one or more illustrative examples of how data on animal abundance and distribution are derived from the literature, or how data on the nature and duration of activities on the range are combined and translated into an exposure metric. Therefore, the Marine Mammal Commission recommends that the Navy provide a comprehensive description of the proposed dose-response relationships and the manner in which they will be used. Such information is necessary to allow readers to evaluate the nature and level of risk to marine mammals.

23

Monitoring And Mitigation—With regard to monitoring and mitigation, the HRC DEIS suffers two main shortcomings: it does not include a comprehensive description of monitoring and mitigation options, and it offers estimates of performance for proposed mitigation measures that are inconsistent with existing performance data from similar survey and mitigation efforts. Although the methods for assessing mitigation performance are well understood and such an assessment can be easily carried out, the Navy apparently has not done so. The Navy's own SURTASS LFA EIS includes such analyses, and these same analyses should already have been conducted for the kinds of ongoing fleet activities listed in the HRC DEIS. In the absence of such information, we believe it is incumbent upon the Navy to include a plan for obtaining performance data to justify its confidence in such critical mitigation measures as sonar ramp-up, watchstander training effectiveness, and watchstander probability of detection of marine mammals and other species of concern. This is most obviously true of watchstander performance, for which substantial quantitative data are available from many well-documented surveys for marine mammals and sea turtles. Probabilities of detection for experienced survey observers under ideal conditions, counting highly visible species, still do not rise to the 100 percent probability of detection claimed for Navy watchstanders who have far less experience sighting animals at sea and multiple duties to perform. Detection probabilities are even lower for difficult-to-detect species such as beaked whales or sea turtles. Such probability-of-detection data are easily verified by well-known methods such as dual ship surveys or multiple independent blind control surveys of similar design. Such verification and validation procedures are regularly undertaken by the Navy to verify training performance and to establish the performance of new systems under standard research, development, testing, and evaluation processes that precede acquisition and fleet use. Performing similar verification and validation for environmental effects mitigation would not be unduly costly and would clarify whether the Navy is in fact being realistic in its claims for its proposed mitigation efforts.

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In addition, passive acoustics and other sensing technologies that might improve marine mammal detection and risk mitigation are rejected without undergoing similar performance evaluation and development. Dismissing additional mitigation as not well enough developed to use and then making no effort to bring such tools to maturity should not be an acceptable position when the potential adverse effects of the proposed action are significant and the action agency is as technically adept and strong in new technology acquisition as the Navy. For these reasons, the Marine Mammal Commission recommends that the Navy provide a comprehensive description of the various monitoring and mitigation measures that might be used, evaluate the performance of those measures taking into account existing marine mammal monitoring and mitigation data, and instigate planning to evaluate and address the shortcomings of the proposed measures.

DETAILED COMMENTS

The following detailed comments either reinforce the above points with reference to specific parts of the HRC DEIS, or note additional areas of strength or weakness within the DEIS that merit consideration by the Navy.

7

Action Alternatives—Pages 2-8 to 2-12 define the action alternatives in greatest detail. The national defense plans behind these three alternatives are not sufficiently described to enable the reader to assess whether there is any national defense readiness cost or benefit to any of these alternatives. Therefore, readers of this DEIS cannot make an informed decision as to whether the "historical" level of training must be maintained to prevent the Navy from suffering substantive, quantifiable decrements in some readiness area essential to its long-term plans. Such plans must exist to justify the expenditure of billions of dollars of fuel, expendable equipment and sailor hours.

8

Similarly, the DEIS should describe the consequences to readiness and options available if either Alternative 1 or 2 are rejected. This information is essential to weigh and consider the costs and benefits in terms of both readiness and environmental impact. Part of that consideration should include an option for reducing amounts, types and locations of training to ensure national ocean stewardship and environmental quality goals. For example, RIMPAC is one of the specified training events that is slated for expansion in Alternatives 1 and 2. The DEIS should explain under this alternative why it is necessary for the number of ships in this exercise to expand. The Navy should be able to provide an unclassified yet substantive basis for asking that an increased environmental footprint be allowed, along with the added cost, manpower, and loss of time available for other activities, all of which are all implicit in the three alternatives.

9

The assertion on page 4-65, line 25-29 that because no beaked whales have stranded in Hawaii the HRC activities are therefore not likely to pose a risk to beaked whales in the future is inconsistent with an otherwise well-reasoned and thorough DEIS. This is a case where absence of evidence is mistakenly offered as evidence of absence even though it is mutually agreed that the historical record is known to be unreliable, that historical usage patterns of the area by the Navy may not in fact be reliable predictors of future Naval training needs, and where the problem of concern is known to be more complicated than simply stranding or not stranding in the presence of sonar sound. Reporting of strandings in the main Hawaiian Islands has probably not been consistent until quite recently, and is even less consistent in the history of the northwestern Hawaiian Islands.

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9 Furthermore, stranding is not the only possible outcome of concern. It is also easily arguable that the Navy has in fact not been pursuing the same level and type of training, research, development, testing, and evaluation activities "with essentially the same equipment for the past 30 years."

The DEIS dismisses specific instructive events, such as the USS Shoup transit of Haro Strait (p. 4-85-86) without serious discussion. For example, the reports of behavioral effects on killer whales, Dall's porpoise, and minke whales are not included in this discussion but beg the question as to why the Navy believes these types of effects are not of concern. Other aspects of this event, like the modeling of the Shoup sound fields, were included in the joint Navy-National Marine Fisheries Service development of the dose-response functions used in this DEIS, so it seems inconsistent to consider some aspects of the Shoup event highly relevant to this EIS, but not others.

Supporting data and a more considered discussion are needed for the assertion that none of the Japanese beaked whale strandings cited by Brownell et al (2004) coincided with naval activities in Japan. The cited Center for Naval Analysis examination of the data is probabilistic, not deterministic, and sets a probability that temporal patterns between two sets of events (beaked whale strandings and naval sonar use) are or are not correlated. It does not necessarily indicate that no events co-occurred, but only that the degree of co-occurrence may or may not be explained by chance alone (p. 4-65, line 21-23).

12 ***Risk Estimation***—The DEIS derivation of the "shorthand" version of mid-frequency sound exposure is difficult to understand. While it is understandable that some details of the operating characteristics of the 53-C sonar may be classified, considerable detail has been provided in previous unclassified examples of typical 53-C pings and ping series: the Evans and England 2001 report includes discussion of source levels when in omnidirectional mode (235 dB nominal source Sound Pressure Level (SPL)) and beam-steered or "searchlight" mode (nominal 240+ dB SPL) at 10-20 second intervals, the recent report from the JASON panel includes detailed discussions of sonar ping characteristics, and no doubt other unclassified sources of information could be readily found. The DEIS should include the already released and presumably unclassified information that justifies its use of the expedient of 235 dB SLP, 1-second pings at 30-second intervals to characterize the range of sonar usage patterns and subsequent risk outcomes that might occur (p. 4-96).

13 Information on sound frequency, source level, or basic usage pattern for other sources of noise (helicopter dipping sonars, torpedo sonars, etc.) is completely lacking. These omissions should be corrected because almost all risk assessments for environmental sound now include such a table of source characteristics to facilitate evaluation of the potential acoustic risk associated with them.

14 The risk calculation process (p. 4-99) and especially the exposure volume calculation (lines 6-11), are very difficult to follow. For example, it is difficult to understand the process by which 10 hours of sonar pings by a presumably moving vessel are translated into one hour "averages" and how these in turn are applied to a static volume of water populated by apparently static animals. Similarly, it is not clear to us how sound energy, used to calculate the hourly averages, is to be translated into the single ping sound pressure level threshold within the dose-response function to yield either a probable Level B take or probable no-take. Are all animals within the specified water volume assumed to be at the depth of greatest sound intensity? Do they remain there for the entire

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hour or ten hours? How, once the threshold is triggered, is multiple counting avoided? Intuitively, one thinks in terms of an individual animal and its tendency to move up and down in the water column and to travel in the two-dimensional horizontal plane over time relative to the source, which also is moving. It is hard to understand how this variability in exposure regime over time is captured in the described process, or if it is ignored, how the calculation may over- or under-estimate risk due to the simplifying assumptions of the model. Some sample calculations, and even graphical representations of the probability density surfaces for sound and animal density would be useful in helping the reader navigate this complicated and novel risk estimation process.

The characteristics of the Extended EchoRanging (EER) source are not clear. Rather than refer to another, difficult-to-access document (the JTFEX/COMPTUEX document), it might be better to provide actual charge weight or impulse source level of the EER "ping" (p. 4-102, line 20-27). 15

With regard to the establishment of the extent of Level A take (page 4-175), the Navy goes to great lengths to suggest that it has zero risk of causing a Level A take because its models are actually grossly overestimating encounter rates. This brings up the question of why the Navy is using models it believes to be defective and unsupported by the best available knowledge. More to the point, however, the mitigation is presumed to reduce to zero the risk of unmitigated exposures, whatever their level. But then on lines 23-27 the Navy arbitrarily "agrees to" ask for two lethal or injurious takes for each of five species, apparently also selected arbitrarily as no specific reason or reasons are provided. If there is in fact no rationale for doing this, and all the presented evidence is to the contrary, then it is not clear why the Navy should ask for any Level A takes. Earlier in section 4 the DEIS suggests that a possible concession to uncertainty about beaked whale sensitivity to mid-frequency sonar would be to count 1 percent of all estimated Level B takes as Lethal A takes. Given an estimate of over 2,000 Level B takes, that would indicate a potential for 20 Level A takes of beaked whales if this precaution is invoked, well above the nominal 2 per species suggested on page 4-175. These contrary statements are at best ambivalent about the risk and at worst misleading to the reader. To avoid such confusion we believe the DEIS needs to adopt a single approach to risk estimation based on the best available information and use that approach consistently. We do not believe that it is acceptable to offer an indefensible risk estimate and then create arbitrary concessions. 16

On page 4-21-22, and in Table 4.1.2.3.1-1 on the same page, the blast risk criteria differ slightly from those used by the National Marine Fisheries Service in various Gulf of Mexico rig removal and construction projects, e.g., Bienville Offshore Energy Terminal DEIS of June 2007, vol. 2, Appendix C. This discrepancy between current regulatory agency *de facto* standards and the Navy's proposed criteria should be reconciled before issuance of the FEIS and requested Letter of Authorization. Also, here and elsewhere in the HRC DEIS it is "Navy policy" to use a temporary threshold shift (TTS) criterion of 12 psi peak pressure for charges greater than 2,000 pounds TNT-equivalent, but a TTS criterion of 23 psi for smaller charges (also see page 4-104, line 6-13). The basis for this differential threshold criterion for the same physiological damage issue is not clear and should be clarified. 17

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18 The Navy has done a commendable job in this DEIS of explaining the relationship between physiological and behavioral effects as biological phenomena, versus the definition of regulatory criteria under the Marine Mammal Protection Act of Level A or Level B harassment. This is a confusing but necessary set of distinctions and the DEIS does a very good job on pages 4-35 and 36 of clarifying those relationships and explaining the Navy's rationale for apportioning risk among physiological and behavioral effects to then determine the Level A or Level B consequences of a given physiological or behavioral effect.

The Navy also has done a good job of clearly exploring the relationship of permanent threshold shift (PTS) and temporary threshold shift, the relationship between Sound Pressure Level (SPL) and Sound Energy Level (SEL), and other metrics. These relationships are not generally well understood and the DEIS does a good job of clearly explaining them on pages 4-37 through 4-47.

The DEIS also provides a thorough exploration of the relationship of rectified diffusion, decompression syndrome (DCS), acoustic resonance and other physiological or biomechanical effects of sound (pages 4-48 and 49). The DEIS continues with a similarly strong background review of these physiological phenomena and the scientific evidence for and against manmade sound as a contributing factor on pages 4-49 and 50. While the potential risk to marine mammals from sound via these mechanisms needs further scientific exploration, the DEIS offers the reader sufficient information and original reference material to make an informed judgment based on the currently available science.

The use of a dose-response relationship to capture the probabilistic nature of behavioral reaction to sound is well described, with excellent depth of background references (pages 4-53 through 63). The amount and relevance of data to support this particular dose-response curve is not ideal, nor is it even as substantive as the data used in the SURTASS LFA dose-response function, but the DEIS does indicate an intent by Navy to obtain more and better data to strengthen that risk estimating function.

19 On page 4-63b, lines 334-342, various environmental conditions of special concern are cited as factors in estimating risk for beaked whales. Those conditions include canyon-like bathymetry, surface ducts, etc. However the process by which these factors are to be considered in estimating risk is not described in sufficient detail to enable the estimates to be vetted by an independent outside evaluator. In Section 9, the appendix containing the report after the 2006 RIMPAC exercises, these factors are actually recommended for removal from consideration based on the idea that they are poorly defined and difficult to apply, and/or existing data do not support the idea that these features are in any way predictive of beaked whale occurrence or elevated risk. It should be 20 noted that although more useful data are being generated on the distribution and abundance of beaked whales in the Hawaiian Islands by McSweeney, Baird, Barlow and others, these sources of information are not sufficiently cited and the manner in which such information will be used in planning is not sufficiently described, even though the Navy supported some of the work to generate those data (e.g. Baird et al, 2006). The seasonal avoidance of humpback whales is well described throughout the document, and a convincing case is made that this is factored into event planning. The same is not true for beaked whales. Similarly, on page 4-63b, line 30-33 and in the risk 21 threshold tables a special category is created for harbor porpoises and justification is provided for

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21 their special treatment. Since harbor porpoises are not a species found in the HRC this information should be eliminated from this document.

22 A somewhat outdated paper by Ketten (1998) is cited as the source of an upper hearing limit for baleen whales of 20 kHz (p. 4-64, line 8). More recent observational data by Nowacek et al. (2004) and others, and more recent unpublished analyses by Ketten (2004) and colleagues from Boston University and the Navy Research Lab also suggest that the upper frequency limit for at least some baleen whales may be above 20 kHz (but likely below 30 kHz). It would strengthen the EIS to incorporate recently published work, or citable gray literature references from these researchers.

Mitigation And Monitoring—The Navy has high expectations for the effectiveness of watchstanders in mitigation efforts. Such expectations should be substantiated because 1) a great deal of evidence argues to the contrary, and 2) other means such as passive or active acoustics, radar, infra-red or other sensors may substantially augment visual watches and may be more effective. Page 25 6-23, lines 1-2 hints at a watchstander validation process, but the statement lacks convincing details. The British Royal Navy has a well developed process for both shoreside simulator training and shipboard training that provides a mechanism to quantifiably validate watchstander performance. We would encourage the U.S. Navy to adopt a similar process, especially when the proposed estimate of Level B and Level A takes is being reduced from tens of thousands of takes to zero through the use of visual monitoring alone.

26 The Navy should provide greater detail on the listed protocols for passive acoustic monitoring and mitigation, and reconcile that information with assertions elsewhere in the DEIS that visual monitoring alone is sufficient to assure 100 percent detection of all species of concern 27 before they enter within range of the mitigation zones. A number of mitigation actions are listed on page 6-3. Measure #3 asserts that all personnel manning passive anti-submarine warfare (ASW) sensors will monitor for marine mammals. A great deal of detail is missing and needed before a reader can assess whether this is an effective practice. It is not clear whether the personnel will receive any training comparable to visual watchstanders to enable them to detect and classify marine mammal sounds, how well the available sensors (which were designed for other purposes) will detect and process marine mammal sounds, or whether they will be more or less effective than the SURTASS LFA passive acoustic system (effective only to 500 Hz), which failed to detect any marine mammals in more than 400 hours of monitoring (SURTASS LFA Final Report, 2000-2006). In addition, the DEIS should describe communications between ASW personnel and command personnel responsible for making decisions about mitigation action (sonar source level reduction, shut-down, etc.). Mitigation measure #13 describes a similar effort using submarine sensors without providing sufficient details as to the effectiveness of such effort, or the communication chain by which such information makes its way to decisionmakers responsible for taking mitigation action in a timely manner.

28 The use of permanent or temporary monitoring arrays (passive acoustic or other) also is insufficiently described. The Navy refers throughout the DEIS to the potential utility of the Pacific Missile Range Facility (PMRF) monitoring arrays like BARSTUR and BSURE, and to new devices like the portable array or Scripps ARP/HARP bottomed monitoring devices, but offers no concrete plan for implementation of such monitoring on a regular basis, or for validation of performance.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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29 On page 6-23, line 32 the Navy proposes to capture data on animal presence before and after exercises but cites security reasons for not capturing data during exercises. We would propose that the Navy consider approaches that could capture and archive data throughout that period and either offer declassified redacted data to confirm effect/no effect at all stages of the exercise, or make the classified data available for assessment by appropriately cleared persons.

The Portable Offshore Training Range mentioned in the DEIS deserves further discussion, both as a sound source and as a possible mitigation tool. Described on page 2-51, the portable range produces sound to communicate the relative positions of the listening nodes and to communicate with vessels and other devices carrying pingers through the range. The sound is of relatively low amplitude, with a source level of 190 dB re 1 microPascal SPL, but it is within the range of hearing
30 of most marine mammals at a nominal 8.8, 17, and 40 kHz. The patches of territory where the portable offshore range might be deployed run outside the figure and it appears possible in some cases that such portable range use could be very close to the protected waters of the northwestern
31 Hawaiian Islands. It is not clear how use of the portable ranges would be scheduled and whether the National Marine Fisheries Service would be consulted during this decision. In light of these concerns, discussion of potential environmental impacts of the portable ranges in section 4 seems
32 insufficient. Similarly, the potential for this portable listening array to be used for mitigation monitoring or for post-test analysis of visual observer performance also are not discussed in Section 6. The permanent ranges at the Pacific Missile Range Facility figure prominently in bolstering monitoring for activities within the area covered by those ranges, and it is not clear why the portable ranges are not used similarly.

33 The criteria for resumption of sonar use after detection of a marine mammal seem unrealistically short. Thirty minutes without re-acquiring visual contact with an animal previously detected within the mitigation zone is too short for animals that may dive for more than 30 minutes, or might go more than 30 minutes without presenting another detectable surfacing due to glare, waves, or wind-hindered visibility. The alternative, resumption after the ship has travelled 2000 yards means about 5-6 minutes for a ship travelling at 10 knots. This provides even less time to determine whether the animal has been able to clear the safety zone or whether the animal has in fact fled underwater at 5 knots running straight before the ship and thus could have actually closed range since it was first detected.

The use of ramp-up as a mitigation tool has been a subject of considerable debate and in section 6-8 and Appendix F the Navy rightly questions the effectiveness of this procedure. Ramp-up procedures have never been tested to either validate their effectiveness or to verify that they are
34 ineffective, or perhaps even counterproductive. From the DEIS it appears that the Navy has no plans to take advantage of the current temporary defense exemption to test whether or not ramp-up is in fact effective. Such an assessment effort would be straightforward and could potentially save the Navy considerable time and money if ramp-up were shown to be useless. Alternatively, if the test showed ramp-up to be effective, then confidence in the Navy's environmental risk reduction protocol would be greatly strengthened.

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35 The considerable list of precautions for beaked whales described in mitigation measure #14 (page 6-4) are impressive, but the Navy stated in its RIMPAC 2006 report (DEIS Section 9, appendix F) that most of these measures were difficult to define, of unproven relevance, or overly expensive and therefore not recommended in light of the experiences in the RIMPAC 2006 exercise. In aggregate, the Navy's arguments against these measures elsewhere in the document create an impression that the proposed mitigation efforts may not be regularly applied during planning and execution of ASW exercises and similar sound-producing activities on the range complex. Verification and validation of actual decision processes are a critical aspect of acceptance of the proposed protocol, and we would encourage the Navy to look into the kinds of decision aids and recording devices used by the British Royal Navy to create an alteration-proof record of real-time actions during the planning and execution of its environmental mitigation practices for underwater sound from sonars. We note that the U.S. Navy outlines a process whereby the Officer in Tactical Command has the authority to give consideration to delay, suspend or alter activities, and that it will issue post-exercise reports that would presumably be available as unclassified public documents. Presumably these would be similar to the LFA and RIMPAC unclassified after-action reports and/or as classified documents reviewable by appropriately cleared persons (p. 6-5). That framework could form the basis for an effective verification procedure, and thus greatly reduce concerns about external verification and accountability without unduly taxing Naval resources.

Related to the above concern, the risk estimation and reduction procedures for beaked whales are not as clear as they should be (p. 4-114, line 22-28 for Blainville's beaked whales, p. 4-
36 115, line 24-31 for Cuvier's beaked whales). The contention that more than 2000 encounters with beaked whales would all be successfully mitigated through visual monitoring alone is inconsistent with numerous reports of the low probability of detection of beaked whales even in dedicated visual surveys (e.g., Barlow and Gisiner, 2006). Indeed a wealth of literature on visual survey methods suggests that probabilities of detection for almost all species fall well below 50 percent in most circumstances. The U.S. Coast Guard's considerable body of data on the difficulty of detecting persons or small objects in the water by visual means alone is consistent with the marine mammal survey data, suggesting that with maximal motivation, where human life is at stake, the odds of detecting a relatively small, low-profile object at sea are small. In fact, the Navy's own SURTASS LFA Final Report for mitigation effort 2002-2006 found that visual survey was a poor source of marine mammal detections relative to its own active marine mammal detection sonar. Similarly, while the RIMPAC EIS predicted more than 33,000 takes, visual survey resulted in only 29 actual detection events (for a total of about 100 animals detected) within that mitigation zone. Even within the very much smaller 190 dB threshold zone, the estimated number of takes in the RIMPAC EIS was 256, more than double what was detected visually. Either the model greatly over-predicted takes relative to the number of animals that were actually present (which is likely, but unavoidable due to the uncertainties involved), and/or animals were present but not detected (also more likely than not). The Navy has the means to quantitatively test the effectiveness of visual watch and other means of mitigation and should be able to present a strong plan for iterative testing and improvement of its mitigation monitoring capabilities. The Navy's own very conscientious watches for collisions, and rigorous reporting of all collisions, indicate that marine mammals escape detection almost every year, to the point where they actually come in physical contact with the vessel without being detected. All this evidence shows that the effectiveness of visual monitoring will be nowhere near the 100% that would be required to justify a decision of no effect in this DEIS.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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37 The Navy presents a confusing and inconsistent stance on the utility of non-Naval platforms or independent observers on Naval platforms. The arguments for safety and limitations of berthing space in this section and in Appendix F are well taken, and it would seem reasonable not to expect to include non-military personnel and aircraft as a regular part of normal training and exercise. But that would not seem to preclude a deliberately designed test, outside the context of an actual exercise, to generate some of the performance statistics needed to properly evaluate the effectiveness of various mitigation measures the Navy either considers highly effective, or wishes to eliminate as ineffective and cumbersome. The verification and validation procedures are quite familiar in the Navy and are used often in assessing the performance of new tactical sensors and weapons systems, as well as for assessing personnel, individual unit and multi-ship performance on tactical mission requirements such as minehunting or ASW. The DEIS in fact alludes to such efforts on page 6-25 lines 5-21 and again on page 6-24, lines 4-30, but does not make a definite commitment to try the new technologies or to conduct the third-party testing that would verify performance. Technologies such as passive acoustics are well known to the Navy and the advancement of these technologies for tactical applications is already an existing and growing area of emphasis for the Navy. It would seem that the advancement of supplemental or alternative monitoring technologies would be a priority during the defense exemption, and afterward, as the Navy tries to improve its understanding of the actual risk posed by these environmental concerns, the actual numbers and habitat types of the animals of concern, and the means by which they may be avoided. 38 The argument advanced on pages 6-8 and 9 that new mitigation technologies are expensive and limited in availability should be followed by an explanation about how the Navy plans to go about changing that, just as it would for any technology that was deemed of tactical or safety benefit, from hearing protection aboard aircraft carriers to improvements to torpedo propulsion systems. Page 6-9 refers to the Navy's commitment to continue to fund research, without adequate explanation as to whether the current amount is sufficient, excessive or insufficient to support the Navy's need to plan and execute its mission with an acceptable level of risk to the environment. Simply committing to an amount, without a plan as to how that helps solve the problem, is of little value in this context.

39 The DEIS asserts that archiving and analysis of survey data is unnecessary and unproductive (e.g. page 6-8, lines 34-40), and in section 9 (Appendix F) argues against efforts to use monitoring data for studies of habitat use, abundance or other biologically meaningful questions. The Navy argues that such effort extends beyond the requirement to monitor and verify effect or lack thereof, and that such additional effort imposes a burden of data analysis and communication that detracts from other mission-essential activities (p. 6-7). The Commission believes that such data and the follow-up analyses that can be done with them are equally valuable to the Navy in planning future activities, and as such, the data provide value to the Navy beyond the immediate need to verify compliance for the activity during which they are collected. Data from prior exercises constitute a valuable resource for making better decisions in the future and for developing an improved ability to meet future training requirements. In a data-poor world, in which the Navy itself contends that it is making overly conservative assumptions about risk, the addition of data to make better informed decisions in the future is probably the most valuable mitigation tool the Navy has, and one that is more likely to reduce the burden of compliance than increase it (or more positively stated, renders the Navy more effective in meeting its environmental stewardship goals). Therefore a plan to archive, analyze and frequently update information obtained from mitigation monitoring should be a

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2 October 2007
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clearly developed part of this EIS and part of the Navy's overall plan for addressing its environmental stewardship goals.

We thank the Navy for this opportunity to comment on the HRC DEIS and hope that the Commission's comments prove beneficial to the development of the Final EIS and Request for a Letter of Authorization under the Marine Mammal Protection Act. We have tried to keep our recommendations within the demonstrated capabilities of the Navy and hope that the recommended changes will enhance its ability to carry out its mission-essential activities in a manner consistent with its long and widely respected record of leadership in ocean environmental stewardship.

Sincerely,

Timothy J. Ragen

Timothy J. Ragen, Ph.D.
Executive Director

cc: Captain Larry Rice
The Honorable Donald Schregardus
Craig Johnson

Baird, R.W., D.L. Webster, D.J. McSweeney, A.D. Ligon, G.S. Schorr, and J. Barlow. 2006. "Diving behaviour of Cuvier's (*Ziphius cavirostris*) and Blainville's (*Mesoplodon densirostris*) beaked whales in Hawai`i, Canadian Journal of Zoology 84:1120-1128.

Barlow, J. and R. Gisiner. 2006. Mitigation, monitoring and assessing the effects of anthropogenic sound on beaked whales. J. Cetacean Res. Manage., 7(3):239-249.

Brownell, R.L., T. Yamada, J.G. Mead, and A.L. van Helden. 2004. Mass strandings of Cuvier's beaked whales in Japan: U.S. Naval acoustic link Paper SC/56/E37 presented to the IWC Scientific Committee (unpublished). 10pp. [Available from the Office of the Journal of Cetacean Research and Management.] Barlow and Gisiner, JCRM 2006.

Ketten, D.R. 1998. Marine mammal auditory systems: A summary of audiometric and anatomical data and its implications for underwater acoustic impacts. NOAA-TM-NMFS SWFSC-256, Department of Commerce.

Ketten, D.R. 2004. Marine mammal auditory systems: A summary of audiometric and anatomical data and implications for underwater acoustic impacts. International Whaling Commission, Scientific Committee (IWC-SC) Report, Annex K: Standing Working Group on Environmental Concerns Report (May 2004), Appendix 4.

Nowacek, D.P., M.P. Johnson, and P.L. Tyack. 2004. North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alerting stimuli. Proceedings of the Royal Society of London, Part B., 271:227-231.

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0131

LINDA LINGLE
GOVERNOR

ROBERT G. F. LEE
MAJOR GENERAL
ADJUTANT GENERAL

GARY M. ISHIKAWA
BRIGADIER GENERAL
DEPUTY ADJUTANT GENERAL

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD
HONOLULU, HAWAII 96816-4495

14 SEP 2007

MEMORANDUM FOR COMMANDER, UNITED STATES PACIFIC FLEET
250 Makalapa Drive
Pearl Harbor, HI 96860

FROM: HITAG

SUBJECT: Environmental Impact Statement 5090 N01CE1/0552

1. Thank you for the opportunity to review the final draft Environmental Impact Statement (EIS) for the Hawaii Range Complex. The State of Hawaii Department of Defense strongly supports the proposed upgrades and modernization to the ranges. The range complex is the single most critical component to successful military exercises, war gaming and day-to-day training for our Hawaii National Guard forces in the State of Hawaii. Your modernization proposals will ensure the complex remains a vital part of military training for the foreseeable future. 1

2. Questions can be addressed to Col Ann Greenlee, Chief of Staff, JFHQ – HI, 733-4230.

ROBERT G. F. LEE
Major General
Hawaii National Guard
Adjutant General

COMMENT NUMBER
D-W-0132

ARMAINE TAVARES
Mayor

JEFFREY S. HUNT
Director

COLLEEN M. SUYAMA
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PLANNING

September 17, 2007

Mr. L. M. Foster
Director, Fleet Environmental
Department of the Navy
United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii 96860

Dear Mr. Foster:

SUBJECT: COMMENTS ON THE DRAFT EIS/OEIS FOR THE HAWAII RANGE COMPLEX, HAWAII (RFC 2007/0103) AND (LTR 2007/2709)

Thank you for a copy of your letter to the Executive Summary and Draft EIS/OEIS for the Department of the Navy's Hawaii Range Complex. The Maui County Planning Department (Department) acknowledges that a more robust, risk-based method of determining marine mammal impacts is being used by the Navy. The Department also notes that approximately seventy-five (75) individuals testified at the August 27, 2007 public hearing on the matter, held at Baldwin High School in Maui. The public expressed concern with a number of matters, but primarily were concerned with potential impacts to whales during their period of residence in the near shore waters of Maui. The Department recommends that the Navy exercise caution and implement prudent avoidance and mitigation measures to the extent practical, when operating in near shore waters of Maui County so as to reduce any potential adverse impacts on marine mammals. 1

Thank you for your inquiry and the opportunity to comment. Should further clarification be required contact Staff Planner Thorne Abbott by email at thorne.abbott@mauicounty.gov or by telephone at 270-7530

Sincerely,

JEFFREY S. HUNT, AICP
Planning Director

250 SOUTH HIGH STREET, WAILUKU, MAUI, HAWAII 96793
MAIN LINE (808) 270-7735; FACSIMILE (808) 270-7634
CURRENT DIVISION (808) 270-8205; LONG RANGE DIVISION (808) 270-7214; ZONING DIVISION (808) 270-7253

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

Mr. L. M. Foster
September 17, 2007
Page 2

xc: Colleen M. Suyama, Deputy Planning Director
Clayton I. Yoshida, AICP, Planning Program Administrator
Zoe Norcross-Nu'u, Sea Grant Extension Agent

JSH:TEA:bv

RFC File
General File

K:\WP_DOCS\PLANNING\RFC\2007\0103_Navy_HIRangeComplex\response.wpd

COMMENT NUMBER
D-W-0132 (cont.)

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
INTERIM CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 21, 2007

L.M. Foster, Director, Fllet Environmental
Department of the Navy, Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii 96860-3131

LOG NO: 2007.2888
DOC NO: 0709NM15
Archaeology

Dear Mr. Foster:

SUBJECT: **National Historic Preservation Act, Section 106 Review – Revised Replacement Pages for DEIS/OEIS Revision 1 Executive Summary**
Enhancements to HNRC
PMRF and Northwest Hawaiian Islands, Island of Kauai
TMK: (4) various

The aforementioned is a revision to DEIS.

We believe that "**no historic properties will be affected**," because: 1

- ☐ Intensive cultivation has altered the land
- ☐ Residential development/urbanization has altered the land
- ☐ Previous grubbing/grading has altered the land
- ☐ An accepted archaeological inventory survey (AIS) found no historic properties
- ☐ SHPD previously reviewed this project and mitigation has been completed
- ☒ Other: *No physical impacts.*

In the event that historic resources, including human skeletal remains, are identified during routine construction activities, all work needs to cease in the immediate vicinity of the find, the find needs to be protected from additional disturbance, and the State Historic Preservation Division, Kauai Section, needs to be contacted immediately at (808) 742-7033.

Aloha,

for Laura Thielen
State Historic Preservation Officer

NM:jen

COMMENT NUMBER
D-W-0133

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

09/17/2007 09:55 8082464921	DAVID & NINA'S MANA-	PAGE 01/01

David Monasevitch

Lihue, HI 96766

September 17, 2007

PMRF ATTN HRC EIS/OEIS
PO Box 128
Kekaha, HI 96753-0128

TO WHOM IT MAY CONCERN:

This is my testimony against any expansion of the PMRF operations. I do not support any military expansion of the Missile Range facility. 2

I don't believe the Draft EIS was completed in a peer reviewable scientific manner. Therefore I believe it to be invalid. The war games that PMRF engages in, especially the active and passive sonar systems kill cetaceans. This is fact. 1

I do support the scientific research part of PMRF. It is unfortunate that certain cretins in power used the events of "9/11" to advance a militaristic agenda. Certain toadys tricked on down from the executive administration and are inclined to advance this military agenda in the occupied country of Hawaii. It is a misguided effort, as good science proves.

I ask that you become more honest and scientific in your thinking so that we can actually demilitarize and pursue true science and physics in balance with the planet and the stars.

Yours truly,
David Monasevitch

David Monasevitch

COMMENT NUMBER: D-W-0134

September 16, 2007

Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752-0128

Dear Sirs,

I imagine that concern from citizens must seem like a terrible bore to a navy charged with securing the country from outside harm. However, please consider that you are also protecting the quality of life as well as freedom. Freedom would be meaningless if the world became empty of other species of plants and animals.

Blasting the ocean with intense noise may be justified in the name of safety, but PLEASE consider doing your testing at a time and in a place that will do no harm to ocean mammals. 1

I live near Hanalei Bay and remember well the day that hundreds of melon-head whales swam into the shallow water of the bay in panic. It was proven that navy testing had been conducted nearby and was accepted to be the cause of this unusual behavior. Many other beachings and whale deaths have been similarly tied to your testing.

Are we so arrogant as a species that we can completely discount the well-being of all other inhabitants of our planet? Are you protecting us right out of our balance with nature?

Consider the pain caused by loud, high frequency noise to your dog. Would you want someone to subject your pet to this torture for no reason?

Please stop needlessly inflicting harm on whales and other ocean life with high-intensity, mid-frequency sonar in training exercises. Whales travel for thousands of miles each year between their feeding and breeding grounds. Please respect their right to complete their life cycle in peace. 2

Sincerely,
Nancy Merrill

Nancy Merrill

Hanalei, HI

COMMENT NUMBER: D-W-0135

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0136

Nina Monasevitch

Lihue, Hawaii 96766

Pacific Missile Range Facility
PO Box 128
Kekaha, Hawaii 96752-0128

September 14, 2007

Dear Sirs and Madams,

1 I am writing to ask the U.S. Navy to stop needlessly inflicting harm and death on whales and other ocean life with its use of high-intensity, mid-frequency sonar in its training exercises.

Whales, dolphins and other marine mammals depend on sound to navigate, find food, locate mates, avoid predators and communicate with each other. Blasting their environment with intense sound over large expanses of ocean disrupts these critical behaviors and threatens their survival.

Sonar also harms whales more directly: Navy exercises using mid-frequency sonar have resulted in whale strandings across the globe, including along the coasts of Washington State, the Canary Islands, the Bahamas, Madeira, the U.S. Virgin Islands and Greece. A recent whale stranding death in Hawaii, which occurred when a large pod of whales was driven in panic to shallow waters, took place with Navy sonar exercises nearby and may be the latest in this string of sonar casualties.

The harmful impacts of sonar on fish stocks and other marine life has also been documented. Our oceans are in a critical state, as documented by declining fish numbers, starving marine mammals, exponential loss of coral reefs and reef fishes, the list of ocean degradation goes on and on.

Whales and all marine life should not have to die for military training. The Navy can no longer ignore the unnecessary harm inflicted by this technology.

I ask all of you involved to ask from your soul what is the truth? Who IS the enemy? Is decimating our fragile marine environment worth it? What will

1

COMMENT NUMBER
D-W-0136 (cont.)

your grandchildren inherit, an ocean dead of all whales? Can our planet survive without a healthy ocean eco- system? Please listen deeply, your soul knows the answer.

With Respect and Aloha,

Nina Monasevitch

2

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-W-0137

To: Draft Environmental Impact Statement 9/15/07

Dear Sir:

I urge the U.S. Navy to stop inflicting harm on whales with its use of high intensity, mid-frequency sonar in training exercises.

Whales, dolphins + other mammals use sound to navigate and communicate with eachother. Blasting their world with intense sound disrupts them + threaten their survival.

Whales should not have to die for military training.

1

Respectfully,

Mike Wi[illegible]

Princeville, Hi

COMMENT NUMBER
D-W-0138

09/17/2007 10:36 CHERYL MAGILL! PAGE 01

Monday, September 17, 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752

C/O

http://us.f636.mail.yahoo.com/ym/Compose?To=deis_hrc%40govsupport.us

Fax # 808-3354520

Re: Hawai'i Range Complex

Draft Environmental Impact Statement Overseas Environmental Impact Statement Draft EIS/OEIS

deis_hrc@govsupport.us

This is regarding the proposed Hawai'ian Range Complex. This is about the US Navy's proposal to take the whole place and toy with it. I understand that Hawai'i was a beautiful place once and it was governed by a sovereign whose lands were stolen by the U.S..

I disapprove of the use of high intensity sonar. 1

I have never wanted to go to the Islands of Hawai'i because I am not attracted by depleted uranium.

I oppose the US Navy's entire project. The US Navy has polluted the whole place.

Please stop killing whales and dolphins and people.

Thank you,
Radioactively yours,

Cheryl A. (Half Life) Magill
Coordinator
The Stop LFAS Worldwide Network

Santa Clara, CA

P.S. Your sonar is too loud~!

Exhibit 13.4.1-1. Copy of Written Documents - Draft EIS/OEIS (Continued)

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Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS

Commenter	Comment #	Resource Text	EIS Section	Response Text
Judie Lundborg	D-W-0017-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore there is no proposal to expand. It is true that the proposal includes alternatives that require increases in the frequency of training. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary. The training that is conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
	D-W-0017-2	Policy/NEPA Process		The proponent agency (Lead Agency/Sponsor) is responsible for performing the environmental analysis of its actions, which for this document is the U.S. Navy. Section 1501.5 of the National Environmental Policy Act (NEPA) states that a lead agency shall supervise the preparation of an environmental impact statement. Additionally, Section 1501.2 of NEPA states that Agencies shall integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts."
Wayne Johnson	D-W-0066-1	Alternatives	4.1.2.4.11	Section 4.1.2.4 of the EIS/OEIS explains the potential effects on marine mammals from Navy mid-frequency active (MFA) sonar in the HRC. MFA sonar use in Hawaii is not new and has occurred using the same basic sonar equipment and output for over 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Though the Navy works to minimize impacts on marine mammals to the greatest extent practicable, they are not mandated by any statute to alleviate all risk to marine mammals. Over the past 30 years, the numbers of marine mammals around Hawaii appear to be increasing and there are no indications that sonar has affected marine mammals.
Russell Y. Tsuji --DLNR	D-W-0067-1	Miscellaneous		Thank you for your comment.
	D-W-0068-1	Miscellaneous		Thank you for your comment.
Ken C. Kawahara --DLNR	D-W-0069-1	Utilities	4.3.2.1.12	To ensure that all local or municipal rules and regulation are followed, the Navy maintains a cooperative working relationship with the county water department.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Ken C. Kawahara --DLNR	D-W-0069-2	Water Resources	3.3.2.1.13, 4.3.2.1.13	Depending on the action or construction being undertaken, a variety of Federal and State approvals, comments, and permits may be required. In addition, all construction activities would follow Spill Prevention, Control, and Countermeasures Plans and transportation safety measures; therefore, potential effects on surface and groundwater resulting from accidental spills of hazardous materials would be minimized. The EIS evaluated the potential impacts of launch emissions, spills of toxic materials, and early flight termination. The analysis concluded that hydrogen chloride emissions would not significantly affect the chemical composition of surface or groundwater; that there would be no significant increase in aluminum oxide in surface waters due to launches; that sampling of surface waters in the vicinity of the launch site showed that hydrogen chloride, potentially deposited during past launches, has not affected surface water quality on PMRF or adjacent areas; and that contamination from spills of toxic materials would be highly unlikely. A National Pollutant Discharge Elimination System (NPDES) permit is not required for launch activity due to the lack of significant storm water runoff.
	D-W-0069-3	Utilities	4.3.2.1.12	To ensure that all local or municipal rules and regulation are followed, the U.S. Navy maintains a cooperative working relationship with the county water department.
Russell Y. Tsuji --DLNR	D-W-0070-1	Biological Resources - Terrestrial		As part of the development of the Integrated Natural Resources Management Plans, Navy coordinates with the appropriate State and Federal agencies.
	D-W-0070-2	Biological Resources - Terrestrial	6.0, Appendix C	Your comment regarding the integration of statewide response between DLNR and Department of Navy for invasive species, oil spills, stranded wildlife, and avian disease monitoring is noted. Regarding invasive species, various instructions, as well as exercise-specific operations orders such as the Exercise RIMPAC Operations Order, advise commanding officers of requirements regarding the protection of Hawaii from the immigration of additional alien or invasive species. Introduction of any plant or animal into Hawaii without permission of the State of Hawaii Department of Agriculture is prohibited. All ship commanding officers and aircraft are required by the Defense Transportation Regulation, DoD 4500.9-R, to conduct inspections of equipment, cargo, supplies and waste prior to entering their first port of entry into the U.S. OPNAVINST 6210.2, Quarantine Regulations of the Navy, is intended to prevent the introduction and dissemination, domestically or internationally originated, of diseases affecting humans, plants, and animals; prohibited or illegally taken wildlife; arthropod vectors; and pests of health and agricultural importance. Information in the HRC EIS, Chapter 6.0 and Appendix C on protection against immigration of species has been updated.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Russell Y. Tsuji --DLNR	D-W-0070-3	Cultural Resources		As a trustee of Hawaii's cultural resources, the Navy continually strives to protect sensitive areas and sites through monitoring of activities and consultation with the State Historic Preservation Officer and with Native Hawaiian groups during decision-making processes.
	D-W-0070-4	Socioeconomics		Public recreational opportunities are allowed on Department of Defense property within the constraints military of missions and public safety concerns. For example, Kauai residences possessing an approved beach access pass are welcome to enjoy the approximately 200 ft by 2 miles of beach at Majors Bay. Recreational opportunities are discussed throughout the EIS/OEIS under each location.
	D-W-0070-5	Biological Resources - Terrestrial		Thank you for your comment.
	D-W-0070-6	Biological Resources - Terrestrial		Your comment regarding the Department of Navy acquiring lands to buffer impacts on existing resource management programs and areas is noted but is outside the scope of this EIS/OEIS.
	D-W-0070-7	Water Resources		The Navy welcomes opportunities to participate in cooperative and collaborative partnerships with state, Federal, and local governmental entities, private entities, and non-governmental organizations in accordance with Executive Order 12875 Enhancing the Intergovernmental partnership.
	D-W-0071-1	Miscellaneous		Thank you for your comment.
	D-W-0072-1	Miscellaneous		Thank you for your comment.
Daniel S. Quinn --DLNR	D-W-0073-1	Water Resources	3.3.2.1.13, 4.3.2.1.6, 4.3.2.1.13.1, 4.3.2.1.13.2	Polihale State Park is located approximately 1 mile north of the closest launch site and has low potential for groundwater impacts from missile launch emissions. The greatest potential for groundwater impacts from missile launch exhaust emissions is on PMRF. The results of metal-in-soil sampling conducted in 1999, 2002, and 2007 in rocket motor staging areas are presented in Sandia National Laboratories, 2008. The results show that most reported values are below the EPA residential screening level. Iron and thallium exceeded the residential screening; however, they are below industrial screening level. Arsenic exceeds the industrial screening level; however, the state of Hawaii has identified special circumstances for arsenic. Sampling for perchlorate was conducted at PMRF in October and November 2006 and the results indicated perchlorate levels were within guidelines.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Alton Miyasaka --DLNR	D-W-0074-1	Mitigation Measures	6.0	Chapter 6.0, Mitigation Measures, presents Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. It should be noted that these protective measures have been standard operating procedures for unit-level antisubmarine warfare training since 2004. In addition, the Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.
Clyde Fuse --US Dept. of Transportation	D-W-0075-1	Airspace		Based on further discussions with the Federal Aviation Administration (FAA), special use airspace boundaries will be modified as the information becomes available. Training and RDT&E activities that require the use of special use airspace are coordinated with the FAA. Navy planners utilize the most current airspace boundaries during their planning and coordination.
	D-W-0075-2	Airspace		As the laser program matures, and specific information is available, the Navy will coordinate with the FAA Western Service Area specialists to determine potential impacts. Early coordination with the FAA will allow the program to make adjustments to minimize impacts on air traffic operations.
Patricia S Port --US Dep't of the Interior	D-W-0076-1	Miscellaneous		See response to comment D-E-0437.
Micah A. Kane --State of Hawaii	D-W-0077-1	Miscellaneous		Thank you for your comment.
Bob Jacobson --Hawai'i County Council	D-W-0078-1	Biological Resources - Marine		Thank you for your comment.
John Broussard	D-W-0079-1	Alternatives	1.1, 1.2, 1.3, 4.1.2.4, 4.1.2.4.5, 4.1.2.4.11, 4.1.2.4.11.2, 6.0	As discussed in Section 4.1.2.4.11, Navy believes that evidence not considered previously involving the Hanalei stranding of July 2004 indicates that the full moon could have been a contributing factor in terms of bringing the animals closer to the shore. See response to comment D-W-0066-1 with regard to likely impact on marine mammals from sonar training. See response to comment D-E-0086-1 with regard to human diver threshold levels and comparison to marine mammals.
	D-W-0079-2	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
John and Nancy Conley --Aloha Acres	D-W-0080-1	Air Quality	4.3.2.1.1.1	There is no scientific evidence to support existence of an ozone hole above Kauai. The ozone depletion from launch exhaust is limited spatially, is temporary, and these reactions do not have a globally significant impact on ozone depletion. This language has been added to Section 4.3.2.1.1.1 of the EIS/OEIS.
	D-W-0080-2	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
John and Nancy Conley -- Aloha Acres	D-W-0080-3	Alternatives		Your comments regarding transferring activities from Kauai to Oahu are noted but are outside the scope of this EIS/OEIS. The CEQ requires consideration of a reasonable range of alternatives in EIS/OEISs. [40 CFR Section 1508.9 (b)]. Under a rule of reason, an EIS/OEIS need not consider an infinite range of alternatives, only reasonable, or feasible ones. The choice of alternatives is bounded by some notion of feasibility, and the Navy is not required to consider alternatives which are infeasible, ineffective, or inconsistent with its basic policy objectives.
	D-W-0080-4	Land Use	4.4.1.2.3.1	The underwater training area would be approximately 2 mi off the southeast coast of Niihau. The restricted access in this area would minimize the potential for public safety issues. The closure of recreational areas near PMRF will be temporary to accommodate recreational use.
Cynthia Rapu	D-W-0081-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-W-0081-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-W-0081-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3
	D-W-0081-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
Eleanor Ballard	D-W-0082-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-W-0082-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-W-0082-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3
	D-W-0082-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-W-0082-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5
John Y. Ota	D-W-0083-1	Cumulative Impacts	3.6.2.1.4	Section 3.6.2.1.4 of the EIS/OEIS includes details of depleted uranium at Pohakuloa Training Area. The Army has confirmed the presences of depleted uranium on remote sections of Pohakuloa Training Area. Since the Proposed Action includes training activities at Pohakuloa Training Area, guidance provided to users of Pohakuloa Training Area will be followed.
	D-W-0083-2	Hazardous Materials and Waste	3.6.2.1.4	The Navy currently trains at Pohakuloa Training Area, which provides unique training resources otherwise unavailable in Hawaii. As discussed in Section 3.6.2.1.4, a plan is being developed to fully address the issue of deplete uranium at the Pohakuloa Training Area by the U.S. Army.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
John Y. Ota	D-W-0083-3	Biological Resources - Terrestrial		Yes, the Navy is concerned about the effects of noise as well as additional issues. The numbers of threatened and endangered species are often greater on military installations than in the surrounding areas. The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment. Navy has provided protected haul-out locations for the Hawaiian monk seal, improved nesting habitat for the wedge-tailed shearwater, and organized volunteers to pick-up beach trash while documenting marine debris. Navy also participated in a program to remove invasive plants from endangered Hawaiian stilt habitat and has active programs to conserve energy and use renewable resources including solar powered water heating panels and shielded street lights.
	D-W-0083-4	Water Resources		Although no studies have been conducted, potential changes to ice under the peaks of Mauna Kea and Mauna Loa would not be expected. Ground vibrations at Pohakuloa Training Area from exploding rounds would dissipate over relatively short distance and would not be strong enough to affect ice under the peaks.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
John Y. Ota	D-W-0083-5	Mitigation Measures	Appendix F	Visual detection of marine mammals has proven an effective mitigation as documented in Appendix F. Fish finders are higher frequency sonar and some are closer to the center frequency range of toothed whale hearing than the Navy's mid-frequency sources. They are used to detect schools of fish at relatively short distances. These fish finders may impact marine mammals, they are not present on the Navy ships conducting ASW training in the HRC, and are not capable of detecting anything at the distances required to serve as effective mitigation during ASW training events. Navy submarines are capable of passive acoustic detection of vocalizing marine mammals. As stated in Chapter 6.0, U.S. Navy shipboard lookout(s) are highly qualified and experienced observers of the marine environment. Their duties require that they report all objects sighted in the water to the Officer of the Deck and all disturbances that may be indicative of a threat to the vessel and its crew. There are personnel serving as lookouts on station at all times when a ship or surfaced submarine is moving through the water. Navy lookouts undergo extensive training in order to qualify as a watchstander. This training includes on-the-job instruction under the supervision of an experienced watchstander, followed by completion of the Personal Qualification Standard program, certifying that they have demonstrated the necessary skills. In addition to these requirements, Fleet lookouts periodically undergo a 2-day refresher training course. The Navy includes marine species awareness as part of its training for its bridge lookout personnel on ships and submarines. Marine species awareness training was updated in 2005, and the additional training materials are now included as required training for U.S. Navy lookouts. This training addresses the lookout’s role in environmental protection, laws governing the protection of marine species.
	D-W-0083-6	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
John Y. Ota	D-W-0083-7	Mitigation Measures	6	There is no data specific to sonar affects on new born whales. As stated in Chapter 6.0, Mitigation: seasonal avoidance suggestions fail to take into account the fact that the mitigation measures avoid all detected marine mammals no matter the season and that there are "whales" present year-round in Hawaii. If the question is in regards to humpback whales, the Navy specifically informs all naval vessels to increase vigilance when the first humpback whales have been sighted around the Hawaiian Islands. The purported need for such suggested mitigation measures is based on speculative findings from other areas of the world that do not have direct application to the unique environment present in Hawaii. Such measures also can not be accurately implemented until there is a scientific basis defining parameters for the measures. Lacking any scientific basis behind the measures in Hawaii and lacking any evidence in Hawaii that there has ever been an impact resulting from the lack of these measures, there is no evidence that they would increase the protection of marine mammals. However, they would unacceptably impact the effectiveness of the training.
Vincent K. Pollard	D-W-0084-1	Alternatives	4.1.2.1, 4.1.2.2, 4.1.2.3, 4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1 with regard to noise effects on marine mammals and Sections 4.1.2.1 thru 4.1.2.3 with regard to noise effects on other marine species.
	D-W-0084-2	Alternatives		See response to comment D-T-0039-2
Sandra Miner	D-W-0085-1	Alternatives	1.1, 1.2, 1.3, 4.1.2.4, 4.1.2.4.11	See response to comment D-E-0057-1.
Kristin McCleery	D-W-0086-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
	D-W-0086-2	Alternatives	4.1.2.4, 4.1.2.4.10, 4.1.2.4.11, 6.1.2	Regarding the Bahamas stranding, see the discussion of stranding events in Section 4.1.2. In addition, see the discussion added to the EIS/OEIS in Section 4.1.2 regarding the critical importance of context (as discussed by Southall et al. (2004)) and any likely impacts on beaked whales in the Hawaiian Islands. The Bahamas conditions do not occur in Hawaii. With regards to why passive sonar can not be used exclusively for ASW, see Section 6.1.2.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Kristin McCleery	D-W-0086-3	Biological Resources - Marine	4.1.2.2	To summarize Section 4.1.2.2, based on the limited studies, there is some evidence that there could be minor impacts on fish (i.e., behavioral response or avoidance) from mid-frequency active (MFA) sonar, while in other studies, using hearing specialist species and intense exposure there has been severe impacts (i.e., death) to fish from MFA sonar. Also, exposure to a high intensity sound has been shown for some species to potentially damage the ears of fish, if left in close proximity (which generally they would avoid). However, most marine fishes are hearing generalists, with a hearing range generally below the mid-frequency bandwidth. Therefore, given a worst-case scenario (e.g., a hearing specialist fish in close proximity to the source and unable to relocate), there is the possibility of fish mortality. However, the loss of individuals in close proximity to the source would not result population impacts on the species. Also, it is assumed that fish that could detect MFA sonar would vacate the area, as a behavioral response, which would be deemed a temporary, not a permanent, adverse impact. To summarize Section 4.1.2.3, the intensity of sound and how turtles sense it is dependent on them being able to "hear" at that frequency. Turtles do not hear mid-frequency sounds, so the intensity is irrelevant.
	D-W-0086-4	Mitigation Measures	6.0	Chapter 6.0, Mitigation Measures, has been updated to reflect the Navy’s current mitigation measures and their use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.
C.A. Macgeorge	D-W-0087-1	Alternatives		Thank you for your comment.
Peter Courture	D-W-0088-1	Alternatives	1.0, 2.0,	As discussed in Chapters 1.0 and 2.0, the HRC provides the geography, infrastructure, space, and location necessary to accomplish complex military training and RDT&E activities. The large area available to deploy forces within the HRC allows training to occur using a geographic scope that replicates possible real world events. In addition, the HRC has the infrastructure to support a large number of forces, has extensive existing range assets, and accommodates Navy training and testing responsibilities both geographically and strategically, in a location under U.S. control. The Navy’s physical presence and training capabilities are critical in providing stability to the Pacific Region.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Peter Courture	D-W-0088-2	Mitigation Measures	6.0	Chapter 6.0, Mitigation Measures, presents the U.S. Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. It should be noted that these protective measures have been standard operating procedures for unit-level antisubmarine warfare training since 2004. In addition, The Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.
	D-W-0088-3	Program	4.1.2.5.4	The Navy is in compliance with all applicable environmental laws. Regarding Marine Mammal Protection Act endangered species, effects on listed species are the subject of consultations with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. The Navy is consulting with the Hawaii Coastal Zone Management Program in accordance with the Coastal Zone Management Act. In regard to the National Marine Sanctuaries Act, there is no new consultation requirement in law; all activities have been previously reviewed, and there is not a significantly greater chance of destruction or injury to sanctuary resources.
Bonnie P. Bator	D-W-0089-4	Policy/NEPA Process		Scoping transcripts/records of scoping comments are not a part of the EIS/OEIS but are included in the Administrative Record.
	D-W-0089-5	Miscellaneous	10	Your name will be added to the EIS/OEIS distribution list.
	D-W-0089-6	Program		Thank you for your comment.
Nova Blazej --USEPA, Region 9	D-W-0090-1	Alternatives	4.1.2.4.6	As discussed in Southal et al (2007:413-414) and presented in 4.1.2.4.6 of the EIS/OEIS, the modeling and threshold levels developed for analysis of impacts to marine mammals universally erred on the side of precaution with regard to the range at which an animal may have a probability of behavioral harassment (65 nmi and 120 dB) or with regard to the accumulation of energy for harassment with no accounting for reactions of animals.
	D-W-0090-2	Alternatives	2.2.4, 2.2.5	In the Supplement to the Draft EIS and as incorporated into the EIS/OEIS, an additional alternative (Alternative 3) has been analyzed. Sonar hours for Alternative 3 and effects associated with ASW training would be identical to that presented under the No-action Alternative. Table 2.2.5-1 lists MFA/HFA sonar usage analyzed for the No-action Alternative and Alternative 3. Sonar usage is based on SPORTS data and operator input. Alternative 3 is the preferred alternative because it allows the Navy to meet its future non-ASW training and RDT&E mission objectives and avoid increases in potential effects to marine mammals above historic levels of ASW training in the HRC.
	D-W-0090-3	Alternatives	2.2.4. 3.0	See response to comment D-W-0090-2. Training Applications/Munitions elements and hazardous constituents are discussed in Chapter 3.0 of the EIS/OEIS.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Nova Blazej --USEPA, Region 9	D-W-0090-4	Alternatives	4.1.2.4.6, 6.1.2	As discussed in Southal et al (2007:413-414) and presented in 4.1.2.4.6 of the EIS/OEIS, the modeling and threshold levels developed for analysis of impacts to marine mammals universally erred on the side of precaution with regard to the range at which an animal may have a probability of behavioral harassment (65 nmi and 120 dB) or with regard to the accumulation of energy for harassment with no accounting for reactions of animals. For a discussion of alternative mitigation measures considered but not carried forward, see Section 6.1.2.
	D-W-0090-5	Biological Resources - Marine	4.1.2.2	Tuna species, including bigeye tuna are discussed in the EIS/OEIS and Essential Fish Habitat Assessment, and are recognized as being members of Pelagic Management Unit Species (i.e., managed species by the Western Pacific Fishery Management Council). The impact analysis does not specifically address tuna species, as tuna species are not considered endangered or threatened. They are grouped with other pelagic species, with the analysis focusing on impacts associated with any of the proposed operations that may affect pelagic species (e.g., detonation in the open ocean, sonar). The Navy recognizes that individual fish may be injured or killed as the result of several of the operations; however, that these incidents are localized, and would not have a population impact on any individual species. The Navy does not believe that training will affect Essential Fish Habitat. Regarding the qualification of impacts, all impact analyses are qualified based on the best available data, the effects of the operations, and the level or criteria to which an impact would be deemed adverse.
	D-W-0090-6	Hazardous Materials and Waste	2.2.3.5.2, 3.1.4, 3.4.2, 4.4.2.2.3.2.	The EIS/OEIS discusses the potential for mobilization of existing contaminants into the water column, and subsequent effects on environmental resources, in Sections 3.4.1 and 3.4.2. Development of the Acoustic Test Facility involves the addition of pinger equipment at pier S291 on Ford Island, Beckoning Point piers, or on a mobile test site that could operate within the test area. As a result, there would be no disturbance of any contaminated sediments or soils containing PCBs (see Sections 2.2.3.5.2 and 4.4.2.2.3.2).
	D-W-0090-7	Hazardous Materials and Waste	4.1.2, 4.1.4, 4.1.7	The Navy limits the amounts and types of unrecovered training materials deposited on the lands and waters within the HRC. Many of the larger training items are recoverable. The EIS/OEIS concludes that the deposition of unrecovered training materials has no substantial effect on ocean water quality. Therefore, mitigation measures are not necessary. Additional information has been added to Sections 4.1.2, 4.1.4, and 4.1.7 of the EIS/OEIS.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Nova Blazej --USEPA, Region 9	D-W-0090-8	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.1	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the HRC EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
	D-W-0090-9	Alternatives	2.2.4, 2.2.5	In the Supplement to the Draft EIS and as incorporated into the EIS/OEIS, an additional alternative (Alternative 3) has been analyzed. Sonar hours for Alternative 3 and effects associated with ASW training would be identical to that presented under the No-action Alternative. Table 2.2.5-1 lists MFA/HFA sonar usage analyzed for the No-action Alternative and Alternative 3. Sonar usage is based on SPORTS data and operator input. Alternative 3 is the preferred alternative because it allows the Navy to meet its future non-ASW training and RDT&E mission objectives and avoid increases in potential effects to marine mammals above historic levels of ASW training in the HRC.
Clyde Namuo --State of Hawaii	D-W-0091-1	Alternatives	4.1.2	The Navy and NMFS, in the role as regulator and as a cooperating agency, developed the risk function for analysis of impacts using the best available and applicable science. As described in Southall et al (2004) and as discussed in Section 4.1.2, there is paucity of data upon which to base threshold criteria; however, the Navy is following the recommendations of NMFS and using the criteria established by NMFS through a process of scientific review and recommendation.
	D-W-0091-2	Alternatives		Thank you for your comment.
	D-W-0091-3	Biological Resources - Marine	4.1.2	The EIS/OEIS contains a revised methodology provided by NMFS for the Navy, presented to the public in the Supplement to the Draft EIS/OEIS, and incorporated into the revised discussion in Section 4.1.2 of the Final EIS/OEIS.
	D-W-0091-4	Alternatives		Modeling to provide predicted numbers of marine mammal exposures is only the first step in an analysis of impacts. For the large whales and those such as sperm whales which tend to be grouped in pods of many individuals, it is likely that visual mitigations will preclude the exposure of these whales to high levels of sonar. Despite the mitigation measures, Navy is applying for a permit from NMFS for all predicted exposures rather than a reduced number as a result of the mitigation.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Clyde Namuo --State of Hawaii	D-W-0091-5	Mitigation Measures	6	Visual monitoring is critical for ship safety, irrespective mitigation. Navy lookouts and bridge personnel (5 in total on surface ships) are highly qualified and experienced marine observers. Compared to commercial vessels, Navy ships bridges are positioned forward to allow more optimal scanning of the ocean area from the bridge and bow area. Navy lookouts undergo extensive training to include on-the job instruction under supervision of an experienced lookout followed by completion of Personnel Qualification Standard Program. NMFS-approved Marine Species Awareness training is required before every exercise using MFA sonar. Navy lookouts use both hand held and “Big Eye” (20X110) binoculars. Aerial platforms also undertake visual monitoring prior to commencement of ASW operations. Passive acoustic systems are used by all platforms to monitor for marine mammal vocalizations, which are then reported to the appropriate watch station for dissemination. Navy ships also monitor their surroundings using all appropriate sensors at night and with night vision goggles as appropriate for activities conducted at night.
	D-W-0091-6	Alternatives	6.4.5	Monk seals are not likely to occur in areas where the majority of ASW training would take place. In addition, activities taking place on land where monk seals may be hauled out, are subject to clearance procedures before those activities can take place, such as at PMRF. The “Plan” referenced is the National Marine Fisheries Service recovery plan and not the Navy’s. Any concerns regarding that plan should be addressed to the National Marine Fisheries Service.
	D-W-0091-7	Land Use	1.2, 4.2	As discussed in Sections 1.2 of the EIS/OEIS, the President's Proclamation establishing the Papahanaumokuakea Marine National Monument exempted "activities and exercises of the Armed Forces" from the prohibitions on activities in the Monument, in recognition of the importance of on-going missile testing over and within Monument boundaries. However, the Proclamation does require that all activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities. As discussed in 4.2, due to the infrequency and short duration of tests, the large ocean areas in which testing would occur, and the relatively small number of boosters or large debris that could impact Monument waters, it is highly unlikely that harm to marine mammals or other sensitive marine life or resources would occur.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Clyde Namuo --State of Hawaii	D-W-0091-8	Hazardous Materials and Waste	1.2, 3.2, 4.1.2.1., 4.2	Section 4.1.2.1 Corals (Biological Resources - Open Ocean) addresses potential debris impacts on deep water corals. Specifically, the potential for impacts on these deep water corals from Navy training and RDT&E activities would be remote. The Navy activities would not result in any direct impacts on the coral or degradation of water/sediment quality in the vicinity of the corals. The probability of intercept debris or debris from GUNEX, BOMBEX, MISSILEX, or SINKEX reaching the bottom of the ocean floor where the coral is located would be extremely small. The debris is dispersed over a wide area, so even in the unlikely event the debris lands on the coral, the pieces would be spread out and most would be very small. There is no deep water coral located in the area where SINKEX is typically conducted. The potential for impacts on deep sea coral is remote.
	D-W-0091-9	Cultural Resources	3.2.2.2	Using the information provided in the Papahanaumokuakea Marine National Monument World Heritage Application (March 2007), Section 3.2.2.2 will be updated to reflect the most current archaeological information for Nihoa and Necker (Mokumanamana).
	D-W-0091-10	Cultural Resources	3.2.2.2	For background purposes, and to more fully convey the cultural significance of the entire Papahanaumokuakea Marine National Monument, Section 3.2.2.2 will be revised to include additional cultural resources information. Under Section 106 of the National Historic Preservation Act, the cultural resources area of potential effects (APE) is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist." For the activities near Papahanaumokuakea proposed in this EIS/OEIS, the cultural resources APE encompasses the southeastern most portion of the Monument (i.e., Nihoa and Mokumanamana [Necker] Islands), where missile intercepts and associated falling debris could occur. Because of the proposed missile trajectories, the other islands of Papahanaumokuakea would not be affected.
	D-W-0091-11	Cultural Resources	4.2.2.2, Appendix H.2	See response to comment D-W-0091-12.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Clyde Namuo --State of Hawaii	D-W-0091-12	Cultural Resources	4.2.2.2, Appendix H.2	Section 106 consultation was initiated during the scoping process for this EIS in the fall of 2006. Representatives from the Navy held public and agency meetings at several locations throughout the islands between September 13 and September 18, 2006, and additional agency coordination has been conducted since that time. This includes providing the Hawaii State Historic Preservation Officer with a copy of the Draft EIS/OEIS. A follow up letter was also sent to the SHPO's office and a concurrence letter was received by the Navy on September 17, 2007 indicating that "no historic properties will be affected." In addition, there is an existing Programmatic Agreement (PA) in place for Navy activities in Hawaii. Signed in June 2003, the PA was negotiated between the Commander, Navy Region Hawaii, the Advisory Council on Historic Preservation, and the Hawaii SHPO. There were also several consulting parties to this PA including the National Park Service, the National Trust for Historic Preservation, and the Office of Hawaiian Affairs (see Appendix H.2).
Peter Rappa --Univ. of Hawaii at Manoa	D-W-0092-1	Alternatives	1.0, 2.0,	See response to comment D-E-0324-4.
	D-W-0092-2	Miscellaneous	9	The information was obtained from a report identified as For Official Use Only. The reference section has been revised accordingly. Other reference documents that may not be accessible to the public also have been identified as such.
	D-W-0092-4	Program	4.3.2.1.1.1	See response to comment D-E-0324-5.
	D-W-0092-5	Program		See response to comment D-E-0324-6.
	D-W-0092-6	Airspace	3.1.1	See response to comment D-E-0324-8.
	D-W-0092-7	Program		See response to comment D-E-0324-9.
	D-W-0092-8	Program		See response to comment D-E-0324-10.
	D-W-0092-9	Program	4.3.2.1.7.1, K	See response to comment D-E-0324-11.
	D-W-0092-11	Biological Resources - Marine	4.1.2.4.1	See Section 4.1.2.4.1 regarding ship strikes and marine mammals.
	D-W-0092-12	Health and Safety	4.3.2.1.7	See response to comment D-E-0324-14.
	D-W-0092-13	Land Use	3.3.2.1.8, 4.3.2.1.8	See response for comment D-E-0324-15

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Peter Rappa --Univ. of Hawaii at Manoa	D-W-0092-14	Utilities	2.2.4.4, 4.1.1.3, 4.1.5.3	See response to comment D-E-0324-16.
	D-W-0092-15	Cumulative Impacts		See response to comment D-E-0324-17.
	D-W-0092-16	Health and Safety		See response to comment D-E-0324-18.
	D-W-0092-17	Program	2.2.2.1, 2.2.2.3, 2.2.2.4, 2.2.2.4.1	See response to comment D-E-0324-19.
	D-W-0092-18	Policy/NEPA Process		Thank you for your comment.
	D-W-0092-20	Program		See response to comment D-E-0324-7.
	D-W-0092-21	Geology and Soils	'3.3.2.1.5	See response to comment D-E-0324-12
	D-W-0092-22	Hazardous Materials and Waste	4.3.2.1.3.1, 4.3.2.1.6, 4.3.2.1.7,	See response to comment D-E 0324-13.
James Tollefson --The Chamber of Commerce of Hawaii	D-W-0093-1	Policy/NEPA Process		Thank you for your comment.
Beth Tokioka --Office of Economic Development	D-W-0094-1	Policy/NEPA Process		Thank you for your comment.
Robbie Kaholokula --Office of Economic Development	D-W-0095-1	Program		Thank you for your comment.
Eric S. Takamura --Department of Environmental Services	D-W-0096-1	Utilities	3.4.1.7	As noted in Section 3.4.1.7, the Ewa Training Minefield is an ocean area extending from Ewa Beach approximately 2 nautical miles (nm) toward Barber Point, and out to sea approximately 4 nm. The area is restricted by 33 Code of Federal Regulations (CFR) 334.1400 and has been used for surface ship mine avoidance training. The Navy would continue to take the same safety precautions that have protected underwater utilities in the past.
Cory Harden --Sierra Club, Moku Loa	D-W-0097-1	Cumulative Impacts		Thank you for your comment.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Cory Harden --Sierra Club, Moku Loa	D-W-0097-2	Hazardous Materials and Waste	4.1.3, 4.1.7, 5.0	The EIS/OEIS evaluates the expenditure and environmental fate of a variety of training materials. Both qualitative and quantitative assessments of these expenditures conclude that their effects on water quality and bottom sediments, and on the biota that inhabit these environments, would be negligible. A cumulative impact is the sum of the Proposed Action's effects and the effects of other projects. Thus, while the combined ocean discharges of wastewater treatment plants, urban runoff, marine vessels, and other sources may result in unhealthful concentrations of marine pollutants, the Navy's expended training materials would not contribute to that impact. See Section 5.0.
	D-W-0097-3	Cumulative Impacts	5.2.1.3	Section 5.2.1.3 has been added to discuss anthropogenic sources of ambient noise that are most likely to have contributed to increases in ambient noise. These include vessel noise from commercial shipping and general vessel traffic, oceanographic research, and naval and other use of sonar.
	D-W-0097-4	Cultural Resources		A shark heiau (Hal-oKapuni), where human remains were offered to sharks, is said to be located offshore of Kawaihae Pier. Its precise location is unknown since it has been buried for decades.
	D-W-0097-5	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.1	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy’s use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the HRC EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
	D-W-0097-6	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Cory Harden --Sierra Club, Moku Loa	D-W-0097-7	Cultural Resources	4.6.2.1.3	Previous cultural resources surveys of Pohakuloa Training Area encompass the Keamuku area. This has been added to the text. Existing policies regarding native Hawaiian access to religious, traditional, and cultural sites or native Hawaiian religious and subsistence practices are noted throughout the EIS/OEIS and remain unchanged with the proposed activities. Department of Defense installations throughout the state of Hawaii make every effort to accommodate requests for access to religious and subsistence sites within the constraints of their missions. Coordination of site visits is necessary to ensure the safety of all visitors. Alteration of roads and trails at Pohakuloa Training Area is not expected; however, that determination cannot always be made until specific project planning is undertaken. If alterations are required, mission planners will coordinate with the appropriate environmental managers prior to activities to ensure that there are no impacts on cultural resources.
	D-W-0097-8	Noise	4.1.6.1, 3.3.2.1.9	Supersonic flight and sonic booms are discussed in Section 4.1.6.1 for the Open Ocean activities and in detail in Appendix G. The HRC is approved for supersonic flight; however, no data is available that describes the exact location of supersonic operations. Supersonic activity is the HRC is generally restricted to altitudes greater than 30,000 feet above sea level or in areas at least 30 nautical miles from shore. These restrictions prevent most sonic booms from reaching the ground. Sonic booms are also discussed in Section 3.3.2.1.9 for missile launches at PMRF/Main Base. Populated areas are not likely to be affected by sonic booms generated during launch activities because missile trajectories will not include over flight of populated areas.
	D-W-0097-9	Policy/NEPA Process		The Navy released a Supplement to the Draft EIS/OEIS for public comment in light of new sonar data.
	D-W-0097-10	Biological Resources - Terrestrial		Your comment regarding allegations of tampering with scientific results by a USFWS official is noted but is outside the scope of this EIS/OEIS.
	D-W-0097-11	Miscellaneous		Thank you for your comment.
	D-W-0097-12	Miscellaneous		Hawaiian diacritical marks were used for the names of species in the Biological Resources sections and when their use was specifically called out in reference citations or quoted material. Hawaiian diacritical marks were also used when referring to the Papahanaumokuakea Marine National Monument.
	D-W-0097-13	Cumulative Impacts		The Proposed Action does not include planned use of the commercial vessel Superferry.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Cory Harden --Sierra Club, Moku Loa	D-W-0097-14	Transportation		Commercial vessels (i.e., Superferry, Matson vessels, Horizon Lines, and other carriers operating in Hawaii) , the Voluntary Intermodal Sealift Program (VISA), and the Transportation Command (USTRANSCOM) are not within the scope of this document.
	D-W-0097-15	Policy/NEPA Process		Non-training activities (i.e., combat related activities/operations) are exempt from environmental analysis under the NEPA statute/Executive Order 12114. However, military combat operations are planned to take into account potential impacts on the environment, and are then designed to reduce environmental impacts, when possible.
	D-W-0097-16	Cumulative Impacts	5	Cumulative impacts are addressed in Chapter 5.0 of this EIS/OEIS.
	D-W-0097-17	Hazardous Materials and Waste	2.2.3.5.4, 4.6.2.1.2.2	Sections 2.2.3.5.4 and 4.6.2.1.2.2 include details concerning the proposed Joint Threat Emitters at the Pohakuloa Training Area. These transmitters are threat simulators capable of generating radar signals associated with threat systems and consist of a computer controlled multiple emitter and receiver system (one or two command and control units). The proposed transmitters could be antenna or mobile vehicles. Command and control sensors are passive systems. Standard operating procedures and specific safety plans have been developed and would ensure that the general public and range personnel and assets are provided an acceptable level of safety.
	D-W-0097-18	Biological Resources - Terrestrial	3.6.2.1.2-1.	The following comment on the EIS/OEIS was received on 18 April 2007 from Darryl York, Pohakuloa Training Area Biologist: "Remove Hemignathus munroi \`Akia pola\`au from Pohakuloa Training Area species list."
	D-W-0097-19	Alternatives	4.1.2, 4.1.2.4.13.1	As described in the EIS/OEIS, this information is classified. In addition, Section 4.1.2 evaluates impacts from the Proposed Actions on biological resources in the open ocean.
	D-W-0097-20	Alternatives	4.1.2.4.5	While some of these terms are no longer used subsequent to the information presented in the Supplement to the Draft EIS/OEIS, as technical information is the source for analysis for some sections of the EIS/OEIS, the terms used are the most accurate, precise, and therefore the most appropriate to use. Section 4.1.2.4.5 defines these terms.
	D-W-0097-21	Miscellaneous	3.1.2.4, 4.1.2	Chapter 3.0 describes the environmental characteristics that may be affected by each alternative presented in the EIS/OEIS. An analysis of the impact(s) to the marine mammals listed in Table 3.1.2.4-1 (page 3-29) is presented in Chapter 4.0. Chapter 4.0 describes potential environmental consequences at each location; the same resource areas addressed in Chapter 3.0 for each location are addressed in Chapter 4.0; see Section 4.1.2.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Cory Harden --Sierra Club, Moku Loa	D-W-0097-22	Biological Resources - Marine	4.1.2	The EIS/OEIS contains a revised methodology provided by NMFS for the Navy, presented to the public in the Supplement to the Draft EIS/OEIS, and incorporated into the revised discussion in Section 4.1.2 of the Final EIS/OEIS. Affects of multiple pings are considered under the energy metric (EFD) criteria beginning with TTS, which is the first measurable physiological effect presently known. A new risk function is used in the present analysis has behavioral response curve with a lower mean (165 dB SPL) than the previously proposed 173 dB SPL.
	D-W-0097-23	Hazardous Materials and Waste	4.0, 4.1.4	The topic of hazardous wastes, including the amounts that could be generated at sea under Alternatives 2 or 3, are addressed in Section 4.1.4 of the EIS/OEIS. The island-specific subsections of Section 4 each include facility-specific discussions of hazardous waste generation under Alternatives 2 or 3.
	D-W-0097-24	Hazardous Materials and Waste	3.1.4, 3.1.7, 4.1.4, 4.1.7	The time necessary for chaff fibers to decompose depends upon the environment to which the fiber is exposed, but can be as little as three months. Cartridges, pistons, end caps, and other elements of the chaff dispensing system will generally fall into the ocean and sink to the bottom. Some potential exists for chaff fibers dispensed over the ocean to be inhaled but, to date, there have been no known cases of chaff inhalation or other chaff-related health incidents on land or at sea. Discussions of chaff are provided in Sections 3.1.4, 3.1.7, 4.1.4, and 4.1.7.
	D-W-0097-25	Biological Resources - Terrestrial	4.2.1.1.1.1	Text has been added to section 4.2.1.1.1.1 clarifying the size and area of an anticipated debris field. The exact size of debris anticipated would vary with each intercept. In a successful intercept, both missiles would be destroyed by the impact. Momentum would carry debris along the respective paths of the two missile until the debris falls to earth. The debris would consist of a few large pieces (approximately 110 pounds [lb]), of each missile, many medium pieces (approximately 11 lb), and mostly tiny particles. This debris is subject to winds on its descent to the surface. The debris would generally fall into two elliptically-shaped areas.
	D-W-0097-26	Air Quality	3.6.2.1.4	As detailed in Section 3.6.2.1.4, a plan is being developed to fully address the issue of depleted uranium at the Pohakuloa Training Area by the U.S. Army. Guidance provided to users of Pohakuloa Training Area will be followed for proposed training activities.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Cory Harden --Sierra Club, Moku Loa	D-W-0097-27	Airspace	4.6.2.1	As described in Section 4.6.2.1.1, these types of training events are confined to the special use airspace R-3103 located above the range associated with Pohakuloa Training Area. Air activity is controlled and coordinated by Pohakuloa Training Area Range Control. For training that includes 10 or more aircraft, the Bradshaw Army Airfield manager submits a Notice to Airmen (NOTAM) to the Federal Aviation Administration (FAA) Honolulu Flight Service Station to be published as a Honolulu Local NOTAM and as a Class D NOTAM. The Bradshaw Army Airfield manager provides this information to the airfield Air Traffic Information Service. Typically, one aircraft carrier trains during a Major Exercise. Alternatives 2 and 3 propose the use of three aircraft carriers during a Major Exercise; this would require an increase in coordination and scheduling by the Navy, Bradshaw Army Airfield, and the FAA. The increased training would be accommodated within the existing airspace.
	D-W-0097-28	Biological Resources - Terrestrial	4.0, 5.0	Impacts from applicable Army activities are addressed in Chapter 5.0--Cumulative Impacts. Chapter 4.0 of the HRC EIS/OEIS addresses impacts from Navy activities on Army land.
	D-W-0097-29	Biological Resources - Terrestrial	4.6.2.1.2.3	Up to three Strike Groups could visit the area once a year. Their operations would be mainly in the Open Ocean and thus the potential for impacts would not necessarily be added to Army impacts. Cumulative impacts are discussed in Chapter 5.0 of the HRC EIS/OEIS.
	D-W-0097-30	Noise	2, 3.6.2.1.5, 4.6.2.1.5	Specific changes in tempo, frequency and number are provided in Chapter 2.0. Section 3.6.2.1.5 has been updated and Figure 3.6.2.1.5-1 has been added to include information regarding existing noise levels at Pohakuloa Training Area. These noise levels include current (the No -action Alternative) Navy training and RDT&E activities. According to the current noise levels depicted in Figure 3.6.2.1.5-1, Laupahoehoe is not within the Zone II or III noise levels. This means that, in accordance with the Army's noise evaluation program, the area would not receive noise levels equal to or higher than 65 dBA. In addition, Section 4.6.2.1.5 has also been updated. While training events would increase in number at Pohakuloa Training Area, the type of training would be the same and would not increase the current modeled noise levels. The proposed training would be individual events and would not occur simultaneously.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Cory Harden --Sierra Club, Moku Loa	D-W-0097-31	Hazardous Materials and Waste	4.1.3, 4.1.7, 5.0	Under the No-action alternative, there would be a continuation of ongoing training activities at Bradshaw Army Airfield. The activities will not cause an increase in the amount or type of hazardous materials used or hazardous waste produced. Bradshaw Army Airfield has plans in place to manage hazardous materials and waste. Training activities proposed for Alternatives 1 and 2 would be similar to those for the No-action Alternative. While the number of activities would increase, hazardous materials used and hazardous waste generated would be similar to existing usage and generation, and would not result in any changes to management plans currently in place at Bradshaw Army Airfield.
	D-W-0097-32	Socioeconomics	4.6.2.2	As noted in Section 4.6.2.2, there are no activities proposed within this EIS/OEIS that would affect socioeconomics or transportation at Bradshaw Army Airfield. The number of personnel living in or traveling to Bradshaw Army Airfield will not increase, and there would be to the level of service for the roadways.
	D-W-0097-33	Airspace	2.2.4.1, 4.6.2.2.1.1	Helicopter raids are associated with Special Warfare Operations (SPECWAROPS). For all locations in the HRC there are 30 SPECWAROPS per year identified for the No-action, Alternative 1, Alternative 2, and Alternative 3 (EIS/OEIS, Table 2.2.2.3-1). There would be less than six helicopter raids per year at Bradshaw Army Airfield (see Section 4.6.2.2.1.1).
	D-W-0097-34	Biological Resources - Terrestrial	4.6.2.2.2.2	As stated Section 4.6.2.2.2.2, training operations at Bradshaw Army Airfield are limited in scope and not anticipated to impact areas beyond the airfield itself. Training occurs within pre-defined areas. Thirty SPECWAROPS occur annually throughout the HRC, including Bradshaw. This number is not expected to increase under either Alternative 1, 2, or 3.
	D-W-0097-35	Biological Resources - Terrestrial	4.8	Correspondence with and comments provided by USFWS (Dept. of Interior) are included in the EIS/OEIS. NMFS correspondence and comments are not included because they are a cooperating agency on the EIS/OEIS. Compliance status with the National Marine Sanctuaries Act has been added to Table 4.8-1.
	D-W-0097-36	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Cory Harden --Sierra Club, Moku Loa	D-W-0097-37	Cumulative Impacts		The scope of this EIS/OEIS is to evaluate the environmental effects of the Proposed Actions within the HRC. It is not intended to provide an analysis of the programs requested. Consequently, inclusion of this information is not appropriate or essential to perform the required environmental analysis of the Proposed Action.
	D-W-0097-38	Cumulative Impacts	4	Specific information relation on other marine resources related to environmental contamination and biotoxins is also not available to adequately determine potential cumulative impacts. However, a detailed analysis of potential impacts on water resources, hazardous materials and waste, and essential fish habitat is provided in Chapter 4
	D-W-0097-39	Cumulative Impacts		Detailed analysis for the permanent stationing of the 2/25th Stryker Brigade Combat Team is beyond the scope of this EIS/OEIS but can be found at the following website: http://www.sbct-seis.org/. However, cumulative impacts from Army activity are considered in Chapter 5.0 of this EIS/OEIS.
	D-W-0097-40	Biological Resources - Marine	4.1.2	Use of the SOFAR channel is beyond the scope of this document given that it does not involve one of the proposed actions. The EIS states that the nominal source level of the AN/SQS 53 is 235 dB @ 1m re 1 u-Pa2. Marine mammals (we believe your reference is to studies on beluga specifically) are context specific for animals that are hunted and must contend with shifting ice, which does not have relevance in the Hawaii context. In addition, "the 110 to 120 dB", discussed is a received level (at the whales) as opposed to a source level (1 meter from the sonar), which is inside the sonar dome (inside the bow of the ship). Thresholds developed in cooperation with NMFS are presented in Section 4.1.2, which provides details on the various possible effects and the method NMFS has approved for analyzing those possible effects.
	D-W-0097-41	Alternatives	2	As discussed in Chapter 2.0, the Proposed Action does not include the use of low-frequency active sonar.
	D-W-0097-42	Biological Resources - Marine		Both the Department of the Interior and the Department of Defense (the Navy in this case) recognize that migratory birds are of great ecological and economic value and are an important international resource. They are a key ecological component of the environment. The Department of the Interior and Department of Defense also recognize that steps should be taken to minimize or avoid negative impacts on migratory birds when planning and executing military readiness activities, while maintaining the effectiveness of such activities. The Department of the Interior reviewed the Draft EIS/OEIS and their comments/concurrence will be in the final version.
	D-W-0097-43	Biological Resources - Terrestrial		Only simulants discussed in the Lethality Program EA and also proposed at HRC are TBP and glycols.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Cory Harden --Sierra Club, Moku Loa	D-W-0097-44	Hazardous Materials and Waste	4.3.2.1.7.2	Section 4.3.2.1.7.2 details health and safety for target launches that include TBP and various glycols proposed for Alternatives 1, 2, and 3.
	D-W-0097-45	Biological Resources - Terrestrial		The Navy and other Services recognize that past practices conducted decades ago resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and remediation is proceeding with the available funds.
	D-W-0097-46	Hazardous Materials and Waste	4.1.4.1.1, C.5	Hazardous materials generated aboard ship that would be considered hazardous wastes when offloaded in port are not disposed of at sea. Hazardous wastes are offloaded upon reaching port in Hawaii, and enter the Navy's shore-side waste management system (see Section 4.1.4.1.1). The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing training, funds, pollution prevention efforts and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws, reporting requirements, and has established rules and procedures to ensure that Navy activities are performed in a responsible manner to protect Hawaii's environment (see Appendix C.5).
	D-W-0097-47	Hazardous Materials and Waste		In layman's terms, used hazardous materials and hazardous wastes will be characterized by trained professionals, placed in containers of appropriate materials and design, stored in secure areas under appropriate conditions, and finally transported to government-approved treatment or disposal facilities, all in accordance with State and Federal regulations.
	D-W-0097-48	Hazardous Materials and Waste	3.1.4	Most wastes meeting RCRA hazardous criteria cannot be disposed in Hawaii, where land is at a premium and the volumes of various types of hazardous waste streams are insufficient for a disposal facility to be cost-effective, but this is a dynamic situation. Depending upon the materials, some treatment - such as consolidation, blending, and neutralization - can be accomplished in Hawaii. Hazardous wastes that are not treated or disposed in Hawaii are shipped to mainland facilities (see Section 3.1.4 - Disposal)
	D-W-0097-49	Hazardous Materials and Waste	4.1.4	Under Alternatives 2 or 3, about 4,884 cartridges of aerial chaff and about 280 cartridges of super-bloom offboard chaff will be used per year, totaling about 5 tons per year of these materials. The amounts used by other services are not relevant, in that they do not occur in the same areas as the expenditures of chaff under the Proposed Action, so there is no cumulative effect. See Section 4.1.4.
	D-W-0097-50	Hazardous Materials and Waste	3.14, 3.1.7, 4.1.4, 4.1.7	Please see responses to comments D-E-0460-37, D-E-0460-38, and D-E-0460-39.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Cory Harden --Sierra Club, Moku Loa	D-W-0097-51	Hazardous Materials and Waste	4.1.7	Chaff fibers dispersing into the ocean from the aerial releases where the chaff cartridge functions as designed will never be present in surface waters at concentrations that could fill the digestive tract of a bird. In addition, the size, thickness, and visibility in water of individual chaff fibers are such that it would be difficult for a seabird to selectively feed on these materials. In those rare instances (estimated at <5 percent) where the cartridge does not function as designed, the most likely result would be that the chaff was not dispensed at all (see Section 4.1.4 - Chaff and Flares)
Gary Hooser --Hawaii State Senate	D-W-0098-1	Miscellaneous		The initial comment period was extended from 45 days to 52 days (July 27 - September 17, 2007).
Roland Sagum	D-W-0099-1	Program		Thank you for your comment.
Valerie Weiss	D-W-0100-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
Maria Walker	D-W-0101-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
Evelyn de Buhr	D-W-0102-1	Policy/NEPA Process		Thank you for your comment.
Inanna Carter	D-W-0103-1	Biological Resources - Marine	4.1.2	Regarding the Bahamas stranding, see the discussion of stranding events in Section 4.1.2. In addition, see the discussion added to the EIS/OEIS in Section 4.1.2 regarding the critical importance of context (as discussed by Southall et al., 2004) and any likely impacts on beaked whales in the Hawaiian Islands. The Bahamas conditions do not occur in Hawaii.
Steve Tyler	D-W-0104-1	Cumulative Impacts		Your comment regarding sonar training off the southern California coast is noted but is beyond the scope of this EIS/OEIS.
Jennifer Ho	D-W-0106-1	Policy/NEPA Process		In accordance to Section 1506.6 of the National Environmental Policy Act, the Navy made a diligent effort to involve the public in preparing and implementing the NEPA process, which includes making the document available where the public would have access. The Draft EIS/OEIS was placed in 8 public libraries in the state of Hawaii, and there were 4 public hearings held between 21 and 29 August 2007. The Navy solicited additional comments from agencies and the public during the comment period that followed the public hearings for the Draft EIS/OEIS. Additionally, a website was created so stakeholders would be able to download or view the document for review and comments could be e-mailed or submitted via the website to the Navy.
	D-W-0106-2	Biological Resources - Marine		Thank you for your comment.
Jay Miller	D-W-0107-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
Edmond Silva	D-W-0108-1	Environmental Justice		Thank you for your comment.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Nina Monasevitch	D-W-0109-1	Program		Thank you for your comment.
	D-W-0109-2	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore, there is no proposal to expand. It is true that the proposal includes increases in the frequency of training.
Cory Harden	D-W-0110-1	Alternatives		As "highly technical" information is the source for analysis for some sections of the EIS/OEIS, the term(s) are the best/most appropriate to use.
	D-W-0110-2	Health and Safety	4.1.2, 4.1.4, 4.2	Sections 4.1.2, Biological Resources - Open Ocean, 4.1.4, Hazardous Materials & Waste - Open Ocean, and 4.2, Northwestern Hawaiian Islands, include details regarding missile intercept and the debris associated with these intercepts.
	D-W-0110-3	Alternatives	3.0,	As stated in Chapter 3.0, environmental characteristics are discussed according to location; the Open Ocean Area is discussed first, followed by offshore and onshore discussion organized by island location from west to east: Northwestern Hawaiian Islands, Kauai, Oahu, Maui, and Hawaii. For organizational purposes, discussions about Niihau and Kaula are included under the Kauai heading, because although they are separate islands, they are part of Kauai County. In addition, discussions about Molokai, Lanai, and Kahoolawe are included under the Maui heading, because although they are separate islands, they are part of Maui County. The last section discusses the Hawaiian Islands Humpback Whale National Marine Sanctuary. Preparing environmental analysis by location seemed to be the most logical, it allows the reader to find their area of concern without confusion.
	D-W-0110-4	Miscellaneous	All	The document will be reviewed, and if appropriate, "lay-person" terminology will be considered.
	D-W-0110-5	Environmental Justice	5	Chapter 5.0 of the EIS/OEIS discusses the cumulative impacts for Cultural Resources, Land Use, Health & Safety, and Socioeconomics. Chapter 4.0 discusses the factors used during the analysis of each alternative for the Proposed Action presented in the EIS/OEIS.
	D-W-0110-6	Socioeconomics		Your comments regarding native Hawaiians are noted, but these types of issues are outside the scope of the environmental impact analysis process.
	D-W-0110-7	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Cory Harden	D-W-0110-8	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination.
Marsha Green -- International Ocean Noise Coalition	D-W-0111-1	Alternatives	4.1.2.4.11.2.	Regarding the Bahamas stranding, see the discussion of stranding events in Section 4.1.2. Also note that the analysis of impacts is based on metrics for direct physiological impacts and for behavioral impacts. In the Bahamas, it is unlikely that sound energy directly caused the histological manifestations reported in the stranded beaked whales. It is also important that in the Hawaii context, there has never been a beaked whale stranding associated with the use of sonar over decades of sonar use in Hawaiian Waters.
	D-W-0111-2	Alternatives		Nowacek et al. (2004) used an “alert stimuli” signal meant specifically to keep Atlantic right whales from having ship strikes. This “alert stimuli” signal is in no way comparable to mid-frequency active sonar.
	D-W-0111-3	Alternatives	4.1.2.4.6, 4.1.2.4.9.1, 4.1.2.4.9.2	Section 4.1.2 provides a discussion of the data used to generate the analytical risk function. As explained in Section 4.1.2 and as presented in Southall et al., 2007, “data gaps severely restrict the derivation of scientifically-based noise exposure criteria.” As explained in the Supplement to the Draft EIS/OEIS and in Section 4.1.2, the risk function made use of all appropriate data as recommended and reviewed by NMFS scientists.
	D-W-0111-4	Alternatives	4.1.2.4.10	While the absence of evidence does not prove there have been no effects, 30 years of history with no evidence of any impacts or strandings would seem to indicate that problems encountered in locations far from Hawaii involving beaked whales are location and context specific and do not apply in Hawaiian waters.
	D-W-0111-5	Alternatives	4.1.2.4.11.1	The behavioral criteria established takes into account reactions to very low received sound pressure levels to account for potential and direct effects. See Section 4.1.2 discussion of the risk function in this regard. There have been very few cases over the last decade when the Navy and NMFS believe that this has happened, and all these occurred in locations other than Hawaii. Chapter 6.0 details mitigation measures in place to further minimize the possibility. Acknowledging the uncertainty and small probability, the Navy has requested mortality of a small number of a few species. This amount of mortality would not result in any long-term population level effects.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Marsha Green -- International Ocean Noise Coalition	D-W-0111-6	Alternatives	4.1.2.4.10	In Hawaii, there have been no known beaked whales strandings associated with the use of mid-frequency active sonar. While the absence of evidence does not prove there have been no effects on beaked whales, 30 years of history with no evidence of any impacts or strandings would seem to indicate that problems encountered in locations far from Hawaii involving beaked whales are location and context specific and do not apply in Hawaiian waters.
	D-W-0111-7	Alternatives	4.1.2, 5.0	Cumulative effects analysis is presented in Chapter 5.0 of the EIS/OEIS. The discussion of the framework for derivation and analysis of acoustic effects is provided in Section 4.1.2 of the EIS/OEIS. These concerns will also be addressed independently by NMFS during rulemaking (a public process) for issuance of the Letter of Authorization under MMPA and the Biological Opinion for Endangered Species.
	D-W-0111-8	Mitigation Measures		It is critical that Navy be able to conduct ASW training in a variety of environment and bathymetric conditions, including in the vicinity of seamounts. The seamount allows a submarine to hide in an area that is shadowed by seamount because the active transmission cannot reach the sub via the bottom bounce path. Therefore, it is critical to operate MFA sonar in areas of high bathymetric variability.
	D-W-0111-9	Alternatives	4.1.2	The Navy, and NMFS in its cooperating agency role, used the best available and applicable science as determined by the regulator (NMFS) and the regulatory scheme required by the MMPA. If and when the regulatory scheme changes and NMFS establishes subgroup populations, the Navy will reassess their analysis.
	D-W-0111-10	Alternatives	4.1.2.4.11.3	As discussed in Section 4.1.2.4.11, Navy believes that evidence not considered previously involving the Hanalei “stranding” of July 2004 indicates that the full moon could have been a contributing factor in terms of bringing the animals closer to the shore.
	D-W-0111-11	Mitigation Measures		Imposing training restrictions from other countries on the U.S. Navy without considering the differences between each navies’ capabilities, systems, mission requirements, and threats; and without considering whether the foreign country’s training restrictions are more effective in protecting marine mammals from harm than the extensive precautions currently taken by the U.S. Navy, would arbitrarily undermine the U.S. Navy’s ability to maintain military readiness.
Cathy Liss --Animal Welfare Institute	D-W-0112-1	Biological Resources - Marine	6.0	Chapter 6.0, Mitigation Measures, has been updated to reflect the Navy’s current mitigation measures and their use of the best available science balanced with the NMFS approach and the requirements of the Navy to train.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Cathy Liss --Animal Welfare Institute	D-W-0112-2	Alternatives	4.1.2.4, 4.1.2.4.11	Section 4.1.2 provides a discussion of the data used to generate the analytical risk function. As explained in Section 4.1.2 and as presented in Southall et al., 2007, "data gaps severely restrict the derivation of scientifically-based noise exposure criteria." As explained in the Supplement to the Draft EIS/OEIS and in Section 4.1.2, the risk function made use of all appropriate data as recommended and reviewed by NMFS scientists.
	D-W-0112-3	Alternatives	4.1.2.4.6, 4.1.2.4.9.1, 4.1.2.4.9.2, 4.1.2.4.12, 5.2.1, 5.3.3.2	The Navy and NMFS, in the role as regulator and as a cooperating agency, developed the risk function for analysis of impacts using the best available and applicable science. As described in Southall et al (2004) and as discussed in Section 4.1.2, there is paucity of data upon which to base threshold criteria, however, Navy is following the recommendations of NMFS and using the criteria established by NMFS through a process of scientific review and recommendation.
	D-W-0112-4	Alternatives	4.1.2.4.10, 4.1.2.4.11.2	Regarding the Bahamas stranding, see the discussion of stranding events in Section 4.1.2. In addition, see the discussion added to the EIS/OEIS in Section 4.1.2 regarding the critical importance of context (as discussed by Southall et al. (2004)) regarding likely impacts on beaked whales in the Hawaiian Islands. The Bahamas conditions do not occur in Hawaii.
	D-W-0112-5	Alternatives	4.1.2.4.10	In Hawaii, there have been no known beaked whales strandings associated with the use of mid-frequency active sonar. While the absence of evidence does not prove there have been no affects on beaked whales, 30 years of history with no evidence of any impacts or strandings would seem to indicate that problems encountered in locations far from Hawaii involving beaked whales are location and context specific and do not apply in Hawaiian waters.
	D-W-0112-6	Alternatives	1.1, 1.2, 1.3, 4.1.2.4, 4.1.2.4.11	As described in Section 4.1.2, it is unlikely given the Navy's standard protective measures that there will be any serious injury to marine mammals in the Hawaiian Islands as a result of the continuation of training and RDT&E in the HRC. The activities being analyzed have been occurring in the Hawaiian Islands for decades and there have been no known impacts resulting from those activities, especially sonar use.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Cathy Liss --Animal Welfare Institute	D-W-0112-7	Mitigation Measures	6	Visual monitoring is critical for ship safety, irrespective mitigation. Navy lookouts and bridge personnel (5 in total on surface ships) are highly qualified and experienced marine observers. Compared to commercial vessels, Navy ships bridges are positioned forward to allow more optimal scanning of the ocean area from the bridge and bow area. Navy lookouts undergo extensive training to include on-the job instruction under supervision of an experienced lookout followed by completion of Personnel Qualification Standard Program. NMFS-approved Marine Species Awareness training is required before every exercise using MFA sonar. Navy lookouts use both hand held and “Big Eye” (20X110) binoculars. Aerial platforms also undertake visual monitoring prior to commencement of ASW operations. Passive acoustic systems are used by all platforms to monitor for marine mammal vocalizations, which are then reported to the appropriate watch station for dissemination. Navy ships also monitor their surroundings using all appropriate sensors at night and with night vision goggles as appropriate for activities conducted at night.
	D-W-0112-8	Mitigation Measures	6.0	Navy ships monitor their surroundings using all appropriate sensors at night and with night vision goggles as appropriate for activities conducted at night.
	D-W-0112-9	Mitigation Measures	6.0	Chapter 6.0, Mitigation Measures, presents the U.S. Navy’s protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. It should be noted that these protective measures have been standard operating procedures for unit-level antisubmarine warfare training since 2004. In addition, the Navy’s current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.
	D-W-0112-10	Biological Resources - Marine	3.1.2.2.3, 3.1.2.2.4, 3.1.2.2.5, 3.1.2.2.6	Please see Section 3.1.2.2.3 - Fish Acoustics, Section 3.1.2.2.4 - Behavioral Effects of Sound, Section 3.1.2.2.5 - Physiological Effects of Sound, and Section 3.1.2.2.6 - Masking Effects, as they discuss noise impacts on fish.
	D-W-0112-11	Biological Resources - Marine	4.1.2.3	To summarize Section 4.1.2.3, the intensity of sound and how fish and turtles sense it is dependent on them being able to "hear" at that frequency. Turtles and fish do not hear mid-frequency sounds, so the intensity is irrelevant.
	D-W-0112-12	Mitigation Measures	6.4	Section 6.4, Mitigation Measures for Underwater Detonations, includes turtles and fish.
	D-W-0112-13	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-W-0112-14	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Juan Wilson	D-W-0113-1	Program		Thank you for your comment.
	D-W-0113-2	Alternatives		The activities being analyzed, including mid-frequency active tactical sonar, DICASS sonobuoys, MK-48 torpedo, dipping sonar and underwater demolition training have been occurring in the Hawaiian Islands for decades and there have been no known impacts resulting from those activities.
	D-W-0113-3	Mitigation Measures	6	Chapter 6.0, Mitigation Measures, presents the U.S. Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. It should be noted that these protective measures have been standard operating procedures for unit-level antisubmarine warfare training since 2004. In addition, the Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.
	D-W-0113-4	Biological Resources - Terrestrial	4.3.1.1.1.1	See response to comment D-E-0438-3.
	D-W-0113-5	Hazardous Materials and Waste	2.2.4.4, 4.1.1.3, 4.1.5.3	Projected RDT&E laser programs do not include the use of hydrogen fluoride, and therefore the use of hydrogen fluoride is not part of the Proposed Action. In the event laser programs do come to PMRF, separate environmental documentation would be required to analyze potential impacts from training operations (see Sections 2.2.4.4, 4.1.1.3, and 4.1.5.3).
	D-W-0113-6	Water Resources	2.2.4.4	There are currently no plans for chemical lasers. Because the directed energy programs have not been defined, they cannot be fully analyzed in this EIS/OEIS. As stated in Section 2.2.4.4 of the EIS/OEIS, "Should the Airborne Laser program decide to perform testing at PMRF, separate environmental documentation would be required to analyze potential impacts."
	D-W-0113-7	Health and Safety		PMRF would develop the necessary standard operating procedures and range safety requirements necessary to provide safe operations associated with future direct energy tests. However, separate environmental documentation would be required to analyze potential impacts from these R & D activities.
	D-W-0113-8	Mitigation Measures		Additional environmental documentation for construction and use of the Maritime Directed Energy Center at PMRF would include analysis of the safety issues associated with directed energy. The EIS/OEIS only addresses potential locations of the Center on PMRF as part of the R & D activities.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Juan Wilson	D-W-0113-9	Cumulative Impacts		The scope of this EIS/OEIS is not intended to provide an analysis of Littoral Combat Vessels stationed in Hawaii with an Expeditionary Attack Force since there are no proposals ready to date. Consequently, inclusion of information concerning the use of Littoral Combat Vessels is not appropriate or essential to perform the required environmental analysis of the Proposed Actions.
Manuel Kuloloio	D-W-0115-1	Miscellaneous	13	All comments received will be placed in Chapter 13.0 in the EIS/OEIS.
Bob McDermott --Navy League	D-W-0116-1	Biological Resources - Marine		See response to comment D-T-0037-2
	D-W-0116-2	Mitigation Measures	5.2.1	See response to comment D-T-0037-4.
	D-W-0116-3	Cumulative Impacts		See response to comment D-T-0037-3.
Howard Sharpe	D-W-0117-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
	D-W-0117-2	Alternatives		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
Thomas Nakagawa	D-W-0118-1	Biological Resources - Marine		Thank you for your comment.
	D-W-0118-2	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-T-0045-2
	D-W-0118-3	Socioeconomics		See response to comment D-T-0045-4.
	D-W-0118-4	Biological Resources - Marine		See response to comment D-T-0045-5.
	D-W-0118-5	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-T-0045-6.
Anita Wintner	D-W-0119-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-T-0058-1.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Anita Wintner	D-W-0119-2	Health and Safety	4.1.5.1.1	Human exposure to underwater noise is addressed in Section 4.1.5.1.1. The Navy issues Notices to Mariners (NOTMARS) to alert commercial and recreational users, such as dive services, about upcoming at-sea training activities so that they may divert to open areas. During training exercises, Navy assets monitor the area to ensure that the public is not exposed to a health or safety risk. If non-participants are detected in the vicinity of an exercise, then it is delayed or postponed until those individuals have moved a safe distance away. With these measures in place, the Navy has an exemplary record of public safety. To date, no member of the public has been exposed to unhealthful levels of underwater noise.
	D-W-0119-3	Biological Resources - Marine	4.1.2.2	See response to comment D-T-0058-3
	D-W-0119-6	Biological Resources - Marine	3.1.2.3.2	The species description in Section 3.1.2.3.2 has been revised to include: "Since 1991, 81 nesting female hawksbills have been tagged on the Big Island at various locations, 22 tagged in the last 3 years. These do not include nesting females from Maui or Molokai which would add a small number to the total. While this appears to be an encouraging trend, Seitz and Kagimoto (2007) report that there are insufficient data to confirm an increasing population as yet.
	D-W-0119-7	Mitigation Measures	6.0	Chapter 6.0, Mitigation Measures, presents the U.S. Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. It should be noted that these protective measures have been standard operating procedures for unit-level antisubmarine warfare training since 2004. In addition, the Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.
	D-W-0119-8	Policy/NEPA Process		To the best of the Navy's knowledge, the National Marine Fisheries Services has not released "a cause of death" for the whale that was found in Kihei, Maui and reported at 6:30 a.m. on April 25, 2007. A necropsy was being performed to provide more information on the species of toothed whale, which inhabits the deep ocean and is rarely seen.
	D-W-0119-9	Alternatives	4.1.2.4.11.2	Section 4.1.2.4.11.2 includes a discussion of specific stranding events that have been linked to potential sonar operations. Of note, these events represent a small overall number of animals over an 11-year period (approximately 40 animals), and not all worldwide strandings can be linked to naval activity.
Lanny Sinkin	D-W-0120-1	Alternatives		The 1998 observations referenced were in regard to use of low-frequency active (LFA) sonar. The use of LFA in the HRC is not part of the Proposed Action of this EIS/OEIS. In addition, your comment's characterization of the results of the tests is in error.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Lanny Sinkin	D-W-0120-2	Policy/NEPA Process		See response for comment D-T-0076-3.
	D-W-0120-3	Policy/NEPA Process		See response for comment D-T-0078-4.
Hans Mortensen -- Keaukaha Community Assoc.	D-W-0121-1	Noise	3.6.2.1	Section 3.6.2.1 has been revised to state that there are no proposed activities in this EIS/OEIS that include Navy training at the Hilo International Airport. The State of Hawaii Department of Transportation, Airports Division operates and maintains the airport in conformity with environmental rules. Navy P-3 aircraft from Marine Corps Base Hawaii do currently perform infrequent practice approach and landing proficiency flights at Hilo International Airport and other airfields (e.g., Kona, Lihue, Kahului). The Navy P-3 has a limited flying schedule based on its home airfield, and operations only occur between 0730 and 2300 Monday through Thursday, 0730-2100 on Friday, and 0730-1600 on Saturday. There are no Sunday flights. Military aircraft activities make up a small percentage of the total aircraft activities at the Hilo International Airport. Based on FAA statistics for calendar year 2003, there were 99,415 total aircraft operations at the Hilo International Airport. Of these, only 11 percent were military aircraft; the remaining 89 percent were commercial. Preliminary statistics for the 12-month period ending 30 March 2007 indicates 9% of the flights were military.
	D-W-0121-2	Health and Safety	3.6.2.1	See response to comment D-W-0121-1
	D-W-0121-3	Air Quality	3.6.2.1	See response to comment D-W-0121-1
Shelley Stephens	D-W-0122-1	Cultural Resources	4.2.2.2	See response comments D-E-0062-4 and D-W-0091-12.
Star Newland --Sirius Institute	D-W-0123-1	Miscellaneous		See response for comment D-T-0094.
	D-W-0123-2	Policy/NEPA Process	13	Scoping transcripts/records of scoping comments are not a part of the EIS/OEIS but are included in the Administrative Record. All comments were reviewed and incorporated where appropriate. Some comments may have been outside the scope of the document and therefore were not addressed in the EIS/OEIS. Chapter 13.0 contains all comments on the draft EIS/OEIS received during the public comment period and the responses to each comment.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Star Newland --Sirius Institute	D-W-0123-3	Biological Resources - Marine	6.1.2	As discussed in Section 6.1.2, "seasonal" avoidance suggestions fail to take into account the fact that the existing mitigation measures avoid exposing detected marine mammals to levels associated with TTS or injury. In addition, the Navy specifically informs all naval vessels to increase vigilance when the first humpback whales have been sighted around the Hawaiian Islands. The purported need for such suggested mitigation measures is based on speculative findings from other areas of the world that do not have direct application to the unique environment present in Hawaii. Such measures also can not be accurately implemented until there is a scientific basis defining parameters for the measures. Lacking any scientific basis behind the measures in Hawaii and lacking any evidence in Hawaii that there has ever been an impact resulting from the lack of these measures, there is no evidence that they would increase the protection of marine mammals. However, they would unacceptably impact the effectiveness of the training.
Lynn Nakkim	D-W-0124-1	Alternatives		Thank you for your comment.
Cory Harden --Sierra Club	D-W-0125-1	Alternatives		Thank you for your comment.
	D-W-0125-2	Cumulative Impacts		Thank you for your comment.
	D-W-0125-3	Biological Resources - Marine	4.2	Potential impacts on the Northwestern Hawaiian Islands (Nihoa and Necker) are discussed in Section 4.2.
	D-W-0125-4	Biological Resources - Terrestrial		Your comment regarding allegations of tampering with scientific results by a USFWS official is noted but is outside the scope of this EIS/OEIS.
Helen Schonwatter --KAHEA, the Hawaiian Environmental Alliance	D-W-0126-1	Alternatives	4.1.2.4.11.2	Section 4.1.2.4.11.2 includes a discussion of specific stranding events, including Hanalei Bay, that have been linked to potential sonar operations. Of note, these events represent a small overall number of animals over an 11-year period (approximately 40 animals) and not all worldwide strandings can be linked to naval activity. Navy believes that evidence not considered previously involving the Hanalei "stranding of July 2004 indicates that the full moon could have been a contributing factor in terms of bringing the animals closer to the shore.
	D-W-0126-2	Biological Resources - Marine	4.2.1.1	As explained in Section 4.2.1.1, less than 12 missile flight trajectories per year could overfly the NWHI. Of these only a select few would have the potential to expend material on or offshore of Nihoa. Military readiness activities, including flight testing interceptor and target missiles, are exempt from consultation requirements or Monument regulations.
	D-W-0126-3	Biological Resources - Marine	6.0	Chapter 6.0, Mitigation Measures, has been updated to reflect the Navy's current mitigation measures and their use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Helen Schonwatter --KAHEA, the Hawaiian Environmental Alliance	D-W-0126-4	Alternatives	4.1.2.4.11.2	Section 4.1.2.4.11.2 includes a discussion of specific stranding events that have been linked to potential sonar operations. Of note, these events represent a small overall number of animals over an 11-year period (approximately 40 animals), and not all worldwide strandings can be linked to naval activity.
	D-W-0126-5	Biological Resources - Marine	4.1.2.2	Please refer to Section 4.1.2.2 for an updated analysis of fish and underwater noise levels.
Lester Chang --City and County of Honolulu	D-W-0127-1	Miscellaneous		Thank you for your review of the document.
Duane Erway	D-W-0128-1	Miscellaneous		All comments received during the "public comment period" will be published. Transcripts from the public meeting cannot be altered or deleted.
Akahi Nui --Kingdom of Hawaii	D-W-0129-1	Environmental Justice		Your file for the record regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.
Timothy Ragen --Marine Mammal Commission	D-W-0130-1	Alternatives	2.2.1.1	The Council on Environmental Quality (CEQ) requires consideration of a reasonable range of alternatives in EISs [40 CFR Section 1508.9 (b)]. Under a rule of reason, an EIS need not consider an infinite range of alternatives, only reasonable, or feasible ones. The No-action Alternative consists of the current baseline of operations at the HRC, including over 9,300 training and RDT&E operations being conducted in the HRC annually. This Alternative appropriately uses current activities as the no-action status quo. A reduction in training operations could jeopardize the ability of specialty forces, transient units, and Strike Groups using the HRC for training purposes to be ready and qualified for deployment.
	D-W-0130-2	Alternatives	4.1.2	As presented in the Supplement to the Draft EIS/OEIS, the risk function has replaced the dose function. The development of the risk function is detailed in Section 4.1.2 and reflects the recommendations of NMFS and the scientific review panel charged with revision of the analytical methodology.
	D-W-0130-3	Mitigation Measures	6.0	Chapter 6.0, Mitigation Measures, presents the U.S. Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. It should be noted that these protective measures have been standard operating procedures for unit-level antisubmarine warfare training since 2004. In addition, the Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Timothy Ragen --Marine Mammal Commission	D-W-0130-4	Alternatives	2.2.1.1	There has been no presumption that exposures are reduced to zero by mitigation and in fact the Navy is consulting with NMFS for all exposures resulting from the modeling without any reduction as a result of mitigation or standard protective measures, however, the few exposures resulting in injury (e.g. PTS) are very unlikely given the protective measures and range clearance procedures that have been in place for years. There has never been, to anyone's knowledge, any impact on marine mammals as a result of training to testing in the HRC over decades of operation.
	D-W-0130-5	Air Quality	4.1	Text has been added to Section 4.10 to address your concern regarding irreversible or irretrievable effects due to the use of nonrenewable energy sources: hydrocarbon fuels for aircraft, vessels, and vehicles.
	D-W-0130-6	Alternatives	2.0, 3.0, Appendix D	The description of the activities that allows the commenter to weigh national security benefits of each alternative is provided in Chapter 2.0 and in Appendix D. A cost benefit analysis is beyond the scope of this EIS/OEIS.
	D-W-0130-7	Alternatives		Economic analysis of the security benefits of each alternative is beyond the scope of the HRC EIS/OEIS. The loss of training opportunities would be detrimental to military readiness.
	D-W-0130-8	Alternatives		The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary.
	D-W-0130-9	Biological Resources - Marine	4.1.2.4.11	Section 4.1.2.4.11 includes specific stranding events that have been linked to potential sonar operations are discussed. Of note, these events represent a small overall number of animals over an 11-year period (approximately 40 animals), and not all worldwide strandings can be linked to naval activity.
	D-W-0130-10	Alternatives		Thank you for your comment.
	D-W-0130-11	Alternatives	Appendix J	See Appendix J for details on implementation of the risk function of the methodology.
	D-W-0130-12	Alternatives		This information is classified. No greater detail can be provided; however, the acoustic impact modeling was undertaken using representative parameters for the systems modeled.
	D-W-0130-13	Alternatives		This information is classified. No greater detail can be provided; however, the acoustic impact modeling was undertaken using representative parameters for the systems modeled.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Timothy Ragen --Marine Mammal Commission	D-W-0130-14	Alternatives	4.1.2, Appendix J	The discussion of regarding the acoustic modeling methodology has been revised in Section 4.1.2 and in Appendix J. This is, however, a very technical subject and is not conducive to simplistic explanations without loss of the required precision and accuracy necessary to remain factual.
	D-W-0130-15	Alternatives		The charge weight of an IEER/EER is spread over a long ribbon having a total weight of 4.4 pounds and does not act in the same manner as a 4.4 pound point source. Information beyond that is classified and will not assist in any greater understanding of the potential for effects.
	D-W-0130-16	Alternatives	4.1.2.4.6	As discussed in Southal et al (2007:413-414) and presented in 4.1.2.4.6 of the EIS/OEIS, the modeling and threshold levels developed for analysis of impacts to marine mammals universally erred on the side of precaution with regard to the range at which an animal may have a probability of behavioral harassment (65 nmi and 120 dB) or with regard to the accumulation of energy for harassment with no accounting for reactions of animals. There has been no presumption that exposures are reduced to zero by mitigation and in fact the Navy is consulting with NMFS for all exposures resulting from the modeling without any reduction as a result of mitigation or standard protective measures. The few exposures resulting in injury (e.g. PTS) are very unlikely given the protective measures and range clearance procedures that have been in place for years. There has never been, to anyone's knowledge, any impact on marine mammals as a result of training to testing in the HRC over decades of operation.
	D-W-0130-17	Alternatives	4.1.2	The Navy has coordinated with NMFS on all marine species impact criteria used in the HRC EIS/OEIS.
	D-W-0130-18	Alternatives		Thank you for your comment.
	D-W-0130-19	Alternatives	4.1.2	The EIS/OEIS has revised the discussion to make clear that the context in Hawaii is not in any way comparable to the context in the Bahamas or other locations where sonar was potentially associated with a stranding. The measures required by NMFS and employed during RIMPAC 2006 were of questionable and/or unknown effectiveness at the time they were mandated, which is why NMFS required the RIMPAC After Action Report was to evaluate them following the exercise. The discussion previously presented on page 4-63b, was inaccurate and the text has been revised.
	D-W-0130-20	Alternatives	4.1.2	The work cited is discussed as evidence why the Hawaii context is different from other locations where beaked whales have been associated with strandings coincident with the use of sonar. Long-term residency by beaked whales in locations where sonar use has occurred for decades suggests there is no need to avoid these areas due to the presence of beaked whales.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Timothy Ragen --Marine Mammal Commission	D-W-0130-21	Alternatives	4.1.2	The text has been revised to eliminate mention of harbor porpoise.
	D-W-0130-22	Alternatives	4.1.2	The text has been revised to incorporate additional references.
	D-W-0130-23	Mitigation Measures	6.0	Chapter 6 presents a detailed review and analysis of monitoring and mitigation options. A monitoring plan is being developed in coordination with NMFS.
	D-W-0130-24	Mitigation Measures	6.0	Chapter 6.0, Mitigation Measures, has been updated and presents the U.S. Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. The Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.
	D-W-0130-25	Mitigation Measures	6.0	Navy lookouts and bridge personnel (5 in total on surface ships) are highly qualified and experienced marine observers. Navy lookouts undergo extensive training to include on-the job instruction under supervision of an experienced lookout followed by completion of Personnel Qualification Standard Program. NMFS-approved Marine Species Awareness Training is required for every qualified lookout. In addition, available aerial platforms also provide visual monitoring during ASW events. Passive acoustic systems are used by all platforms to monitor for marine mammal vocalizations, which are then reported to the appropriate watch station for dissemination. There effects of the visual mitigation are not applied to the quantification of potential acoustic exposures, so the contention that the "takes" are otherwise being reduced to zero is not correct nor suggested. The Navy's Letter of Authorization request to NMFS is for the total number of modeled marine mammals acoustic exposures.
	D-W-0130-26	Mitigation Measures	6.0	The EIS/OEIS does not assert that visual monitoring alone is sufficient to assure 100 percent detection. Chapter 6.0, Mitigation Measures, has been updated and presents the U.S. Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. It should be noted that these protective measures have been standard operating procedures for unit-level antisubmarine warfare training since 2004. In addition, the Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Timothy Ragen --Marine Mammal Commission	D-W-0130-27	Mitigation Measures	6.0, Appendix F	Given the paucity of scientific information regarding marine mammals, there is no data present on the quantifiable effectiveness of mitigation measures. The mitigation measures presented in Chapter 6.0 are, however, believed to be effective to some degree. Appendix F provides information on the qualitative effectiveness of the mitigation measures during RIMPAC 2006 and a USWEX event. In addition, the Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.
	D-W-0130-28	Mitigation Measures		The Navy and NMFS are developing a monitoring plan to address the most effective use of the various technologies and methods for detecting marine mammals. The use of passive acoustics to detect and localize marine mammals is still in the development stages and is complicated by the context in Hawaii where the number of diversity marine mammal vocalizations are very large.
	D-W-0130-29	Mitigation Measures		There was an after-action report for RIMPAC 2006 and reports being sent to NMFS detailing data on the marine mammals detected during every USWEX event (in Hawaii) and JTFEX event (in Southern California) so this suggestion has already been implemented.
	D-W-0130-30	Biological Resources - Marine	2.2.3.5.3	The Portable Undersea Tracking Range would be located in suitable areas around the Main Hawaiian Islands. The figure (2.2.3.6.3-1) has been revised to more clearly depict this.
	D-W-0130-31	Program	1.7. 2.2.3.5.3	The Navy has been working with many partners during the preparation of this EIS/OEIS. The Navy has sought the advice of the National Marine Fisheries Services (NMFS) and has worked closely with their marine mammal and regulatory experts in trying to develop a method to quantify potential impacts on marine life caused by Navy activities, including use of the portable ranges (see Section 2.2.3.6.3). As stated in Section 1.7, NMFS is one of several cooperating agencies in the preparation of this EIS/OEIS.
	D-W-0130-32	Mitigation Measures		Temporary/portable arrays are frequency filtered to detect and track the specific frequencies of range pingers (placed on ships, submarines, and targets) and are therefore not useful in detection and localization of marine mammals.
	D-W-0130-33	Mitigation Measures		If an animal traveled 5 knots and a ship traveled 10 knots, when ship is 2000 yards, animal would still be 1000 yards back. There are many scenarios given a variety of ship speeds and animal speeds but all are unlikely given that, if one assumes that sonar is adverse to marine mammals, it is inconsistent to postulate that the marine mammal would continue to swim close to the ship.
	D-W-0130-34	Mitigation Measures		Thank you for your comment.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Timothy Ragen --Marine Mammal Commission	D-W-0130-35	Mitigation Measures	6.8	As described in Section 6.8, the Navy is developing a long-term marine mammal monitoring plan to determine behavioral and population level changes to marine mammals within Navy ranges. This plan will continue or initiate studies of abundance, distribution, habitat utilization, etc. for sensitive species of concern using visual surveys, passive and acoustic monitoring, radar and data logging tags (satellite or radio linked to record data on acoustics, diving and foraging behavior, and movements). The plan will include the validation of Navy lookouts that monitor all exercises. As of this EIS/OEIS, the Long-term Marine Mammal Monitoring Plan is under review by NMFS.
	D-W-0130-36	Mitigation Measures		Navy could not locate the text that the commenter is referring to, however, Navy does more than just visual monitoring. Aerial platforms also undertake visual monitoring prior to commencement of ASW operations. Passive acoustic systems are used by all platforms to monitor for marine mammal vocalizations, which are then reported to the appropriate watch station for dissemination. Navy ships also monitor their surroundings using all appropriate sensors at night and with night vision goggles as appropriate for activities conducted at night.
	D-W-0130-37	Mitigation Measures	6.1.2	Further details regarding the source of confusion are presented in Section 6.1.2. Using non-Navy personnel onboard Navy vessels to provide surveillance of Antisubmarine Warfare (ASW) or other exercise events would adversely impact military readiness activities, including personnel safety, and the practicality of implementation, and impact on the effectiveness of the military readiness activity. Security clearance issues would have to be overcome to allow onboard participants. Use of non-Navy observers is not necessary given that Navy lookouts are extensively trained in spotting items at or near the water surface.
	D-W-0130-38	Mitigation Measures	6.0, Appendix F	Mitigation Measures as described in Chapter 6 and as discussed in Appendix F, present only one mitigation measure (survey of the area before, during, and after without a sampling design) that was argued to be not cost effective as opposed to being too costly. Chapter 6 has been updated and presents the Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. The Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train. The Navy is in cooperation with NMFS over the development of a monitoring plan and integration of appropriate and effective technologies.

Table 13.4.1-2. Responses to Written Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource Text	EIS Section	Response Text
Timothy Ragen --Marine Mammal Commission	D-W-0130-39	Mitigation Measures	6.4.12	As described in Section 6.4.12, the Navy is developing a long-term marine mammal monitoring plan to determine behavioral and population level changes to marine mammals within Navy ranges. This plan will continue or initiate studies of abundance, distribution, habitat utilization, etc. for sensitive species of concern using visual surveys, passive and acoustic monitoring, radar and data logging tags (satellite or radio linked to record data on acoustics, diving and foraging behavior, and movements). The plan will include the validation of Navy lookouts that monitor all exercises. As of this EIS/OEIS, the Long-term Marine Mammal Monitoring Plan is under review by NMFS.
Robert G. F. Lee --Hawaii National Guard	D-W-0131-1	Miscellaneous		Thank you for your comment.
Jeffrey S. Hunt --County of Maui	D-W-0132-1	Biological Resources - Marine	6.0	Chapter 6.0, Mitigation Measures, has been updated to reflect the Navy's current mitigation measures and their use of the best available science balanced with the NMFS approach and the requirements of the Navy to train.
Laura Thielen --Department of Land and Natural Resources	D-W-0133-1	Cultural Resources		Thank you for your comments.
David Monasevitch	D-W-0134-1	Miscellaneous		Thank you for your comment.
	D-W-0134-2	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea, or airspace; therefore, there is no proposal to expand. It is true that the proposal includes increases in the frequency of training.
Nancy Merrill	D-W-0135-1	Biological Resources - Marine		Thank you for your comment.
	D-W-0135-2	Alternatives		See response to comment D-W-0066-1.
Nina Monasevitch	D-W-0136-1	Alternatives		See response to comment D-W-0066-1.
Mike Winneguth	D-W-0137-1	Alternatives		See response to comment D-W-0066-1.
Cheryl Magill --The Stop LFAS Worldwide Network	D-W-0138-1	Alternatives		See response to comment D-W-0066-1.

13.4.2 EMAIL PUBLIC COMMENTS

There were 419 emails from the public commenting on the Draft EIS/OEIS. A form letter made up 265 of the 419 emails.

Table 13.4.2-1 presents individuals who commented via email, with their respective commenter identification number. This number can be used to find the emailed document that was submitted and to locate the corresponding table in which responses to each comment are provided.

Exhibit 13.4.2-1 presents reproductions of the emails that were received in response to the Draft EIS/OEIS. Comment documents are identified by commenter ID number, and each statement or question that was categorized as addressing a separate environmental issue is designated with a sequential comment number.

Table 13.4.2-2 presents the responses to emailed comments to the Draft EIS/OEIS. Responses to specific comments can be found by locating the corresponding commenter ID number and sequential comment number identifiers.

Table 13.4.2-1. Commenters on the HRC Draft EIS/OEIS (Email)

Commenter	Comment ID	Commenter	Comment ID
Ron Agor	D-E-0475	Debra Baruch	D-E-0412
Melinda Ahn	D-E-0243	Ihor Basko	D-E-0413
Pi'ilani Akina	D-E-0202	Joseph Bateman	D-E-0097
Bill Akiona	D-E-0191	Jeri Baumgardner	D-E-0485
Jim Albertini	D-E-0076	Marguerite Beavers	D-E-0477
James V. Albertini	D-E-0400	Elisha Belmont	D-E-0096
Bobbie Alicen	D-E-0098	David Bishaw	D-E-0244
Kathy-Lyn Allen	D-E-0113	Moana Bjur	D-E-0151
Rosemary Alles	D-E-0306	Rhonda Black	D-E-0290
Email alohajai	D-E-0064	Donna Blackwell	D-E-0245
Judith Altemus	D-E-0403	Beryl Blaich	D-E-0183
Nadine Apo	D-E-0137	Patricia Blair	D-E-0170
Harvey Arkin	D-E-0091	Pat Blair	D-E-0364
Dick Artley	D-E-0081	Humberto Blanco	D-E-0369
Chessa Au	D-E-0274	Dmitry Boldvrev	D-E-0362
Charlene Avallone	D-E-0312	Lee Bowden	D-E-0134
Andrea Baer	D-E-0380	Royelen Lee Boykie	D-E-0148
Jacquelyn Baetz	D-E-0129	Jonathan Boyne	D-E-0065
Gia Baiocchi	D-E-0402	Ursula Brackett	D-E-0253
Robin W. Baird, Research Biologist, on behalf of the Cascadia Research Collective	D-E-0404	Tim Brause	D-E-0222
Linda Ballou	D-E-0320	Janice Brencik	D-E-0067

Table 13.4.2-1. Commenters on the HRC Draft EIS/OEIS (Email) (Continued)

Commenter	Comment ID	Commenter	Comment ID
Andrea Brower	D-E-0439	Fred Dente	D-E-0411
Jose Bulatao, Jr.	D-E-0450	Priscilla Derven	D-E-0343
Debbie Burack	D-E-0219	Caren Diamond	D-E-0169
Kelley Burg	D-E-0442	Dennis Dias	D-E-0457
Ellen Caldwell	D-E-0449	Lisa Diaz	D-E-0286
Ruth Callahan	D-E-0224	Jacquelyn Dillon	D-E-0434
Makana Cameron	D-E-0192	Stephen Dinion	D-E-0195
Ru Carley	D-E-0057	David H Dinner	D-E-0055
Ru Carley	D-E-0436	Fred Dodge	D-E-0125
Melissa Castaneda	D-E-0146	Pete Doktor	D-E-0106
Emily Castro	D-E-0272	Email Dolphinaria	D-E-0353
Sherry Chambers	D-E-0303	Kaj Dorstenia	D-E-0103
Ednette Chandler	D-E-0289	Noreen Dougherty	D-E-0389
Deanna Chang	D-E-0283	Kristin Duin	D-E-0293
Sam Chung Hoon	D-E-0204	Elaine Dunbar	D-E-0407
Christy Church	D-E-0252	J T Dunlap	D-E-0241
Email ckeala	D-E-0352	Amy Dunn	D-E-0465
Paul Clark	D-E-0361	Frederika Ebel	D-E-0130
Miriam Clarke	D-E-0428	Romi Elnagar	D-E-0421
DJ Colbert	D-E-0438	Bryson Embernate	D-E-0111
Leslie Conder	D-E-0217	Duane Erway	D-E-0431
Robert Conlan	D-E-0145	Garid Faria	D-E-0174
Nola Conn	D-E-0175	Estrella Ferrer	D-E-0236
Elizabeth Connors	D-E-0042	Joel Fischer	D-E-0050
Don Cooke	D-E-0288	Katy Fogg	D-E-0318
Tara Cornelisse	D-E-0190	Erin Foley	D-E-0394
Kevin Correll	D-E-0127	Erin Foley	D-E-0395
Robert V. Crifasi	D-E-0424	Doug Fox	D-E-0390
John Cusick	D-E-0063	Doug Fox	D-E-0316
Donna Cussac	D-E-0187	Angela Franco	D-E-0210
Michael Dahlem	D-E-0357	Neil Frazer	D-E-0184
Lisa Damon	D-E-0323	Elizabeth Freeman	D-E-0469
Sarah Daniels	D-E-0275	Karin Friedemann	D-E-0432
J. Scott Daniels	D-E-0069	Kekama Galioto	D-E-0158
Jordan Davis	D-E-0227	Joy Gardner	D-E-0302
Ralph Davis	D-E-0099	Cathy Garger	D-E-0425
Michelle DeFelice	D-E-0321	Felicita Garrido	D-E-0156
Marj Dente	D-E-0398	John Garvison	D-E-0337

Table 13.4.2-1. Commenters on the HRC Draft EIS/OEIS (Email) (Continued)

Commenter	Comment ID	Commenter	Comment ID
David and Carol Gerow	D-E-0419	Arius Hopman	D-E-0375
Glenn Giles	D-E-0418	Michael Howells	D-E-0279
Carrie Ginnane	D-E-0208	Emilie Howlett	D-E-0330
Mary K Gionson	D-E-0075	Lorraine Howlett	D-E-0331
Christopher Glenn	D-E-0257	Ron Howlett	D-E-0334
Suzanne Chantal Godbout	D-E-0336	Mark Hubbard	D-E-0384
William Golove	D-E-0089	Ka'iulani Huff	D-E-0420
Sharon Goodwin	D-E-0480	Everett Hullum	D-E-0372
Gregory I. Goodwin	D-E-0458	Sara Hult	D-E-0254
Marsha Green, North American Representative, on behalf of The Hawaiian-Environmental Alliance	D-E-0481	Forrest Hurst	D-E-0135
Jo Greenwald	D-E-0242	Kathlen Ireland	D-E-0093
Aarin Gross	D-E-0167	Rana Jackson	D-E-0185
Ravi Grover	D-E-0326	Rana Jackson	D-E-0358
Edgar Guiher	D-E-0260	Tom Jackson	D-E-0332
Margaret Guiler	D-E-0355	Kirsten Jackson	D-E-0435
Ka`iana Haili	D-E-0162	Bob Jacobson	D-E-0360
Monica Hall	D-E-0351	Scott Jarvis	D-E-0284
Eric Hanson	D-E-0062	Michael Jasny, Senior Policy Analyst on behalf of the Natural Resources Defense Council	D-E-0463
Linda Harmon	D-E-0448	Jonathan Jay	D-E-0416
Marcia Harter	D-E-0391	Alexander Jelinek	D-E-0107
Alison Hartle	D-E-0181	Delaney Jeter	D-E-0231
Hilary Harts	D-E-0220	Pearl Johnson	D-E-0038
Andrea Hauck	D-E-0266	JoJo JoJo	D-E-0339
Vanda Hauserova	D-E-0281	Michael Jones	D-E-0324
Sara Hayes	D-E-0108	Kyle Kajihiro	D-E-0451
Judith Heath	D-E-0422	Sandy Kamaka	D-E-0327
Selina Heaton	D-E-0100	Kalai Kamauoha	D-E-0144
Claudia Herfurt	D-E-0363	David Kane	D-E-0356
Sandy Herndon	D-E-0383	Kanoe Kapu	D-E-0193
Hana Hill	D-E-0114	Linda M. Karr	D-E-0154
Andrew Hina	D-E-0133	Sonja and Andy Kass	D-E-0163
Martha Hodges	D-E-0083	Email katrinaa	D-E-0094
Daniel Hoffman	D-E-0430	Christine Kauahikau	D-E-0116
Russell Hoffman	D-E-0415	Pualani Kauila	D-E-0166
Casey Holaday	D-E-0406	Lehua Kaulukukui	D-E-0247
Fern Holland	D-E-0194	Pono Kealoaha	D-E-0472
J.J. Holt Jr.	D-E-0486	Keone Kealoha	D-E-0453

Table 13.4.2-1. Commenters on the HRC Draft EIS/OEIS (Email) (Continued)

Commenter	Comment ID	Commenter	Comment ID
Pono Kealoha	D-E-0178	Lynn Manheim	D-E-0346
Naia Kelly	D-E-0248	Marya Mann	D-E-0417
Colleen Kelly	D-E-0149	Katie Marshall	D-E-0258
Suzanne Kim	D-E-0277	Matt Mason	D-E-0237
Roy Kincaid	D-E-0126	James Mason	D-E-0221
Rob Kinslow	D-E-0344	Camellia May	D-E-0426
Zachary Klaja	D-E-0179	Candy McCaslin	D-E-0374
Michael Kline	D-E-0365	Bobby McClintock	D-E-0256
Louis Korn	D-E-0399	Amber McClure	D-E-0225
Diana La Bedz	D-E-0452	Katt McConiga	D-E-0268
Gordon La Bedz	D-E-0444	Tabitha McCoy	D-E-0232
Matthew Laclair	D-E-0230	Spencer McDonald	D-E-0410
Steve LaFleur	D-E-0164	Michele McKay	D-E-0246
Joan Lander	D-E-0297	Napuanani McKeague	D-E-0433
Joan Lander	D-E-0471	Joe Meagher	D-E-0228
Holly Lazo	D-E-0077	David Meanwell	D-E-0123
Barbara Leighton	D-E-0199	Marianne Merki	D-E-0315
Gordana Leonard	D-E-0461	Marilyn Mick	D-E-0115
Pilipo Souza Leota	D-E-0092	Dick Miller	D-E-0101
Kathryn Letkey	D-E-0139	Rebecca Miller	D-E-0376
David Letourneau	D-E-0136	Jay Miller	D-E-0216
Jason Leverett	D-E-0270	Bryan Milne	D-E-0282
Ellen Levinsky	D-E-0325	Alison Moceri	D-E-0188
Joan Levy	D-E-0368	Maya Moiseyev	D-E-0070
Sam Long	D-E-0349	Email MomBurgess	D-E-0446
Barbara Long	D-E-0200	Guenter Monkowski	D-E-0310
Thomas Loudat	D-E-0180	Mishelle Morales	D-E-0269
Aimee Love	D-E-0305	Gian Andrea Morresi	D-E-0393
Bryan Lovsness	D-E-0322	Claire Mortimer	D-E-0487
Alapaki Luke	D-E-0155	Claire Mortimer	D-E-0215
Jeannette Lyons	D-E-0287	Roy Moss	D-E-0211
Denise Lytle	D-E-0207	Paul Moss	D-E-0128
Stephen MacDonald	D-E-0338	Lisa Muehlstein	D-E-0295
Phin MacDonald	D-E-0265	Michael Myers	D-E-0261
Angela Macken	D-E-0294	Kristie Nakasato	D-E-0341
Vic Maietta	D-E-0218	David Nelson	D-E-0251

Table 13.4.2-1. Commenters on the HRC Draft EIS/OEIS (Email) (Continued)

Commenter	Comment ID	Commenter	Comment ID
Nadine Newlight	D-E-0079	Pat Porter	D-E-0080
Dafydd Nicholas	D-E-0121	Ken Posney	D-E-0408
Dafydd Nicholas	D-E-0118	Eve Powers	D-E-0381
Jason S. Nichols	D-E-0427	Nina Puhipau	D-E-0159
James M. Nordlund	D-E-0213	Anjali Puri	D-E-0165
Kaleopono Norris	D-E-0110	Wendy Raebeck	D-E-0378
Akahi Nui	D-E-0482	Kim L. Ramos	D-E-0196
Email ocean5	D-E-0307	Janet Rapoport	D-E-0455
Caitlin Odom	D-E-0392	Susan Rasmussen	D-E-0240
Nancy O'Harrow	D-E-0068	Rayne Regush	D-E-0484
Catherine Okimoto	D-E-0301	Jacqueline Remington	D-E-0105
Maren Orion	D-E-0447	Anna Reycraft	D-E-0280
Jamie Oshiro	D-E-0262	Sarah Rickerby	D-E-0300
L. Osterer	D-E-0379	Odette Rickert	D-E-0109
Lea Padilla	D-E-0212	Erin Rietow	D-E-0354
Pumehana Paisner	D-E-0160	Cathy Robinson	D-E-0264
Janice Palma-Glennie	D-E-0249	Bina Robinson	D-E-0157
Kealii Pang	D-E-0172	Email rocokona	D-E-0308
Graham Parkes	D-E-0095	Joseph Rodrigues	D-E-0143
Alika Parks	D-E-0445	Puanani Rogers	D-E-0347
Linda Pascatore	D-E-0382	Elyse Rollins	D-E-0238
Julie Penny	D-E-0440	Cynthia Romero	D-E-0229
Chris Perritt	D-E-0088	Angela Rosa	D-E-0273
William D. Perry	D-E-0371	Katy Rose	D-E-0405
Kelsey Peterson	D-E-0271	Cheryl Rosenfeld	D-E-0074
Cara Petty	D-E-0201	Ruby Roth	D-E-0319
Douglas Phillips	D-E-0119	Shannon Rudolph	D-E-0104
Sandra Phillips	D-E-0214	Shannon Rudolph	D-E-0423
Matthew Pintar	D-E-0141	Randyl Rupar	D-E-0043
Bruce Pleas	D-E-0470	A. Russell	D-E-0153
Marilyn & Ed Pollock	D-E-0386	Janice Saaristo	D-E-0255
Kylie Polzin	D-E-0066	Jeff Sacher	D-E-0140
Uhane Pono	D-E-0171	Barbara Saiki	D-E-0462
Email ponoau	D-E-0348	Pake Salmon	D-E-0176
Tina Pope	D-E-0292	Noyita Saravia	D-E-0206
Patricia S Port	D-E-0437	Shelby Sargent	D-E-0234

Table 13.4.2-1. Commenters on the HRC Draft EIS/OEIS (Email) (Continued)

Commenter	Comment ID	Commenter	Comment ID
Essence Satterfield	D-E-0329	Catherine Taylor	D-E-0239
Tom Scallon	D-E-0335	Cynthia Taylor	D-E-0328
Ed Schlegel	D-E-0142	Gabriela Taylor	D-E-0385
Jon Schmitz	D-E-0117	Kalinke ten Hulzen	D-E-0150
Greg Schneider	D-E-0203	Lee Tepley	D-E-0397
Helen Anne Schonwalter	D-E-0082	Addie Texeira	D-E-0168
Susan Scott	D-E-0401	Sarah Thornton	D-E-0173
Zena Seeley	D-E-0350	Marilynn Tolmachoff	D-E-0313
John P. Shannon	D-E-0443	Robin Tomer	D-E-0235
Sarah Sharp	D-E-0147	Lynne Torres	D-E-0309
Kelly Silberstein	D-E-0090	Marti Townsend	D-E-0233
Jade Silver	D-E-0333	LiLi Townsend	D-E-0317
Philip Simon	D-E-0085	Healani Trembath	D-E-0414
Amanda Sims	D-E-0124	Ron Tuason	D-E-0388
Harriet Smith	D-E-0467	Antoinette Tenhunen Tukholmankatu	D-E-0340
Harriet Smith	D-E-0476	Masako Uematsu	D-E-0205
Colleen Soares	D-E-0152	Kelley Uyeoka	D-E-0223
Francisca Sopacua	D-E-0182	Dona Van Bloemen	D-E-0186
Maureen O'Dea Spencer	D-E-0122	Stela Vasques	D-E-0250
Hugh Y. Starr	D-E-0474	Mehana Blaich Vaughan	D-E-0459
Kourtney Startin	D-E-0259	Mehana Blaich Vaughan	D-E-0456
Sandi Sterker	D-E-0377	Katie Velasquez	D-E-0189
Donald Stevens	D-E-0072	Briana Wagner	D-E-0131
Carmen Stevens	D-E-0120	Robert Wagner	D-E-0086
Samantha Stewart	D-E-0278	Felicia Ann Waialae	D-E-0197
Email stfpare	D-E-0087	Virginia Walden	D-E-0102
Dawn Stobart	D-E-0298	Judy Walker	D-E-0460
Kevin Stockhausen	D-E-0285	Maria Walker	D-E-0478
Kahea Stocksdale	D-E-0209	Judy Walker	D-E-0466
Michal Stover	D-E-0299	Judy Walker	D-E-0473
Michal Stover	D-E-0366	Loreen Walker & family	D-E-0409
Petra Sundheim	D-E-0359	Sheila Ward	D-E-0161
Jerry Taber	D-E-0291	Aaron Warren	D-E-0276
Robert Tanner	D-E-0267	Ilana Waxman	D-E-0073
Randy Tashjian	D-E-0177	Denise Weber	D-E-0263

Table 13.4.2-1. Commenters on the HRC Draft EIS/OEIS (Email) (Continued)

Commenter	Comment ID	Commenter	Comment ID
Ingrid Wedel	D-E-0370	Juan Wilson	D-E-0060
Lorena Werner	D-E-0345	Marty Wilson	D-E-0138
Momi Wheeler	D-E-0071	Angeline Winsor	D-E-0296
Ron Whitmore	D-E-0198	Emil Wolfgramm	D-E-0479
Den Mark Wichar	D-E-0078	Dawn Wooten	D-E-0112
Email Wild Dolphin Foundation	D-E-0226	Bill Young	D-E-0373
Donald H. Wilson	D-E-0387		

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	COMMENT NUMBER
From: Pearl Johnson - Honolulu, HI To: deis hrc@govsupport.us Subject: sonar harms marine mammals Date: 7/27/2007 11:44:32 PM	D-E-0038
The Navy should not use high-intensity sonar in its planned training exercises. Such sonar has been directly associated with repeated occurrences of mass strandings and deaths of whales, dolphins, and other marine species in U.S. waters and around the world. Use of sonar in Hawaii waters poses an unnecessary and avoidable threat to marine mammals and violates two fundamental environmental laws: the Marine Mammal Protection Act (MMPA) and the National Environmental Policy Act (NEPA). The National Resources Defense Council has considerable convincing scientific evidence demonstrating that the Navy's use of sonar can kill, injure, and disturb many marine species, including marine mammals. Please do not harm our whales and dolphins. Pearl Johnson Honolulu, HI	1

	COMMENT NUMBER
From: Elizabeth Connors - Kailua, HI To: deis hrc@govsupport.us Subject: No to Navy sonar tests Date: 7/31/2007 4:26:46 AM	D-E-0042
I have no confidence whatsoever in the Navy's statement that it does not expect to harm marine mammals in Hawaii waters even with increased use of sonar in large scale training. They should expect it, it has been demonstrated that these sonar tests do affect the mammals in the area and marine mammals have very sensitive hearing systems. It is simply not acceptable to endanger the endangered sea animals....keep looking for another way to reach your goals. Elizabeth Connors Kailua HI	1

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS

COMMENT NUMBER
D-E-0043

From: Randyl Rupar
To: deis hrc@govsupport.us
Subject: Re: Navy Training
Date: 8/1/2007 11:43:34 AM

To Whom it May Concern,

1 The Protection of our country is indeed an important issue. However, presidential proclamation of the establishment of Papahanaumokuakea, a national monument aimed at protecting the Northwestern Hawaiian Islands and providing a sanctuary for the endangered species that live there is also of utmost importance.
Please take into consideration the environmental impact on these protected habitats as they too are valuable to The United States of America.
Looking forward to being proud to be an American.

In Peace,
Randyl Rupar

COMMENT NUMBER
D-E-0050

From: Joel Fischer - Honolulu, HI
To: deis hrc@govsupport.us
Subject: STRYKER EIS
Date: 8/7/2007 5:29:04 PM

I am a loyal American and a former member of the US ARMY. I am writing these comments in that context, and also as someone who is very concerned about our delicate island environment.

1 I think your EIS, quite simply, missed the point. Hawai`i is an island community. Our islands have VERY delciate ecological balances. So, no matter how your EIS addresses the many issues involving having the Strykers based in Hawai`i, the MAIN issue is: Can our islands maintain the Strykers here without sustaining permanent damage? The answer clearly is NO. The military has control over a huge amount of the land base of our home. There is irrefutable evidence that some of those lands have been damaged forever.

Therefore, I am asking the scientists and politicians who are involved in decision-making on the Strykers: Please understand our point of view as an island state. Please do not permanently base the Strykers in Hawai`i knowing that the environmental destruction to our islands caused by that decision will be immense.

Thank you.

Aloah.

joel

Dr. Joel Fischer, ACSW
Professor
University of Hawai'i, School of Social Work
Henke Hall
Honolulu, HI

"There comes a time when one must take a position that is neither safe, nor politic, nor popular, but one must take it because one's conscience tells one that it is right."
Dr. Martin Luther King, Jr.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

"Never, never, never quit."
Winston Churchill

COMMENT NUMBER
D-E-0050 (cont.)

From: David H Dinner - HI
To: deis hrc@govsupport.us
Subject: PMRF
Date: 8/11/2007 1:02:56 PM

Dear Navy

I appreciate the opportunity to respond to the Navy¹s plans to build up forces in Hawaii. I only hope that you will be sensitive to the wishes of the people.

I will be off Island for your public hearing, but I wish to go on record as vigorously opposing the buildup of more Navy forces in Hawaii, especially here on Kauai. Our environment and infrastructure simply cannot tolerate the impact that the Navy is already placing on it. 1

Aloha
David H Dinner

COMMENT NUMBER
D-E-0055

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0057	From: Ru Carley To: deis hrc@govsupport.us Subject: marine mammals and ocean noise Date: 8/16/2007 4:38:36 PM
1	I am writing to defend the marine mammals from the Navy's projected use of sonar in Hawaiian waters and anywhere else in the world. This must be stopped immediately. There are many clear examples of marine mammal deaths by sonar and the Navy has NO RIGHT to kill these defenseless creatures. These animals are meant to be protected by us, not attacked for wargames. I am outraged and disgusted by human behavior that does not support our fellow creatures in the wild. When we act in this way we are hastening our own annihilation. Please see the light and STOP THE SONAR!!!!! Thank you, in advance. Ru Carley

COMMENT NUMBER	
D-E-0060	From: Juan Wilson - Hanapepe HI, HI To: deis hrc@govsupport.us Subject: Stryker Brigade, DU, Superferry Date: 8/21/2007 2:55:31 PM Navy Paficic Range EIS & OEIS Staff,

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0060 (cont.)

From: Juan Wilson
Sent: Tuesday, August 21, 2007 2:56 PM
To: deis_hrc@govsupport.us
Subject: Stryker Brigade, DU, Superferry

Navy Paficic Range EIS & OEIS Staff,

There is much evidence that the Hawaii Superferry is part of a program to build Littoral Combat Ships (LCS) using civilian private and public funds. The plan of stationing of the Stryker Brigade on Oahu and the plan to train them at Pohakuloa Range does not make sense without the use of the Superferry as a LCS delivery system capable of reaching around the rim of the Pacific. It is a strategic decision made without concern for the environment of the ocean or Hawaii.

The fact is that the Stryker Brigade and its associated weapons platforms all carry Depleted Uranium (DU) weaponry. This ranges from the BushMaster machine gun to the MA777 Howizter.

Yesterday the Army admitted use of DU at Pohakuloa. The two page "Media Release", dated 20 August 2007, from the Public Affairs Office of the U.S. Army Garrison in Pohakuloa says in part:

"Experts from the government contractor Cabrera Services confirmed today, the use of the formerly classified weapon, the Davy Crockett recoilless gun, and the presence of depleted uranium (DU) in the impact area at the U.S. Army Garrison, Pokakuloa. This is the same type of material previously found at Schofield Barracks..."

The particular weapon involved was the "Davy Crockett" M28 120mm Atomic Battle Group Delivery System. this is a nuclear weapons platform. If coordinated with the Stryker Brigade, this means that the Superferry will potentially be carrying nuclear weapons. Anybody do an EIS on that yet?

Has anyone evaluated that if the Superferry is to carry the Stryker Brigade and associated equipment, it cannot be considered a civilian vessel or not be considered a legitimate military target to or enemies. Morever, it presents a clear danger to residents of Hawaii by acting as the agent that will carry DU to every corner of every island it visits.

The Navy is ramping up its invasive activity in Hawaii and the Pacific. If one makes the obvcious linkage between the Superferry (on EIS or OEIS) and Pohakuloa Range (no EIS on siting the Stryker Brigade), RIMPAC activities (in defiance of worldwide environmental concerns) it is obvious that the Navy has not been honest or or forthcoming with information concerning their plans in Hawaii. Some of that may be related to security concerns related to potential enemies, but I suspect that much of it political concerns. The Navy knows how damaging and unpopular its activities are.

The impact on the island and ocean environment of Hawaii could be catastrophic. If the Navy wants a USNS Alakai as a LCS it should buy it, paint it in navy camo colors and dock it in Pearl Harbor.

I ask that the following be answered in the Navy EIS and OEIS:

1) Is it possible that equipment used in the field at Pohakuloa Range be contaminated with DU? **1**
2) Will military equipment used at Pohakuloa Range be tested for DU before boarding the Superferry?

1

COMMENT NUMBER
D-E-0060 (cont.)

3) Will military equipment used at Pohakuloa Range be decontaminated of DU before boarding the Superferry?
4) Will the Superferry visit Kauai transporting any military equipment?
5) Will the Stryker Brigade, or associated weapons platforms disembark on Kauai?
6) Will the Superferry to coordinate efforts with PIMPAC 2008?
7) Will the Superferry be part of any Pacific Ocean LCS simulations or war games?
8) Will the Superferry use civilian or military protocols for avoiding whales when loaded with military equipment?
9) Will the Navy be involved with insurrection simulations using the Superferry on any Hawaiian Island?
10) Will the Superferry ever be equipped with mid or low frequency sonar capable of harming whales?
11) What genetic impact could Depleted Uranium dust have on GMO corn experiments within the Navy PMRF easement area?

This only scratches the surface of one issue. There are so many. The environmental danger of the directed energy program stands out as another: The "Starwars Laser Death Ray". **2**

It is my understanding that the US is developing a chemical laser in which hydrogen and fluorine react together to form hydrogen fluoride, which is a corrosive gas or liquid which can be made to release a powerful burst of infrared radiation. The laser is focused and aimed by prisms and mirrors. A chemical laser of sufficient power, at least 25 megawatts, could destroy a missile almost 2,000 miles away. The plan is for this technology to be tested on Kauai.

12) What effect on the environment Mana Plain wetlands will the firing of lasers using hydrogen fluoride?
13) What cleanup efforts will be made after each directed energy test?
14) What testing will guarantee the safety people using Polihale State Park and the access road to it?
15) What quantity of runoff of hydrogen fluoride contaminated water through the ditch system could there be?
16) What effect on coral reefs and offshore marine life would there be from hydrogen fluoride contaminated runoff?
17) What permanent of long term (one year or more) effect could a catastrophic failure of a text have on Polihale State Park?

Juan Wilson
Architect-Planner

Hanapepe HI

2

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
From: Eric Hanson - Honolulu, HI To: deis hrc@govsupport.us Subject: Expanding Naval Wargames in Hawaii is Unacceptable Date: 8/21/2007 10:43:01 PM	D-E-0062
Mr. Tom Clements Pacific Missile Range Facility P.O. Box 128 Kekaha, HI 96752-0128	
To:Mr. Clements,	
The world recognizes Hawai'i hosts unique and fragile marine environments crucial to the overall health of our oceans. The U.S. acknowledged the importance of protecting Hawai'i's oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands. This is the primary foraging grounds of last few remaining Hawaiian monk seals, home of rare cold water coral reefs,	
The Navy's proposal to significantly increase wargames in the Hawaiian Islands directly undermines the policies of the federal and state governments to protect the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary.	1
The Navy's plan to use active sonar that harms marine mammals, spread toxic chemicals that undermine the public's health, and jeopardize cultural sites sacred to Native Hawaiians is completely unacceptable and cannot be allowed.	2, 3, 4
Please Stop the Wargames, Eric E. Hanson Honolulu, HI	5

	COMMENT NUMBER
The text of comment D-E-0063 was the same as that of D-E-0062. This comment was submitted by John Cusick of Honolulu, HI.	D-E-0063
The text of comment D-E-0064 was the same as that of D-E-0062. This comment was submitted by None	D-E-0064
The text of comment D-E-0065 was the same as that of D-E-0062. This comment was submitted by Jonathan Boyne of Honolulu, HI.	D-E-0065
The text of comment D-E-0066 was the same as that of D-E-0062. This comment was submitted by Kylie Polzin of Honolulu, HI.	D-E-0066
The text of comment D-E-0067 was the same as that of D-E-0062. This comment was submitted by Janice Brencik of KAMUELA, HI.	D-E-0067
The text of comment D-E-0068 was the same as that of D-E-0062. This comment was submitted by Nancy O'Harrow of Lake Oswego, OR.	D-E-0068
The text of comment D-E-0069 was the same as that of D-E-0062. This comment was submitted by J. Scott Daniels of Houston, TX.	D-E-0069
The text of comment D-E-0070 was the same as that of D-E-0062. This comment was submitted by Maya Moiseyev of Palo Alto, CA.	D-E-0070
The text of comment D-E-0071 was the same as that of D-E-0062. This comment was submitted by Momi Wheeler of Kea'au, HI.	D-E-0071
The text of comment D-E-0072 was the same as that of D-E-0062. This comment was submitted by Donald Stevens of Winter Park, FL.	D-E-0072
The text of comment D-E-0073 was the same as that of D-E-0062. This comment was submitted by Ilana Waxman of Honolulu, HI.	D-E-0073

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment D-E-0074 was the same as that of D-E-0062. This comment was submitted by Cheryl Rosenfeld of Columbia, MO.	D-E-0074
The text of comment D-E-0075 was the same as that of D-E-0062. This comment was submitted by Mary K Gionson of Waianae, HI.	D-E-0075
The text of comment D-E-0076 was the same as that of D-E-0062. This comment was submitted by Jim Albertini of Kurtistown, HI.	D-E-0076
The text of comment D-E-0077 was the same as that of D-E-0062. This comment was submitted by Holly Lazo of Hanalei, HI.	D-E-0077
The text of comment D-E-0078 was the same as that of D-E-0062. This comment was submitted by Den Mark Wichar of Vancouver, WA.	D-E-0078
The text of comment D-E-0079 was the same as that of D-E-0062. This comment was submitted by Nadine Newlight of Ha`iku, HI.	D-E-0079
The text of comment D-E-0080 was the same as that of D-E-0062. This comment was submitted by Pat Porter of Yardley, PA.	D-E-0080
The text of comment D-E-0081 was the same as that of D-E-0062. This comment was submitted by Dick Artley of Grangeville, ID.	D-E-0081
The text of comment D-E-0082 was the same as that of D-E-0062. This comment was submitted by Helen anne Schonwalter of Paia, HI.	D-E-0082

COMMENT NUMBER D-E-0083

From: Martha Hodges - Princeville, HI
To: deis hrc@govsupport.us
Subject: opposition to increased military testing
Date: 8/21/2007 11:23:44 PM

To whom it may concern;

"Concern" - there's the key word. I'm concerned! But why isn't the local, state and federal government concerned? On one hand, President Bush declares the outer Hawaiian Islands to be a Maritime Sanctuary and in the next stroke, it is proposed that missile testing be extended in this most pristine Pacific Ocean region. Outrageous! 1

Of course, the Navy's DEIS is going to report that there will be no environmental impact. The people drawing up these reports get paid big bucks to report things in the best possible light. Do we really think that the truth of sonar impact on whales is actually going to be reported or that the truth about the radioactive residue on the Stryker brigade vehicles is going to be discussed? 2

I cannot attend the open meeting for public comment that is planned for August 21st as I am housebound with a broken leg right now but if I could go and say my piece, it would be to state my horror and dismay at this proposal. With all the technical sophistication we possess, computer simulation should be adequate for conducting training and testing. Otherwise, it's as if we are using our own weaponry to harm our environment and in turn, ourselves! 3

This move on the Navy's part to increase operations is going to feather someone's pocketbook but it is in no way advantageous to the environment or human welfare of the Hawaiian Islands. Will the Navy/Army be discussing the 100,000 rounds of unexploded ordinances that were dumped off the western coast of Oahu after WW II that sit decaying in 30-100 ft. of water or the unusually high cancer rate in that part of the island? Maybe they should clean that mess up first before they add anymore chemicals to our islands?? Maybe for once, the consequence and impact of actions should take precedence over expediency and economy dollars? 4

I respectfully stand opposed.

Martha E. Hodges

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0083 (cont.)

Martha Hodges

Princeville, HI

COMMENT NUMBER
D-E-0086

From: Robert Wagner - Lawrenceville, GA
To: deis hrc@govsupport.us
Subject: No Naval Wargames in Hawaii!
Date: 8/21/2007 11:30:54 PM

Mr. Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752-0128

To:Mr. Clements,

During sonar exercises, the Navy sets a limit of 145 decibels for human divers, to prevent internal hemmorhaging. Whales, dolphins, and others have underwater hearing that is much more sensitive than humans', so the limit should be LESS than that, not MORE. 1

Since sound is measured on a logarithmic scale, the 235-decibel level the Navy wants to use in the northwest Hawaiian Islands - including in a Humpback Whale Sanctuary! - are 100 MILLION times more intense than the 145-decibel human limit!

Using the Navy's arrogant, heartless logic, let's put a few Navy divers in the water and subject them to 235 decibels, to prove to the American people that this level is perfectly safe. Since human hearing is nowhere near as sensitive as the hearing of marine mammals, this should cause very little discomfort.

Truth is, their eyeballs, eardrums, and various internal organs would soon hemmorhage, rupture, and explode from the excrutiating pressure of that frequency - exactly what happens to a lot of the whales and dolphins they've found beached around the world these last few decades.

The Navy's proposal to significantly increase wargames in the Hawaiian Islands directly undermines the policies of the state 2

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
of Hawaii to protect the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary. The Navy's plan to use active sonar that kills marine mammals and spreads toxic chemicals is completely unacceptable and MUST NOT be allowed! Please Stop the Wargames, Robert Wagner Lawrenceville, GA	D-E-0086 (cont.)

	COMMENT NUMBER
The text of comment D-E-0085 was the same as that of D-E-0062. This comment was submitted by Philip Simon of San Rafael, CA.	D-E-0085
The text of comment D-E-0087 was the same as that of D-E-0062. This comment was submitted by None stfpare@prw.net.	D-E-0087
The text of comment D-E-0088 was the same as that of D-E-0062. This comment was submitted by Chris Perritt of Kailua Kona, HI.	D-E-0088
The text of comment D-E-0089 was the same as that of D-E-0062. This comment was submitted by William Golove of El Cerrito, CA.	D-E-0089
The text of comment D-E-0090 was the same as that of D-E-0062. This comment was submitted by Kelly Silberstein of Honolulu, HI.	D-E-0090
The text of comment D-E-0091 was the same as that of D-E-0062. This comment was submitted by Harvey Arkin of Honolulu, HI.	D-E-0091
The text of comment D-E-0092 was the same as that of D-E-0062. This comment was submitted by Pilipo Souza Leota of Kaneohe, HI.	D-E-0092
The text of comment D-E-0093 was the same as that of D-E-0062. This comment was submitted by Kathlen Ireland of Makawao, HI.	D-E-0093
The text of comment D-E-0094 was the same as that of D-E-0062. This comment was submitted by None katrinaa@hawaii.edu.	D-E-0094
The text of comment D-E-0095 was the same as that of D-E-0062. This comment was submitted by Graham Parkes of Honolulu, HI.	D-E-0095
The text of comment D-E-0096 was the same as that of D-E-0062. This comment was submitted by Elisha Belmont of Westminster, CA.	D-E-0096
The text of comment D-E-0097 was the same as that of D-E-0062. This comment was submitted by Joseph Bateman of Salt Lake City, UT.	D-E-0097

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0098	The text of comment D-E-0098 was the same as that of D-E-0062. This comment was submitted by Bobbie Alicen of Kea'au, HI.

COMMENT NUMBER	
D-E-0099	From: Ralph Davis - Scappoose, OR To: deis hrc@govsupport.us Subject: Expanding Naval Wargames in Hawaii is Unacceptable Date: 8/22/2007 12:55:17 AM Mr. Tom Clements Pacific Missile Range Facility P.O. Box 128 Kekaha, HI 96752-0128 To:Mr. Clements, I've been scuba diving in Hawaiian waters when the prop noise from cruise ships has become intolerable and chased every fish into panic. I cannot believe this Navy Sonar blasting is anything but disruptive and/or deadly. The world recognizes Hawai'i hosts unique and fragile marine environments crucial to the overall health of our oceans. The U.S. acknowledged the importance of protecting Hawai'i's oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands. This is the primary foraging grounds of last few remaining Hawaiian monk seals, home of rare cold water coral reefs,
1	The Navy's proposal to significantly increase wargames in the Hawaiian Islands directly undermines the policies of the federal and state governments to protect the NWHI Marine Monument, State
2, 3, 4	Refuge, and the Humpback Whale Sanctuary. The Navy's plan to use active sonar that harms marine mammals, spread toxic chemicals that undermine the public's health, and jeopardize cultural sites sacred to Native Hawaiians is completely unacceptable and cannot be allowed.
5	Please Stop the Wargames, Ralph Davis Scappoose, OR

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0100	The text of comment D-E-0100 was the same as that of D-E-0062. This comment was submitted by Selina Heaton of Laie, HI.

COMMENT NUMBER	
D-E-0101	

From: Dick Miller - Lihue, HI
To: deis hrc@govsupport.us
Subject: Expanding Naval Wargames in Hawaii is Unacceptable
Date: 8/22/2007 1:06:43 AM

Mr. Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752-0128

To:Mr. Clements,

The world recognizes Hawai'i hosts unique and fragile marine environments crucial to the overall health of our oceans. The U.S. acknowledged the importance of protecting Hawai'i's oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands. This is the primary foraging grounds of last few remaining Hawaiian monk seals, home of rare cold water coral reefs,

1 The Navy's proposal to significantly increase wargames in the Hawaiian Islands directly undermines the policies of the federal and state governments to protect the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary. 2, 3, 4 The Navy's plan to use active sonar that harms marine mammals, spread toxic chemicals that undermine the public's health, and jeopardize cultural sites sacred to Native Hawaiians is completely unacceptable and cannot be allowed.

In addition I would like to add, these wargames are a bunch of BS. Our biggest terror threats have come from our own government since 9-11 by using this as a scare tactic for everything they want to ram down our throats. Leave the Hawaiian waters alone. We don't need your phony "protection from the bad guys, YOU ARE THE BAD GUYS!!!"

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

Please Stop the Wargames,
Dick Miller

Lihue, HI

COMMENT NUMBER
D-E-0101 (cont.) 5

	COMMENT NUMBER
The text of comment D-E-0102 was the same as that of D-E-0062. This comment was submitted by Virginia Walden of Waimanalo, HI.	D-E-0102
The text of comment D-E-0103 was the same as that of D-E-0062. This comment was submitted by Kaj Dorstenia of Copenhagen	D-E-0103
The text of comment D-E-0104 was the same as that of D-E-0062. This comment was submitted by Shannon Rudolph of Holualoa, HI.	D-E-0104
The text of comment D-E-0105 was the same as that of D-E-0062. This comment was submitted by Jacqueline Remington of Waimanalo, HI.	D-E-0105
The text of comment D-E-0106 was the same as that of D-E-0062. This comment was submitted by Pete Doktor of Honolulu, HI.	D-E-0106
The text of comment D-E-0107 was the same as that of D-E-0062. This comment was submitted by Alexander Jelinek of San Jose, CA.	D-E-0107
The text of comment D-E-0108 was the same as that of D-E-0062. This comment was submitted by Sara Hayes of Long Beach, CA.	D-E-0108
The text of comment D-E-0109 was the same as that of D-E-0062. This comment was submitted by Odette Rickert of Hilo, HI.	D-E-0109
The text of comment D-E-0110 was the same as that of D-E-0062. This comment was submitted by Kaleopono Norris of Kapaau, HI.	D-E-0110
The text of comment D-E-0111 was the same as that of D-E-0062. This comment was submitted by Bryson Embernate of Kamuela, HI.	D-E-0111
The text of comment D-E-0112 was the same as that of D-E-0062. This comment was submitted by Dawn Wooten of Lihue, HI.	D-E-0112

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

The text of comment D-E-0113 was the same as that of D-E-0062. This comment was submitted by Kathy-Lyn Allen of Pueblo, CO.	COMMENT NUMBER D-E-0113
The text of comment D-E-0114 was the same as that of D-E-0062. This comment was submitted by Hana Hill of Kailua Kona, HI.	D-E-0114
The text of comment D-E-0115 was the same as that of D-E-0062. This comment was submitted by Marilyn Mick of Honolulu, HI.	D-E-0115
The text of comment D-E-0116 was the same as that of D-E-0062. This comment was submitted by CHRISTINE KAUAHIKAUA of WAIMANALO, HI.	D-E-0116
The text of comment D-E-0117 was the same as that of D-E-0062. This comment was submitted by Jon Schmitz of Honolulu, HI.	D-E-0117
The text of comment D-E-0118 was the same as that of D-E-0062. This comment was submitted by Dafydd Nicholas of Malibu, CA.	D-E-0118
The text of comment D-E-0119 was the same as that of D-E-0062. This comment was submitted by Douglas Phillips of Kamuela, HI.	D-E-0119
The text of comment D-E-0120 was the same as that of D-E-0062. This comment was submitted by Carmen Stevens of Honolulu, HI.	D-E-0120
The text of comment D-E-0121 was the same as that of D-E-0062. This comment was submitted by Dafydd Nicholas of Las Vegas, NV.	D-E-0121

COMMENT NUMBER

D-E-0122

From: Maureen O'Dea Spencer - Phoenix, AZ
To: deis hrc@govsupport.us
Subject: Expanding Naval Wargames in Hawaii is Unacceptable
Date: 8/22/2007 3:45:28 AM

Mr. Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752-0128

To:Mr. Clements,

I am sending the pre-written letter below, in support of KAHEA, as it represents my strong feelings and opinions about the preservation of Hawaiian marine life and ecology, in light of recent Navy proposals.

My family served in the U.S. Navy in the Pacific in World War II, my father having personally served Admiral Nimitz as his secretary and my uncle having been a Naval Intelligence officer whose ship was attacked by "kamakazis" and barely floated. As much as I respect our Navy, I also feel very strongly that it is their duty to seek to preserve the marine life and other wildlife in Hawai'i as much as possible, since it is now part of the U.S.

We all know high-intensity sonar is the main culprit suspected in the beaching deaths of marine mammals, dolphins and whales.

The following is the pre-written portion that explains what the current problems involve:
** The world recognizes Hawai'i hosts unique and fragile marine environments crucial to the overall health of our oceans. The U.S. acknowledged the importance of protecting Hawai'i's oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands. This is the primary foraging

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT TEXT	COMMENT NUMBER
grounds of last few remaining Hawaiian monk seals, home of rare cold water coral reefs.	D-E-0122 (cont.)
The Navy's proposal to significantly increase wargames in the Hawaiian Islands directly undermines the policies of the federal and state governments to protect the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary.	1
The Navy's plan to use active sonar that harms marine mammals, spread toxic chemicals that undermine the public's health, and jeopardize cultural sites sacred to Native Hawaiians is completely unacceptable and cannot be allowed.	2, 3, 4
** End of pre-written portion. This is really me talking. My father just died. I could not respect more his and Uncle Jack's Navy service in World War II, but I also believe the recent Navy proposals would cause irreversible damage. I have followed the efforts, and seen how many years it takes, and how difficult it is, of the most dedicated Hawaiian people working to preserve the beauty and wildlife of the Hawaiian and Northwestern Hawaiian Island archipelago. As you can imagine, competitive commercial fishing alone poses significant threats.	7
It seems just as soon as there is a victory, such as President Bush's recent declaration of the NWHI as a preservation sanctuary, something else comes up to threaten it. Just because Hawai'i "belongs" to the U.S. now shouldn't mean it's ours to "trash" but should, rather, mean it's our country's duty to protect.	
Please Stop the Wargames, Maureen O'Dea Spencer Phoenix, AZ	5

COMMENT TEXT	COMMENT NUMBER
The text of comment D-E-0123 was the same as that of D-E-0062. This comment was submitted by David Meanwell.	D-E-0123
The text of comment D-E-0124 was the same as that of D-E-0062. This comment was submitted by Amanda Sims of Honolulu, HI.	D-E-0124
The text of comment D-E-0125 was the same as that of D-E-0062. This comment was submitted by Fred Dodge of Waianae, HI.	D-E-0125

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
From: Roy Kincaid - Kailua Kona, HI To: deis hrc@govsupport.us Subject: Expanding Naval Wargames in Hawaii is Unacceptable Date: 8/22/2007 4:24:02 AM	D-E-0126
Mr. Tom Clements Pacific Missile Range Facility P.O. Box 128 Kekaha, HI 96752-0128	
To:Mr. Clements,	
The world recognizes that Hawaii hosts unique and fragile marine environments crucial to the overall health of our oceans. The U.S. acknowledged the importance of protecting Hawaii?s oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands. This is the primary foraging grounds of last few remaining Hawaiian monk seals, home of rare cold water coral reefs,	
The Navy's proposal to significantly increase war games in the Hawaiian Islands directly undermines the policies of the federal	1
and state governments to protect the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary. The Navy's plan to use active sonar that harms marine mammals, spread toxic chemicals that undermine the public's health, and jeopardize cultural	2
sites sacred to Native Hawaiians is completely unacceptable and cannot be allowed.	3, 4
Those of us who live in the islands see daily what can happen when we do not follow common sense guidelines to protect the fragile eco systems contained here. Many of us give of our time and resources to assist in environmental clean up projects caused by visitors to our home. I want the government to open their eyes to the harm that could and will be generated if the Navy is allowed to continue to harm the fragile environments here.	

	COMMENT NUMBER
Please do what you can to stop this proposed action.	D-E-0126 (cont.)
Please Stop the Wargames, Roy Kincaid	5
Kailua Kona, HI	

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment D-E-0127 was the same as that of D-E-0062. This comment was submitted by Kevin Correll of Wernersville, PA.	D-E-0127
The text of comment D-E-0128 was the same as that of D-E-0062. This comment was submitted by Paul Moss of White Bear Lake, MN.	D-E-0128
The text of comment D-E-0129 was the same as that of D-E-0062. This comment was submitted by Jacquelyn Baetz of Albany, NY.	D-E-0129
The text of comment D-E-0130 was the same as that of D-E-0062. This comment was submitted by Frederika Ebel of Flemington, NJ.	D-E-0130
The text of comment D-E-0131 was the same as that of D-E-0062. This comment was submitted by Briana Wagner of Hagerstown, MD.	D-E-0131
The text of comment D-E-0133 was the same as that of D-E-0062. This comment was submitted by Andrew Hina of Denver, CO.	D-E-0133
The text of comment D-E-0134 was the same as that of D-E-0062. This comment was submitted by Lee Bowden of Hilo, HI.	D-E-0134
The text of comment D-E-0135 was the same as that of D-E-0062. This comment was submitted by Forrest Hurst of Westfield, IN.	D-E-0135
The text of comment D-E-0136 was the same as that of D-E-0062. This comment was submitted by David Letourneau of Kailua Kona, HI.	D-E-0136
The text of comment D-E-0137 was the same as that of D-E-0062. This comment was submitted by Nadine Apo of Denver, CO.	D-E-0137
The text of comment D-E-0138 was the same as that of D-E-0062. This comment was submitted by Marty Wilson of Mpls, MN.	D-E-0138

	COMMENT NUMBER
The text of comment D-E-0139 was the same as that of D-E-0062. This comment was submitted by Kathryn Letkey of Oakland, CA.	D-E-0139
The text of comment D-E-0140 was the same as that of D-E-0062. This comment was submitted by Jeff Sacher of Kamuela, HI.	D-E-0140
The text of comment D-E-0141 was the same as that of D-E-0062. This comment was submitted by Matthew Pintar of Canonsburg, PA.	D-E-0141
The text of comment D-E-0142 was the same as that of D-E-0062. This comment was submitted by Ed Schlegel of Capistrano Beach, CA.	D-E-0142
The text of comment D-E-0143 was the same as that of D-E-0062. This comment was submitted by Joseph Rodrigues of Anchorage, AK.	D-E-0143
The text of comment D-E-0144 was the same as that of D-E-0062. This comment was submitted by Kalai Kamauoha of Burbank, CA.	D-E-0144
The text of comment D-E-0145 was the same as that of D-E-0062. This comment was submitted by Robert Conlan of Honolulu, HI.	D-E-0145
The text of comment D-E-0146 was the same as that of D-E-0062. This comment was submitted by Melissa Castaneda of Irvine, CA.	D-E-0146
The text of comment D-E-0147 was the same as that of D-E-0062. This comment was submitted by Sarah Sharp of Berkeley, CA.	D-E-0147
The text of comment D-E-0148 was the same as that of D-E-0062. This comment was submitted by Royelen Lee Boykie of Washington, D.C., DC.	D-E-0148

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

Email	COMMENT NUMBER
From: Colleen Kelly - Honolulu, HI To: deis hrc@govsupport.us Subject: Expanding Naval Wargames in Hawaii is Unacceptable Date: 8/22/2007 11:15:31 AM	D-E-0149
Mr. Tom Clements Pacific Missile Range Facility P.O. Box 128 Kekaha, HI 96752-0128	
To:Mr. Clements,	
The Northwestern Hawaiian Islands is a protected ocean wilderness. It is not appropriate for any military activity what so ever. The world recognizes Hawai'i hosts unique and fragile marine environments crucial to the overall health of our oceans. The U.S. acknowledged the importance of protecting Hawai'i's oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands. This is the primary foraging grounds of last few remaining Hawaiian monk seals, home of rare cold water coral reefs,	
The Navy's proposal to significantly increase wargames in the Hawaiian Islands directly undermines the policies of the federal and state governments to protect the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary.	1
The Navy's plan to use active sonar that harms marine mammals,	2
spread toxic chemicals that undermine the public's health, and jeopardize cultural sites sacred to Native Hawaiians is completely unacceptable and cannot be allowed.	3, 4
Please Stop the Wargames,	5
Colleen Kelly Honolulu, HI	

Comment	COMMENT NUMBER
The text of comment D-E-0150 was the same as that of D-E-0062. This comment was submitted by Kalinke ten Hulzen of Wieringerwerf, RW.	D-E-0150
The text of comment D-E-0151 was the same as that of D-E-0062. This comment was submitted by Moana Bjur of Waialua, HI.	D-E-0151
The text of comment D-E-0152 was the same as that of D-E-0062. This comment was submitted by Colleen Soares of Honolulu, HI.	D-E-0152
The text of comment D-E-0153 was the same as that of D-E-0062. This comment was submitted by A. Russell of Kapa'a, HI.	D-E-0153
The text of comment D-E-0154 was the same as that of D-E-0062. This comment was submitted by Linda M. Karr of Hilo, HI.	D-E-0154
The text of comment D-E-0155 was the same as that of D-E-0062. This comment was submitted by Alapaki Luke of Honolulu, HI.	D-E-0155
The text of comment D-E-0156 was the same as that of D-E-0062. This comment was submitted by Felicita Garrido of Haleiwa, HI.	D-E-0156
The text of comment D-E-0157 was the same as that of D-E-0062. This comment was submitted by Bina Robinson of Swain, NY.	D-E-0157
The text of comment D-E-0158 was the same as that of D-E-0062. This comment was submitted by Kekama Galioto of Tucson, AZ.	D-E-0158
The text of comment D-E-0159 was the same as that of D-E-0062. This comment was submitted by Nina Puhipau of Waialua, HI.	D-E-0159
The text of comment D-E-0160 was the same as that of D-E-0062. This comment was submitted by Pumehana Paisner of Boulder, CO.	D-E-0160

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment D-E-0161 was the same as that of D-E-0062. This comment was submitted by Sheila Ward of San Juan, PR.	D-E-0161
The text of comment D-E-0162 was the same as that of D-E-0062. This comment was submitted by Ka`iana Haili of Hilo, HI.	D-E-0162
The text of comment D-E-0163 was the same as that of D-E-0062. This comment was submitted by Sonja and Andy Kass of Kapaa, HI.	D-E-0163
The text of comment D-E-0164 was the same as that of D-E-0062. This comment was submitted by Steve LaFleur of Paia, HI.	D-E-0164
The text of comment D-E-0165 was the same as that of D-E-0062. This comment was submitted by Anjali Puri of Honolulu, HI.	D-E-0165
The text of comment D-E-0166 was the same as that of D-E-0062. This comment was submitted by Pualani Kauila of Honolulu, HI.	D-E-0166
The text of comment D-E-0167 was the same as that of D-E-0062. This comment was submitted by Aarin Gross of Kaneohe, HI.	D-E-0167
The text of comment D-E-0168 was the same as that of D-E-0062. This comment was submitted by Addie Texeira of Hilo, HI.	D-E-0168
The text of comment D-E-0169 was the same as that of D-E-0062. This comment was submitted by Caren Diamond of Hanalei, HI.	D-E-0169
The text of comment D-E-0170 was the same as that of D-E-0062. This comment was submitted by Patricia Blair of Kailua, HI.	D-E-0170
The text of comment D-E-0171 was the same as that of D-E-0062. This comment was submitted by Uhane Pono of Kailua Kona, HI.	D-E-0171

	COMMENT NUMBER
The text of comment D-E-0172 was the same as that of D-E-0062. This comment was submitted by Kealii Pang of Honolulu, HI.	D-E-0172
The text of comment D-E-0173 was the same as that of D-E-0062. This comment was submitted by Sarah Thornton of Hilo, HI.	D-E-0173
The text of comment D-E-0174 was the same as that of D-E-0062. This comment was submitted by Garid Faria of Honolulu, HI.	D-E-0174
The text of comment D-E-0175 was the same as that of D-E-0062. This comment was submitted by Nola Conn of Anahola, HI.	D-E-0175
The text of comment D-E-0176 was the same as that of D-E-0062. This comment was submitted by Pake Salmon of Waianae, HI.	D-E-0176
The text of comment D-E-0177 was the same as that of D-E-0062. This comment was submitted by Randy Tashjian of Glendale, CA.	D-E-0177
The text of comment D-E-0178 was the same as that of D-E-0062. This comment was submitted by Pono Kealoha of Pearlcity, HI.	D-E-0178
The text of comment D-E-0179 was the same as that of D-E-0062. This comment was submitted by Zachary Klaja of Seattle, WA.	D-E-0179
The text of comment D-E-0180 was the same as that of D-E-0062. This comment was submitted by Thomas Loudat of Kaneohe, HI.	D-E-0180
The text of comment D-E-0181 was the same as that of D-E-0062. This comment was submitted by Alison Hartle of Honolulu, HI.	D-E-0181
The text of comment D-E-0182 was the same as that of D-E-0062. This comment was submitted by Francisca Sopacua of Groningen, CC.	D-E-0182

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

Email	COMMENT NUMBER
From: Beryl Blaich - Kilauea, HI To: deis hrc@govsupport.us Subject: Expanding Naval Wargames in Hawaii is Unacceptable Date: 8/22/2007 3:30:09 PM	D-E-0183
Mr. Tom Clements Pacific Missile Range Facility P.O. Box 128 Kekaha, HI 96752-0128 To:Mr. Clements, Naval and other military agency plans for use of the the Papahanaumokuakea are entirely incompatible with the purposes for which President Bush established the national monument.	
If the military's record of stewardship of Hawaii were not so deplorable (including Makua, Waikane, Kahoolawe, and, most recently, Pohakuloa), if there were not so much evidence that cetaceans suffer from mid frequency actie sonar, if a damaged marine ecology were easily and quickly reparable, if wargames weren't so counterproductive to ensuring peace for planet, Naval use of these waters might be scrutinized and considered.	1
I implore you: No naval use of Papahanaumoku, please.	2
Please Stop the Wargames, Beryl Blaich Kilauea, HI	

Comment	COMMENT NUMBER
The text of comment D-E-0184 was the same as that of D-E-0062. This comment was submitted by Neil Frazer of Kailua, HI.	D-E-0184
The text of comment D-E-0185 was the same as that of D-E-0062. This comment was submitted by Rana Jackson of Lihue, HI.	D-E-0185
The text of comment D-E-0186 was the same as that of D-E-0062. This comment was submitted by Dona Van Bloemen of Santa Monica, CA.	D-E-0186
The text of comment D-E-0187 was the same as that of D-E-0062. This comment was submitted by Donna Cussac of Cleveland, TN.	D-E-0187
The text of comment D-E-0188 was the same as that of D-E-0062. This comment was submitted by Alison Moceri of Seattle, WA.	D-E-0188
The text of comment D-E-0189 was the same as that of D-E-0062. This comment was submitted by Katie Velasquez of Kihei, HI.	D-E-0189
The text of comment D-E-0190 was the same as that of D-E-0062. This comment was submitted by Tara Cornelisse of San Rafael, CA.	D-E-0190
The text of comment D-E-0191 was the same as that of D-E-0062. This comment was submitted by Bill Akiona of Makaha, HI.	D-E-0191
The text of comment D-E-0192 was the same as that of D-E-0062. This comment was submitted by Makana Cameron of Honolulu, HI.	D-E-0192
The text of comment D-E-0193 was the same as that of D-E-0062. This comment was submitted by Kanoe Kapu of Hilo, HI.	D-E-0193
The text of comment D-E-0194 was the same as that of D-E-0062. This comment was submitted by Fern Holland of Kapa'a, Kauai, HI.	D-E-0194

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment D-E-0195 was the same as that of D-E-0062. This comment was submitted by Stephen Dinion of Honolulu, HI.	D-E-0195
The text of comment D-E-0196 was the same as that of D-E-0062. This comment was submitted by Kim L. Ramos of Honolulu, HI.	D-E-0196
The text of comment D-E-0197 was the same as that of D-E-0062. This comment was submitted by Felicia Ann Waialae of Waipahu, HI.	D-E-0197
The text of comment D-E-0198 was the same as that of D-E-0062. This comment was submitted by Ron Whitmore of Hilo, HI.	D-E-0198
The text of comment D-E-0199 was the same as that of D-E-0062. This comment was submitted by Barbara Leighton of Hilo, HI.	D-E-0199
The text of comment D-E-0200 was the same as that of D-E-0062. This comment was submitted by Barbara Long of Mililani, HI.	D-E-0200
The text of comment D-E-0201 was the same as that of D-E-0062. This comment was submitted by Cara Petty of Mililani, HI.	D-E-0201
The text of comment D-E-0202 was the same as that of D-E-0062. This comment was submitted by Pi'ilani Akina of Haleiwa, HI.	D-E-0202
The text of comment D-E-0203 was the same as that of D-E-0062. This comment was submitted by Greg Schneider of Westfield, NJ.	D-E-0203
The text of comment D-E-0204 was the same as that of D-E-0062. This comment was submitted by Sam Chung Hoon of Jacksonville Beach, FL.	D-E-0204
The text of comment D-E-0205 was the same as that of D-E-0062. This comment was submitted by Masako Uematsu of Boston, MA.	D-E-0205

	COMMENT NUMBER
The text of comment D-E-0206 was the same as that of D-E-0062. This comment was submitted by Noyita Saravia of Kahuku, HI.	D-E-0206
The text of comment D-E-0207 was the same as that of D-E-0062. This comment was submitted by Denise Lytle of Fords, NJ.	D-E-0207
The text of comment D-E-0208 was the same as that of D-E-0062. This comment was submitted by Carrie Ginnane of Honolulu, HI.	D-E-0208
The text of comment D-E-0209 was the same as that of D-E-0062. This comment was submitted by Kahea Stocksdale of Keaau, HI.	D-E-0209
The text of comment D-E-0210 was the same as that of D-E-0062. This comment was submitted by Angela Franco of Honolul, HI.	D-E-0210
The text of comment D-E-0211 was the same as that of D-E-0062. This comment was submitted by Roy Moss of Grants Pass, OR.	D-E-0211
The text of comment D-E-0212 was the same as that of D-E-0062. This comment was submitted by Lea Padilla of Redlands, CA.	D-E-0212
The text of comment D-E-0213 was the same as that of D-E-0062. This comment was submitted by James M. Nordlund of Stockton, KS.	D-E-0213
The text of comment D-E-0214 was the same as that of D-E-0062. This comment was submitted by Sandra Phillips of Oregon City, OR.	D-E-0214
The text of comment D-E-0215 was the same as that of D-E-0062. This comment was submitted by Claire Mortimer of Kilauea, HI.	D-E-0215
The text of comment D-E-0216 was the same as that of D-E-0062. This comment was submitted by Jay Miller of Portsmouth, RI.	D-E-0216

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment D-E-0217 was the same as that of D-E-0062. This comment was submitted by Leslie Conder of Salt Lake, UT.	D-E-0217
The text of comment D-E-0218 was the same as that of D-E-0062. This comment was submitted by Vic Maietta of Green Island, NY.	D-E-0218
The text of comment D-E-0219 was the same as that of D-E-0062. This comment was submitted by Debbie Burack of New York, NY.	D-E-0219
The text of comment D-E-0220 was the same as that of D-E-0062. This comment was submitted by Hilary Harts of Kula, HI.	D-E-0220
The text of comment D-E-0221 was the same as that of D-E-0062. This comment was submitted by James Mason of Kailua-Kona, HI.	D-E-0221
The text of comment D-E-0222 was the same as that of D-E-0062. This comment was submitted by Tim Brause of Honolulu, HI.	D-E-0222
The text of comment D-E-0223 was the same as that of D-E-0062. This comment was submitted by Kelley Uyeoka of Kailua, HI.	D-E-0223
The text of comment D-E-0224 was the same as that of D-E-0062. This comment was submitted by Ruth Callahan of Kailua-Kona, HI.	D-E-0224
The text of comment D-E-0225 was the same as that of D-E-0062. This comment was submitted by Amber McClure of Honolulu, HI.	D-E-0225
The text of comment D-E-0226 was the same as that of D-E-0062. This comment was submitted by None Wild Dolphin Foundation of Waianae, HI.	D-E-0226
The text of comment D-E-0227 was the same as that of D-E-0062. This comment was submitted by Jordan Davis of Wilson, NC.	D-E-0227

	COMMENT NUMBER
The text of comment D-E-0228 was the same as that of D-E-0062. This comment was submitted by Joe Meagher of Houston, TX.	D-E-0228
The text of comment D-E-0229 was the same as that of D-E-0062. This comment was submitted by Cynthia Romero of Miami Beach, FL.	D-E-0229
The text of comment D-E-0230 was the same as that of D-E-0062. This comment was submitted by Matthew Laclair of Mesa, AZ.	D-E-0230
The text of comment D-E-0231 was the same as that of D-E-0062. This comment was submitted by Delaney Jeter of Mechanicsville, VA.	D-E-0231
The text of comment D-E-0232 was the same as that of D-E-0062. This comment was submitted by Tabitha McCoy of Fort Myers, FL.	D-E-0232
The text of comment D-E-0233 was the same as that of D-E-0062. This comment was submitted by Marti Townsend of Honolulu, HI.	D-E-0233
The text of comment D-E-0234 was the same as that of D-E-0062. This comment was submitted by Shelby Sargent of Hampton, VA.	D-E-0234
The text of comment D-E-0235 was the same as that of D-E-0062. This comment was submitted by Robin Tomer of Danville, VA.	D-E-0235
The text of comment D-E-0236 was the same as that of D-E-0062. This comment was submitted by Estrella Ferrer of Miami, FL.	D-E-0236
The text of comment D-E-0237 was the same as that of D-E-0062. This comment was submitted by Matt Mason of Kissimmee, FL.	D-E-0237
The text of comment D-E-0238 was the same as that of D-E-0062. This comment was submitted by Elyse Rollins of Lake Forest, CA.	D-E-0238

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

The text of comment	COMMENT NUMBER
The text of comment D-E-0239 was the same as that of D-E-0062. This comment was submitted by Catherine Taylor of Benbrook, TX.	D-E-0239
The text of comment D-E-0240 was the same as that of D-E-0062. This comment was submitted by Susan Rasmussen of Quitman, MS.	D-E-0240
The text of comment D-E-0241 was the same as that of D-E-0062. This comment was submitted by J T Dunlap of Kansas City, MO.	D-E-0241
The text of comment D-E-0242 was the same as that of D-E-0062. This comment was submitted by Jo Greenwald of Kailua, HI.	D-E-0242
The text of comment D-E-0243 was the same as that of D-E-0062. This comment was submitted by Melinda Ahn of Kaneohe, HI.	D-E-0243
The text of comment D-E-0244 was the same as that of D-E-0062. This comment was submitted by David Bishaw of Hilo, HI.	D-E-0244
The text of comment D-E-0245 was the same as that of D-E-0062. This comment was submitted by Donna Blackwell of Mesa, AZ.	D-E-0245
The text of comment D-E-0246 was the same as that of D-E-0062. This comment was submitted by Michele McKay of Honolulu, HI.	D-E-0246
The text of comment D-E-0247 was the same as that of D-E-0062. This comment was submitted by Lehua Kaulukukui of Waikoloa, HI.	D-E-0247

COMMENT NUMBER D-E-0248

From: Naia Kelly - HI
To: deis hrc@govsupport.us
Subject: The sonar war game exercises around Hawaii
Date: 8/24/2007 2:59:26 AM
*

Public Affairs Officer

Pacific Missile Range Facility

ATTN: HRC EIS/OEIS

P. O. Box 128

Kekaha, Hawaii 96752-01

**To Whom It May Concern;*

**

*As a new citizen of Hawaii, we moved here in May, not only do I oppose giving the Navy a permit to "take" the marine mammals listed in the Draft Environmental Impact Statement on the Hawaii Range Complex, but I'm quite surprised for a few reasons. We moved from Los Angeles to Maui in order to live a more peaceful, environmentally friendly kind of life. First, I am shocked that in a place like Hawaii, which almost entirely relies on the tourist for income, that this kind of thing would even be considered. 1
People come to these islands to swim with the dolphins!! They come to whale watch and see all of the marine life and scuba dive, snorkel and swim. When these tests are being conducted will people be banned from the water? What if there is a mistake in what we think these animals can withstand and there is a mass die off on our beaches? How do you think the tourists will react? 2

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
* * * *Secondly, does the government not realize that these mammals are intelligent and have the ability to speak in complete thoughts? Does that not entitle them a voice about what we do to their environment? I would imagine it does. To say that either we are not intelligent enough, or rather our technology isn't advanced enough yet to be able to interpret their language is, I believe, correct. Don't we owe them enough respect to at least wait until we can discuss it with them? They are, most likely, smarter than our estimates, but we aren't able to tell for sure yet because we, ourselves, lack the ability to do so. Do we want to be the ones that possibly inflict torture on another potentially highly intelligent species here on our own planet? Please think about this as it's a real situation. I have personally had the opportunity to work with marine mammals at the Dolphin Research Center in Grassy Key, F.L. and considering the things I witnessed there, I wouldn't want you to chance being wrong. If you would like to further discuss some of the things I witnessed these animals doing, I would be happy to talk with you and connect you to the people at DRC. * ** *Please don't make this decision lightly on a whim. Thank you so much for your time and consideration.* ** ** *Regards, * *Naia Kelly*	D-E-0248 (cont.) 1 3

	COMMENT NUMBER
The text of comment D-E-0249 was the same as that of D-E-0062. This comment was submitted by Janice Palma-Glennie of Kailua-kona, HI.	D-E-0249
The text of comment D-E-0250 was the same as that of D-E-0062. This comment was submitted by Stela Vasques of Lisbon	D-E-0250
The text of comment D-E-0251 was the same as that of D-E-0062. This comment was submitted by David Nelson of Minnapolis, MN.	D-E-0251
The text of comment D-E-0252 was the same as that of D-E-0062. This comment was submitted by Christy Church of Port St. Lucie, FL.	D-E-0252
The text of comment D-E-0253 was the same as that of D-E-0062. This comment was submitted by Ursula Brackett of College Park, GA.	D-E-0253
The text of comment D-E-0254 was the same as that of D-E-0062. This comment was submitted by Sara Hult of Conifer, CO.	D-E-0254
The text of comment D-E-0255 was the same as that of D-E-0062. This comment was submitted by Janice Saaristo of Duluth, MN.	D-E-0255
The text of comment D-E-0256 was the same as that of D-E-0062. This comment was submitted by Bobby McClintock of Honolulu, HI.	D-E-0256
The text of comment D-E-0257 was the same as that of D-E-0062. This comment was submitted by Christopher Glenn of Chicago, IL.	D-E-0257
The text of comment D-E-0258 was the same as that of D-E-0062. This comment was submitted by Katie Marshall of Dayton, OH.	D-E-0258
The text of comment D-E-0259 was the same as that of D-E-0062. This comment was submitted by Kourtney Startin of Spokane, WA.	D-E-0259

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

The text of comment D-E-0260 was the same as that of D-E-0062. This comment was submitted by Edgar Guiher of Conneaut Lake, PA.	D-E-0260
The text of comment D-E-0261 was the same as that of D-E-0062. This comment was submitted by Michael Myers of Cape Coral, FL.	D-E-0261
The text of comment D-E-0262 was the same as that of D-E-0062. This comment was submitted by Jamie Oshiro of Honolulu, HI.	D-E-0262
The text of comment D-E-0263 was the same as that of D-E-0062. This comment was submitted by Denise Weber of Clearwater, FL.	D-E-0263
The text of comment D-E-0264 was the same as that of D-E-0062. This comment was submitted by Cathy Robinson of Mobile, AL.	D-E-0264

COMMENT NUMBER D-E-0265

From: Phin MacDonald - Medford, MA
To: deis hrc@govsupport.us
Subject: No Expanded Wargames in Hawaii
Date: 8/24/2007 3:58:05 PM

Mr. Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752-0128

To:Mr. Clements,

The world recognizes that Hawai'i is home to unique and fragile marine environments that are crucial to the overall health of our oceans. The U.S. acknowledged the importance of protecting Hawai'i's oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands.

Expanded naval wargames will exacerbate threats to the public's health from the military in Hawai'i. Hawai'i's residents are in shock from the recent announcement that depleted uranium (DU) contamination is now confirmed on O'ahu and Hawai'i Island. Instead of committing to protect our health and our environment by cleaning up these contaminated sites, the Navy is proposing to contribute to the contamination. The Navy wants to increase 6 live-fire bombing practices at Pohakuloa and Makua Valley - potentially spreading DU-tainted dust and exposing personnel. The Navy also wants to dump rocket fuel, chemical weapon simulants, and missile debris in the ocean. These actions pose an unacceptable risk to the public's health and cannot be allowed.

The Navy's proposal to significantly increase wargames in the 1
Hawaiian Islands directly undermines the policies of the federal 2
and state governments to protect the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary. The Navy's plan to use active sonar that harms marine mammals, spread toxic chemicals

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

that undermine the public's health, and jeopardize cultural sites sacred to Native Hawaiians is completely unacceptable and cannot be allowed.	D-E-0265 (cont.) 3, 4
Please Stop the Wargames, Phin MacDonald Medford, MA	5

	COMMENT NUMBER
The text of comment D-E-0266 was the same as that of D-E-0062. This comment was submitted by Andrea Hauck of Fairview Hghts, IL.	D-E-0266
The text of comment D-E-0267 was the same as that of D-E-0062. This comment was submitted by Robert Tanner of Honolulu, HI.	D-E-0267
The text of comment D-E-0268 was the same as that of D-E-0062. This comment was submitted by Katt McConiga of Las Vegas, NV.	D-E-0268
The text of comment D-E-0269 was the same as that of D-E-0062. This comment was submitted by Mishelle Morales of Cypress, CA.	D-E-0269
The text of comment D-E-0270 was the same as that of D-E-0062. This comment was submitted by Jason Leverett of Austin, TX.	D-E-0270
The text of comment D-E-0271 was the same as that of D-E-0062. This comment was submitted by Kelsey Peterson of Bellingham, WA.	D-E-0271
The text of comment D-E-0272 was the same as that of D-E-0062. This comment was submitted by Emily Castro of Henderson, NV.	D-E-0272
The text of comment D-E-0273 was the same as that of D-E-0062. This comment was submitted by Angela Rosa of Hawi, HI.	D-E-0273
The text of comment D-E-0274 was the same as that of D-E-0062. This comment was submitted by Chessa Au of Ronkonkoma, NY.	D-E-0274
The text of comment D-E-0275 was the same as that of D-E-0062. This comment was submitted by Sarah Daniels of Kane'ohe, HI.	D-E-0275
The text of comment D-E-0276 was the same as that of D-E-0062. This comment was submitted by Aaron Warren of Scarsdale, NY.	D-E-0276

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment D-E-0277 was the same as that of D-E-0062. This comment was submitted by Suzanne Kim of Round Lake, IL.	D-E-0277
The text of comment D-E-0278 was the same as that of D-E-0062. This comment was submitted by Samantha Stewart of Scranton, PA.	D-E-0278
The text of comment D-E-0279 was the same as that of D-E-0062. This comment was submitted by Michael Howells of Honolulu, HI.	D-E-0279
The text of comment D-E-0280 was the same as that of D-E-0062. This comment was submitted by Anna Reycraft of North Miami, FL.	D-E-0280
The text of comment D-E-0281 was the same as that of D-E-0062. This comment was submitted by Vanda Hauserova of Prague	D-E-0281
The text of comment D-E-0282 was the same as that of D-E-0062. This comment was submitted by Bryan Milne of Brooklyn, NY.	D-E-0282
The text of comment D-E-0283 was the same as that of D-E-0062. This comment was submitted by Deanna Chang of Honolulu, HI.	D-E-0283
The text of comment D-E-0284 was the same as that of D-E-0062. This comment was submitted by Scott Jarvis of Hanalei, HI.	D-E-0284
The text of comment D-E-0285 was the same as that of D-E-0062. This comment was submitted by Kevin Stockhausen of Miami Beach, FL.	D-E-0285

COMMENT NUMBER D-E-0286

From: Lisa Diaz - Kailua-Kona, HI
To: deis hrc@govsupport.us
Subject: Expanding Naval Wargames in Hawaii is Unacceptable
Date: 8/25/2007 4:06:55 PM

Mr. Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752-0128

To:Mr. Clements,

Hawaii's marine environment is essential to the overall global health of our oceans. President Bush established Papahanaumokuakea Marine Monument in the Northwestern Hawaiian Islands as the largest, most highly protected marine preserve in our nation, because it is critical to protect this unique and fragile eco-system. The Northwestern Hawaiian Islands preserve is the primary foraging grounds of last few remaining Hawaiian monk seals, home of rare cold water coral reefs, and nesting grounds for endangered sea birds and green sea turtles. An overwhelming majority of Hawaii's citizens approve of Papahanaumokuakea National Marine Monument.

The Navy's proposal to significantly increase wargames in the 1
Hawaiian Islands directly undermines the policies of the federal and state governments to protect the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary. The Navy's plan to use 2
active sonar that harms marine mammals, spread toxic chemicals that undermine the public's health, and jeopardize cultural sites sacred to Native Hawaiians is completely unacceptable and cannot be allowed. Proposing war games within and around a 3, 4
National Monument that our people and president have established is a completely irresponsible and unpatriotic act. The people of Hawaii will not allow you to do this.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0286 (cont.)

Please Stop the Wargames, 5
Lisa Diaz

Kailua-Kona, HI

COMMENT NUMBER
D-E-0287

From: Jeannette Lyons - Portland, OR
To: deis hrc@govsupport.us
Subject: Expanding Naval Wargames in Hawaii is Unacceptable
Date: 8/25/2007 5:36:43 PM

Mr. Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752-0128

To:Mr. Clements,

The world recognizes that Hawai'i is home to unique and fragile marine environments that are crucial to the overall health of our oceans. The U.S. acknowledged the importance of protecting Hawai'i's oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands.

The Navy is proposing to expand its use of mid-frequency active sonar, which emits sound at levels of 235 decibels. Because sound is measured on a logarithmic scale, that means these sonar "pings" are a billion times more intense than the 145 decibel level that the Navy agrees is safe for human divers. To be consistent with low-frequency sonar standards and state and federal laws, the Navy should limit the intensity of received sound within marine protected areas to 145 decibels or less. 1

The Navy's proposal jeopardizes the rich cultural history of the NWHI. These islands are respected in Native Hawaiian traditions as the Elder Islands of the Main Hawaiian Islands. Rare, pre-contact burial sites, temples, and house plots are well-protected on Nihoa and Mokumanamana (Necker Island). Expanding the Navy's wargames over the NWHI will pose consider risk of damage to irreplaceable and sacred cultural sites. This risk is unjustified and cannot be permitted. 2

The Navy's proposal to significantly increase wargames in the 3

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

Hawaiian Islands directly undermines the policies of the federal and state governments to protect the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary. The Navy's plan to use mid-frequency active sonar and to jeopardize cultural sites sacred to Native Hawaiians is completely unacceptable and cannot be allowed.

I respectfully request your consideration in this matter.

Please Stop the Wargames,
Jeannette Lyons

Portland, OR

COMMENT NUMBER: D-E-0287 (cont.)

	COMMENT NUMBER
The text of comment D-E-0288 was the same as that of D-E-0062. This comment was submitted by Don Cooke of Kaneohe, HI.	D-E-0288
The text of comment D-E-0289 was the same as that of D-E-0062. This comment was submitted by Ednette Chandler of Las Vegas, NV.	D-E-0289
The text of comment D-E-0290 was the same as that of D-E-0062. This comment was submitted by Rhonda Black of Palm Desert, CA.	D-E-0290
The text of comment D-E-0291 was the same as that of D-E-0062. This comment was submitted by Jerry Taber of Wailuku, HI.	D-E-0291
The text of comment D-E-0292 was the same as that of D-E-0062. This comment was submitted by Tina Pope of Memphis, TN.	D-E-0292
The text of comment D-E-0293 was the same as that of D-E-0062. This comment was submitted by Kristin Duin of Seattle, WA.	D-E-0293
The text of comment D-E-0294 was the same as that of D-E-0062. This comment was submitted by Angela Macken of Dublin, .	D-E-0294
The text of comment D-E-0295 was the same as that of D-E-0062. This comment was submitted by Lisa Muehlstein of Pepeekeo, HI.	D-E-0295
The text of comment D-E-0296 was the same as that of D-E-0062. This comment was submitted by Angeline Winsor of Corona, CA.	D-E-0296

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0297	From: Joan Lander - Naalehu, HI To: deis hrc@govsupport.us Subject: Expanding Naval Wargames in Hawaii is Unacceptable Date: 8/26/2007 7:21:37 PM
	Mr. Tom Clements Pacific Missile Range Facility P.O. Box 128 Kekaha, HI 96752-0128
	To:Mr. Clements,
1	Once again we are having to come to the defense of an area that is supposed to be protected by U.S. law. Why do we have to constantly raise our voices to protect places that have already been declared sanctuaries?
	The U.S. acknowledged the importance of protecting Hawai'i's oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands. This is the primary foraging grounds of last few remaining Hawaiian monk seals, home of rare cold water coral reefs,
2, 3, 4, 5	The Navy's proposal to significantly increase wargames in the Hawaiian Islands directly undermines the policies of the federal and state governments to protect the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary. The Navy's plan to use active sonar that harms marine mammals, spread toxic chemicals that undermine the public's health, and jeopardize cultural sites sacred to Native Hawaiians is completely unacceptable and cannot be allowed.
7	In addition to the above, the military's actions are in violation of the neutrality laws of the Hawaiian Kingdom.
6	Please Stop the Wargames,

COMMENT NUMBER	
D-E-0297 (cont.)	Joan Lander Naalehu, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment D-E-0298 was the same as that of D-E-0062. This comment was submitted by Dawn Stobart of Loves Park, IL.	D-E-0298
The text of comment D-E-0299 was the same as that of D-E-0062. This comment was submitted by Michal Stover of Kilauea, HI.	D-E-0299
The text of comment D-E-0300 was the same as that of D-E-0062. This comment was submitted by Sarah Rickerby of Tampa, FL.	D-E-0300
The text of comment D-E-0301 was the same as that of D-E-0062. This comment was submitted by Catherine Okimoto of Pahoa, HI.	D-E-0301

	COMMENT NUMBER
From: Joy Gardner - Paia, HI To: deis hrc@govsupport.us Subject: Sonar Date: 8/27/2007 3:16:20 PM Dear People:	D-E-0302
Please desist from using military sonar in the waters around Hawaii. It is unsafe for both the people and for the whales.	1
Thank you, Joy Gardner Joy Gardner Vibrational Healing Program Paia, HI	

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

The text of comment D-E-0303 was the same as that of D-E-0062. This comment was submitted by Sherry Chambers of Cleveland, OH.	COMMENT NUMBER
	D-E-0303

	COMMENT NUMBER
From: April Fountain To: deis hrc@govsupport.us Subject: Sonar hearing in Hilo Date: 8/27/2007 1:53:33 PM	D-E-0304
I respectfully request that you log my protest to conducting the sonar tests around our sensitive Island environment. I realize that your aim is for our protection but I do not believe that this is the answer and would like all the other alternatives to be considered. Please do not do this sonar testing. April Fountain Hilo, Hawaii.	1

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
From: Aimee Love To: deis hrc@govsupport.us Subject: Save the whales Date: 8/27/2007 5:31:01 PM	D-E-0305
Please stop the sonar testing and protect our island wildlife. We need to speak up because they do not have a voice. Please let me know what I can do. Warmest aloha, Aimee Love	1

	COMMENT NUMBER
The text of comment D-E-0306 was the same as that of D-E-0062. This comment was submitted by Rosemary Alles of Kamuela, HI.	D-E-0306
The text of comment D-E-0307 was the same as that of D-E-0062. This comment was submitted by None	D-E-0307
The text of comment D-E-0308 was the same as that of D-E-0062. This comment was submitted by None	D-E-0308

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Lynne Torres To: deis hrc@govsupport.us Subject: Hawaii Range Complex EIS Date: 8/27/2007 9:53:55 PM Attached please find my comments. thanks. Lynne Torres	COMMENT NUMBER D-E-0309

	COMMENT NUMBER D-E-0309 (cont.)
The following are my thoughts related to the EIS/OEIS on the Proposed Action and Alternatives for the Hawaii Range Complex.	
1) An environmental study should not be conducted by the same group or organization that is about to make the changes; it should be done by an independent, outside body.	3
2) There is no way the HRC can truly, honestly say that these proposals will have no impact on marine life, the soil, ocean, and air. Sonar damages. Depleted uranium is lethal. Particles of explosions mix in with the air we breathe in and also become acid rain.	2
3) The issue here is not whether or not the navy/military should continue to expand. The real issue is whether or not we, humans, are in agreement that WAR is the solution to the problems mankind are facing today for their survival.... the pollution of our air, soil ,water and global warming. Should we continue contributing to the massacre of our planet, or start doing something now to change the course of our future? What we are witnessing is lack of intelligent non-violent communication between societies and different cultures, and basically, between each other, on a daily basis. We are all one, no matter what religion, culture or race. We should be working to achieve harmony between each other, not war.	4
4) This is not about whether or not the PMRF are "good neighbors" or about how many jobs they bring to Kauai. The issue here is on a much higher level. Are we in agreement with the present government's war policies and attitudes in regards to "protectionism"? Are we heading in the right direction by placing such a large amount of the financial pie towards more military interventions, more war weapons, more war games?	
5) I believe it would be preferable to give more attention and money to protecting the air, waters and health of the land and its people and in creating more harmony and peace through dialogue, not war.	2

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0310
1

From: Guenter Monkowski - Holualoa, HI
To: deis hrc@govsupport.us
Subject: Move on heroes!

Date: 8/27/2007 11:12:33 PM

Go and destroy the last resorts on Earth with your creepy, poisonous technology. You really must be not to smart or you must hate your children. Moreover your country is bankrupt, but who cares, Walstreet will print some money.

Yeah, we see you heroes in Iraq and Afghanistan where you cowardly bomb, slaughter and murder civilians. The "great" American way, and if the locals defend themselves guess what your heroic troops of cowards call them terrorist.

Can't believe that U.S. was finally taken over by the Nazis! Actually the Germans won the war!

U.S. is now seen by 80% of the Earth population as a rogue country - guess why that is so! Moreover people around the World think that Americans are brainless gunhoes.

An army of sickos who like to destroy their own country. Really great!

Go on and destroy the rest of our unique environment, but remember it might be lost forever. Prayers will not help you.

Do you guys have brains, or has it been removed after 9/11 by Homeland Security.

I'm happy that I'm old!

--
Guenter Monkowski

Holualoa, HI, USA

P.S: Patriot=Idiot!

COMMENT NUMBER
D-E-0312

The text of comment D-E-0312 was the same as that of D-E-0062. This comment was submitted by Charlene Avallone of Kailua, HI.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0313

From: Marilynn Tolmachoff
To: deis hrc@govsupport.us
Subject: Navy Sonar Nightmare
Date: 8/28/2007 10:02:39 AM

What additional data needs to be gathered at this point ??? What am I missing here?!? So sadistic I cannot even believe this and yet this is so typical - so prevalent in the quagmire and business as usual attitude - "Make up the rules as you go" - so Federaliesque.

1 The breeding and calving sanctuary could be disturbed forever more w/ this hostile and cruel beyond cruel brutal activity.

How can this be stopped - it is totally documented where the whales travell to birth and mate - why can't the Navy go to DEAD WATERS - how many whale deaths are ENOUGH!!!???

MAKE IT STOP!!!!

Marilynn Tolmachoff

COMMENT NUMBER
D-E-0315

The text of comment D-E-0315 was the same as that of D-E-0062. This comment was submitted by Marianne Merki.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

Email	COMMENT NUMBER
From: Doug Fox To: deis hrc@govsupport.us Subject: public testimony Date: 8/28/2007 8:27:15 PM	D-E-0316
The US military in Hawaii has irrevocably contaminated the seas and aina of Hawaii already. No further activities such as those in the EIS should be allowed until the military cleans up all its old opala and vacates the territories it has taken by force of arms. A terrible example of military stewardship is Pohakuloa Training Area, contaminated with depleted uranium. Ocean stewardship is also negligent. The whales don't want US Naval sonar. The land residents don't want war, missiles and explosions. Take them back to Connecticutt, please, and turn off your reactors on the way out. The negative impacts of the EIS activities are very significant to the residents, no matter what the paid consultants to the Navy say. Or lands and waters are being irreparably degraded by war activities. aloha, Doug Fox Honaunau, HI	1

Email	COMMENT NUMBER
From: LiLi Townsend To: deis hrc@govsupport.us Subject: Not again! Date: 8/28/2007 9:54:25 PM	D-E-0317
Surely you know the will of the Hawaiian residents by now. We are concerned at the heartless denial of Navy War Games proposal. A Marine Sanctuary is not a place for war games. Marine mammals are part of our Hawaiian culture and deserve our caring and respect. Sincerely, LiLi Townsend	1

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment D-E-0318 was the same as that of D-E-0062. This comment was submitted by Katy Fogg of Olympia, WA.	D-E-0318
The text of comment D-E-0319 was the same as that of D-E-0062. This comment was submitted by Ruby Roth of Los Angeles, CA.	D-E-0319
The text of comment D-E-0320 was the same as that of D-E-0062. This comment was submitted by Linda Ballou of Sherman Oaks, CA.	D-E-0320
The text of comment D-E-0321 was the same as that of D-E-0062. This comment was submitted by Michelle DeFelice of Tucson, AZ.	D-E-0321
The text of comment D-E-0322 was the same as that of D-E-0062. This comment was submitted by Bryan Lovsness of Caspar, CA.	D-E-0322
The text of comment D-E-0323 was the same as that of D-E-0062. This comment was submitted by Lisa Damon of Kamuela, HI.	D-E-0323

COMMENT NUMBER D-E-0324

From: Michael Jones - Honolulu, HI
To: deis hrc@govsupport.us
Subject: comments on the draft EIS/OEIS for the Hawaii Range Complex
Date: 8/29/2007 1:29:31 PM

29 Aug. 2007

via E-mail to: deis_hrc@govsupport.us

Below are my comments on the draft EIS/OEIS for the Hawaii Range Complex.

The very limited distribution of the draft EIS is not conducive to meaningful evaluation of technical aspects. For example, the Univ. of Hawaii Environmental Center and Hamilton Library should have been included. 1

Despite the detailed comments I submitted at the 14 Sept. 2006 scoping meeting on Oahu and the fact that I received two postcards (with slightly different addresses) announcing the availability of the draft EIS, my name is not on the Distribution List in section 10.0. The comments I submitted are part of the Oahu scoping comments at http://www.govsupport.us/navynepahawaii/Docs/Oahu/Oahu%20Scoping%2014SEP06_rev1.pdf
I did receive a copy of the draft EIS (Revision 1) on 9 Aug. 2007 after I sent an E-mail on 6 Aug. to deis_hrc@govsupport.us to ask that a copy be sent to me and to the Univ. of Hawaii Hamilton Library.
Because many of my scoping comments are not addressed in detail in the draft EIS, one wonders if anyone read them. 2

Table ES-11 on page ES-57 includes high energy laser tests and operations that "present the potential for fires on Niihau" as a health and safety issue. If this implies that high-power laser beams could be projected at targets on or near Niihau, a detailed evaluation is needed in the final EIS. 21

One of the most serious deficiencies is the inadequate analysis of alternative locations for some training activities. The discussion in section 2.2.1.2 consists of two pages and concludes that it is "neither reasonable, practical nor appropriate to seek alternative 4

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0324 (cont.)

locations." No details are given to justify this conclusion. Two examples make it clear that alternative locations for some activities do exist. One is field carrier landing practice (FCLP). It is noted on page 2-14 that no FCLP training operations are part of the baseline so apparently some alternative locations for FCLP exist. The draft EIS does not compare these locations with those at PMRF and MCBH proposed in alternatives 1 and 2 so there is no basis to judge whether these new locations are needed. Because no carriers are homeported in Hawaii, there seems to be little justification for FCLP in Hawaii. The other example is major training exercises. The recent Valiant Shield exercises near Guam seem to be a reasonable and practical alternative to similar exercises in Hawaii. An article in the 10 Aug. 2007 Honolulu Star-Bulletin noted that 4 Hawaii-based ships participated and reported that Admiral Robert Willard, the Pacific Fleet Commander, "said Guam's military training ranges offered a perfect location for a large-scale exercise." This "perfect location" should be evaluated as an alternative in the EIS.

It would be useful to compare the propellant weights of the missiles 5
shown in Fig. 2.2.2.4.1-1 on page 2-22.

Fig. 2.2.2.4.1-3 on page 2-26 purports to show existing missile flight 6
corridors from PMRF. What environmental analyses have been done for the corridors to the north and south? What missiles have been launched along these corridors?

Figs. 2.2.2.4.1-4 and 2.2.2.4.1-5 show conceptual intercept scenarios 7
involving air or sea targets which have ranges exceeding 400 nautical miles (about 740 kilometers) and thus could violate the INF Treaty and possibly the START Treaty. The draft EIS has no discussion of INF Treaty restrictions on long-range air-launched and sea-launched targets or START Treaty restrictions on sea-launched targets. As I noted in my comments on the 1998 PMRF Enhanced Capability draft EIS (See page 9-323 of the 1998 PMRF Enhanced Capability final EIS.), INF Treaty Article VII, paragraph 12d restricts launches for research and development so that "the launchers for such booster systems are fixed, emplaced above ground and located only at research and development launch sites which are specified in the Memorandum of Understanding." In addition, the START Treaty Article V, paragraph 18a, prohibits tests and deployment of "ballistic missiles with a range in excess of 600 kilometers, or

COMMENT NUMBER
D-E-0324 (cont.)

launchers of such missiles, for installation on waterborne vehicles, including free-floating launchers, other than submarines." The 1998 PMRF Enhanced Capability EIS and the 2003 GMD ETR EIS did not consider treaty compliance despite the fact that previous analyses (1994 TMD ETR EIS and 1998 TMD ETR Draft Supplemental EIS) did consider this issue. The 1994 TMD ETR EIS explicitly refers to the INF Treaty restrictions on page 2-10 and states, "In order to comply with the Intermediate-Range Nuclear Force (INF) Treaty, mobile and fixed sea launch platforms for targets would be located no more than 500 km (311 mi) from the planned target impact point." The 1998 TMD ETR DSEIS notes that the START treaty prohibits launches from sea-based platforms and that launches from ships are restricted to ranges less than 600
kilometers. There can be no meaningful public evaluation of the 7
proposed tests without a detailed discussion of treaty compliance in the final EIS. Responses such as, "We will not implement any actions that are not in accordance with current U.S. policy on treaty compliance." (page 9-331 of the 1998 PMRF Enhanced Capability final EIS) or "This is beyond the scope of the EIS." (page 8-326 of the 2003 GMD ETR final EIS) are neither reassuring nor informative.

Debris from intercepts of targets launched from Wake Island, Kwajalein, 8
or Vandenberg AFB could pose a hazard to aircraft in the flight corridors shown in Fig. 2.2.3.4-1 on page 2-43. The final EIS should show diagrams of the debris areas with jet routes superimposed. Such diagrams for other intercept scenarios are in Figs. 2.1.8-1 to 2.1.8-6 in the 2003 GMD ETR final EIS.

The discussion of the Super Strypi system on page 2-42 gives a total 9
propellant weight of over 48,000 pounds, which is considerably larger than that for the Strategic Target System (36,750 pounds). It is stated that the Super Strypi "would require a 1,500-ft radius circle ground hazard area around the launcher." The 1,500-ft radius circle could refer to the ESQD arc shown in Fig. 2.2.2.4.1-2 rather than the radius of the ground hazard area for the launch, which is 10,000 feet for the Strategic Target System. Table E-8 on page E-9 gives ground hazard radii of 2,000 feet for "most unguided systems" and 6,000 to 10,000 feet for guided systems. I was told at the 23 August meeting that the Super Strypi was a rail-launched system and thus would have a smaller GHA than that for the Strategic Target System. The

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
	D-E-0324 (cont.)
final EIS should clarify this, explicitly show GHA diagrams for Super Strypi launches, and give details about the determination of the ground hazard area.	
Page 2-65 contains the statement that, "Construction of the Maritime Directed Energy Test Center would require separate/additional environmental documentation." Presumably this documentation would include analysis of the serious safety issues associated with such high-power laser beams projected onto air and surface targets. The final EIS should at least examine alternative locations, such as the White Sands Missile Range or a floating platform, for such tests.	10
Pages 2-65 and 2-66 note that testing for the Advanced Hypersonic Weapon would include two launches of the Strategic Target System and two launches of Orion boosters from KTF. Because of the larger amount of propellant in the Orion boosters (41,760 pounds) than in the Strategic Target System (36,750 pounds), some justification is needed for use of the same ground hazard area for Orion launches. Is a detailed environmental analysis planned for Orion launches from KTF? If the launch azimuth for these launches is other than 280 degrees, diagrams of the ground hazard areas should be shown either in the final EIS or a subsequent environmental analysis.	11
The reference for the lead concentrations near the Vandal launch site on page 3-123 does not indicate which of the many U.S. Department of the Navy references in section 9.0 is intended. As I noted in my comments on the 1998 PMRF Enhanced Capability EIS (page 9-378 of the final EIS), soil sampling results are in the PMRF Environmental Baseline Study dated January 1996. A reference to this document, which was designated "for official use only," was included on page 10-13 of the final EIS.	12
The Restrictive Easement for STARS and Vandal launches in Appendix C of the final EIS states that the GRANTEE will "clean up any debris or any releases of hazardous substances resulting from its launches in accordance with all federal and applicable State and local environmental laws." There seems to be no exemption for the area within 100 feet of the launch pad.	13
Page 4-259 mentions that ground hazard areas (GHA) typically extend from 1,000 to 20,000 feet from the launch point. However, previous environmental analyses left unresolved safety issues involving Strategic Target System and THAAD launches at PMRF. No detailed hazard areas have been shown for Strategic Target System launches at azimuths other than 280 degrees. Similarly, no diagrams showing the THAAD hazard area were given in the 2002 THAAD EA and no detailed analysis was cited to justify the reduction in the hazard area radius from 20,000 feet in the 1998 PMRF EIS to 10,000 feet in the THAAD EA.	14
Page 4-266 has a brief discussion of the restrictive easement which permits removal of people from the part of Polihale State Park within the GHA for some missile launches. It should also be noted that this easement can be employed a maximum of 30 times per year -- including times for which the the area is cleared but no launch occurs. The final EIS should give information about the number of times the easement has been used in the past several years and how many times would be expected with alternatives 1 and 2.	15
Page 4-290 mentions the Directed Energy Test Center and states that a "Basic Facility Requirements report has not being completed." The final EIS should clarify whether this report has been or is being completed. Where will it be available for public review?	16
Table 5.2-1 does not include any other missile testing programs in the Pacific as part of cumulative impacts. It would be useful for the final EIS to give the cumulative numbers of launches at the various launch sites for tests analyzed in the 1998 PMRF Enhanced Capability EIS, the 2001 North Pacific Targets Program EA, the 2002 THAAD EA, and the 2003 GMD ETR EIS. The 2004 draft BMDS PEIS estimated 515 launches between 2004 and 2014. Any tests of the Kinetic Energy Interceptor program near PMRF should be included. The final EIS should also include any test launches of offensive missiles. For example, tests of the Trident D5 were reported to be planned near PMRF in 2005.	17
Appendix K contains a general discussion of missile launch safety. It is noted on page K-1 that risk values depend on the probability of vehicle failure. Pages K-5 and K-6 briefly discuss rocket motor failure and note that three types of guidance/control failures have been observed in previous launches. However, no quantitative estimates of failure probabilities are given. In fact no such estimates were given in either the 1994 BMD draft PEIS or in the 2004 draft BMDS PEIS. This information	18

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0324 (cont.)

is necessary for any meaningful assessment of the risks from launch failures. As I noted in my comments on the 2003 GMD ETR draft EIS (page 8-219 in the final EIS), an analysis of Minuteman test launches found a rate of severe failures of 15%. The Strategic Target System had no failures in 4 launches at PMRF and two serious failures (9 Nov. 2001 and 25 May 2007) in three launches from Kodiak.

Because there have been serious consequences from past accidents during missile launch and Navy training activities, it is worth noting these as examples of what can go wrong. In Dec. 1988, a commercial ship near Kauai was hit by a missile launched from an aircraft and one of the ship's crew was killed. The 15 June 1993 Minuteman failure at Vandenberg AFB started a brush fire that burned 1,000 acres. (This accident is relevant to PMRF because a similar failure there could trap people in the north half of Polihale State Park.) On 4 May 1994, two 20 mm depleted uranium rounds were accidentally fired inland from the Aegis cruiser Lake Erie while it was moored in Pearl Harbor. The 8 July 1994 Vandal launch failure at PMRF resulted in elevated lead concentrations near the launch pad. The most regrettable incident was the sinking of the Japanese ship Ehime Maru by a Navy submarine on 9 Feb. 2001.

The 1998 PMRF Enhanced Capability EIS explicitly excluded the Navy Theater-Wide System (subsequently called Sea-Based Midcourse in MDA Fact Sheets dated March 2002 and Jan. 2003 and now called Aegis BMD) from evaluation and asserted (page 9-332), "This document covers enhanced capabilities for PMRF to support Area Defense and the Aegis Leap Intercept. The Theater-Wide program is not sufficiently developed to be included in this analysis." The conceptual intercept scenarios analyzed (e.g. Fig. 2.3.5-1 of the final EIS) involve only a "Ship Area Interceptor" and targets launched within 1200 kilometers of PMRF. According to the Jan. 2003 MDA Fact Sheet, the Aegis Leap Intercept (ALI) phase was completed with intercepts in January and June 2002. It further added, "With the completion of ALI, Aegis BMD is now transitioning to intercepts against more stressing ballistic missile targets and target scenarios based upon technological advances in associated risk reduction activities." It is clear from earlier BMDO Fact Sheets that the ALI tests were part of the Theater-Wide program. BMDO Fact Sheet AQ-99-03 on Navy Theater Wide (NTW) stated, "The NTW flight demonstration phase is the AEGIS LEAP Intercept (ALI)." BMDO Fact Sheet AQ-99-02 described the Navy Area program as using AEGIS ships and SM-2 interceptors. An article in the 16 Dec. 2001 New York Times reported that the Navy Area program had been canceled by the Pentagon. No subsequent environmental analysis has been done even though Aegis BMD tests have been done near PMRF using the same interceptor (SM-3) as the Theater-Wide System. Thus it seems that environmental analyses have been done only for a canceled program and a completed program but not for an ongoing program. The final EIS should evaluate Aegis BMD tests, including conceptual intercept scenarios, or indicate when separate environmental analyses of these tests will be done. 19

Table 5 of the Missile Defense Agency FY08 Budget Overview at http://www.mda.mil/mdalink/pdf/budgetfy08.pdf has an item for "Classified Programs." Will any of these programs involve tests at PMRF? If so, how will the environmental impacts be evaluated? 20

Please send me a copy of the final EIS.

Michael Jones
Dept. of Physics & Astronomy
Univ. of Hawaii

Honolulu, Hawaii

COMMENT NUMBER
D-E-0324 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
From: Ellen Levinsky - HI To: deis hrc@govsupport.us Subject: sonar-draft EIS Date: 8/29/2007 6:41:07 PM My name is Ellen Levinsky and I have been a resident of Maui, Hi. since 1979.	D-E-0325
It is very important to have an EIS done to address the effects of the Navy using sonar radar (testing it or other uses) because there are several adverse and negative results from this. There are many instances that indicate sonar waves have a detrimental impact on marine life especially whales and dolphins. There can be temporary and permanent damage to these marine mammals' co-ordination and communication skills. The Navy does not know what frequencys will hurt these animals delicate internal functions. I am also against underwater missle testing in the waters within 100 miles of the Hawaiian waters. There have been several instances in recent years when marine mammels have beached and/or died when military sonar was being used; prime examples are on Kauai and the Bahamas. It is time for the Navy and the military to consider the negative impact of their testing on animals in the sea, natural resources, and listen to the opposition from educated scientists and citizens of the U.S. and STOP using these high frequencies of sonar! Thank-you for including my testimony, Ellen Levinsky	1

	COMMENT NUMBER
The text of comment D-E-0326 was the same as that of D-E-0062. This comment was submitted by Ravi Grover of Chicago, IL.	D-E-0326
The text of comment D-E-0327 was the same as that of D-E-0062. This comment was submitted by Sandy Kamaka of Kailua Kona, HI.	D-E-0327
The text of comment D-E-0328 was the same as that of D-E-0062. This comment was submitted by Cynthia Taylor of Keauhou, HI.	D-E-0328

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Essence Satterfield
To: deis hrc@govsupport.us
Subject: NO Navy testing in Hawaiian waters!
Date: 8/31/2007 3:06:52 AM

Aloha,
I am deeply concerned about the safety of our marine enviroment.The well being of so many of our species is at risk,from a variety of factors. Some are out of our control and many are choices. We can make the right decision or the wrong one. Please,keep navy sonar out of our waters! The whales are the largest mammal in our islands. After decades upon decades they were finally safe. let us let them live and be free! They are native hawaiians and it is their territory and the U.S government has no right. The brutal technological developments have done enough harm to Hawaii's oceans,Lands,and people. Let cease NOW! Help us to the road of right decisions! 1

Sincerely, Essence Satterfield,Maui

COMMENT NUMBER: D-E-0329

The text of comment D-E-0330 was the same as that of D-E-0062. This comment was submitted by Emilie Howlett of Pukalani, HI. D-E-0330

The text of comment D-E-0331 was the same as that of D-E-0062. This comment was submitted by Lorraine Howlett of Pukalani, HI. D-E-0331

The text of comment D-E-0332 was the same as that of D-E-0062. This comment was submitted by Tom Jackson of Denver, CO. D-E-0332

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0333

From: Jade Silver - Kula, HI
To: deis hrc@govsupport.us
Subject: Expanding Naval Wargames in Hawaii is Unacceptable
Date: 8/31/2007 3:52:30 AM

Mr. Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752-0128

To:Mr. Clements,

2
1
Expanding Wargames in Hawaii is an unecessary act that Hawaii should not persue. There a many endangered species such as the Humback Whale and Monk Seals which will be harmed if Hawaii is used as a wargame site. We must realize the dangers of using sonar on animal, because it is our responsibility as humans to protect and perserve or marine life. We all must do our part in respecting the natural habitat of Hawaii. If we do not act now, it is likley that marine life, such as Monk Seal will become exstinct. Please, save the Whales, and other Marine life.

Please Stop the Wargames,
Jade Silver

Kula, HI

COMMENT NUMBER
D-E-0334

From: Ron Howlett - Pukalani, HI
To: deis hrc@govsupport.us
Subject: Expanding Naval Wargames in Hawaii is Unacceptable
Date: 8/31/2007 4:03:08 AM

Mr. Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752-0128

To:Mr. Clements,

If we cannot protect the animals and plant life of our natural world, then we can do nothing but expect the natural world to lash out in anger through events such as earthquakes, tsunamis, hurricanes etc (sound familiar?) These natural disasters shake our world (literally and metaphorically) and we wonder what is wrong with the earth. Well we are ruining the balance. Sonar blasting corrupts the whales natural instincts, harms and kills them. This is their life, their home, OUR ocean. Yes, i'm sure sonar blasting is beneficial in some way to the military for reasons i cant comprehend, but hey, war is not the answer anyway so basically you are just setting yourself up to be f d. We dont have the option we have the OBLIGATION not as scientists, military men, or politicans but as good humans to protect our land and oceans, for future generations. And have you ever seen humpback whales? Have you ever seen them swim in the ocean as if they were dancing? Or heard their sweet voices communicate as if they were singing? Have you seen them play protectively with their young, and smile at you as you pass? Have you ever felt so small next to something so huge, so magnificent, so beautiful, yet you were so damn glad you had the oppurtunity to just be in their presence? Have you seen a little childs face light up the moment they spotted a whale breach into the air and land with a great big splash? If you havnt i recommend you do, because you have not lived once you have. so please, let this great mammals 1
live in peace. let them eat and travel and reproduce and dont

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0334 (cont.)	blow their f ing ears out with sonar wargames. its not the humane thing to do. peace Please Stop the Wargames, Ron Howlett Pukalani, HI

COMMENT NUMBER	
D-E-0335	From: Tom Scallon To: deis hrc@govsupport.us Subject: idea about chaff... Date: 8/31/2007 4:52:33 AM Hello,
1	I wanted to mail you about an idea I had recently. I often hear on TV about the military using "chaff" over the islands to engage in military operations, as it shows up in the weater reports. They say that it is made of mylar. It occured to me that perhaps mylar wasn't the best substance to use because of it's plastic content, since most plastics don't easily biodecay. Replacement ot subsitution presents it's own set of problems too, and that is what my idea pertained to. I recalled seeing articles and media about a proposal to do carbon sinking & trading by seeding rust particles in the ocean as a nutrient. It occured to me that "chaff" made of substances that would quickly rust, and possibly seed other metallic nutrients in a bimetal arrangment might serve as a substitute material. Instead of being a pollution component, this activity could create a carbon offset resource that did not even exist previously. In any case I wanted to pass the idea on, rusty foils might make for great PR when people express concerns about the activity. Tim Scanlon

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0336	The text of comment D-E-0336 was the same as that of D-E-0062. This comment was submitted by Suzanne Chantal Godbout of Spartanburg, SC.

COMMENT NUMBER	
D-E-0337	From: John Garvison To: deis hrc@govsupport.us Subject: Comment on Navy Traing Date: 8/31/2007 2:19:29 PM
1	I support the no action alternative. John Garvison

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment D-E-0338 was the same as that of D-E-0062. This comment was submitted by Stephen MacDonald of High Falls, NY.	D-E-0338
The text of comment D-E-0339 was the same as that of D-E-0062. This comment was submitted by JoJo JoJo of BC.	D-E-0339
The text of comment D-E-0340 was the same as that of D-E-0062. This comment was submitted by Antoinette Tenhunen Tukholmankatu of Helsinki	D-E-0340
The text of comment D-E-0341 was the same as that of D-E-0062. This comment was submitted by Kristie Nakasato of HI.	D-E-0341
The text of comment D-E-0343 was the same as that of D-E-0062. This comment was submitted by Priscilla Derven of High Falls, NY.	D-E-0343

COMMENT NUMBER: D-E-0344

From: Rob Kinslow - Honolulu, HI
To: deis hrc@govsupport.us
Subject: Naval Wargames in Hawaii are Unnecessary
Date: 9/2/2007 1:55:29 PM

Mr. Tom Clements
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752-0128

To:Mr. Clements,

The world recognizes that Hawai'i is home to unique and fragile marine environments that are crucial to the overall health of our oceans. The U.S. acknowledged the importance of protecting Hawai'i's oceans by establishing the largest, most highly protected marine preserve in the Northwestern Hawaiian Islands. This is the primary foraging grounds of last few remaining Hawaiian monk seals, home of rare cold water coral reefs,

The Navy's proposal to significantly increase wargames in the Hawaiian Islands directly undermines the policies of the federal and state governments to protect the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary. The Navy's plan to use active sonar that harms marine mammals, spread toxic chemicals that undermine the public's health, and jeopardize cultural sites sacred to Native Hawaiians is completely unacceptable and cannot be allowed. [1] [2] [3, 4]

I do not believe that wargames and environmental stewardship of our children's natural resources can be accomplished in a manne that preserves and enhances the natural world assets. There is no evidence that the Navy is able to enhance natural world assets while playing god with the rest of the planet. Our national security is dependent on the natural world survival not on some made up human conflict zone or warmaking. [6]

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
Fully funding a Department of Peace and de-funding the Department of War would bring peace and sustainable relationships to our great America. Continuing to fund adventures in fear and warmaking is a sure path to insanity and destruction of all species.	D-E-0344 (cont.)
Please Stop the Wargames, Rob Kinslow Honolulu, HI	5

	COMMENT NUMBER
The text of comment D-E-0345 was the same as that of D-E-0062. This comment was submitted by Lorena Werner of Savannah, GA.	D-E-0345
The text of comment D-E-0346 was the same as that of D-E-0062. This comment was submitted by Lynn Manheim of Factoryville, PA.	D-E-0346
The text of comment D-E-0347 was the same as that of D-E-0062. This comment was submitted by Puanani Rogers of Kapaa, HI.	D-E-0347
The text of comment D-E-0348 was the same as that of D-E-0062. This comment was submitted by None	D-E-0348
The text of comment D-E-0349 was the same as that of D-E-0062. This comment was submitted by Sam Long of Lynnwood, WA.	D-E-0349
The text of comment D-E-0350 was the same as that of D-E-0062. This comment was submitted by Zena Seeley of Kekaha, HI.	D-E-0350
The text of comment D-E-0351 was the same as that of D-E-0062. This comment was submitted by Monica Hall of Dallas, TX.	D-E-0351
The text of comment D-E-0352 was the same as that of D-E-0062. This comment was submitted by None	D-E-0352
The text of comment D-E-0353 was the same as that of D-E-0062. This comment was submitted by None	D-E-0353

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-E-0354

From: Erin Rietow
To: deis hrc@govsupport.us
Subject: Written Comment
Date: 9/13/2007 12:53:46 AM
September 12, 2007

In response to the Draft Environmental Impact Statement/Overseas Environmental Impact Statement:

□I disagree with the proposal to increase naval operations within the Hawaii Range Complex. I feel the damages to the environment that are currently taking place should not be added to by increased exercises. I also think that many of the issues presented in the EIS/OEIS need to be more thoroughly explored and some of the conclusions made need to be reviewed.
Specifically I would like to request more research be done on mid-frequency 2
sonar and its affect on marine mammals. As stated on p.ES-28 □given the frequency of naturally occurring marine mammal stranding□s in Hawaii, it is conceivable that a stranding could co-occur within the timeframe of a Navy exercise even though the stranding may be unrelated to Navy activities□. I am skeptical as to the truth of this statement as well as the extent to which this statement is supported by scientific data. I would like to see more concrete data that proves beyond a reasonable doubt that mid-frequency sonar is only correlated to marine mammal deaths coincidentally.
□I am also concerned with the amount of debris that is entering the open 3
oceans and atmosphere (ES-13). Continued exposure of missile debris, especially metals, to ocean water causes leeching of potentially toxic
materials that negatively impact marine micro and macro-fauna. Chemicals 4
introduced to the atmosphere can have adverse affects on air quality as well as disrupt important chemical balances in the upper atmosphere that may lead to irreparable damages in the o-zone. I understand that dispersion decreases the localized affects of such toxins and harmful reactions, but there is a capacity for this type of dilution. After considering the residence time of each occurrence this capacity may be lower than expected especially when you take into consideration that fact that just minute amounts of certain toxins can have detrimental affects on the organisms that live in the area. And as we have all witnessed here in Hawaii, slight changes in the numbers of certain biota can disrupt entire ecosystems beyond repair.

COMMENT NUMBER

D-E-0354 (cont.)

□Additionally I would like to see the following questions addressed:

(ES-5) Hawaiian Island Humpback Whale National Marine Sanctuary□s are bordered closely by naval stations on some islands. Are there regulations in place to prevent sonar broadcasting across these areas? 5

(ES-11, line 14) Is there a protocol within TAP that checks the implementation and enhancement of the environmental portion of the program? 6
If it is found that there are environmental impacts, what requirements are there for action (of a preventative nature)?

(ES-32) □Navy policies and procedure during these training activities will minimize the effects on vegetation and wildlife, as well as limit the potential for introduction of invasive plant species□. What are these procedures and how effective have they proven in the past? 1

Thank you for reviewing my statement. I sincerely hope that these questions are taken seriously and addressed in an appropriate manner. The environment here in Hawaii and all across the world is necessary for our survival as a race and the sensitive balance that exists should be regarded with more respect. I feel that we will be able to meet the requirements set forth by the constitution without the expansion of the naval program here in the HRC and the adverse effects this increase will have on our home.

Sincerely,

Erin Rietow

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Margaret Guiler - Koloa, HI To: deis hrc@govsupport.us Subject: Research at PMRF, Kauai, HI Date: 9/13/2007 2:47:51 PM I am writing to discourage and speak out against any further research at the PMRF. As it is, the evidence of the past research of our surrounding ocean indicates a negative effect on the environment. Please include my testimonial among those who say NO MORE. Stop annoying Mother Nature. Cordially, Margaret Guiler, Koloa, HI	COMMENT NUMBER D-E-0355 1

From: David Kane To: deis hrc@govsupport.us Subject: the US Navy proposal for increased testing in the waters surrounding Hawaii Date: 9/13/2007 2:56:07 PM Re: US Navy proposal for increased testing (of both technologies and areas) in the waters surrounding Hawaii To Whom it May Concern: With the recent discoveries of hundreds of heretofore unknown species -- with equally unknown chemical properties, that likely will give us whole new ways of fighting and curing diseases -- a Vast Untapped Database of Knowledge lies in the oceans and it is as irresponsible to ignore the damgage that active naval systems can have on this irreplaceable treasure as it is to ignore the greenhouse gases that are driving global warming. As stewards of this planet for future generations -- and isn't this precisely what the Navy's duties are? Protecting future generations? -- if there is some doubt when it comes to issues that bear directly on the future ability of the planet to sustain life, shouldn't we err on the side of caution? We need someone to protect us from our own Navy when it comes to using the oceans to further test technologies known to harm ocean life and even more dangerous to test new technologies on our distant ancestors who likely hold the keys to many questions we have concerning aging and evolution. And we are only just beginning to see the extent of these effects on migration	COMMENT NUMBER D-E-0356 1 2 3 4

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0356 (cont.)

patterns -- with global warming the oceans will be undergoing huge changes; is this really the
time to throw more unkowns into a system beginning to change rapidly?

We need to set our priorities and it should be Obvious that our priority should be to life, not to
death. The Navy, of course, sees things differently. That is their job. Our job is to protect
the world our children will inherit. Will it be a world of war, and the mindset that creates, or
a will it be a world of peace, and all the benefits that brings.

What kind of world do you want your children's children to inherit from you? 5

Please think about that question when you consider the Navy's proposals to experiment further in
an environment already under stress.

Thank you for your time and consideration,

Mr. David Kane

COMMENT NUMBER
D-E-0357

From: Michael Dahlem - Kihei, HI
To: deis hrc@govsupport.us
Subject: Sonar
Date: 9/13/2007 3:36:08 PM

September 13, 2007

Public Affairs Officer
Pacific Missile Range Facility
ATTN: HRC EIS/OEIS
P. O. Box 128
Kekaha, Hawaii 96752-0128

Dear sir or madam:

We are writing to express our opposition to the proposed increase of sonar in Hawaiian waters for the reasons set forth in the International Ocean Noise Coalition's letter to Michael Payne dated August 30, 2007. 1

Sincerely,

Michael Dahlem
Linda Andersen

Kihei, HI

Michael Dahlem, Attorney at Law
Specializing in school, labor and employment law
Kihei, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0358

From: Rana Jackson - Lihue, HI
To: deis hrc@govsupport.us
Subject: Sonar use in Navy War Games in Hawaii-public comment
Date: 9/13/2007 5:34:44 PM

I am submitting the following comment for inclusion in the public record relating to the Draft EIS and the Oversees EIS.

1 Thank you for the opportunity to voice our concerns and have our questions answered through this public comment period. My strong request is that all harm surrounding the use of active sonar in the Navy conducted war exercises by extensively researched, considered, and only carried out when there is real proof of NO harm to our precious sea life. Please understand that while it may seem necessary to carry out these initiatives in the name of keeping our citizens safe, in the long run it does more disastrous harm than good and other alternatives for executing these war games should be considered.

2 To the members of the Navy, I know you are just carrying out your duties in the name of protecting your fellow Americans, but I ask you to take an objective look (outside the goggles of the military if possible) at the ultimate end result of these actions, not just where sea life is concerned, but ultimately the worth of conducting these exercises in the first place. It is time that we (including our tax-dollar supported military) look into alternatives to violence and war. War just leads to more war. It seems to be one thing we can all agree on.

Thank you for your time.

Rana Jackson

Lihue, HI

COMMENT NUMBER
D-E-0359

From: Petra Sundheim
To: deis hrc@govsupport.us
Subject: PRMF Expansion
Date: 9/13/2007 5:52:08 PM

Aloha decision makers!

1 It is from a place of inner peace that I choose to comment. That peace does NOT depend on weapons of war. I find no sense of security in the buildup of PRMF which only serves to make us a desireable target, a magnet for destruction by other fear based minds. Yes it is fear, not love based minds that invent war. What you focus on is what you get; death and destruction. Yes there is money in what you are doing, if that is your goal. Why not use that money to clean up the ocean, preserve our cetaceans and the beautiful nature of this island? But let there be truth, not lies in your attempts to woo the public.

We are well into the 11th hour to choose Peace FROM THE HEART to avoid destruction. I do hold the VISION OF A NEW EARTH where the earth is respected and ALL LIFE is honored and protected. Study and Learn the ways of Peace and then there will be Peace. Those who won't will leave the planet, probably not by choice. The Earth can no longer tolerate the abuses, mankind has foisted on her and events of nature will take place to purge the planet.

Kauai is one of the most beautiful islands in the world. There is healing energy in our land. This is meant to be a place of healing, of refuge; not a place to be exploited by greedy developers and the US war machine.

The choices you make will impact Kauai. Use that power and energy for the good of all life.

Sincerely,
Petra Sundheim

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Bob Jacobson - Hilo, HA
To: deis hrc@govsupport.us
Subject: Hawaii Range Complex Draft EIS/OEIS Comments
Date: 9/13/2007 9:05:38 PM

Dear Sirs, Thank you for the opportunity of providing my comments in this way.

Mahalo, Bob Jacobson

COMMENT NUMBER
D-E-0360

BOB JACOBSON
Councilmember

Chair, Environmental Management Committee
Vice-Chair, Finance Committee

333 Kilauea Avenue, Second Floor
Ben Franklin Building, Hilo, Hawai'i 96720

Mailing Address: 25 Aupuni Street, Suite 200
Phone: (808) 961-8263
Fax: (808) 961-8912
E-Mail: jjaco@co.hawaii.hi.us

HAWAI'I COUNTY COUNCIL

County of Hawai'i

September 13, 2007

Public Affairs Officer,
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawaii 96752-0128

ATT: EIS/OEIS

Dear Sirs,

Thank you for the opportunity to provide comments on the Draft Environmental Impact Statement/Overseas Environmental Impact Statement for the Hawaii Range Complex on the island of Kauai.

I have a real concern with the use of munitions that contain or result in exposure to depleted uranium and other heavy metals currently and historically used by the United States Military. I would like to see an end to and complete ban on the use, storage and/or disposal of any plutonium, radiolytic ammunitions, experimental or otherwise, any where on the Big Island. 1

I would also like to see the complete mapping of all unexploded conventional ordinance that have been left or disposed of here, both on land and at sea. We should be mindful of the possibility however distant, that any motivated individual or group could easily mine these sites for the materials to make a dirty bomb.

Sonic testing has been demonstrated to negatively impact whales, porpoises and marine species that rely on their own intrinsic sonar. Testing and training using damaging sonar sources should be prohibited. These activities will likely have impacts on endangered and threatened species of fish, marine mammals, sea birds and plants as well. 2

Lastly I worry that these activities will increase the possibility of aggression against us by other established military powers in the region. 3

Thank you for the opportunity to comment on the Hawaii Range Complex Draft EIS/OEIS.

District 6 – Upper Puna, Ka'ū, and South Kona
Hawai'i County Is An Equal Opportunity Provider And Employer

COMMENT NUMBER
D-E-0360 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Paul Clark - Hanalei, HI To: deis hrc@govsupport.us Subject: RE: URGENT: PLEASE PROTECT WHALES THREATENED by PMRF. Date: 9/13/2007 10:07:31 PM Aloha,	COMMENT NUMBER D-E-0361
The 100,000+ members of Save Our Seas urge the U.S. Navy to stop needlessly inflicting harm on whales and other ocean life with its use of high-intensity, mid-frequency sonar in its training exercises. Navy exercises using mid-frequency sonar have resulted in whale strandings across the globe. The Navy can no longer ignore the unnecessary harm inflicted by this technology. We urge the Navy to immediately adopt common-sense measures to keep whales safe. Mahalo, Captain Paul Clark President - Save Our Seas Hanalei, HI USA	1

From: Dmitry Boldvrev To: deis hrc@govsupport.us Subject: We strongly oppose the expansion of the base on the south of Kauai Date: 9/13/2007 10:24:56 PM Hi-	COMMENT NUMBER D-E-0362
Please consider interest of the public living on Kauai, making it their home place. We do not want to have military expansion going on here, in fact we want it to shrink! I think people have shown you - as is with	1
SuperFerry - that public opposes the growth of military influence on Kauai. Polihale area was quoted o be a spiritually significant place by his holiness Dali Llama during his visit to Kauai a couple of years ago. I hold a degree in Computer Science and Mathematics from University of Utah, yet I understand the significance of preservation of the rare places like Polihale. Please leave it for future generations to experience that unique place. Keep Kauai free of military pollution! Thank you! Dmitry B.S. CE/MATH inventor of MP3 player founder of Blossoming Lotus restaurant	2

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0363

From: Claudia Herfurt
To: deis hrc@govsupport.us
Subject: PLEASE PROTECT WHALES THREATENED by EXPANSION of PMRF
Date: 9/13/2007 10:56:18 PM

Hello,

1 again I want to urge the U.S. Navy to stop needlessly inflicting harm on whales and other ocean life with its use of high-intensity, mid-frequency sonar in its training exercises.

We clearly know that whales, dolphins and other marine mammals depend on sound to navigate, find food, locate mates, avoid predators and communicate with each other. Blasting their environment with intense sound over large expanses of ocean disrupts these critical behaviors and threatens their survival.

Sonar also harms whales more directly: Navy exercises using mid-frequency sonar have resulted in whale strandings across the globe, including along the coasts of Washington State, the Canary Islands, the Bahamas, Madeira, the U.S. Virgin Islands and Greece. A recent whale stranding death in Hawaii, which occurred when a large pod of whales was driven in panic to shallow waters, took place with Navy sonar exercises nearby and may be the latest in this string of sonar casualties.

Whales should not have to die for military training. The Navy can no longer ignore the unnecessary harm inflicted by this technology. I urge the Navy to immediately adopt common-sense measures to keep whales safe.

Sincerely,
Claudia Herfurt

COMMENT NUMBER
D-E-0364

From: Pat Blair - Kailua, HI
To: deis hrc@govsupport.us
Subject: Navy SOnar
Date: 9/13/2007 11:17:13 PM

1 I do not support the use of Navy Sonor in our Pacific Ocean. The sonor indangers the whales that birth in the winter. The whales must be protected.
Pat Blair, Kailua, Hi.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER D-E-0365

From: Michael Kline - Kilauea, HI
To: deis hrc@govsupport.us
Subject: input on high-intensity, mid-frequency sonar
Date: 9/14/2007 12:29:12 AM

1

To Whom It May Concern: Please accept this as public testimony on the draft EIS/OEIS. I believe that the Navy is concerned about our oceans, the marine life in them, and wanting to have a good public image. I believe that military training is necessary, but I also believe it can be done in a respectful way that will not only reassure the American people that you are prepared as best as possible, but also in a way that repects whales and the other marine life in the oceans. I urge the U.S. Navy to stop needlessly inflicting harm on whales and other ocean life with its use of high-intensity, mid-frequency sonar in its training exercises.The Navy can no longer ignore the unnecessary harm inflicted by this technology. I strongly encourage the Navy to immediately adopt common-sense measures to keep whales and other marine life safe. Imagine the good publicity if you did adopt measures that protects marine life. Father Michael KlinePriest at Christ Memorial ChurchKilauea, Hawai'i

COMMENT NUMBER D-E-0366

From: Michal F. Stover - Kilauea, HI
To: deis hrc@govsupport.us
Subject: Comments on DIES re Navy's Use of Mid-Frequency Sonar
Date: 9/14/2007 1:04:37 AM

□

1

Dear Sir or Madam:□□I□urge the U.S. Navy to stop needlessly inflicting harm on whales and other□ocean life with its use of high-intensity, mid-frequency sonar in its□training exercises.□□□Whales, dolphins and other marine mammals depend on sound to navigate,□find food, locate mates, avoid predators and communicate with each other.□Blasting their environment with intense sound over large expanses of□ocean disrupts these critical behaviors and threatens their□survival.□□□Sonar also harms whales more directly: Navy exercises using□mid-frequency sonar have resulted in whale strandings across the globe,□including along the coasts of Washington State, the Canary Islands, the□Bahamas, Madeira, the U.S. Virgin Islands and Greece. A recent whale□stranding death in Hawaii, which occurred when a large pod of whales was□driven in panic to shallow waters, took place with Navy sonar exercises□nearby and may be the latest in this string of sonar casualties.□□□Whales should not have to die for military training. The Navy can no□longer ignore the unnecessary harm inflicted by this technology.
□□

2

The Navy could adopt simple safety measures when training with sonar□that would prevent the needless infliction of pain and death on these□magnificent animals. For example, the Navy could avoid marine habitats□where whales are known to migrate, feed, and raise their young. These□common-sense precautions would not compromise military readiness. Whales should not have to die for military practice. □□□Sincerely,□□Michal F. Stover□
Kilauea, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0368

From: Joan Levy - Kauai, HI
To: deis hrc@govsupport.us
Subject: Navy sonar input

Date: 9/14/2007 2:45:06 AM

Please see this corrected letter.

1 I am very concerned about the use of low and mid- frequency sonar in our Hawaiian waters - or any American waters for that matter. There is more than ample evidence that low and mid frequency sonar waves are in fact dangerous for whales. Disoriented whales have lost their way and have been damaged, beached and died due to these sonar frequencies.

There are other ways for the military to accomplish their tasks without harming marine life. What gives humans the right to serve their needs first whatever the costs. The California decision to stop the military from these same kind of sonar assaults awhile back didn¹t come without due diligence.

So many decisions have been made to sacrifice animal and plant life and environmental safety for the good of some human profit or defense endeavor. Our human arrogance will eventually come back to haunt us. Let us take a stand now and include our delicate ecosystem in the decision making process of how we will walk on the face of this earth.

You have the power to help us live more responsibly to our environment and to the well-being of the planet we leave to our future generations. Please act now to give the whales the respect and care that are their due. Direct the military to find other, safer means to conduct their missions.

Thank you!

Joan Levy, Kapaa, HI

COMMENT NUMBER
D-E-0368 (cont.)

....
....

"If you can't be a good example, then you'll just have to be a horrible warning!" Catherine Aird

³You can tell a lot about a person by the way he/she handles these three things: a rainy day, lost luggage, and tangled Christmas tree lights.² Maya Angelou

JOAN LEVY, MSW, LSW, LCSW, ACSW
BodyMind & Breath Center
Kapaa, Kauai, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0369
1

From: Humberto Blanco - Anahola,

To: deis hrc@govsupport.us

Subject: Comments on PMRF training expansion to be considered for the Final EIS/OEIS

Date: 9/14/2007 3:32:08 AM

1 Given that mid-level sonar damage to whale populations has been documented, it seems prudent to limit such military exercises to areas ouitside those regularly frequented by whales. It is essential to maintain military readiness, but let's use common sense when these magnificent creatures otherwise have to pay an unnecessary price. Humberto Blanco, Anahola

COMMENT NUMBER
D-E-0370
1

From: Ingrid Wedel

To: deis hrc@govsupport.us

Subject: Comments at the Public Hearing on August 27, 2007.

Date: 9/11/2007 11:49:52 AM

To : Public Affairs Officer

Pacific Missile Range Facility

ATTN: HRC EIS/OEIS

I oppose to your proposed expansion of the sonar war game exercises around Hawaii . 1

You can also submit written comments at the Public Hearing on August 27, 2007.

The Navy should not be allowed to use sonar anywhere close to the Hawaiian islands.

I am expressing my concern about the Navy's intention to use high intensity mid frequency active sonar in Hawaiian waters.

The Navy's actions show that it does not want to study the effects of sonar and really find out the collateral damage of its war games.

It is time we love and take a stand for life and cooperate to heal what needs our help and protect what is healthy.

Ingrid Wedel - Germany

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0371

From: William D. Perry - Kilauea, HI
To: deis hrc@govsupport.us
Subject: sonar
Date: 9/14/2007 11:35:05 AM

September 14, 2007

To Whom It May Concern:

I urge the U.S Navy to stop needlessly inflicting harm on whales and other ocean life with its use of high-intensity, mid-frequency sonar in its testing exercises. Using this high-intensity sonar disrupts the bevavior of ocean life and threatens their survival. I urge the Navy to utilize common snese and stop this inhumane practice. 1

Thank you.

Sincerely,

William D. Perri, D.Min., Ph.D.

Kilauea, HI

COMMENT NUMBER
D-E-0372

From: Everett Hullum - Princeville, HI
To: deis hrc@govsupport.us
Subject: Sonar Use Kills Whales
Date: 9/14/2007 12:18:42 PM

Like many others, I urge the Navy either to conduct its training in waters that have no whales or to refrain from using high-intensity, mid-frequency sonar in its training exercises. 1

Such sonar harms whales -- there are numerous evidences of that. And whales are beneficial to humankind, in fact probably more beneficial than any sort of Navy training, much less this unnecessary underwater sonic blasting.

Whales shouldn't have to die so that sailors can learn whatever sailors need to learn. Isn't it about time the Navy became aware of the harm it inflicts and begin to act humanely, responsibly, and environmentally to make its training compatible with the needs of the world in which we live? I urge the Navy to remember its earlier promises not to harm whales and from use of high-intensity, mid-frequency sonar ... they were the whales' oceans before our Navy came along; let's respect the whales and treat them kindly.

Thank you,

Everett Hullum

Princeville, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0373

From: Bill Young - Kailua, HI
To: deis hrc@govsupport.us
Subject: support for military
Date: 9/14/2007 2:02:23 PM

To Whom It May Concern:
I support the U.S. military's defensive efforts.
This short note is to express my disbelief that the U.S. would continue its quest to expand sonar research beyond parameters clearly understood to harm whales and dolphins. 1
I could not be more opposed to the narrow vision of this strategy and would hope common sense would prevail.

Everything humanly possible should be done to prevent harming the planet by the U.S. military.

Bill Young
Kailua, Hawaii

COMMENT NUMBER
D-E-0374

From: Candy McCaslin
To: deis hrc@govsupport.us
Subject: Mid and Hi-frequency sonar
Date: 9/14/2007 2:04:20 PM

I urge the US Navy to stop using both mid and hi-frequency sonar in exercises to detect submarines. The science is in and we are all aware of the devastating affects on our marine life. We are supposed to be the most civilized nation, one that stewards the worlds people and creatures and protects our tiny earth. Whales and other marine life should not have to die for military training. Please stop this harm to our islands and our whales. 1
Candy McCaslin

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0375	From: Arius Hopman - Hanapepe, HI To: deis hrc@govsupport.us Subject: Date: 9/14/2007 2:38:44 PM PETITION, please include in the DEIS
1	THE GLOBAL BIOSPHERE IS IN THE MIDDLE OF A MASS EXTINCTION THAT COULD EQUAL THE ONE 60 MILLION YEARS AGO. THIS IS ALL DUE TO HUMAN ACTIVITY. HALF OF THE DESTRUCTION OF THE BIOSPHERE HAS OCCURRED IN THE LAST CENTURY. WE ARE LOOSING UP TO 200 SPECIES PER DAY TO EXTINCTION. THIS IS THE CRISIS OF OUR ERA. I HEREBY PETITION THE NAVY TO USE ITS TECHNOLOGY TO DEFEND AGAINST THIS MAJOR THREAT. WE ARE ALL DEPENDENT ON A HEALTHY PLANET.
2	I urge the U.S. Navy to stop needlessly inflicting harm on whales and other ocean life with its use of high-intensity, mid-frequency sonar in its training exercises. Whales, dolphins and other marine mammals depend on sound to navigate, find food, locate mates, avoid predators and communicate with each other. Blasting their environment with intense sound over large expanses of ocean disrupts these critical behaviors and threatens their survival. SCIENTISTS STILL DO NOT KNOW WHAT OTHER DAMAGING EFFECTS SONAR HAS Sonar also harms whales more directly: Navy exercises using mid-frequency sonar have resulted in whale strandings across the globe, including along the coasts of Washington State, the Canary Islands, the Bahamas, Madeira, the U.S. Virgin Islands and Greece. A recent whale stranding death in Hawaii, which occurred when a large pod of whales was driven in panic to shallow waters, took place with Navy sonar exercises nearby and may be the latest in this string of sonar casualties.

COMMENT NUMBER	
D-E-0375 (cont.)	Whales should not have to die for military training. The Navy can no longer ignore the unnecessary harm inflicted by this technology. I urge the Navy to immediately adopt common-sense measures to keep whales safe. THE USA HAS NO PEER ENEMY WORLD-WIDE THERE IS NO NEED FOR THIS EXTREME SUPER MEGA DEFENSIVENESS! Arius Hopman, Hanapepe, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0376

From: Rebecca Miller
To: deis hrc@govsupport.us
Subject: Re: training ground increases on Kauai
Date: 9/14/2007 3:00:47 PM

Dear People,

Most people on the island of Kauai are peace loving and do not want war. There are those who are fearful that some terrorist will surely get us if we do not expand our war efforts. The truth is the more we expand our war efforts the more likely we are to sustain a terroristic attack as we further enflame the anger of those who are capable of such actions. The wise person does not need to attack to avoid attack. Let's be a model of peace and maturity. It is only fear that needs to lash out. I want us to live in peace. There needs to be a measure of trust in that outcome for that to happen. Trust, not aggression will bring us the world we so want to live in. Maybe you think this is naive. Time will show the truth in whatever way we choose to learn it. Thank you for taking the time to read my statement. I do not wish for the expansion of the PMRF training grounds. 1

Rebecca Miller

COMMENT NUMBER
D-E-0377

From: Sandi Sterker
To: deis hrc@govsupport.us
Subject:
Date: 9/14/2007 4:41:49 PM

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0377 (cont.)
1

PMRF EIS

Having attended the public hearing in Kauai on Aug. 21st and reporting to a number of our members, I am writing in behalf of the Kauai Republican Women's Club. You have our full support and admiration for the work that you have been doing here in Hawaii. We are especially impressed at the presentation that was done at the public hearing. Having the experts there to explain all aspects of PMRF activities was helpful and totally informative. How fortunate we of this island are to have your presence and to know that our military "boys" are being trained at such a wonderful facility.

It is apparent that so much thought of the environment has gone into all your work including even the use of utilities. We were especially interested in the sonar because so much has been apparently misrepresented about the effect to the whales. We are thankful to learn all the measures that PMRF is taking to alleviate this problem While we are all concerned about our mammals of the ocean, we are much more concerned about those service men and women who are defending our country! You have also done excellent with all the birds, turtles and seals.

We would like to also add our thanks to PMRF for being such a good "neighbor." You have supported so many things on our island and have participated in sponsorships, prizes, parades and donations. We who work for many of the charitable organizations are thankful for all the dollars that have been donated!!

In closing…..THANK YOU FOR BEING HERE AND DOING SUCH GREAT WORK!

The members of the Republican Women's Club of Kauai

COMMENT NUMBER
D-E-0378
1
2

From: Wendy Raebeck - Kauai'i, HI
To: deis hrc@govsupport.us
Subject: OPPOSED TO ANY EXPANSION OF NAVAL FACILITIES OR OPERATION IN HAWAI'I
Date: 9/14/2007 5:06:55 PM

9/14/2007

I AM OPPOSED TO ANY AND ALL EXPANSION OF NAVAL OR MILITARY OPERATIONS OR FACILITIES IN THE STATE OF HAWAI'I. Below is a letter of my sentiments.

TO: THE U.S. NAVY

There's no way anyone in or out of the Navy can think about the effects of sonar on sea creatures and feel okay about it.

Does the Navy not understand that when whales are GONE they are gone forever? Do you think it's okay to harm even a few of them, or to rock their world? Do you not understand the value of the living oceans? Do you not understand the real power people have to help and to improve life on Earth rather than diminish it?

I will say again what I've said before: It is time for the U.S. Navy, despite everything coming out of Washington, D.C. right now, to begin a new course. It is time for the U.S. to take a lead role environmentally and become part of the salvation of the planet. The Navy should become the steward of the seas, the champion of marine life, the expert on endangered species and authority on the best solutions for protecting them.

I will continue to fight for any and all creatures who cannot defend themselves against the insensitivity of humanity. Just as I will beg on my knees before the biggest warships to stop the maiming, stop the insensitivity, stop believing the world is dangerous and horrible and that we need more weapons. Believe in yourself, in caring, in doing the right thing, in saying no to fear and aggression.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

I'm sad. And I'm sick of all this. But I will continue to work for improvement of this absurd situation the U.S. has gotten itself into. Someday it will all change, because it has to. We can't go on like this. I wonder how much we will lose between now and then? With aloha, Wendy Raebeck Kauai'i resident	**COMMENT NUMBER** **D-E-0378 (cont.)**

From: L. Osterer - Kauai, HI To: deis hrc@govsupport.us Subject: PMRF DEIS Date: 9/14/2007 5:27:26 PM	**COMMENT NUMBER** **D-E-0379**
Please consider the following comments for the EIS/OEIS evaluating high-intensity mid-frequency sonar. The harmfulness to whales and other marine mammels is evident, yet arguable in the official view as to significance. The military seems to continue their actions with reasons of secrecy and security, often masking both public and congressional insight. What isn't clear is answers to the following questions:	**1**
If the navy insists on testing, why they cannot do it in waters that are less frequented by these mammels? There are huge expanses of ocean with very low densities of marine life.	**2**
Aren't these training exercises "out of date" for current military needs, considering that the only former world adversary with submarines (Russia) is no longer a threat?	**3**
When was this program evaluated as to authorized and efficient spending of tax dollars and whether it is a viable defense system for the future?	**4**
Exactly what programs are used to fund it and when do their budgets come up for review?	
Thank you for your consideration. Please respond to:	
L. Osterer, Kauai resident	

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0380	The text of comment D-E-0380 was the same as that of D-E-0062. This comment was submitted by Andrea Baer of Kihei, HI.

	COMMENT NUMBER
From: Eve Powers To: deis hrc@govsupport.us Subject: DEIS/Overseas EIS re Naval sonar comment Date: 9/15/2007 12:06:51 AM September 14, 2007	D-E-0381
Pacific Missile Range Facility POB 128 Kekaha, Hawaii 96752-0128	
Dear Sirs:	
I demand that the United States Navy stop unnecessarily harming whales, dolphins and other marine mammals and sea life with the use of high-intensity, mid-frequency sonar.	1
Marine mammals use sound to determine location, find food, find mates, escape predators, and communicate with one another. The Navy's use of large-spread sonar disrupts all of these activities and threatens the very survival of these intelligent animals.	
I was on Kauai when the pod of bottle-nosed dolphins was stranded in Hanalei Bay as the U. S. Navy was using sonar in nearby exercises. Only with the dedicated help of many local residents was the pod eventually guided back out to sea. Whether they survived this sound attack is unknown.	
The Navy could easily adopt simple safety measures, such as avoiding sonar in known marine mammal areas. This would not compromise our National defense.	2
Please--no more stranded, hemmorrhaging and dying marine mammals due to Naval sonar!	1
Thank you for your attention, Eve Powers Kapa'a, Hawaii	

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

From: Linda Pascatore - Hanapepe, HI
To: deis hrc@govsupport.us
Subject: Comment on EIS, Hawaii Range Expansion
Date: 9/15/2007 3:20:18 AM

D-E-0382

To Whom It May Concern:

1 Regarding the expansion of operations in Hawaii in general, and at PMRF in particular, I ask that the Navy stop any expansion of their operations.

On Kauai, the Navy has already taken over miles of public beach and severely restricted public use. This has an adverse cultural and recreational effect on the people of Kauai. PMRF has recently taken control of an additional 6000 acres on the Mana plain, which is our access to our beloved Poli Hale State Park, a valued recreational, cultural and spiritual public resource. Further expansion of the range will require more frequent closures of the State Park. I object to these restrictions on the public right to access our park.

2 I also object to the Navy's plan to increase the use of sonar that has been proven to be harmful to endangered marine mammals. This is inexcusable, and should not be allowed. In fact, current use of low and mid frequency sonar.

3 I also ask that the use of Directed Energy Laser Weapons be disallowed, because of danger of contamination with hydrogen fluoride of the land, beach, ocean and reef.

4 I ask that the Navy consider closing the base at PMRF, and giving us our beach back, as well as control of access to our state park!

Linda Pascatore

Hanapepe, HI

COMMENT NUMBER

From: Sandy Herndon - Kapaa, HI
To: deis hrc@govsupport.us
Subject: Expansion of PMRF
Date: 9/15/2007 4:06:20 AM

D-E-0383

1 This is an official and legal document requesting the US Navy to withdraw plans to expand the area of PMRF on Kaua'i. I don't want Kaua'i to become a more significant target than it already is. The plans you are attempting to put into place, will place us in the center of the bullseye, for any potential retaliation for any of the number of military transgressions, and/or poltical abuses inflicted by the Bush-Cheney administration.

2 In addition, I am asking that you cease the medium range sonar testing which

3 is so devastating to our sea life, whales in particular. The intelligence of man has come up with alternatives to this type of game playing; use that intelligence as well as your God given compassion ... spare these magnificent life forms from the torture and destruction that will destroy all of us in the long run. Consider the legacy you are leaving our children in terms of the environment, debt deficit, and world opinion.

The people of Kauai are NOT in favor of this expansion.

Thank you for hearing my concern and accepting my letter opposing the expansion of PMRF.

Sincerely,
Sandra Herndon
Kapaa, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0384

From: Mark Hubbard - Lihue, HI
To: deis hrc@govsupport.us
Subject: Hawaii Range Complex Draft EIS
Date: 9/15/2007 10:40:16 AM

1 I support alternatives 1 and/or 2 as described in the DEIS.

Thank you for your efforts in protecting the environment while protecting the freedom of the citizens of the United States and the rest of the free world.

Aloha,

Mark

Mark Hubbard

Lihue, HI

COMMENT NUMBER
D-E-0385

From: Gabriela Taylor - Kapaa, HI
To: deis hrc@govsupport.us
Subject: Comments:Navy Expansion EIS
Date: 9/15/2007 11:21:47 AM

Re: public comments on Navy Expansion in Hawaii

1 I am opposing any expansion of the Navy at PMRF on Kauai. The presense of the Navy is already disruptive and excessive and expansion should be denied. It is counter to our rural atmosphere.

2 Sonar use by the navy is disruptive and dangerous to Whales and other creatures in the sea. Please curb any sonar use now and deny any expansion of Sonar use around the Hawaiian Islands.

Sincerely, Gabriela Taylor
Kapaa, Hi.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0386

From: Marilyn & Ed Pollock - Hanalei, HI
To: deis hrc@govsupport.us
Subject: sonar use by Navy
Date: 9/15/2007 4:32:46 PM

1 Aloha, it seems that I am writing yet again to alert you to what isn't working for the preservation of a great natural wonder, the humpback whale, the sonar use by the Navy.
It's intolerable that you continue to subject the whale and the public to an indefensiable spin that war games give you permission to proceed without conscience consideration of aquatic species. You are just asking for problems. I can't believe that you are unaware of the impact of your sonar use on marine species. Is the ocean just a free zone to do whatever you want? I don't think so.
I strongly oppose using low-frequency sonar in waters that are home to breeding whales, to our endangered seals and any other marine species that would be impacted by the Navy action.
Marilyn & Ed Pollock

Hanalei, HI

COMMENT NUMBER
D-E-0387

From: Donald H. Wilson
To: deis hrc@govsupport.us
Subject: HAWAII RANGE COMPLEX EIS/OEIS
Date: 9/15/2007 8:21:08 PM

Ladies/gentlemen,

1 Please accept my written testimony in unqualified support of the Hawaii Range Complex.

As a former Pacific Missile Range Facility Commanding Officer, it was my distinct privilege and honor to work with and command the combined efforts of some 100 plus US Navy personnel, approximately 110 federal civil service employees, and about 540 contractors - all devoted to providing the best, most comprehensive range support available anywhere. Indeed, PMRF, as one component of the Hawaii Range Complex, affords the largest, instrumented training range in the world, capable of subsurface, surface, air, and exoatmospheric events either individually or concurrently.

There is no other range anywhere that provides the necessary size, safety, and experienced personnel to conduct training or Test & Evaluation events - all to the benefit of the American people and her allies. Each Armed Service of the US has, in one form or the other, availed itself of this unique asset and, in even numbered years, PMRF hosts the Rim of the Pacific (RIMPAC) training events in concert with allies, affording them an opportunity they would not have otherwise.

But the Hawaii Range Complex is not just defined by the training and testing events held on the land, in the water, or in the air over its waters. PMRF is a national asset of incalculable value, with much greater worth than the sum of its individual parts:

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0387 (cont.)

*□Economic impact: PMRF is the third largest non-government employer on Kauai - only the Hyatt and Marriott Hotels employ more civilians than does ITT, with its PMRF contract. 10

*□Disaster relief: PMRF's airfield was the first on the island of Kauai, and the only operational airfield in the county following Hurricane INIKI on 9/11/92. Because the airfield was "reconfigured" as soon as possible, it was the only field useable to host aircraft bringing much needed relief supplies to an island devastated by the hurricane. PMRF employees - Navy, civil service, and overwhelmingly civilian contractors - provided the requisite, exigent support to an island with no viable alternatives. Whether ice to preserve food stocks, electrical generators, medical supplies, or engineering services, PMRF was the focal point for those efforts - all to the direct benefit of Kauai residents. 5

*□Environmental stewardship: PMRF is an outstanding steward of natural and sensitive resources, with sanctuary areas for split-tail Shearwater birds, an occasional Hawaiian monk seal, migratory Laysan albatross, and transiting whales. In support of these efforts, the base minimizes use of white lights at night, protecting Shearwaters that might mistake glistening asphalt streets for the ocean with predictably disasterous results. The base minimizes its "footprint" with as few buildings as possible, to limit the impact of man-made structures on the eco-system. Working in concert with the US Fish & Wildlife Service, and the Hawaii State Department of Land & Natural Resources, the Navy, through PMRF, 4

provides botanists, ornithologists, marine biologists, and other scientists the opportunity to study, and protect endangered species from human impact.
The US Navy pays for and maintains pumps to prevent Mana, and other areas 6
appurtenant to PMRF, from flooding due to mountain rainwater runoff. And, 7
in formal partnership with the State of Hawaii and Kauai County, the Navy is a signatory to the Agricultural Preservation Initiative - designed to protect lands adjacent to PMRF for agricultural pursuits, complementing the

COMMENT NUMBER
D-E-0387 (cont.)

"blackout" initiative on PMRF, and affording local farmers a place to grow crops, and conduct hybrid research. And, as a former Kauai County Mayor once observed, "PMRF has the cleanest beaches on Kauai." That's true, and it happens only through a deliberate effort to "sweep" the beaches periodically, and prohibit certain activities that could contribute to despoiling the beach. Finally, PMRF and its users are compelled by federal, state, and county law, regulations, and ordinances to restrict, reduce, or eliminate events that might pose lasting harm to the land or adjacent waters. But it is not just the rule of law that assures adherence to
specific environmental stewardship - PMRF employees are driven to protect 8
the aina by who they are, not what they do. Ships operating on the range are charged with maintaining and manning sensors and lookout positions to be alert for endangered sealife that might be impacted by training, and to either cease, reduce, or amend operational events to protect these species.

*□Cultural sensitivity: PMRF is sensitive to Hawaiian cultural concerns, and employs a significant percentage of Hawaiians both on Kauai and Niihau, to ensure particularly sensitive areas are identified and protected from intrusive, or destructive behavior. For example, the sand dunes near Nohili Point house and conceal ancestral Hawaiian bones (iwi) and are, therefore, protected by PMRF. The base has successfully resisted efforts proposing to build a longer runway, or expand the runway beyond its current configuration - whether mauka or makai. And, in order to ensure the sand dunes do not unnecessarily erode, PMRF encouraged the growth of native dune grasses, and prohibits driving on these dunes, affording the grasses the opportunity to flourish, and therefore "trap" the dunes and by extension, preserve the iwi. 3

*□Community activities: PMRF, while not a national park, nonetheless has accommodated progressively more liberal base access, to provide Kauai residents the opportunity to use Majors Bay for surfing and other beach activities; to fish adjacent to the runway, when operations provide a safe environment free from exposure to aircraft take-offs and landings, and to use "Shenanigan's," PMRF's "all hands" club on the beach, where food and 2
libations are available for cleared members of the public. In addition, 9
over the years, PMRF has supported and continues to support community blood

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

and food drives; loaned free of charge equipment not otherwise available, and not in competition with commercial activities, such as bleachers for high school graduations; supported - through a formal Mutual Assistance agreement - fire fighting and emergency medical services for "westsiders," and afforded community charitable organizations the opportunity to cull downed kiawe wood for use as charcoal for fundraisers. There was one instance during my tenure when assigned US Navy sailors saved the life of a Kauai resident who was caught in an undertow, and unable to save himself. And PMRF has occasionally provided helicopter-borne firefighting support to Kauai County, or search and rescue missions above the mountains or out at sea. And, because the overwhelming percentage of PMRF workers are local, i.e., are and were Kauai residents before employment, our community ties transcend ethnicity and the type of clothing worn.	**COMMENT NUMBER** D-E-0387 (cont.) 2
PMRF is indeed an invaluable national resource, committed to serving its national mission, while being sensitive to - and a part of - the local community in which it is situated. Its employees well represent the Hawaiian concept of pono, and are devoted to providing safe, controlled, least intrusive, training and test and evaluation support. The base provides disaster relief capabilities not otherwise available, and protects some seven miles of beach, stretching from Kekaha to Polihale Beach Park, in a sensitive, responsible fashion, worthy of emulation.	
I am proud of the outstanding efforts of PMRF employees, and their commitment to their community.	
And I support, without qualification, the Hawaii Range Complex and in particular the Navy's efforts, in concert with other federal, state, and county entities, to provide an invaluable resource. I respectfully and strongly recommend continued support for the Hawaii Range Complex as currently configured and used. Today's DOD activities need it, and so do the residents of the State of Hawaii, especially Kauai County.	1

Sincerely, Donald H. Wilson CAPT, USN (Ret.)	**COMMENT NUMBER** D-E-0387 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

The text of comment D-E-0388 was the same as that of D-E-0062. This comment was submitted by Ron Tuason of San Francisco, CA.

COMMENT NUMBER
D-E-0388

From: Noreen Dougherty - Kapaa, HI
To: deis hrc@govsupport.us
Subject: Environmental protection
Date: 9/15/2007 9:05:53 PM

I am an educator in the state of Hawaii and my curriculum's central focus is the natural environment, respect, and environmental awareness. I ask you to please discontinue the sonar affecting the whales and other marine life. Please set examples for our young people that show that we have respect and make conscious decisions that will assure them a planet worth inheriting from its elders. Mahalo. 1

Noreen Dougherty

Kapaa, Hawaii.

COMMENT NUMBER
D-E-0389

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

From: Doug Fox - Honaunau, HI
To: deis hrc@govsupport.us
Subject: draft EIS public comment
Date: 9/16/2007 5:04:07 AM

D-E-0390

Please send confirmation of receipt of this public comment into record.

1 People in Hawaii who practice aloha aina are opposed to the destructive activities described in the draft EIS. Please stand down and return to
home port outside Hawaiian waters, especially all nuclear powered vessels which emit radioactivity into our waters, sediments, and air. Pearl Harbor has already been contaminated. Hawaii is very unlikely to be attacked by foreign terrorists but highly likely to be ruined as a healthy place by the US military. From the current level of activities the Navy should be scaling back, not expanding. National security is not a reason to harm any place. Ironically, the nation most responsible for global insecurity is the US, according to recent National Intelligence Estimates. Historical events support the allegation that the US has in modern times become a rogue nation with too many weapons and no wisdom. The US did invent Weapons of Mass Destruction
and immediately used them on civilians. The US did invent radiologic terrain contaminants in its manufacture of DU munitions, and uses them still in many of its weapons systems. The US does torment the creature with the largest brain, the whale, with sonar. What is the point in making a marine 3
sanctuary if it is going to be attacked by the military? The US does 1
manipulate intelligence and falsely blame sovereign nations for acts they did not
commit as a precursor to invasion, occupation, and seizure of sovereign assets
especially oil in the ground. The US does openly endorse violation of the Geneva Convention, while breaching the Constitution at home. The US does maintain a huge standing Army and Navy which military historians say always leads
to ruin. Sun Tzu said it is best to win without fighting, while the US Navy proposes to expand militarism during peace. The US does have an out of
control industrial segment making ruinous policy in direct contradiction to the public will in both the US "homeland" and Iraq. Questions of whether to

COMMENT NUMBER

D-E-0390 (cont.)

escalate the gross misappropriation of public funds in the US to include pristine waters and land in the Hawaiian archipelago are only seen by the US Navy from its age old perspective as hostile imperial facilitator, bombardier, and occupier. Maritime law is based on piracy and flies an invisible flag of skull and bones. That is not the way of aloha and was never accepted voluntarily in Hawaii. Moral authority can never be bought with innocent victims. The truth cannot be reinvented by bayonets.
Kauai is a beautiful and spiritual moku. It should not be sacrificed to the missile range, which should be shut down permanently or moved to the Chesapeake Bay area closer to home for disassembly. No assaults on our islands
are welcome. And Kauai's waters should not become a place of torment for the whales. Many documented cases of whale distress coincident with sonar 2
are known, for example:

THE HAWAIIAN ISLANDS - In 1998, three whale calves and one dolphin calf were found dead or abandoned during and immediately following sonar testing, even though in 15 years of research this phenomenon had never been observed. One
of these was a distressed whale calf who breached 230 times and pectoral slapped 658 times in front of Dr. Marsha Green's research team in a four-hour period before the sun set on his distress. In addition, a pod of dolphins was observed by naturalists familiar with normal dolphin behavior huddling unusually close to the shore near the surface and vocalizing excessively while the
sound was on.

Monday, July 5, 2004
http://starbulletin.com/2004/07/05/news/story4.html
Hundreds of volunteers herded a pod of about 200 melon-headed whales out of
Kauai's Hanalei Bay and into deeper water yesterday morning, a day after the animals had initially come near shore in what experts called unusual behavior.
The Navy had six ships about 23 miles northwest of Kauai at about 8 a.m. Saturday in operations that involved underwater sonar tracking, Geisen said.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

http://the.honoluluadvertiser.com/article/2003/Oct/09/ln/ln07a.html
Posted on: Thursday, October 9, 2003
Study links bends-like whale deaths to sonar By Marc Kaufman Washington Post
High-powered sonar from Navy ships appears to be giving whales and other marine mammals a version of the bends, causing them to develop dangerous gas
bubbles in some vital organs and blood vessels, to beach themselves and die, according to a study published today in the journal Nature.
continued at link
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http:
//www.washingtonpost.com/wp-dyn/content/article/2006/04/27/AR2006042702084.html
Sonar Called Likely Stranding Cause
By Marc Kaufman
Washington Post Staff Writer
Friday, April 28, 2006; Page A08
Federal marine specialists have concluded that Navy sonar was the most likely cause of the unusual stranding of melon-headed whales in a Hawaiian bay in
2004.
The appearance of as many as 200 of the normally deep-diving whales in Hanalei Bay in Kauai occurred while a major American-Japanese sonar training
exercise was taking place at the nearby Pacific Missile Range Facility.
The report is the latest in a series of scientific reviews linking
traditional mid-frequency naval sonar to whale strandings. Sonar has been used for
decades, but it was only recently that the apparent connection to strandings was
established.
While the National Oceanic and Atmospheric Administration scientists said they could not definitely state that sonar caused the strandings, they said extensive study led them to the conclusion that there was no other likely cause.
continued at link

COMMENT NUMBER
D-E-0390 (cont.)

http://www.marineconnection.org/archives/rescue_2004.html
Orca stranding in Hawaii
(Added:- 14 April 2004)
Two Orcas were sighted off Lanai recently but one of the creatures stranded itself in shallow water along the southeast coast of the island and died.

Hawaii Ocean Noise Coalition
http://www.hawaiionc.org/
http://www.thepetitionsite.com/takeaction/332945156

Humpback whale, abandoned calf alongside HWRF research boat. Maui, Hawaii,
USA.
Stranding / Abandonment photos
http://www.oceanlight.com/lightbox.php?x=stranding_/_abandonment__whale_behavi
or__whale__cetacean__animal&pg=1
http://hawaiihumpbackwhale.noaa.gov/mm_contact_info.html
http://hawaiihumpbackwhale.noaa.gov/special_offerings/sp_off/publications.html

US Navy's Misinformation To Congress About LFAS
http://www.oceanmammalinst.com/lfa-navy.html

Quotes from the Navy's Head of Undersea Surveillance Concerning LFAS:
Navy Statement 1- "The Navy is committed to operating this system in an environmentally responsible manner."
* Fact - From 1980 to 1995 the Navy developed and tested LFAS without obeying any of the applicable environmental laws. (National Environmental Policy Act, the Endangered Species Act, the Marine Mammal Protection Act, and
the Coastal Zone Management Act.)
* Fact - While the Navy was illegally developing and testing LFAS, they were also building a ship (TAGOS-23) estimated cost $60 million to deploy
the sonar.
* Fact - In 1995, the Navy agreed to comply with federal laws and

COMMENT NUMBER
D-E-0390 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

prepare an Environmental Impact Statement (EIS) prior to final deployment of the
system only after pressure from the Natural Resources Defense Council (NRDC).

Navy Statement 2 - "Prior to preparing the Draft Environmental Impact Statement (DEIS) covering proposed system operation, the Navy sponsored an
extensive Scientific Research Program (SRP) to specifically evaluate any potential
effects."
* Fact -This SRP tested LFAS on only 4 species of cetaceans (out of over 30) for about one month each in only 3 geographical areas.
* Fact - This SRP tested LFAS at an acoustic intensity at least 5,000 times lower than the Navy's planned deployment levels.
* Fact - After testing LFAS for only one month the impact on long term reproductive rates of whales, dolphins, fish and all marine life are not known.
* Fact - The Marine Mammal Commission, (a federal agency created to help protect marine mammals), expressed grave concerns in their 1997 annual report to Congress about the effects of the sonar on whales and other marine life. Specifically their report states:
* "If the LFA system were made available for worldwide use as proposed, all species and populations of marine mammals including those listed as
endangered and threatened under the Endangered Species Act possibly could be
affected."

continued at link

more http://www.oceanmammalinst.com/misinfo.html
http://www.oceanmammalinst.com/navyconclusionsflawed.html

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http://www.fpir.noaa.gov/PRD/prd_marine_mammal_response.html

COMMENT NUMBER
D-E-0390 (cont.)

Marine Mammal Response The Pacific Island Region Marine Mammal Response
Network consists of cetacean and monk seal response in the main Hawaiian Islands, Northwest Hawaiian Islands, Guam, American Samoa, and the Northern Mariana
Islands.

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http://www.cdnn.info/news/eco/e060218.html
NOAA blasts U.S. Navy over whale-killing sonar
Powered by CDNN - CYBER DIVER News Network
by MARC KAUFMAN
WASHINGTON (18 Feb 2006) -- The civilian agency in charge of marine issues has sharply challenged the Navy's plans to build an underwater sonar training range in the Atlantic Ocean, saying that the military significantly underestimated the danger posed to whales and other marine mammals and that the science
the Navy used to reach its conclusions is flawed.
In a technical letter to the Navy, the National Oceanic and Atmospheric Administration (NOAA) said the Navy had neglected to address the likelihood that
its mid-frequency sonar would kill some whales and that the highly endangered right whale makes its annual migrations near the proposed site off North Carolina and could be threatened. But most telling, the NOAA letter said that the Navy had used a measure for allowable noise 100 times as high as the level
recommended by the agency.
The sonar testing range is a high priority for the Navy, which says that it needs an Atlantic Ocean site to train sailors to detect foreign submarines that come near American shores. But it is trying to get the project approved at a time when scientists have become increasingly convinced that the loud blasts of active sonar have caused whales to strand themselves and die.
The NOAA letter, which is a formal comment on the Navy's environmental impact statement regarding the sonar range, is the most public indication so far
of what agency insiders have described as friction between NOAA and Navy officials regarding the sonar issue. In the past, NOAA has generally supported the
Navy's plans with reservations, but the most recent letter makes little

COMMENT NUMBER
D-E-0390 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0390 (cont.)

effort to hide significant disagreements.
NOAA, for instance, wrote that the Navy predicted only lower-level "harassment" of whales by the sonar, despite recent fatal and near-fatal mass strandings in Hawaii and elsewhere that many scientists think were caused by Navy sonar.
"NOAA believes the Navy should seriously reconsider the potential for mortality of [whales] due to strandings related to activities" in the proposed sonar testing range, the letter said.
NOAA officials did not respond yesterday to requests for comment about the specific issues raised in the letter, which was sent on Jan. 30. A Navy official said the service would like to respond, but that it could not until the letter was reviewed and a formal response prepared.
A representative of the Natural Resources Defense Council, an environmental group which has sued the Navy over its sonar programs, said that the NOAA letter was remarkable, given the pressure the civilian agency was known to be under.
"What the NOAA letter does is confirm that the Navy analysis is fundamentally flawed," said NRDC lawyer Michael Jasny. In the past, his organization has accused NOAA's National Marine Fisheries Service of minimizing the effects of sonar on whales, but he said that this time, the agency stood by the evolving science.
"They're an agency with their own institutional integrity," Jasny said. "No doubt NOAA -- like other agencies -- can bend. But here the Navy is asking them to snap."
"The NOAA letter is truly unbelievable," said Kyla Bennett of Public Employees for Environmental Responsibility, a national whistle-blower organization that supports government workers who come into conflict with policymakers and elected officials.
"It takes an amazing amount of courage for a federal employee to take this kind of strong stance against the Navy under the Bush administration," she said.

4

Here on the island of Hawaii, the first appropriate change the Navy should be making is to permanently shut down Pohakuloa Training Area. Citizens have never agreed to any bombing of Hawaii island from land, sea, or air. That was started during martial law in WWII. Hawaii has been contaminated with radioactive weapons-the horrible depleted uranium- from a WMD system developed by the US that was kept secret for four decades. .

Auwe! Aole pilikia! May akua preserve beautiful Hawaii in righteousness, peace, and health, not war industry. Cleanup, not buildup. Malama the pono!

Doug Fox

Honaunau, HI

COMMENT NUMBER
D-E-0390 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0391	

From: Marcia Harter - Anahola, HI
To: deis hrc@govsupport.us
Subject: sonar and whales
Date: 9/16/2007 1:30:31 PM

I urge the U.S. Navy to stop needlessly inflicting harm on whales and other ocean life with its use of high-intensity, mid-frequency sonar in its training exercises. 1

Whales, dolphins and other marine mammals depend on sound to navigate, find
food, locate mates, avoid predators and communicate with each other. Blasting
their environment with intense sound over large expanses of ocean disrupts these critical behaviors and threatens their survival.

Sonar also harms whales more directly: Navy exercises using mid-frequency sonar have resulted in whale strandings across the globe, including along the coasts of Washington State, the Canary Islands, the Bahamas, Madeira, the U.S. Virgin Islands and Greece. A recent whale stranding death in Hawaii, which
occurred when a large pod of whales was driven in panic to shallow waters, took place with Navy sonar exercises nearby and may be the latest in this string of sonar casualties.

Whales should not have to die for military training. The Navy can no longer ignore the unnecessary harm inflicted by this technology. I urge the Navy to immediately adopt common-sense measures to keep whales safe.

There is no need for animals to suffer as a result of navy experimentation.
I, for one, do not want to be "protected" at the expense of the animals
and environment that provide such a richness to life especially when there are mitigating measures that can be taken. I urge the Navy to put forth all necessary effort to eliminate the deleterious effects of the sonar testing on marine mammals.

Marcia Harter
Anahola, Hawaii

Marcia Harter

COMMENT NUMBER	
D-E-0392	

From: Caitlin Odom
To: deis hrc@govsupport.us
Subject: stop the navy expansion
Date: 9/16/2007 1:50:54 PM

To whom it may concern,
I am a long time resident of Kaua'i and strongly oppose the navy's expansion at PMRF. We need to focus on preservation of our land and seas and stop dangerous testing and polluting for the purpose of "testing." This is a new time we are living in and our focus should be on taking care of what is left of our environment. Remember land has eyes and teeth!! 1

Malama pono,

Caitlin

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

The text of comment D-E-0393 was the same as that of D-E-0062. This comment was submitted by Gian Andrea Morresi of Fairfield, CT.

COMMENT NUMBER
D-E-0393

From: Erin Foley
To: deis hrc@govsupport.us
Subject: Navy Actions Impacts Hawai'i
Date: 9/16/2007 2:52:45 PM

Dear Mr. Clements,

I would like to express my opposition to the Navy□s plans the expand war games in the Hawaiian Islands. Hawai□i and its surrounding ocean contain thousands of unique and fragile organisms, many of which are on the brink of extinction, including the Hawaiian monk seal and the rare cold water coral reefs. The Hawaiian Islands are now protected by federal and state law and include the NWHI Marine Monument, State Refuge, and the Humpback Whale Sanctuary. The Navy□s plan to use active sonar that harms marine mammals, the inevitable spreading of toxic chemicals that harm our environment and health, and the disrespect for Native Hawaiian cultural and sacred sites is unacceptable and cannot be allowed. 1 2

The Navy□s proposal jeopardizes the rich cultural history of the NWHI. These islands are respected in Native Hawaiian traditions as the Elder Islands of the Main Hawaiian Islands. Rare, pre-contact burial sites, temples, and house plots are well-protected on Nihoa and Mokumanamana (Necker Island). Expanding the Navy□s wargames over the NWHI will pose considerable damage to irreplaceable and sacred cultural sites. This risk is unjustified and cannot be permitted. 3

Please respect federal and state laws protecting the Hawaiian Islands. Our global treasure should not be defaced in wargames. 1

Sincerely,

Erin Foley

COMMENT NUMBER
D-E-0394

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

The text of comment D-E-0395 was the same as that of D-E-0062. This comment was submitted by Erin Foley of Hilo, HI.	COMMENT NUMBER D-E-0395

From: Lee Tepley - Kailua-Kona, HI
To: deis hrc@govsupport.us
Subject: Dr Lee Tepley's testimony on the draft EIS
Date: 9/16/2007 10:46:13 PM
Re: Hawaii Range Complex
Draft Environmental Impact Statement/
Draft Overseas Environmental Impact Statement

COMMENT NUMBER D-E-0397

My entire testimony includes the attached pdf file "Bubble Activation and Growth in Cetaceans by a Relatively Low Energy Sound Wave. Please print this as part of my testimony in addition to the text below.

About 5 years ago, I was invited to present a paper at a workshop put on by National Marine Fisheries in Silver Springs, Maryland on sonar resonance effects which might cause tissue injuries and death to cetaceans. At that meeting Dr. John Potter proposed a mechanism based on earlier work by both civilian and Navy Scientists (See reference at end). Dr. Potter's mechanism is based on something called "bubble activation" and states that a currently unknown (but possibly quite low) sonar level could cause deep diving whales to get the bends from bubble expansion during a quick ascent from fear or other factors . I discussed and supported Dr. Potter's work in a long informal educational non-refereed paper on one of my web sites. I am attaching it below as a PDF file.

I believe that it is widely agreed that Dr. Potter's work is essentially correct and is the most likely reason for the strandings of beaked whales and other cetaceans following tests of mid-frequency sonar in both the Bahamas and the Canary Islands but, so far, not in Hawaii despite the fact that mid-frequency sonar tests have been going on in Hawaiian waters for many years. It seems likely that the reasons are (1) Differences in current patterns and geography which are not conducive to strandings in Hawaii so that dead animals may sink, get eaten by sharks or drift out to sea and (2) Differences in cetacean density in the three island groups.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0397 (cont.)
1

However, on July 11, 2004 during a low frequency active sonar test supposedly about 20 miles off shore, about 200 melon headed whales seemed to panic and swam into Hanalei Bay, Kauai. Apparently, they were far enough from the sonar tests so as to not have suffered direct injuries - or perhaps they were not in deep enough water during the actual time of the sonar transmissions to get the bends

In view of the above, please answer the following questions:

(1). What are the received levels at which deep diving whale species would likely get the bends after exposure to mid-frequency sonar??

(2). At what range would this occur assuming transmission of mid-frequency sonar at 235 dB??

(3). Since sounds from deep diving whales are not likely to be loud and therefore are unlikely to be heard by any passive sonar array, how many of these whales are you likely to injure or kill during a test of mid-frequency sonar??

Sincerely,

Dr. Lee Tepley
PhD in Physics

Kailua-Kona, Hawaii,

Reference: J.R. Potter, A Possible Mechanism for Acoustic Triggering of Decompression Sickness in Deep Diving Marine Mammals (paper presented at the IEEE Inernational Symposium on Underwater Technology 2004, Taipei, Taiwan, April 2004

COMMENT NUMBER
D-E-0397 (cont.)

Bubble Activation and Growth in Cetaceans by a Relatively Low Energy Sound Wave and the Confusion about Rectified diffusion

Posted on April 6, 2002. 1st update on April 30, 2002. 2nd update on May 20, 2002. 3rd update on May 30, 2002.

Preface

Recently, a very promising new mechanism was proposed by Houser, et al. (Reference 1) to explain how mid-requency sonar tests could have caused the beaked whale strandings and deaths in the Bahamas. The proposed mechanism has important implications regarding possibly similar effects from LFA sonar. It is based on a largely mathematical treatment of rectified diffusion by Crum and Mao in 1996 (Reference 2). Unfortunately, due to an understandable mis-interpretation by Houser, et al. of the assumptions made by Crum and Mao, the catch-phrase "Rectified Diffusion" was used to describe the proposed mechanism. This catch phrase caught on and I used it myself in a series of e-mails about the proposed mechanism. However, "Rectified Diffusion" actually has little - or perhaps nothing - to do with the proposed mechanism. When I realized that this was the case, I wrote the first version of this message to try to set the record straight. However, the world did not sit up and take notice.

I am concerned that the importance of the proposed new mechanism is not likely to be fully appreciated as long as it continues to be confused with the mechanism of "Rectified Difusion". This is discussed in the following Introduction and Q & A session. It is also discussed in this section taking a somewhat different approach. This could help clear up the confusion.

The mathematical treatment by Crum and Mao started with the concept of a bubble in a solution (say water) containing some dissolved gas. You could think of the bubble as just sitting there waiting for something to happen - like waiting for a sound wave coming along. However, in the real world the bubble would not just sit passively. Two things would be happening even before the sound wave arrived:

(1). Gas molecules dissolved in the water would be flowing into the bubble. The more molecules dissolved in the water (that is, the greater the degree of saturation), the faster would be this inward flow (called static diffusion). This would cause the bubble to grow.

(2). At the same time gas molecules in the bubble would be flowing outward and dissolving in the water. The rate of outward flow would depend partlly on the surface tension of the bubble. If it were great enough, it could overcome the inward flow from the water. It could even cause the bubble to squeeze down and disappear.

So would the bubble grow or shrink?? Good question! ! It could go either way depending on the relationship between the degree of saturation of the water and the surface tension of the bubble. Crum and Mao probably already knew the answer - but they wanted to learn how adding a sound wave to the mix would effect the result. They also knew that the sound wave would cause the bubble to grow by a process called "Rectified Diffusion" (more on this in the Introduction and in the Q & A session).

So how did they set up this problem?? In effect, they pretended to put a "rigid spherical shell" around the spherical bubble. Next, they pretended that the shell disappeared at the very moment that they turned on the sound wave. Then, using the basic laws of physics and a computer simulation, they found out what happened; that is, they learned how their bubble grew or shrank depending on factors like sound level, water saturation level and bubble surface tension. They then presented their results in a very important paper.

So where did the confusion about "Rectified Diffusion" arise?? It all has do with the "rigid spherical

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shell" that Crum and Mao initially put around their bubble. The shell is called a "mathematical artifice". Physicists and mathematicians use such artifices frequently to help them set up mathematical problems. However, in this case, the rigid shell was more than just an artifice because it closely approximated the spherical membrane that surrounds and, in fact, forms a "stabilized bubble" or "nucleation site". So by taking away the artificial "rigid spherical shell", Crum and Mao, in effect, removed the real membrane. Therefore, the bubble was no longer stabilized. It was now free to grow or shrink. You could say that it was "activated". By resorting to this arbitrary procedure, Crum and Mao deliberately avoided having to consider the make-up of the membrane surrounding the bubble or what really caused the membrane to disappear. **This problem was left for another day.**

Anyhow, Crum and Mao solved an important problem. They demonstrated that, under certain conditions, a sound wave at a very low level (even zero) could cause an activated bubble to grow and lead to "the bends". They also demonstrated that rectified diffusion would make only a minor contribution to this process **unless the sound level was very high.** But they did not consider a problem of comparible interest which is: **What sound level is required to penetrate or break open the membrane that surrounds a bubble so that the growth process can start??** - or, alternatively - **What sound level is required to activate a bubble??**

Crum and Mao were well aware that they did not solve the latter problem. In fact, their paper included a discussion similar to that above but a lot more complex and rigorous. They even stated "**Although not indicated here in this analytical model, the role of acoustics might be to"activate" the bubble."**

In summary, we are dealing with two separate but related problems. The first problem concerns the rate of bubble growth after it has been activated. This problem was solved in principle in 1996 by Crum and Mao. Recently, Dr. John Potter (private communication) extended their calculations to higher degrees of supersaturation so that the results could be applied more directly to the beaked whale strandings in the Bahamas. The second problem - which concerns the sound level required to activate a bubble - is currently unsolved. In fact, until recently, no one was even interested in this problem

Does the above discussion help reduce "The Confusion About Rectified Diffusion"?? It would be nice if it did. So on to the remainder of this effort - most of which was written earlier so there will be some repetition.

End of Preface: Start of Introduction

I first came across an important paper by Navy-supported scientists published in Dec. 2001 (Reference 1). Some of the results in that paper were based on an earlier paper by Crum and Mao (Reference 2) on bubble growth by a mechanism called "Rectified Diffusion" . Although I had been familiar with the earlier paper for some time, I had not appreciated it's possible significance in leading to bubble activation and growth and consequent serious tissue damage to cetaceans by means of a **relatively low level sound wave**. Crum and Mao's paper considered tonal sound waves - such as those associated with Navy sonars. The following discussion is also limited to tonal sound waves. Anyhow, after the Navy-supported scientists pointed out the significance of the earlier work, I wrote a number of e-mails on the subject Starting in Dec. 2001. Because it seemed likely that NMFS might grant the Navy an LOA to permit LFA sonar to become operational at any time, it seemed urgent to publicize the proposed mechanism before this occurred. Therefore, my earlier efforts were a bit rushed. Because NMFS has not yet granted the Navy an LOA, I have had time to investigate the mechanism in more detail .

The earlier paper by Crum and Mao was largely an investigation of bubble growth which might be caused by rectified diffusion at relatively high levels of LFA sonar. The later paper by the Navy-supported scientists emphasized that under certain conditions, lower sound levels might also lead to bubble growth and tissue damage. It related these effects to rectified diffusion. However, as pointed out in the preface, rectified diffusion itself might play only a minor role - or perhaps no role - in the process so that the interpretation by the Navy supported scientists was not entirely correct.

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D-E-0397 (cont.)

Nevertheless,their conclusions still turned out to be valid. The important point is that, under certain conditions, **bubbles activated by relatively low level sound waves could grow and cause serious tissue damage.** The dB value of this "relatively low level" is unknown and could be difficult to measure or estimate. This will be discussed further below.

1. In their important paper, the Navy-supported scientists referred to a sound level of 150 dB - thus implying that this sound level was of possible importance in leading to bubble growth and consequent tissue damage. In a letter to the Navy which pointed out various possible mechanisms for tissue damage, The National Research Council (NRDC) also referred to this sound level. **However, this sound level has no real significance.** It is only the lowest sound level used in the calculations in the paper on rectified diffusion by Crum and Mao. **Their calculations - which assumed that pre-activation of bubbles was not required - could have been extended down to a sound level of zero.**

2. A far more important sound level is that required to activate bubbles. The word "activate" means to form a bubble from an entity which is in a form that can be turned into a bubble. Such an entity is sometimes called a "nucleation site" or a "stabilized bubble". More on this below. In any case, for humans, **this sound level is also zero; that is, a sound wave is not required to activate a bubble which would then grow and cause tissue damage.** However, no one has the slightest idea of what sound level is required for bubble activation in cetaceans. It is not likely to be zero because cetaceans are not known to get the bends in the absence of a sound wave - probably because of evolutionary differences between cetaceans and humans. But cetaceans did not evolve in the presence of even moderate intensity sonar sound waves - so their bubble activation sound level could still be quite low. To complicate things even more, it is possible that different types of nucleation sites may exist in the same species . These different sites could have different characteristics so it may not be possible to determine a unique sound level for bubble activation for each species. For example, some nucleation sites might be activated at a low sound level. Others might require a far louder sound. In any case, it is of primary importance to get some idea of the bubble activation sound level (or range of levels) for cetaceans before permitting LFA sonar to become operational.

3. For relatively high sound levels - say 190 dB or higher - rectified diffusion by itself can lead to rapid growth of an existing bubble and to consequent tissue damage. However, we are far more interested in bubble growth caused by moderately low sound levels. In the latter case, despite the recent hype - by myself and others - about the possible importance of rectified diffusion - **it is only a single step in a multi-stage process consisting of bubble activation by a sound wave followed by diffusion of gas from blood into bubbles which can then lead to rapid bubble growth. This process requires a high degree of supersaturation of the cetacean blood and the primary process leading to bubble growth is static (rather than rectified) diffusion.** In fact, in this very important case, rectified diffusion may play only a small role - or, perhaps, no role at all. Surprised to learn that rectified diffusion is not all that important in the process?? So was I.

For more details read the following Q & A which goes into the subject in considerable detail and attempts to put the whole process into perspective. It was written at an earlier date than the above preface and introduction so, again, there will be some repetition. it also includes occasional feeble attempts at humor to reduce the overall tedium

Q & A on Supersaturation,Bubble Activation and Growth, Rectified and Static Diffusion, etc.

Based on results based in the earlier paper by Crum and Mao, the Navy-supported scientists pointed out in their published paper that the activation and growth of air bubbles by a process called rectified diffusion - followed by additional bubble growth by static diffusion - could lead to serious tissue damage in marine mammals. This sequence of events could be initiated by a moderately low level acoustic signal (same as a sonar sound wave). After learning of the results of the Navy scientists, I re-read the paper by Crum and Mao. It now seems likely to me that rectified diffusion would play only a

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

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minor role - or perhaps no role in the process but , except for this point (which is confusing but not really important) the results of the Navy-supported scientists are correct. The following quotes are taken from their published paper.

"Thus, activation of nuclei by an acoustic signal could have severe consequences for a marine mammal with gas supersaturated tissue as bubbles will continue to grow until restricted by tissue boundaries."

"In the case of the beaked whale, gas concentrations could exceed 300% by the conclusion of a dive sequence. Once activated by an acoustic signal, supersaturation to this degee would drive rapid bubble growth via static diffusion."

Starting in Dec., 2001, I started to churn out e-mails on some aspects of the relationships between rectified diffusion, static diffusion and supersaturation. However, there were other factors that I barely touched on or did not go into. Some of them I did not fully understand - including the extremely important factor of bubble activation by the sonar sound wave. Writing the following Q & A session helped clear my mind. I hope it can make things clearer to others. It also corrects some minor errors that I made in some of my e-mails . It is not all easy reading and I won't feel bad if you don't understand everything that follows. However, I hope that it might provide some background information to impress a congressperson or an attorney in some future legal action against the Navy.

So here goes the Q and A session between me and myself.

Q: What is "Supersaturation"??

A: A dictionary states that "to supersaturate" means: "to add more of a substance to a solution than can be dissolved permanently".

Let's consider an example of applying pressure to a gas above a liquid. The gas will slowly dissolve into the liquid until the liquid can hold no more gas. At this point the liquid is said to be "saturated". Then if the pressure on the gas is increased further, more gas will be dissolved until the liquid is again "saturated". This is because the amount of gas that a liquid can hold will increase with the applied pressure. Finally, if the applied pressure should now be decreased, as when a bottle of carbonated water is opened, the liquid can no longer permanently hold all of the dissolved gas (in accordance with the above definition) - in which case we say that the liquid is "supersaturated". The gas will now have a tendency to come out of the solution - either in the form of bubbles or by diffusing directly into the air above the liquid. The gas will continue to leave the liquid until the liquid is no longer "supersaturated."

Q: This is kind of complicated but I think I almost understand. Next question: What is "Diffusion"??

A. Good question. I'm glad you asked. In my e-mail of 1/8/02, I was in a hurry and stated . "Now it is known that nitrogen molecules are constantly flowing from the water into the bubble and from the bubble back into the water . You could say that they are "diffusing" between the two ------".

Right! You could say that - and I did say it - but it does not accurately define "Diffusion" so let's go to a dictionary definition again: "Diffusion is the tendency of molecules of a substance (gaseous, liquid or solid) to move from a region of high concentration to one of lower concentration."

Q: Duh!! I'm sorry I asked - so what does this have to do with "Static diffusion"??

A. Think of a whale which has been cruising in deep water for a long enough time so that it's blood has been almost saturated with air from it's lungs. As the whale starts to swim upwards, the external water pressure - which is also called the "Hydrostatic Pressure" - starts to decrease. Unless there is some problem with "equalization" (which we won't worry about for now), the whales' body (including the blood vessels) will quickly come into equilibrium with the hydrostatic pressure. At some depth the

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whale's blood will reach nitrogen "saturation" and as the whale continues to ascend the blood will become "supersaturated". When this occurs, the dissolved air will want to come out of solution. If there any bubbles present, the air is likely to diffuse into the bubbles. This is what is called "Static Diffusion".

Q: I think I get it - but why do you have to make it sound so complicated??

A. I am trying to avoid over-simplifying and saying something stupid. I probably will not succeed.

Q: OK - but what if there are no bubbles present? What happens then??

A: Great question!! Although the gas is eager to diffuse out of the supersaturated blood, it may not happen until the blood reaches the whale's lungs. At this point the dissolved gas can probably diffuse directly into the air in the lungs. Bubbles may not be involved at all.

However, the experts seem to agree that there are always very small bubbles present in the blood (or at least the "nuclei" of small bubbles) that stay about the same size for a long time; that is, they are "stabilized". You could think of them as having skins which are rather like the surface of ballons so it is difficult for gas to get either in or out of the bubbles (Reference 3). But in supersaturated blood, the dissolved gas keeps trying and eventually it may "penetrate" or "break through" the skins after which the bubbles start to expand by static diffusion - but it might take a long time before this happens. Still, these "stabilized" bubbles seem to provide good locations for dissolved gas to try to come out of solution.

Q. You are telling me that air bubbles have skins like balloons?? Do you expect me to believe this??

A. Well! We are talking here about bubbles that are so small that the experts can only guess at how they behave. Their skins are not exactly like balloons. They may be a bit porous. Scientists sometimes use terms like "semi-permeable membranes" to describe this type of thing. One of the "guesses" is that the balloon-like skins are made up of "contaminants" which give the skins a slightly different composition than the surrounding blood. The experts believe that these skins help to stabilize the very small bubbles which are also called "nucleation sites" (Reference 2). Also, there are other types of so-called nucleation sites. I won't go into this any further but the idea is that gas seems to require the presence of some kind of nucleation site (or an existing bubble) if it is to come out of solution at all. There is also something called "Surface Tension" which can help to stabilize bubbles. Ask me about this later.

Q. I'm glad that you are not going any further into balloon-like skins and nucleation sites. In fact, I think you have already gone too far - but let's go on to something else. Where does "Rectified Diffusion" come into all this??

A. First, let's forget about nucleation sites and assume that bubbles -big or small - are already present in the blood. By definition, Rectified diffusion requires a sound wave. This is equivalent to an alternating increase and decrease in the pressure of the blood surrounding a bubble. When the pressure decreases the bubble expands and a little bit of gas diffuses from the blood into the bubble. When the pressure increases, the bubble contracts and a little bit of gas diffuses from the bubble back into the blood. It turns out that a little bit more gas diffuses into the bubble when it expands than diffuses out when it contracts. Hence the overall diffusion is "rectified" and the bubble continues to expand. Do you get it??

Q. No. Do you??

A. Yes! -but it is a bit tricky. However, some very smart scientists figured it out many years ago so it is for real (Reference 2 again). Honest it is!!

Q: So what if there are no bubbles in the blood when the sound wave is turned on?? Can rectified diffusion still happen??

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

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D-E-0397 (cont.)

A: No!! - because bubbles are required for rectified diffusion to occur. But the idea is that very small stabilized bubbles (or nucleation sites) are **always** likely to be present in a liquid. As I wrote earlier, dissolved gas wants to get into these bubbles but the "balloon-like" skin of the bubble can make it hard to happen. Then a sound wave comes along. The skin of the bubble gets shaken up by the alternating pressure changes caused by the sound wave. It then breaks open and allows gas to diffuse in to the bubble (Reference 2 again). This "shaking and breaking" process is called "activation" - so the first step is the activation of bubbles by a sound wave. The bubbles can then expand by rectified diffusion as explained above.

Q: OK. I don't really understand this but let's pretend that I do. So now let's get down to the practical stuff. You have written in earlier e-mails that, because of rectified diffusion, it may require only a "moderately low sound level" to start bubble growth which can ultimately result in serious tissue damage. So how low is "moderately low"??

A: This is a really important question. For starters, it depends partly on the degree of supersaturation. The more supersaturation, the lower the required sound level.

Q: What do you mean by "partly"?? What else affects the so-called "moderately low sound level"??

A: I was hoping you wouldn't ask. It partly depends on the surface tension of the liquid.

Q: I am starting to get irritated! What in the hell is "surface tension" and how does it come in to the act??

A: If you hadn't asked, I wouldn't have to answer. You might not like this rather long but very good dictionary definition: "Surface tension is a condition at the surface of a liquid that causes it's surface to act as a stretched rubber membrane. It results from the mutual attraction of the molecules to each other, thus producing a cohesive state that causes liquids to assume a shape presenting the smallest surface area to the surrounding medium. This accounts for the spherical shape assumed by fluids, such as drops of oil or water".

The above definition can be extended to "drops of air" immersed in a liquid. These "drops of air" are more commonly called "bubbles". If the surface tension of the liquid is large enough it can squeeze down on a bubble and keep it from expanding - maybe even make it smaller. In an extreme case it might make the bubble dissappear by forcing all of the air molecules inside the bubble to diffuse back into the liquid.

Q: I'm sorry I asked - but does this mean that supersatuation and surface tension act in opposite directions??

A: Yes. Supersaturation tends to force dissolved air into the bubble and makes it larger. Surface tension tends to squeeze air out of the bubble and makes it smaller. It could even make the bubble disappear.

Q: Dammit!! Every question I ask seems to be making it more complicated. Are there other effects that contribute to the "partly" factor in determining the exact value of the "moderately low sound level??

A: Yes! In fact, there may be a nunber of factors that I have never even heard of - but let's go on to something else.

Q: I'm for that! - but you still haven't told me what you mean by a "moderately low level" sound wave. I will re-phrase my question and give you one more chance. What is the lowest level of the sound wave that can start the process of bubble growth??

A: Alright already! ! I will give you the answer but you may not like it. The answer is "zero" (Reference 4). Surprised?? You shouldn't be because in supersaturated blood, bubbles sometimes form and grow in the absence of sound. Otherwise scuba divers would never get the bends.

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D-E-0397 (cont.)

Q: So you have just told me that we may not even need a sound wave!! So if we don't need a sound wave, we sure as hell don't need "rectified diffusion". So now I am totally confused. Should we just forget about the whole thing??

A: No! Things can be darkest just before the dawn - so don't give up yet! What is really important here is that (as far is is known) cetaceans don't get the bends as humans do despite the fact that they sometimes dive very deep, stay down for a very long time and may even come up fast. (This is an important part of their every-day life-style.) In fact, the Navy supported scientists (Reference 1) have measured or estimated very high amounts of supersaturation for several types of cetaceans.

Q. So why don't cetaceans get the bends??

A. The experts are still debating this point but the idea is that during the evolutionary process, cetaceans developed protective mechanisms that make it more difficult for dissolved gases to diffuse from their blood into the very small stabilized bubbles or nucleation sites that we discussed above. This seems to be true even if the blood is highly supersaturated. Try to imagine a situation where the dissolved gas desperately wants to come out of the blood and diffuse into the very small bubbles but - due to their "balloon-like skins" - the bubbles manage to keep the dissolved gas out.

Q: OK. I can imagine this - so where do we go from here??

A. We are almost there!! Despite it's so-called "balloon-like skin", a very small bubble is not really a "balloon" and the "balloon-like skin" is not entirely stable. If the skin should somehow be broken or penetrated, dissolved gas would start rushing in and the bubble would start to grow.

Q: I think I can almost see where you are going. So, pray tell, what could possibly break open the skin of the bubble??

A: I think you may have gotten ahead of me!! A sound wave could do the job. It could cause the skin of the bubble to expand and contract and, if the sound wave is strong enough, it could break the skin open. This process is called "activation". Once the bubble is activated, bubble growth will start (Reference 2).

Q: So how large a sound wave would it take to "activate" a bubble??

A: Nobody has the slightest idea. For humans, bubbles can be activated without a sound wave (as discussed above). Research is needed to figure out the activation sound level for cetaceans - probably a lot of research. **Although cetaceans have apparently evolved with built in protection against getting the bends, they did not evolve in the presence of sound waves which could possibly destroy their protective mechanisms. I am referring here to "tonal" sonar- type sound waves rather than to transient or "noise-type" sound waves. Although an impulsive sound could conceivably break open the skin of a small stabilized bubble, it seems intuitively that the repetitive pressure changes of a tonal sound would be more likely to cause bubble activation .** In addition, there are many kinds of "white noise" in the ocean that apparentlly do not cause bubble activation - but there are relatively few tonal sounds. The loudest natural tonal sound in the ocean is probably the humpback whale song. There are various numbers given for whale song sound levels. "Marine Mammals and Noise" gives 144-174 dB (Reference 6). Some "experts" even give higher levels. But - due to spherical spreading - the sound level will decrease by 40 dB only 100 meters away from the singing whale so that, for example, a beaked whale would have to be very close to a singing humpack to experience a sound level of over 140 dB. In contrast, a sonar-type sound wave could exceed 160 dB at a considerable distance from the source.

Q: So you have just told me (I think) that once a bubble is activated by a sound wave, dissolved gases would start rushing in and bubble growth would start. This sounds like all that is necessary to do the job is activation followed by static diffusion - which we discussed earlier. So where does "rectified diffusion" come into act??

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0397 (cont.)

A: I was afraid you might ask. This question bothered me for a long time. **There has been a lot of "hype" recently about the importance of "rectified diffusion" in contributing to bubble growth - and I have been doing some of the "hyping" myself. Still, it now seems likely that rectified diffusion is likely to be really important only when the sonar sound level is relatively high.** This was the case of primary interest to Crum and Mao (Reference 2). For this case, rectified diffusion can cause a bubble to grow rapidly when there is little or no supersaturation. However, when the degree of supersturation is relatively high, both rectified and static diffusion contribute to bubble growth and both types of diffusion are included in the equation for bubble growth derived by Crum and Mao (Reference 2). Their results show that when the sound level is relatively low, bubble growth is due largely to static diffusion - but a higher degree of supersaturation is required.

We are mostly concerned with the latter case; That is, **How can a relatively low level sound wave lead to bubble growth and subsequent tissue damage??** The mechanism appears to be the activation of very small bubbles by a sound wave followed by bubble growth caused by static diffusion . It is conceivable (but not obvious) that rectified diffusion could play a part during or shortly after the activation process - **but the most important part of the process is the static diffusion of gas into the activated bubble.** Although we cannot assign a dB value to the sound level required to cause bubble activation in cetaceans, it could be extremely low when the degree of supersaturation is quite high. **Clearly the required sound level is zero for the case of humans. For cetaceans, the value must be higher because of differences in evolutionary processes in the developement of cetaceans and humans - but we have no idea how much higher.** Therefore, it makes no sense to state - as the Navy does in it's defense of LFA sonar - that any sound level below 180 dB is basically safe. In fact, the Navy's criterion seems to be based only on auditory processes. **It does not consider possible effects of bubble growth in supersaturated blood.**

It should also be pointed out that the joint NOAA/Navy interim report on the Bahamas strandings (Reference 5) stresses the existence and importance of a surface duct leading to an increased sound level close to the surface of the ocean. Consider a whale that has dived deep and has stayed down for a long time. Then it swims upwards into a surface duct. Within the duct both the sound level and the degree of supersaturation of the whale's blood are near their maximum values. **Hence conditions in the duct are close to optimum for bubble activation by the sonar sound wave and growth by static diffusion.**

Furthermore, if a surface duct indeed exists, It makes it less likely that air-space resonances of sinus cavities could have significantly contributed to the Bahamas strandings since most such resonances would occur in deep water (far below the surface duct) where the sonar sound level would be greatly attenuated. However, read the note added immediately below.

Note added on 4-30-02:

Simultaneous occurrence of Resonance and Bubble Activation.

At the NMFS workshop on April 24-25, 2002, I presented some results on the variation of the displacement of the surface of a free bubble at resonance as a function of depth. I considered a range of bubble volumes at the surface which could be related to various sinus cavities of cetaceans. It turned out that the larger air spaces resonated at greater depths and with correspondingly lower displacements. For example, for an 835 cc surface volume (like that of a ptergoid sinus cavity of a beaked whale), resonance occurred at a depth of about 4600 ft. with a displacement of less than 0.4 microns. This result is somewhat counter-intuitive and argues against tissue damage due to resonance occurring at great depths.

However, the displacement at resonance of smaller air spaces (such as the middle ear), could be on the order of a few microns in shallow water making tissue damage somewhat more likely in these air spaces. Although this displacement may not actually be great enough to directly cause tissue damage, it would lead to increased "shaking" of bubble nuclei in the spongy tissue

COMMENT NUMBER
D-E-0397 (cont.)

adjacent to the air space. This increased shaking could, in turn, lead to bubble activation. Thus, the mechanisms of air-space resonance and bubble activation could act together near the surface of the water.

Note added on 5-30-02:

Do Beaked whales decompress??

Also, at the NMFS workshop on April 24-25, 2002, Ken Balcomb pointed out that he has observed that beaked whales make several brief shallow dives (about 15 minutes at 60-90 ft. depth) following a long deep dive (about 1 hour at a great but unknown depth). Snorklers observed that the whales appeared to be resting during the shallow dives. Balcomb believes that the whales could be decompressing while resting - a process which they may have acquired during evolution to prevent them from getting the bends. In contrast, Balcomb has observed that Sperm whales only have to rest for awhile at the surface between deep dives. This implies that they have less of a problem with decompression than do Beaked whales or, alternatively, that they do not have to decompress at all. This difference in behavior between Beaked and Sperm whales implies a more successful evolutionary adaptation to minimizing bubble activation and growth in the latter species. **Nevertheless, Beaked whales do not appear to get the bends in the absence of sonar sound waves.**

Furthermore, if sonar-induced bubble activation and growth in shallow water indeed cause Beaked whales to get the bends, it is likely that they would experience pain and would not be in the mood to descend for their routine shallow water decompression. But even if they did descend to decompress before they experienced pain, their evolutionary developed decompression schedule would no longer apply because bubble formation and growth would have been a lot greater than under normal conditions. Finally, if they were exposed to a moderately loud sonar signal during a large part of their 15 minute decompression interval, rectified diffusion could further upset their evolutionary decompression schedule. Although bubble growth by rectified diffusion would be slow for a moderately low level sound wave, it might still be great enough over a long decompression interval to cause or contribute to the bends. In fact, it could partly compensate for the decreased rate of static diffusion relative to it's value at the surface. **This is one situation in which rectified diffusion caused by a moderately low level sound wave could conceivably play an important role.**

Reference 1: Can Diving-induced Tissue Nitrogen Supersaturation Increase the Chance of Acoustically Driven Bubble Growth in Marine Mammals?, D.S. Houser, R. Howard and S. Ridgway, Journal of Theoretical Biology, Pages 183-195, Vol 213, 2001. Also, posted for use of stoplfas members only. at http://groups.yahoo.com/group/stoplfas/files/Super%20Saturation/Houser.pdf

Reference 2: Acoustically enhanced bubble growth at low frequencies and its implications for human diver and marine mammal safety., L. Crum and Y Mao, Journal of Acoustical Society of America, Pages 2898-2907, Vol. 99, 1996.

Reference 3: Generation of Stabilized Microbubbles in Seawater., B. Johnson and R. Cooke, Science, Pages 209-213, Vol. 213, 1981.

Reference 4: Rectified Diffusion, L. Crum. Ultrasonics, Pages 216-224, Vol. 22, 1984.

Reference 5: Joint Interim Report Bahamas Marine Mammal Stranding Event of 15-16 March 2000. Available at http://www.nmfs.noaa.gov/prot_res/overview/New.html

Reference 6: Marine Mammals and Noise, Richardson, et al., Page 163, Academic Press, Inc. 1995,

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0397 (cont.)

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COMMENT NUMBER
D-E-0398

From: Marj Dente - Kapa'a, HI
To: deis hrc@govsupport.us
Subject: PMRF
Date: 9/17/2007 3:01:03 AM

1 I am totally against any further expansion of any military operations, equipment, land acquisition, and war games on Kauai. It is completely unnecessary and violates all Kanaka Maoli cultural practices. I am a resident and property owner since 1989.

Marj Dente, Kapa'a, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0399

From: Louis Korn - Naalehu, HI
To: deis hrc@govsupport.us
Subject: environmentally deadly R&D vs improving police intelligence
Date: 9/17/2007 3:26:15 AM

1 fMaintaining our military supremacy requires constant research and development of our war-fighting capability, which must not be allowed to destroy the environment our lives depend on, the reason for having a deis.

But the most modern weapons of mass destruction cannot protect us from dozens of determined people poisoning our water and food supplies, disabling transportation in any number of ways, disrupting vital communications, creating havoc in notoriously under protected nuclear facilities, etc. Such protection requires police intelligence vastly more sophisticated than our greatly resented blundering
airport and border check points.

Nevertheless, our annual multibillion dollar military R&D increasingly weakens and erodes our environmental protections, the ozone layer, and globally poisoning air, water, soil, and food, increasingly damaging the DNA of human and other species human life depends on. Many conditions are converging toward human extinction. Many credible biologists doubt the trend is reversible. Why, then continue in a direction that will, without doubt, take us over the brink?

Please confirm that this comment is received in your record.

Louis Korn, Naalehu HI

COMMENT NUMBER
D-E-0400

From: James V. Albertini - Ola'a (Kurtistown), HI
To: deis hrc@govsupport.us
Subject: Comments of Draft EIS for Hawaii Range Complex
Date: 9/17/2007 3:43:19 AM

Comments on Navy Hawaii Range Complex draft EIS

Testimony sent via email to deis_hrc@govsupport.us

Time for military Clean-Up NOY Build-Up! September 16, 2007

2 I do not support any military expansion in the Hawaii Range Complex. I reject both Alternatives 1 and 2, and I insist on protecting Hawaii (its land, its ocean, its wildlife, and its people) from further harm and degradation caused in large part by the U.S. military, which is the greatest polluter on earth. It is time for military clean up NOT further build up.

All of our mother's teach us to clean up after ourselves. It is a basic lesson in life. All of us need to take that lesson to heart, including the U.S. Military – the U.S. Navy.

The Navy says it takes environmental stewardship seriously. If that is the case,

Before the Navy considers Hawaii Range Complex increased Navy training, questions need to be answered.

3 1. When is the navy going to clean up the 750 contaminated sites, including superfund sites in Pearl Harbor?

2. When is the Navy going to clean up the more than 2000 fifty-five gallon drums of radioactive waste dumped to the ocean floor off Oahu as acknowledged in a Honolulu Star-Bulletin article entitled “Nuclear Waste” of 4 April 1979 by Star Bulletin writer Nadine Scott?

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
	D-E-0400 (cont.)
3. When is the Navy going to clean up the nuclear waste dumped directly into Pearl Harbor? The Navy Seas System Command acknowledged discharging 4,843,000 gallons of radioactive liquid waste into Pearl Harbor between 1964-1973, and then it stopped releasing the data.	
4. When is the navy going to address its cumulative environmental impacts in Hawaii starting from its direct involvement in the illegal overthrow of the independent nation of hawaii in 1893 when the USS Boston landed 183 armed marines with gattling guns to assist the sugar barons in the treasonous act against the lawful Hawaiian government of Queen Liliuokalani?	4
5. Actually the Navy dirty deeds started six years earlier when the Navy got exclusive use of Pearl Harbor as part of a deal under the so called Bayonet Constitution of 1887 when the sugar planters literally put the bayonets on King David Kalakaua to force concessions. The deal by the Sugar planters giving the U.S. Navy Pearl Harbor appears to have cemented the Navy backing of the Sugar planters in their overthrow of Queen Liliuokalani in 1893.	
One view of the cumulative impact of navy activities is reflected in a song entitled “Ballad of Pearl Harbor –Matthew 7:6”	
“Do not give what is holy to dogs or toss your pearls before swine. They will trample them under foot at best, and perhaps even tear you to shreds.” Matthew 7:6	
Some of the words to the song ….	
1. We showered you with our pearls but you wanted even more. You took away our mother pearl, raped, plundered, and trampled her. We were blinded by your breath of fire. You made us very proud. We worshipped you not knowing, we were losing our souls.	
(Chorus) Take back the pearl for the people, let mother pearl shine again, and	

	COMMENT NUMBER
	D-E-0400 (cont.)
give life back to the land, and welcome all of her rainbow children that bridge the ocean of peace.	
2. You poisoned the waters and destroyed the fishponds. You killed the fish and the oysters and desecrated holy lands. You put up fences and iron gates. You brought in disease and waves of death.	
3. We have been fools but our eyes are now opening. No longer will we worship you or follow in your ways. Depart from us with your poisoned quills and deadly unhatched eggs.	
Questions continued:	
6. Explain the big oyster kill in 1969 in Pearl Harbor and its relationship to the $80 million dollars in damage to the nuclear powered and armed aircraft carrier Enterprise that was brought into Pearl Harbor for emergency repairs after a rocket accidentally exploded onboard the ship in Hawaiian waters killing 24 and injuring more than 85. Is it a fact that Atomic Energy emergency teams were flown in to Hawaii because of that accident? Release full details of that accident.	5
7. Explain the link between the Navy low frequency navigation and communication towers in Lualualei Valley on the Waianae coast and the increase in Downs syndrome in the area.	6
8. When is the U.S. military going to clean up all the unexploded ordnance dumped off the South Kohala coast of Hawaii Island and on Hawaii Island? This one island has more than 57 former military sites, including a land area of 250,000 acres (9 Kaho`olawes in size) littered with unexploded bombs and military toxins. See Army Corps of engineers for details and a map produced by our organization.	3
9. Pohakuloa Training Area (PTA) on Hawaii Island has now been documented by the Army to be contaminated with Depleted Uranium (DU). Will the navy commit to no fire (live or otherwise) and other training at PTA that could create dust and thereby spread the DU? This action is urged in the interest of	7

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0400 (cont.)

community health and safety and the safety of military troops involved in training?

10. Where has the Navy used DU as weapons or ballast in Hawaii and the area in the Hawaii Range Complex and the overseas areas addressed in this OEIS? Please explain in detail the quantities used. 8

11. Navy sonar is reported to be 235dp. That's a lethal level for humans and perhaps other creatures as well. There should be no exemptions for the Navy operating in a whale/marine sanctuary and a marine monument. 1

IN SUMMARY, all of Hawaii (its land, its ocean, its wildlife, and its people) are in the same boat as the Ehime Maru, the Japanese training ship cut in half and sunk causing many deaths by a hot roding U.S. Navy submarine commander. It is time for the U.S. Navy to close its Hawaii Range Complex, pack its bags and ship out of the illegally occupied nation of Hawaii. On your way out, be sure to clean up after yourselves. You have left a big mess in your wake. Your mother, my mother, Mother earth herself, says enough!

It's time for Military Clean-up NOT build up!

James V. Albertini

President

Malu `Aina Center for Non-violent Education & Action

Ola`a (Kurtistown)

Kingdom of Hawaii

COMMENT NUMBER
D-E-0401

From: Susan Scott - Kapaa, HI
To: deis hrc@govsupport.us
Subject: Sonar Dangers

Date: 9/17/2007 4:14:39 AM

Re NMFS study:

I would like to express my concern about the Navy's opinion regarding sacrificing a few whales for their war games. The idea that marine life is expendable for the cause of war games is morally reprehensible. 1

These gentle giants depend on their sense of sound to survive. The blasts of sound from sonar tests causes an agonizingly painful reaction in whales and dolphins and in some cases the blasts result in standings and death. These cases have been well documented. Can't the Navy restrict it's exercises to areas of the seas where whales are not known to congregate? Hawaii is their traditional breeding territory and as such not a sensible or responsible area to conduct war games.

I urge the Navy to act responsibly and immediately adopt common-sense measures to keep whales safe. The Navy should be the protectors of the sea including all marine life. Mid-frequency sonar causes pain and death and should be used as sparingly as possible and only in extenuating circumstances in areas of the sea not known to harbor marine mammals.

Thank you,
Susan Scott

Kapaa, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0402

From: Gia Baiocchi
To: deis hrc@govsupport.us
Subject:
Date: 9/17/2007 5:22:55 AM

Aloha. I am writing in protest of the DEIS. It is my belief that increasing military presence is undesirable and unnecessary. The islands of Hawaii are not a war zone and there is absolutely no need to expand the military operations in this area. It has already been proven that research and development has done nothing more than damage the environment and all of its inhabitants. The earth, air and sea are much healthier, happier places without the presence of the military. I do not support any kind of expansion at the Pacific Missile Range Facility in Kauai. I promote and encourage peace and compassion. 1

Mahalo nui loa. Mahalo ke akua.
Gia Baiocchi

COMMENT NUMBER
D-E-0403

From: Judith Altemus
To: deis hrc@govsupport.us
Subject: Protect Marine Animals
Date: 9/17/2007 9:37:03 AM

To whom it may concern,

I urge the U.S. Navy to stop needlessly inflicting harm on whales and other ocean life with its use of high-intensity, mid-frequency sonar in its training exercises. 1

Whales, dolphins and other marine mammals depend on sound to navigate, find food, locate mates, avoid predators and communicate with each other. Blasting their environment with intense sound over large expanses of ocean disrupts these critical behaviors and threatens their survival.

Sonar also harms whales more directly: Navy exercises using mid-frequency sonar have resulted in whale strandings across the globe, including along the coasts of Washington State, the Canary Islands, the Bahamas, Madeira, the U.S. Virgin Islands and Greece. A recent whale stranding death in Hawaii, which occurred when a large pod of whales was driven in panic to shallow waters, took place with Navy sonar exercises nearby and may be the latest in this string of sonar casualties.

Whales should not have to die for military training. The Navy can no longer ignore the unnecessary harm inflicted by this technology. I urge the Navy to immediately adopt common-sense measures to keep whales safe.

Thank you

Judith Altemus

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0404

From: Robin W. Baird - Olympia, WA
To: deis hrc@govsupport.us
Subject: comments on the Hawaii Range Complex Draft EIS/OEIS
Date: 9/17/2007 11:25:06 AM

Please find attached my comments on the Hawaii Range Complex Draft Environmental Impact Assessment. In addition I have pasted my comments below.

September 17, 2007

Public Affairs Officer
Pacific Missile Range Facility

P.O. Box 128

Kekaha, HI 96752

Dear Sir or Madam,

I am writing in regards to the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (HRC DEIS/OEIS) for the Hawai'i Range Complex (Fed Reg 72(149):43251-43252). In terms of my background relevant to this issue, I have been studying cetaceans since 1986, have a Ph.D. in Biology (1994), served as a member of the IUCN Cetacean Specialist Group (1992-1998), the Committee of Scientific Advisors for the Society for Marine Mammalogy (1995-2001), and the Marine Mammal Advisory Committee of the Western Pacific Fishery Management Council (2005-present), and have been undertaking research on cetacean populations around the main Hawaiian Islands since 1999. My research in Hawaiian waters has involved examining stock structure, estimating population sizes, and studying diving behavior, ecology and social organization of more than 10 species of odontocetes, as well as studies of the diving behavior of humpback whales. I have published a number of papers and reports pertinent to understanding potential impacts of anthropogenic activities on these populations (see www.cascadiaresearch.org/robin/hawaii.htm). In addition, I have reviewed relevant sections of the HRC DEIS/OEIS, the Navy's Programmatic Environmental Assessment/Overseas Environmental Assessment and Finding of No Significant Impact for the USWEX exercises, the After-Action Report from RIMPAC 2006, and most publications and reports available on cetacean populations in Hawaiian waters, among other documents. I have a number of concerns regarding the analyses and measures outlined in the HRC DEIS/OEIS in regards to potential impacts on marine mammal populations, outlined below.

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D-E-0404 (cont.)

1. Do the lack of documented strandings associated with prior naval exercises in Hawai'i mean no impacts have occurred? 6

The HRC DEIS/OEIS bases conclusions on the potential for impacts from future naval exercises in Hawai'i in part on the relative lack of observed impacts from prior naval exercises. Faerber and Baird (2007a, 2007b) address the question of whether the lack of beaked whale strandings in Hawai'i in relation to military exercises mean no impacts have occurred. A number of recent cetacean strandings have been linked to naval exercises, particularly involving mid-frequency sonar. Two species most affected are Cuvier's and Blainville's beaked whales. In 22 years there have been six such strandings in the Canary Islands, yet none have occurred in the Hawaiian Islands, despite the existence of regular naval exercises in the islands and resident populations of both species of beaked whales (McSweeney et al. 2007). The HRC DEIS/OEIS and other assessments of potential impacts of ongoing naval exercises in Hawai'i have used the lack of mass strandings to imply that there have been no past impacts. Faerber and Baird (2007a, 2007b) hypothesize that the likelihood of a dead or moribund beaked whale stranding, and the probability of a stranded animal being detected, differ between the Canary and Hawaiian Islands. They examined near-shore bathymetry, shoreline slope, human population densities, fringing reef presence, ocean currents, sea surface temperature, and the presence of large scavenging sharks. The Canary Islands have a greater

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

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	D-E-0404 (cont.)
proportion of beaked whale "habitat" (depths >650 m) closer to shore (10.6% versus 6.3% within 3-km of shore), with a steeper slope (avg. slope Canaries - 134m/km, Hawai'i -95 m/km). Hawai'i is dominated by steeper (>50°) shoreline cliffs (6% of shorelines vs. <1% for Canaries), human population density is 28% of that in the Canaries, and population per kilometer of shoreline is 53% of that in the Canaries. Fringing reefs are common around the main Hawaiian Islands, while such reefs do not form in the Canaries. Suitable habitat closer to shore, more accessible coastlines, lack of fringing reefs, lower water temperature with slower currents, and increased human population densities all suggest moribund or dead beaked whales are more likely to strand and be detected in the Canary Islands than in the Hawaiian Islands. Faerber and Baird (2007b) thus conclude that a lack of mass strandings in the Hawaiian Islands cannot be used to indicate a lack of impact.	
In addition, a lack of sightings of dead floating whales or dolphins in monitoring efforts does not indicate that animals have not been killed. Most species of whales and dolphins (with the exception of sperm whales and right whales) usually sink upon death. If animals die in shallow water, decomposition processes may eventually result in the carcass re-floating (where it has a chance of being detected). In deep waters, however, increased hydrostatic pressure and differences in gas solubility may prevent carcasses from re-floating (Allison et al. 1991). Given that beaked whales and other potentially at risk species typically inhabit deep waters in Hawai'i, if an individual is killed the carcass may not re-float where it could be detected.	
2. Is the Hanalei Bay melon-headed whale embayment associated with RIMPAC 2006 related to the Rota sighting?	2
The HRC DEIS/OEIS notes that (page 4-28) "A simultaneous "stranding" of 500 to 700 melon headed whales and Risso's dolphins occurred at Sasanhaya Bay, Rota, in the Northern Marianas Islands on the same morning as the Hanalei stranding", and suggest that this is in some way related to the embayment of melon-headed whales at Hanalei Bay associated with the RIMPAC 2006 exercise. It is factually incorrect to consider the sighting reported by Jefferson	

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	D-E-0404 (cont.)
et al. (2006) as a "stranding", as the whales were first seen in a water depth of 77 m and moved into deeper water as the sighting progressed. Additionally, as noted by Ligon et al. (2007), inferring habitat preferences from other populations may be misleading, given population-level variability in habitat use. To assess melon-headed whale habitat preferences specific to the main Hawaiian Islands, Ligon et al. (2007) examined 2,515 hours of search effort between 2000-2006 for sighting depths and distance-from-shore. They recorded 23 melon-headed whale encounters with depths from 148-4,779m (median = 1,610m); distance-from-shore values ranged from 3.0-41.2km, (median = 9.8km). While over 55% of effort (1,402 hours) was in waters <1,000m, only 21.7% of melon-headed whale sightings occurred in this range. At a finer resolution, 811 hours (32.2 %) were spent searching waters <200m with only one melon-headed whale encounter (4.3%). For distance-from-shore values, 43.5% of sightings occurred between 5-10km from shore; only 17.4% occurred in waters <5km; and none less than 3km. Consequently, when normalized against per-unit-effort, sighting rates were 4.5 times higher in depths >1000m and 3.1 times higher for sightings >20km from shore, indicating that melon-headed whales show a preference for deeper, offshore waters. Therefore, Ligon et al. (2007) conclude that the occurrence of melon-headed whales in the shallow waters of Hanalei Bay should be considered abnormal behavior within the main Hawaiian Islands.	
3. Mitigation measures outlined are ineffective at detecting long-diving and cryptic species	3
The HRC DEIS/OEIS assumes that the measures it proposes will mitigate impacts on marine mammals. The mitigation measures outlined (Sec. 4.1.2.4.12) primarily involve a combination of visual and passive acoustic detection methods for the presence of marine mammals around vessels operating mid-frequency active sonar. However, a number of species of odontocetes found in Hawaiian waters dive for extended periods. For example, Blainville's and Cuvier's beaked whales have been documented diving for periods of up to 83 and 94 minutes, respectively (Baird et al. 2006, Baird unpublished), and regularly dive for periods of 50-60 minutes. Short-finned pilot whales may dive for periods of up to 27 minutes in Hawai'i (Baird unpublished), and dwarf and pygmy sperm whales dive for extended periods (>10 minutes).	

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

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D-E-0404 (cont.)

According to the best available estimates, fewer than 2% of beaked whales would likely be detected by visual observations as outlined in the HRC DEIS/OEIS, even when directly on the ship's trackline (Barlow and Gisiner 2006). The detection rate would approach zero for beaked whales occurring one km away (Barlow and Gisiner 2006). The HRC DEIS/OEIS suggest that monitoring by passive sonar would allow detection of cetaceans, however the probability of locating all or most toothed whales through passive acoustic monitoring is extremely low. There is currently no information available on the sounds produced by some species of Hawaiian odontocetes (e.g., dwarf sperm whales) so it would be impossible to train passive sonar operators to detect these sounds. No information is available on the proportion of time individuals of most species spend producing sounds, of the sound pressure levels of vocalizations (and thus the potential distance at which they might be detected), or on the depths at which sounds are produced (some species, such as beaked whales, may only vocalize at depth). Information presented in the RIMPAC 2006 After Action Report documents the ineffectiveness of the Navy's passive acoustic monitoring. In this report is it noted that there were 29 instances where marine mammals were detected, 28 visually (at least 20 from ships) and only one acoustically. The fact that there was only a single acoustic detection and at least 20 ship-based visual detections indicates that passive acoustics are unlikely to be an effective means of monitoring marine mammal presence (and thus mitigating impacts) around naval vessels in Hawai'i. Given that passive acoustics are the primary method the Navy intends to use to detect marine mammals at night (and thus mitigate impacts), impacts at night will be impossible to avoid. 7

4. Estimated exposures for non-ESA species for the no-action alternative (4.1.2.5.3) misrepresent the likelihood of detecting species. 4

Species accounts in this section continually assume that "whales that migrate into the Hawaii OPAREA would be detected by visual observers". This statement is not supported by available scientific evidence for most species of small/mid-sized cetaceans, particularly given that the HRC DEIS/OEIS assumes that observers on Navy vessels will have similar abilities to detect cetaceans as experienced observers on NMFS surveys. For minke whales, Rankin et al. (2007) found that visual surveys alone had underestimated the

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minke whale population around the Hawaiian Islands, because "minke whales are notoriously difficult to detect using visual methods due to their small size, short surfacing intervals, and lack of visual blow". Given this, the statement that "it is very likely that lookouts would detect a group of minke whales at the surface" (HRC DEIS/OEIS, page 4-113) in monitoring efforts misrepresents the likelihood that minke whales will be detected with visual monitoring efforts. The same is true for most other species of small/mid-sized cetaceans in Hawaiian waters.

5. The HRC DEIS/OEIS does not fully take into account evidence of population structure when assessing risks to populations. 5

Understanding and predicting the impacts of anthropogenic activities on protected species such as marine mammals requires knowledge of population structure. If populations are fragmented into a number of smaller demographically isolated units, and some of these units are more exposed to anthropogenic activities, the impacts of anthropogenic activities on populations may be greater than otherwise predicted. In Hawaiian waters, population structure has been examined for only four species of odontocetes: false killer whales, short-finned pilot whales, bottlenose dolphins, and spinner dolphins. Genetic evidence from all four of these species indicates the presence of demographically-isolated island-associated populations (Andrews et al. 2006; Chivers et al. 2003, 2007; Martien et al. 2005). Given the high levels of site fidelity that have been documented for melon-headed whales, pygmy killer whales, Blainville's beaked whales, Cuvier's beaked whales, and rough-toothed dolphins (Huggins et al. 2005; McSweeney et al. 2005, 2007; Webster et al. 2005), it is likely that if sufficient genetic samples were available from these populations there would be similar evidence of demographically isolated island-associated populations. As such, instead of potentially impacting a small proportion of a number of widely-ranging populations of odontocetes, naval exercises around the main Hawaiian Islands have the potential to impact a large proportion of individuals in a number of relatively small island-associated populations. High levels of site fidelity documented from photo-identification suggest that if individuals were killed due to anthropogenic activities re-colonization from other populations would not occur quickly.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

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1

6. Data collected as part of the marine mammal exercise monitoring plan should be used to assess the effectiveness of the monitoring effort.

The HRC DEIS/OEIS notes that U.S. Navy lookout watchstander reports (page 6-22) will be the primary data to be evaluated to examine the effectiveness of the monitoring. In particular, the "quality of the data" (line 17, page 6-25) will be examined to assess whether species were identified and animals that were exposed were detected, but no information is presented on how this will be done. Information presented in the RIMPAC After Action Report was insufficient to assess the efficacy of the visual monitoring, because no information was presented on the number of hours of visual monitoring that was undertaken by each vessel. To assess the efficacy of such visual monitoring, information on effort (number of vessels, number of observers, number of hours observed, and sea conditions during observations), and the number of sightings of each species must be recorded and reported. This would allow independent assessment of the efficacy of the monitoring, by comparing sighting rates (by species) to independent survey data from the Hawaiian Islands, to estimate what proportion of marine mammals in the operating area the observers are detecting.

Sincerely,

Robin W. Baird, Ph.D.

Research Biologist

References

COMMENT NUMBER
D-E-0404 (cont.)

Allison, P.A., C.R. Smith, H. Kukert, J.W. Deming, and B.A. Bennett. 1991. Deep-water taphonomy of vertebrate carcasses: a whale skeleton in the bathyal Santa Catalina Basin. Paleobiology 17:78-89.

Andrews, K.R., L. Karczmarski, W.W.L. Au, S.H. Rickards, C.A. Vanderlip and R.J. Toonen. 2006. Patterns of genetic diversity of the Hawaiian spinner dolphin (Stenella longirostris). Atoll Research Bulletin 543:65-73.

Baird, R.W., D.L. Webster, D.J. McSweeney, A.D. Ligon, G.S. Schorr, and J. Barlow. 2006. Diving behaviour of Cuvier's (Ziphius cavirostris) and Blainville's (Mesoplodon densirostris) beaked whales in Hawai'i. Canadian Journal of Zoology 84:1120-1128.

Barlow, J., and R. Gisiner. 2006. Mitigating, monitoring and assessing the effects of anthropogenic sound on beaked whales. Journal of Cetacean Research and Management 7:239-249.

Chivers, S.J., R.G. LeDuc and R.W. Baird. 2003. Hawaiian island populations of false killer whales and short-finned pilot whales revealed by genetic analyses. In Abstracts of the 15th Biennial Conference on the Biology of Marine Mammals, Greensboro, NC, December 2003.

Chivers, S.J., R.W. Baird, D.J. McSweeney, D.L. Webster, N.M. Hedrick, and J.C. Salinas. 2007. Genetic variation and evidence for population structure in eastern North Pacific false killer whales (Pseudorca crassidens). Canadian Journal of Zoology 85:783-794.

Faerber, M.M., and R.W. Baird. 2007a. Beaked whale strandings in relation to

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

military exercises: a comparison between the Canary and Hawaiian Islands. Presentation at the 21st Annual Conference of the European Cetacean Society, San Sebastian, Spain, April 22-27, 2007. Presentation available at www.cascadiaresearch.org/robin/hawaii.htm

Faerber, M.M., and R.W. Baird. 2007b. Does a lack of beaked whale strandings in relation to military exercises mean no impacts have occurred? A comparison of stranding and detection probabilities in the Canary and Hawaiian Islands. Abstract submitted to the 18th Biennial Conference on the Biology of Marine Mammals, Cape Town, South Africa, November-December 2007. (accepted for an oral presentation)

Huggins, J., R.W. Baird, D.L. Webster, D.J. McSweeney, G.S. Schorr and A.D. Ligon. 2005. Inter-island movements and re-sightings of melon-headed whales within the Hawaiian archipelago. Presentation at the 16th Biennial Conference on the Biology of Marine Mammals, San Diego, CA, December 2005.

Jefferson, T.A., D. Fertl, M. Michael, and T.D. Fagin. 2006. An unusual encounter with a mixed school of melon-headed whales (Peponocephala electra) and rough-toothed dolphins (Steo bredanensis) at Rota, Northern Mariana Islands. Micronesica 38:239-244.

Ligon, A.D., R.W. Baird, D.L. Webster, D.J. McSweeney, G.S. Schorr. 2007. Habitat preferences of melon-headed whales (Peponocephala electra) around the main Hawaiian Islands: implications for interpretation of the 2004 Hanalei Bay stranding event. Abstract submitted to the 18th Biennial Conference on the Biology of Marine Mammals, Cape Town, South Africa, November-December 2007. (accepted for a poster presentation)

Martien, K.K., R.W. Baird and K.M. Robertson. 2005. Population structure of

COMMENT NUMBER

D-E-0404 (cont.)

bottlenose dolphins (Tursiops sp.) around the main Hawaiian Islands. Presentation at the 16th Biennial Conference on the Biology of Marine Mammals, San Diego, CA, December 2005.

McSweeney, D.J., R.W. Baird, D.L. Webster, G.S. Schorr and S.D. Mahaffy. 2005. Requirements for conservation action? Small population size, high site-fidelity, strong associations, and uncertainty: pygmy killer whales off the island of Hawai'i. Presentation at the 16th Biennial Conference on the Biology of Marine Mammals, San Diego, CA, December 2005.

McSweeney, D.J., R.W. Baird and S.D. Mahaffy. 2007. Site fidelity, associations and movements of Cuvier's (Ziphius cavirostris) and Blainville's (Mesoplodon densirostris) beaked whales off the island of Hawai'i. Marine Mammal Science 23:666-687.

Rankin, S., T.F. Norris, M.A. Smultea, C. Oedekoven, A.M. Zoidis, E. Silva, and J. Rivers. 2007. A visual sighting and acoustic detections of minke whales, Balaenoptera acutorostrata (Cetacea: Balaenopteridae), in nearshore Hawaiian waters. Pacific Science 61:395-398.

Webster, D.L., R.W. Baird, D.J. McSweeney, A.D. Ligon and G.S. Schorr. 2005. High site-fidelity of a deep-water dolphin: rough-toothed dolphins in the Hawaiian archipelago. Presentation at the 16th Biennial Conference on the Biology of Marine Mammals, San Diego, CA, December 2005

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Robin W. Baird, Ph.D.
Research Biologist
Cascadia Research Collective

Olympia, WA

COMMENT NUMBER

D-E-0404 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

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D-E-0404 (cont.)

Cascadia Research Collective
a non-profit research organization

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September 17, 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, HI 96752

Dear Sir or Madam,

I am writing in regards to the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (HRC DEIS/OEIS) for the Hawai'i Range Complex (Fed Reg 72(149):43251-43252). In terms of my background relevant to this issue, I have been studying cetaceans since 1986, have a Ph.D. in Biology (1994), served as a member of the IUCN Cetacean Specialist Group (1992-1998), the Committee of Scientific Advisors for the Society for Marine Mammalogy (1995-2001), and the Marine Mammal Advisory Committee of the Western Pacific Fishery Management Council (2005-present), and have been undertaking research on cetacean populations around the main Hawaiian Islands since 1999. My research in Hawaiian waters has involved examining stock structure, estimating population sizes, and studying diving behavior, ecology and social organization of more than 10 species of odontocetes, as well as studies of the diving behavior of humpback whales. I have published a number of papers and reports pertinent to understanding potential impacts of anthropogenic activities on these populations (see www cascadiaresearch.org/robin/hawaii.htm). In addition, I have reviewed relevant sections of the HRC DEIS/OEIS, the Navy's Programmatic Environmental Assessment/Overseas Environmental Assessment and Finding of No Significant Impact for the USWEX exercises, the After-Action Report from RIMPAC 2006, and most publications and reports available on cetacean populations in Hawaiian waters, among other documents. I have a number of concerns regarding the analyses and measures outlined in the HRC DEIS/OEIS in regards to potential impacts on marine mammal populations, outlined below.

1. Do the lack of documented strandings associated with prior naval exercises in Hawai'i mean no impacts have occurred?

The HRC DEIS/OEIS bases conclusions on the potential for impacts from future naval exercises in Hawai'i in part on the relative lack of observed impacts from prior naval exercises. Faerber and Baird (2007a, 2007b) address the question of whether the lack of beaked whale strandings in Hawai'i in relation to military exercises mean no impacts have occurred. A number of recent cetacean strandings have been linked to naval exercises, particularly involving mid-frequency sonar. Two species most affected are Cuvier's and Blainville's beaked whales. In 22 years there have been six such strandings in the Canary Islands, yet none have occurred in the Hawaiian Islands, despite the existence of regular naval exercises in the islands and resident populations of both species of beaked whales (McSweeney et al. 2007). The HRC DEIS/OEIS and other assessments of potential impacts of ongoing naval exercises in Hawai'i have used the lack of mass strandings to imply that there have been no past impacts. Faerber and Baird (2007a,

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2007b) hypothesize that the likelihood of a dead or moribund beaked whale stranding, and the probability of a stranded animal being detected, differ between the Canary and Hawaiian Islands. They examined near-shore bathymetry, shoreline slope, human population densities, fringing reef presence, ocean currents, sea surface temperature, and the presence of large scavenging sharks. The Canary Islands have a greater proportion of beaked whale "habitat" (depths >650 m) closer to shore (10.6% versus 6.3% within 3-km of shore), with a steeper slope (avg. slope Canaries -134m/km, Hawai'i -95 m/km). Hawai'i is dominated by steeper (>50°) shoreline cliffs (6% of shorelines vs. <1% for Canaries), human population density is 28% of that in the Canaries, and population per kilometer of shoreline is 53% of that in the Canaries. Fringing reefs are common around the main Hawaiian Islands, while such reefs do not form in the Canaries. Suitable habitat closer to shore, more accessible coastlines, lack of fringing reefs, lower water temperature with slower currents, and increased human population densities all suggest moribund or dead beaked whales are more likely to strand and be detected in the Canary Islands than in the Hawaiian Islands. Faerber and Baird (2007b) thus conclude that a lack of mass strandings in the Hawaiian Islands cannot be used to indicate a lack of impact.

In addition, a lack of sightings of dead floating whales or dolphins in monitoring efforts does not indicate that animals have not been killed. Most species of whales and dolphins (with the exception of sperm whales and right whales) usually sink upon death. If animals die in shallow water, decomposition processes may eventually result in the carcass re-floating (where it has a chance of being detected). In deep waters, however, increased hydrostatic pressure and differences in gas solubility may prevent carcasses from re-floating (Allison et al. 1991). Given that beaked whales and other potentially at risk species typically inhabit deep waters in Hawai'i, if an individual is killed the carcass may not re-float where it could be detected.

2. Is the Hanalei Bay melon-headed whale embayment associated with RIMPAC 2006 related to the Rota sighting?

The HRC DEIS/OEIS notes that (page 4-28) "A simultaneous "stranding" of 500 to 700 melon headed whales and Risso's dolphins occurred at Sasanhaya Bay, Rota, in the Northern Marianas Islands on the same morning as the Hanalei stranding", and suggest that this is in some way related to the embayment of melon-headed whales at Hanalei Bay associated with the RIMPAC 2006 exercise. It is factually incorrect to consider the sighting reported by Jefferson et al. (2006) as a "stranding", as the whales were first seen in a water depth of 77 m and moved into deeper water as the sighting progressed. Additionally, as noted by Ligon et al. (2007), inferring habitat preferences from other populations may be misleading, given population-level variability in habitat use. To assess melon-headed whale habitat preferences specific to the main Hawaiian Islands, Ligon et al. (2007) examined 2,515 hours of search effort between 2000-2006 for sighting depths and distance-from-shore. They recorded 23 melon-headed whale encounters with depths from 148-4,779m (median = 1,610m); distance-from-shore values ranged from 3.0-41.2km, (median = 9.8km). While over 55% of effort (1,402 hours) was in waters <1,000m, only 21.7% of melon-headed whale sightings occurred in this range. At a finer resolution, 811 hours (32.2 %) were spent searching waters <200m with only one melon-headed whale encounter (4.3%). For distance-from-shore values, 43.5% of sightings occurred between 5-10km from shore; only 17.4% occurred in waters <5km; and none less than 3km. Consequently, when normalized against per-unit-effort, sighting rates were 4.5 times higher in depths >1000m and 3.1 times higher for sightings >20km from shore, indicating that melon-headed whales show a preference for deeper, offshore waters. Therefore, Ligon et al. (2007) conclude that the

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

occurrence of melon-headed whales in the shallow waters of Hanalei Bay should be considered abnormal behavior within the main Hawaiian Islands.

3. Mitigation measures outlined are ineffective at detecting long-diving and cryptic species

The HRC DEIS/OEIS assumes that the measures it proposes will mitigate impacts on marine mammals. The mitigation measures outlined (Sec. 4.1.2.4.12) primarily involve a combination of visual and passive acoustic detection methods for the presence of marine mammals around vessels operating mid-frequency active sonar. However, a number of species of odontocetes found in Hawaiian waters dive for extended periods. For example, Blainville's and Cuvier's beaked whales have been documented diving for periods of up to 83 and 94 minutes, respectively (Baird et al. 2006, Baird unpublished), and regularly dive for periods of 50-60 minutes. Short-finned pilot whales may dive for periods of up to 27 minutes in Hawai'i (Baird unpublished), and dwarf and pygmy sperm whales dive for extended periods (>10 minutes). According to the best available estimates, fewer than 2% of beaked whales would likely be detected by visual observations as outlined in the HRC DEIS/OEIS, even when directly on the ship's trackline (Barlow and Gisiner 2006). The detection rate would approach zero for beaked whales occurring one km away (Barlow and Gisiner 2006). The HRC DEIS/OEIS suggest that monitoring by passive sonar would allow detection of cetaceans, however the probability of locating all or most toothed whales through passive acoustic monitoring is extremely low. There is currently no information available on the sounds produced by some species of Hawaiian odontocetes (e.g., dwarf sperm whales) so it would be impossible to train passive sonar operators to detect these sounds. No information is available on the proportion of time individuals of most species spend producing sounds, of the sound pressure levels of vocalizations (and thus the potential distance at which they might be detected), or on the depths at which sounds are produced (some species, such as beaked whales, may only vocalize at depth). Information presented in the RIMPAC 2006 After Action Report documents the ineffectiveness of the Navy's passive acoustic monitoring. In this report is it noted that there were 29 instances where marine mammals were detected, 28 visually (at least 20 from ships) and only one acoustically. The fact that there was only a single acoustic detection and at least 20 ship-based visual detections indicates that passive acoustics are unlikely to be an effective means of monitoring marine mammal presence (and thus mitigating impacts) around naval vessels in Hawai'i. Given that passive acoustics are the primary method the Navy intends to use to detect marine mammals at night (and thus mitigate impacts), impacts at night will be impossible to avoid.

4. Estimated exposures for non-ESA species for the no-action alternative (4.1.2.5.3) misrepresent the likelihood of detecting species.

Species accounts in this section continually assume that "whales that migrate into the Hawaii OPAREA would be detected by visual observers". This statement is not supported by available scientific evidence for most species of small/mid-sized cetaceans, particularly given that the HRC DEIS/OEIS assumes that observers on Navy vessels will have similar abilities to detect cetaceans as experienced observers on NMFS surveys. For minke whales, Rankin et al. (2007) found that visual surveys alone had underestimated the minke whale population around the Hawaiian Islands, because "minke whales are notoriously difficult to detect using visual methods due to their small size, short surfacing intervals, and lack of visual blow". Given this, the statement that "it is very likely that lookouts would detect a group of minke whales at the surface" (HRC DEIS/OEIS, page 4-113) in monitoring efforts misrepresents the likelihood that

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minke whales will be detected with visual monitoring efforts. The same is true for most other species of small/mid-sized cetaceans in Hawaiian waters.

5. The HRC DEIS/OEIS does not fully take into account evidence of population structure when assessing risks to populations.

Understanding and predicting the impacts of anthropogenic activities on protected species such as marine mammals requires knowledge of population structure. If populations are fragmented into a number of smaller demographically isolated units, and some of these units are more exposed to anthropogenic activities, the impacts of anthropogenic activities on populations may be greater than otherwise predicted. In Hawaiian waters, population structure has been examined for only four species of odontocetes: false killer whales, short-finned pilot whales, bottlenose dolphins, and spinner dolphins. Genetic evidence from all four of these species indicates the presence of demographically-isolated island-associated populations (Andrews et al. 2006; Chivers et al. 2003, 2007; Martien et al. 2005). Given the high levels of site fidelity that have been documented for melon-headed whales, pygmy killer whales, Blainville's beaked whales, Cuvier's beaked whales, and rough-toothed dolphins (Huggins et al. 2005; McSweeney et al. 2005, 2007; Webster et al. 2005), it is likely that if sufficient genetic samples were available from these populations there would be similar evidence of demographically isolated island-associated populations. As such, instead of potentially impacting a small proportion of a number of widely-ranging populations of odontocetes, naval exercises around the main Hawaiian Islands have the potential to impact a large proportion of individuals in a number of relatively small island-associated populations. High levels of site fidelity documented from photo-identification suggest that if individuals were killed due to anthropogenic activities re-colonization from other populations would not occur quickly.

6. Data collected as part of the marine mammal exercise monitoring plan should be used to assess the effectiveness of the monitoring effort.

The HRC DEIS/OEIS notes that U.S. Navy lookout watchstander reports (page 6-22) will be the primary data to be evaluated to examine the effectiveness of the monitoring. In particular, the "quality of the data" (line 17, page 6-25) will be examined to assess whether species were identified and animals that were exposed were detected, but no information is presented on how this will be done. Information presented in the RIMPAC After Action Report was insufficient to assess the efficacy of the visual monitoring, because no information was presented on the number of hours of visual monitoring that was undertaken by each vessel. To assess the efficacy of such visual monitoring, information on effort (number of vessels, number of observers, number of hours observed, and sea conditions during observations), and the number of sightings of each species must be recorded and reported. This would allow independent assessment of the efficacy of the monitoring, by comparing sighting rates (by species) to independent survey data from the Hawaiian Islands, to estimate what proportion of marine mammals in the operating area the observers are detecting.

Sincerely,

Robin W. Baird, Ph.D.
Research Biologist

COMMENT NUMBER

D-E-0404 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0404 (cont.)

References

Allison, P.A., C.R. Smith, H. Kukert, J.W. Deming, and B.A. Bennett. 1991. Deep-water taphonomy of vertebrate carcasses: a whale skeleton in the bathyal Santa Catalina Basin. Paleobiology 17:78-89.

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Jefferson, T.A., D. Fertl, M. Michael, and T.D. Fagin. 2006. An unusual encounter with a mixed school of melon-headed whales (*Peponocephala electra*) and rough-toothed dolphins (*Steo bredanensis*) at Rota, Northern Mariana Islands. Micronesica 38:239-244.

Ligon, A.D., R.W. Baird, D.L. Webster, D.J. McSweeney, G.S. Schorr. 2007. Habitat preferences of melon-headed whales (*Peponocephala electra*) around the main Hawaiian

COMMENT NUMBER
D-E-0404 (cont.)

Islands: implications for interpretation of the 2004 Hanalei Bay stranding event. Abstract submitted to the 18th Biennial Conference on the Biology of Marine Mammals, Cape Town, South Africa, November-December 2007. (accepted for a poster presentation)

Martien, K.K., R.W. Baird and K.M. Robertson. 2005. Population structure of bottlenose dolphins (*Tursiops sp.*) around the main Hawaiian Islands. Presentation at the 16th Biennial Conference on the Biology of Marine Mammals, San Diego, CA, December 2005.

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Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0405

From: Katy Rose - Hanalei, HI
To: deis hrc@govsupport.us
Subject: Public Comment - EIS
Date: 9/17/2007 11:26:37 AM

To Whom It May Concern:

I stand firmly opposed to the Navy's plans for expansion of training operations at the Hawai'i Range Complex and Pacific Missile Range Facility.

The history of environmental degradation caused by such training exercises around the world leaves no doubt that the plans of the Navy to expand training exercises will cause irreparable harm.

2 Mid-frequency soanr will destroy uncountable numbers of fish and marine mammals.

3 Expeditionary Assault Activities will tear up beaches and dunes between Polihale and Barking Sands.

Further, I would like to quote Juan Wilson, a Kaua'i citizen who has studied the EIS extensively:

"Worse is the Directed Energy Laser Weapons Program. These are chemical lasers in which use hydrogen fluoride, a corrosive material which can be made to release a powerful burst of infrared radiation. The laser can be focused and aimed as a weapon (death ray). These laser can generate least 25 megawatts of energy that could destroy a missile 2,000 miles away. For the scale of this realize 25megawatts is half the electrical power generating capacity of Kauai. The firing of this weapon also destroys the lasing device and contaminates its site with hydrogen fluoride. A thousand foot radius danger zone, that could close the state park, will persist for days.

The Navy has not told us what effect on the environment hydrogen fluoride waste will have. What if there is a heavy rain and runoff after a test? What effect on coral reefs and offshore marine life would there be from hydrogen fluoride contaminated runoff into the ocean? What efforts will guarantee the safety of people using the access road to Poli Hale State Park after a test?

COMMENT NUMBER
D-E-0405 (cont.)

In its Navy's EIS executive summary it simply says, "Appropriate remedial procedures would be taken before initiation of potentially hazardous laser operations on PMRF".

That's it?!! That is unacceptable. "

4 We must also accept the ethical responisiblity that arises from our collusion with a plan which is intended to bolster our ability to cause death to countless men, women and children around the world.

We must not blindly follow wherever the military leads in a knee-jerk desire for "security." True security rises from a people's ability to provide for their basic needs in a sustainable way while protecting their environment.

I urge you do deny the Navy's expansion plans.

Sincerely,

Katy Rose

Hanalei, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0406

From: Casey Holaday - Hauula, HI
To: deis hrc@govsupport.us
Subject: environmental impact statment
Date: 9/17/2007 11:55:25 AM

As a citizen of the state of Hawaii and the world I would like to express my opposition to the use of the Hawaiian Islands as a military training site. [4] As the recent discovery of unexploded munitions in Makua bay and the unsafe conditions still found on Kahoolawe prove, there is no way for the environment not to be adversely affected by military training. [2] The recent designation of the northwest Hawaiian Island as a national marine sanctuary/ monument makes this area an inappropriate choice for a military training site as well. [3] I believe Hawaii should operate on the "precautionary principle" which dictates that if we do not know the harm something will cause (i.e. sonar) we should not do it. [1]

Mahalo, Casey Holaday
Hauula, Hawaii

COMMENT NUMBER
D-E-0407

From: Elaine Dunbar - Lihue, HI
To: deis hrc@govsupport.us
Subject: DEIS COMMENTS
Date: 9/17/2007 11:53:31 AM

WRITTEN TESTIMONY
DEIS-NAVY EXPANSION PROPOSAL
PMRF
(Copies Forwarded to Appropriate Agencies and Departments)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0407 (cont.)

SEPTEMBER 16, 2007

Elane Dunbar
POB 861
Lihue, Hawaii 96766

Public Affairs Officer
PACIFIC MISSILE RANGE FACILITY
P.O. Box 128
Kekaha, Hawaii 96752-0128

TESTIMONY IN OPPOSITION TO NAVY EXPANSION AT PMRF-ISLAND OF KAUAI AND HAWAIIAN WATERS 1

I. ILLEGAL OCCUPATION

A. I OBJECT TO THE NAVY'S PROPOSAL AS IT WILL BE CONTRARY TO **PUBLIC LAW 103-150.** 3

B. PLEASE REFER TO **PUBLIC LAW 103-150**, PARAGRAPH 29, WHICH STATES: WHEREAS, THE INDIGENOUS HAWAIIAN PEOPLE NEVER DIRECTLY RELINQUISHED THEIR CLAIMS TO THEIR INHERENT SOVEREIGNTY AS A PEOPLE OR OVER THEIR NATIONAL LANDS TO THE UNITED STATES, EITHER THROUGH THEIR MONARCHY OR THROUGH A PLEBISCITE OR REFERENDUM.

C. THE PUBLIC LAW 103-150 IS A DOCUMENT CONTAINING APPROXIMATELY NINETEEN HUNDRED WORDS, APPROXIMATELY 174 SENTENCES. THE NAVY'S **DEIS** RESPONSE REGARDING **PUBLIC LAW 103-150** SITED THE VAGUE AND AMBIGUOUS DISCLAIMER AT THE END OF THE DOCUMENT *(SEC. 3. DISCLAIMER. NOTHING IN THIS JOINT RESOLUTIONS INTENDED TO SERVE AS A SETTLEMENT OF ANY CLAIMS AGAINST THE UNITED STATES.)* WHICH CONSISTS OF ONE SENTENCE CONTAINING 19 WORDS. THE QUESTION TO THE **DEIS** WAS PERTAINING TO THE EXISTING ILLEGAL OCCUPATION OF THE HAWAIIAN ISLANDS BY THE U.S. (NOTHING TO DO WITH SETTLING CLAIMS)

D. WITH REGARD TO THESE 19 WORDS BEING A BASIS FOR THE **DEIS** RESPONSE TO THE QUESTION OF ILLEGAL OCCUPATION, **THE QUESTION HAS STILL NOT BEEN ANSWERED.**

E. THE U.S. HAS REPEATEDLY DEMONSTRATED DISREGARD FOR HAWAIIAN CULTURE. THE U.S. HAS REPEATEDLY DESECRATED SACRED SITES OF THE HAWAIIAN PEOPLE. FOR THIS I ALSO OBJECT TO THE EXPANSION AS THERE HAVE BEEN MANY YEARS TO RECTIFY THESE WRONGS YET THE U.S. ONLY SEEKS TO DO MORE HARM RATHER THAN MAKE THINGS RIGHT.

COMMENT NUMBER
D-E-0407 (cont.)

F. THE WRITERS OF THE **DEIS** RENDERED AN OPINION OF THE POLITICAL STATUS OF HAWAII AS IT RELATES TO THE (ILLEGAL) OCCUPATION OF HAWAIIANS' LANDS.

G. I ASK WHO, IN THE **DEIS** FIRM, LEGAL CONSULT, MILITARY OR U.S. GOVERNMENT HAS THE AUTHORITY, AT THIS TIME, TO PRESENT THAT OPINION/DECISION AS IT RELATES TO THE TAKING OF HAWAIIANS' LANDS? PLEASE SUPPLY THE ANSWER TO THIS QUESTION. IT IS THE CONDITIONAL THREAD OF THE NAVY'S PROPOSAL.

H. AS HAWAIIAN SOVEREIGNTY AND THE AKAKA BILL ARE IN AN UNRESOLVED STATUS AT THIS TIME, HOW IS IT THAT THE **DEIS** COMPANY FOR THE NAVY ASSUMES TO KNOW THE ANSWER TO THIS QUESTION?

I. WHICH BRINGS ME TO THE NEXT OBSERVATION; FOR THE NAVY TO MAKE THIS DETERMINATION ON SUCH A HOTLY DISPUTED POLITICAL QUESTION, DOES THIS INDICATE THE NAVY IS ASSUMING A POSITION OF POLITICAL AUTONOMY WITH REGARD TO INTERPRETATION OF LAW?

II. MARINE LIFE AND SONAR

A. I OBJECT TO THE NAVY'S PLAN TO TRAIN WITH DANGEROUS LFA SONAR OVER 70% OF THE WORLD'S OCEANS. THE INTENSE NOISE THAT THE SYSTEM GENERATES WILL HAVE A PROVEN LETHAL EFFECT ON POPULATIONS OF MARINE MAMMALS. 2

B. THE NAVY WAS UNABLE TO DISPROVE THIS FACT IN THE **DEIS**. PARTS OF THE **DEIS** REVEAL PREMEDITATED IMPACTS/HARRASSMENT TO MARINE MAMMALS STATING INTENT TO DO HARM BY INCREASING SONAR DECIBELS BEYOND THE ALREADY LETHAL LEVELS AS DOCUMENTED IN PROVEN CASES AND COURT RULINGS FORBIDDING THIS ACTIVITY.

III. NUCLEAR, LASER AND EMP WEAPONS

A. IN THE **DEIS** THERE IS A LIST OF 150 PLUS TYPES OF WEAPONS; HOW MANY ARE THERE OF EACH TYPE? THESE WEAPONS AREN'T A BUNCH OF RIFLES AND PISTOLS - THEY ARE THE MORTAL COMBAT ARMAGEDDON WEAPONS THAT MAY BE COOL ON GAMES AND MOVIES BUT THE REALITY IS THEY HAVE CAPABILITIES TO DESTROY THE WORLD. 4

B. IT WOULD VIOLATE INTERNATIONAL TREATIES OF NUCLEAR NON PROLIFERATION BECAUSE SOME OF THESE WEAPONS ARE NUCLEAR.

C. I ABSOLUTELY OBJECT TO NUCLEAR WEAPON ACTIVITY IN THE HAWAIIAN ISLANDS OR ANYWHERE.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0407 (cont.)

D. I OBJECT TO THIS PROPOSAL IN THAT IT WILL CAUSE HAZARDS AND DANGERS TO PERSONNEL, FUELS, ORDNANCE. SOME WEAPONS CREATING A DANGER RADIUS OF 10,000 FT. AND IT WILL INADVERTENTLY SET OFF ORDNANCE THAT HAVE ELECTRONICALLY TRIGGERED MECHANISMS.

E. IS THE NAVY ABLE TO PROVE THEY DID NOT CAUSE THE RECENT HELICOPTER CRASHES IN HAWAII THROUGH THE USE OF EMPS OR SIMILAR DEVICES?

IV. HAARP TYPE EXPERIMENTATION

A. I OBJECT TO THE TRESPASS ON THE INTERNATIONAL COMMUNITY'S PROPERTY RIGHTS BY THE USE OF AND EXPERIMENTATION WITH ATMOSPHERIC ALTERING MECHANISMS, WEATHER MODIFICATION AND OR HAARP. THAT IS INTERNATIONAL TERRITORY, NOT FOR THE U.S. TO TAMPER WITH. 5

B. IT WOULD VIOLATE FUNDAMENTALS OF THE LAW OF NATIONS WITH RESPECT TO WORLDWIDE TERRESTRIAL DAMAGE.

V. CONSTITUTION

A. I OBJECT TO THE NAVY'S PROPOSAL FOR EXPANSION ON THE GROUNDS THAT IT IS UNCONSTITUTIONAL. A VIOLATION OF THE HAWAII STATE CONSTITUTION, THE BILL OF RIGHTS - ARTICLE 1, **SUPREMACY OF CIVIL POWER** SECTION 16. **THE MILITARY SHALL BE HELD IN STRICT SUBORDINATION TO THE CIVIL POWER.** [Ren Const Con 1978 and election Nov 7, 1978] 6

B. I DO NOT WAIVE THE RIGHTS GRANTED TO ME AS AN AMERICAN BY THE U.S. CONSTITUTION, NOR DO I WAIVE THE RIGHTS GRANTED TO ME UNDER THE HAWAII REVISED STATUTES OF THE HAWAII STATE CONSTITUTION THEREFORE, IT IS MY RESPONSIBILITY TO OBJECT TO THE NAVY'S PROPOSED EXPANSION AT PMRF.

VI. SHIP STRIKES

A. SHIP STRIKES TO MARINE MAMMALS ARE BRIEFLY AND INADEQUATELY DISCUSSED AND SHIP STRIKES WILL OCCUR. 7

B. SHIP STRIKES TO SHIPS ARE NOT DISCUSSED AND THE QUESTION WAS RAISED IN MY SCOPING COMMENTS CITING THE EHIME MARU DISASTER AND OTHER VERY LIKELY SHIP STRIKES TO SMALL FISHING AND RECREATIONAL VESSELS. 8

C. THAT THESE CRAFTS MAY NOT HAVE ADEQUATE BOAT RADIOS OR FOR THE SAKE OF REALITY MAY NOT RECEIVE OR BE AWARE OF WARNINGS TO GET OUT OF AN AREA.

COMMENT NUMBER
D-E-0407 (cont.)

D. THE MILITARY'S OCEAN EXERCISES WILL CREATE A DETRIMENT TO THE PUBLIC.

E. WHAT GUARANTEES AND MEASURES DOES THE NAVY PROPOSE TO ELIMINATE THE POSSIBILITY OF EVEN ONE SINGLE MISTAKE? 2, 8

VII. UNCLEAN HANDS

A. I OBJECT TO THIS PROPOSAL BECAUSE THE NAVY IS ATTEMPTING TO IMPLEMENT C-17 RUNWAYS. THAT REQUEST WAS ALREADY DENIED SEVERAL YEARS AGO BY OUR COUNTY COUNCIL.

B. THE U.S. MILITARY IS GUILTY OF IRREPARABLE DAMAGE TO THE HAWAIIAN ISLANDS. THEY ARE NOW ASKING PERMISSION TO DO SOME MORE. IF THEY DON'T RECEIVE PERMISSION. WILL THEY PROCEED REGARDLESS?

I OBJECT AND AM IN OPPOSITION TO ANY AND ALL PROPOSALS BY THE NAVY FOR EXPANSION AT PMRF. 2

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0408
1

From: Ken Posney
To: deis hrc@govsupport.us
Subject: EIS Comment

Date: 9/17/2007 12:50:13 PM

I'd like to comment on the public information given on the Government Support site: Realistic Training in Hawai'i

1. Who is our threat?

2. What is our specific threat?

3. Who has the modern diesel submarines?

4. How many do they have?

5. When did tracking diesel subs passively in shallow water become so difficult?

6. What is so difficult about sending out a deafening "ping"…in shallow water?

7. What happened to off-site sonar training? ("…sonar is a perishable skill")

8. Passive sonar can provide bearing, speed, depth and range (distance).

9. Why not train in commercial shipping areas, where submarines are more likely to hide?

10. Is anyone concerned about our fragile environment (i.e., monk seals, outer islands)

11. Do the right thing here…

Mahalo for your time.

COMMENT NUMBER
D-E-0408 (cont.)

COPIED FROM HYPERLINK
"http://www.govsupport.us/navynepahawaii/training.aspx"http://www.govsupport us/navynepahawaii/training.aspx web site

"Modern, quiet diesel submarines operating in shallow water have become a serious risk to the United States and its allied armed forces, and the U.S. Navy must be prepared to counter them. Mid-frequency active sonar is currently the only way to detect these modern submarines, and the only way to safeguard our men and women in uniform is through realistic training and testing with this sonar technology. The effective use of sonar is a perishable skill that must be practiced frequently.

Why is the Navy using active vs. passive sonar

To successfully defend against submarine threats, our Sailors must train realistically with the latest technology, including next-generation passive and active sonars. Although the Navy is researching improvements in passive sonar, it does not provide the full capabilities of active sonar systems.
The disadvantage of passive sonar is that it only provides a general bearing (direction) to the object, but not an accurate distance. Because it does not give a precise range, passive sonar cannot effectively be used for targeting enemy ships. Diesel submarines are designed to operate quietly and effectively in coastal and littoral waters, and are virtually undetectable with passive sonar, leaving active tactical sonar as the only viable means for locating and neutralizing them before they are able to strike. Active sonar is needed for precise location and targeting purposes because it gives both bearing and distance to the enemy it detects. In addition, passive sonar is less effective in areas where ambient (or background) noise levels are high, such as high traffic areas associated with commercial shipping. High background noise levels make it very difficult for passive sonar to detect quiet, diesel-electric submarines."

Ken Posney

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0409

From: Loreen Walker & family - O'ahu, HI
To: deis hrc@govsupport.us
Subject: =?windows-1252?Q?Opposition_to_Inc?==?windows-1252?Q?reased_Training_&?==?windows-1252?Q?_Testing_in_Hawai?==?windows-1252?Q?=91i?=
Date: 9/17/2007 1:01:56 PM

Aloha:

Our family opposes granting any permits for the Navy to conduct increased ship and submarine training in the Hawai'i Range Complex. 1

We watch the humpback whales annual migration, and have enjoyed the rare visit of Hawaiian monk seals on the beach in front of our home on the North Shore of O'ahu. Long term consequences of high frequency sonar is unknown but it is clear immediate damage is caused to harm these animals.

The Navy's stated interests for this permit, i.e. sailor training, is bogus. I work part-time at the Pearl Harbor Shipyard and have seen numerous sailors floundering in the pool I use there--these sailors--and there are many--can barely get across the length of the pool. If the Navy truly was interested in increasing sailor training it would teach all the sailors how to swim, which can be done in any pool anywhere.

The Navy's claimed need for this permit is clearly outweighed by the potential harm to our fragile ocean environment.

Please deny the Navy's application.

Mahalo,

Lorenn Walker & family

COMMENT NUMBER
D-E-0410

From: Spencer McDonald - Kilauea, HI
To: deis hrc@govsupport.us
Subject: ATTN: HRC/OEIS
Date: 9/17/2007 1:17:10 PM

Dear Public Affairs Officer,

Please leave our planet alone. If you were able to shift your perception just slightly away from your "R&D" and "test evaluations" you might find that humanity has had enough of war and hatred. Please stop your expanded training ops. Please stop your sonar experiments. Please just stop! Our existence on this planet depends on you just stopping. 1

Mahalo,

Spencer McDonald

Kilauea, Hi

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0411

From: Fred Dente - Kapa'a, HI
To: deis hrc@govsupport.us
Subject: PMRF expansion
Date: 9/17/2007 1:27:08 PM

Sept. 17, 2007

Pacific Missle Range Facility
Public Affairs Officer

I am totally against the expansion of the Navy base for training exercises, or for any other reason. I am for the dismantling of the entire base and the complete removal of any and all remnants of that facility and all the people who work there. The merchants of death and destruction at PMRF are trespassing on sacred Hawaiian burial grounds, and they are part of the occupation forces of the United States military, who have have been occupying the Hawaiian Nation since 1893, in gross violation of international treaties and laws. 1

Very Sincerely,

Fred Dente

Kapa`a HI

COMMENT NUMBER
D-E-0412

From: Debra Baruch - Kapaa, HI
To: deis hrc@govsupport.us
Subject: Opposition to Navy expansion - Hawaii Range Complex & PMRF
Date: 9/17/2007 1:33:32 PM

To Whom It May Concern:
I stand firmly opposed to the Navy's plans for expansion of training operations at the Hawai'i Range Complex and Pacific Missile Range Facility.
The history of environmental degradation caused by such training exercises around the world leaves no doubt that the plans of the Navy to expand training exercises will cause irreparable harm.
Mid-frequency sonar will destroy uncountable numbers of fish and marine mammals. 2
Expeditionary Assault Activities will tear up beaches and dunes between Polihale and Barking Sands. 3
Further, I would like to quote Juan Wilson, a Kaua'i citizen who has studied the EIS extensively: 1
"Worse is the Directed Energy Laser Weapons Program. These are chemical lasers in which use hydrogen fluoride, a corrosive material which can be made to release a powerful burst of infrared radiation. The laser can be focused and aimed as a weapon (death ray). These laser can generate least 25 megawatts of energy that could destroy a missile 2,000 miles away. For the scale of this realize 25megawatts is half the electrical power generating capacity of Kauai. The firing of this
weapon also destroys the lasing device and contaminates its site with hydrogen fluoride. A thousand foot radius danger zone, that could close the state park, will persist for days.
The Navy has not told us what effect on the environment hydrogen fluoride waste will have. What if there is a heavy rain and runoff after a test? What effect on coral reefs and offshore marine life would there be from hydrogen fluoride contaminated runoff into the ocean? What efforts will guarantee the safety of people using the access road to Poli Hale State Park after a test?
In its Navy's EIS executive summary it simply says, "Appropriate remedial procedures would be taken before initiation of potentially hazardous laser operations on PMRF".
That's it?!! That is unacceptable. "
We must also accept the ethical responisiblity that arises from our collusion with a plan which is intended to bolster our ability to cause death to countless 4

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0412 (cont.)	men, women and children around the world. We must not blindly follow wherever the military leads in a knee-jerk desire for "security." True security rises from a people's ability to provide for their basic needs in a sustainable way while protecting their environment. I urge you to deny the Navy's expansion plans. Sincerely, Debra Baruch Kapaa, HI

COMMENT NUMBER	
D-E-0413	From: Ihor Basko - Kapaa, HI To: deis hrc@govsupport.us Subject: Expansion Date: 9/17/2007 1:39:27 PM To Whom It May Concern:
1	I am AGAINST the Expansion of the Missile Range and military activity on the Garden Island of Kauai.
	This is not a waste land, this is a tourist destination. Beach access and fishing access to locals is already difficult on the Westside because the military exercises.
	Please go to another state!!!!
	Ihor Basko, DVM Kapaa, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0414

From: Healani Trembath
To: deis hrc@govsupport.us
Subject:
Date: 9/17/2007 1:50:40 PM

1 I urge the U.S. Navy to stop needlessly inflicting harm on whales and other ocean life with its use of high-intensity, mid-frequency sonar in its training exercises.

Whales, dolphins and other marine mammals depend on sound to navigate, find food, locate mates, avoid predators and communicate with each other. Blasting their environment with intense sound over large expanses of ocean disrupts these critical behaviors and threatens their survival.

Sonar also harms whales more directly: Navy exercises using mid-frequency sonar have resulted in whale strandings across the globe, including along the coasts of Washington State, the Canary Islands, the Bahamas, Madeira, the U.S. Virgin Islands and Greece. A recent whale stranding death in Hawaii, which occurred when a large pod of whales was driven in panic to shallow waters, took place with Navy sonar exercises nearby and may be the latest in this string of sonar casualties.

Whales should not have to die for military training. The Navy can no longer ignore the unnecessary harm inflicted by this technology. I urge the Navy to immediately adopt common-sense measures to keep whales safe.

2 CAN YOU JUST GO AWAY TO SOME OTHER PLACE!!!! H. Trembath. YOU POSE A
THREAT TO THIS FRAGILE ISLAND OF KAUAI... YOU SEND A SIGNAL FOR ENEMIES
TO TARGET US AS WELL!!!!

COMMENT NUMBER
D-E-0415

From: Russell Hoffman - Carlsbad, CA
To: deis hrc@govsupport.us
Subject: Hawaii Range Complex Environmental Impact Statement
Date: 9/17/2007 1:46:58 PM

September 17th, 2007

Re: Hawaii Range Complex Environmental Impact Statement

To Whom It May Concern, US Government:

I just have NO IDEA who might have written the statement shown below, but I wish to submit it as my opposition statement to the proposed poisoning of nearly one quarter million square miles (unfenced) of the Pacific Ocean by the United States Navy.

Sincerely Yours,

Russell "Ace" Hoffman

Carlsbad, CA

===
September 13th, 2007
===

Death is upon us. A rogue army is maneuvering to destroy our planet. Its name is Navy.

U.S. Navy.

Step by step by step over the past decade, the military has asked for -- and received --enormous exemptions from caring for humanity. Environmental laws everyone else must obey -- laws which save lives -- mean nothing to them. No longer are they required to obey their civilian leaders. No longer are they required to atone for sins they commit. No longer are they culpable for YOUR death.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0415 (cont.)

You, who they WERE charged to protect.

You, who WERE to be their masters.

You, who FUNDS them.

Citizens of the United States: Rise up! Rise up against your oppressors! Rise up against the randomization of death! Rise up against the destruction of YOUR HOMELAND!

Rise up against the U.S. Navy!

A decade ago, the United States military was granted an exemption from environmental laws. The U.S. Navy is the most egregious -- and dirty -- of all militaries in history. They kill their own sailors, with radiation, with chemicals used in warfare, with chemicals used to keep their ships "ship-shape."

My friends are dying. Your friends are dying. You and I are dying because we cannot -- no, because we WILL NOT -- rein in these cutthroats.

The Navy's most recent crime involves directly poisoning nearly a quarter of a million square miles of "open ocean" -- where our fish grow, where our whales and dolphins frolic, where earth's balancing life develops. No fence will keep the poisons in the designated area.

They will use radiation weapons, Directed Energy Laser Weapons, pressure (concussive and / or vacuum (over- / under-pressure) killing devices, and nearly 150 other kinds of "toys."

These are the same guys who brought you Bikini, Eniwetok, and Rongelap. All radiation-poisoned islands.

The same guys who pollute Vieques, Puerto Rico with Depleted Uranium -- as well as Okinawa and various sites on the U.S. mainland. And Iraq. And Kosovo. And Afghanistan. And tomorrow? Iran.

The same guys who lie about how many of their own -- their submarine sailors -- are dying of brain tumors as their payment for service aboard nuclear submarines.

Hail the U.S. Navy! Professional killers! Professional planet-destroyers! Professional liars! Professionals in every way.

Damn the torpedos. Damn the missiles. Damn the truth. Damn the citizens they claim to protect. Damn us all.

Damn the U.S. Navy: Killers of U. S. citizens. Killers of the planet. Killers of us all.

(Written by a patriotic citizen.)

==

****

** THE ANIMATED SOFTWARE COMPANY

** Russell "Ace" Hoffman, Owner & Chief Programmer

****

IF YOU RECEIVED THIS EMAIL IN ERROR AND/OR DO NOT WISH TO RECEIVE ANY
MORE EMAILS FROM US FOR ANY REASON, PLEASE CONTACT RUSSELL HOFFMAN AT:

COMMENT NUMBER
D-E-0415 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-E-0416

From: Jonathan Jay - Kaua'i, HI
To: deis hrc@govsupport.us
Subject: Please Reject Naval Range Expansion
Date: 9/17/2007 1:59:41 PM

To Whom It May Concern:

1 I stand firmly opposed to the Navy's plans for expansion of training operations at the Hawai'i Range Complex and Pacific Missile Range Facility. Instead of training to fight yesterdays phantoms, the Navy should provide real leadership and confront the challenges that face us today - preservation and remediation of our global environment on this watery world.

The history of environmental degradation caused by such training exercises around the world leaves no doubt that the plans of the Navy to expand training exercises will cause irreparable harm.

Mid-frequency sonar will destroy uncountable numbers of fish and marine mammals.

2 Expeditionary Assault Activities will tear up beaches and dunes between Polihale and Barking Sands.

3 Further, I would like to quote Juan Wilson, a Kaua'i citizen who has studied the EIS extensively:

4 "Worse is the Directed Energy Laser Weapons Program. These are chemical lasers in which use hydrogen fluoride, a corrosive material which can be made to release a powerful burst of infrared radiation. The laser can be focused and aimed as a weapon (death ray). These laser can generate least 25 megawatts of energy that could destroy a missile 2,000 miles away. For the scale of this realize 25megawatts is half the electrical power generating capacity of Kauai. The firing of this weapon also destroys the lasing device and contaminates its site with hydrogen fluoride. A thousand foot radius danger zone, that could close the state park, will persist for days

The Navy has not told us what effect on the environment hydrogen fluoride waste will have. What if there is a heavy rain and runoff after a test? What effect on coral reefs and offshore marine life would there be from hydrogen fluoride contaminated runoff into the ocean? What efforts will guarantee the safety of people using the access road to Poli Hale State Park after a test?

COMMENT NUMBER: D-E-0416 (cont.)

In its Navy's EIS executive summary it simply says, "Appropriate remedial procedures would be taken before initiation of potentially hazardous laser operations on PMRF".

That's it?!! That is unacceptable. "

We must also accept the ethical responsibility that arises from our collusion with a plan which is intended to bolster our ability to cause death to countless men, women and children around the world.

5 We must not blindly follow wherever the military leads in a knee-jerk desire for "security." True security rises from a people's ability to provide for their basic needs in a sustainable way while protecting their environment.

I urge you do deny the Navy's expansion plans.

Sincerely,

jonathan jay

Kapa`a Moku Puna Kaua`i,
Hawai`i Nei

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0417	From: Marya Mann - Kailua-Kona, HI To: deis hrc@govsupport.us Subject: Public Comment on Hawaii Range Complex Date: 9/17/2007 2:27:58 PM _Deis_hrc@govsupport.us_ (mailto:Deis_hrc@govsupport.us) AND _PR1.050107N@noaa.gov_ (mailto:PR1.050107N@noaa.gov) . Public Comment on Draft EIS from Marya Mann, Ph. D. Please Send confirmation of receipt of this public comment into record.
1	I am opposed to the dangerous activities of the U. S. Navy in the sea, on the land, and in the air around the Hawaiian islands. Wargames aren't games. There are no winners in wargames. Everyone is a loser in wargames. From the desk-ridden battle planners to the innocent bystanders who breathe lethal fumes, from the whales and other cetaceans who are being killed by high-powered sonar from Navy ships, to the damaged coral and other sea life, losers will continue to accumulate if you allow the Navy to expand training practice in our delicate region. Wargames are deadly because they express what is most insidious in human nature – aggression, greed, and anger. The Pentagon's short-sighted practices have bankrupt our national ethics and spread death, mayhem, and despair at home and around the world.
5	Wargames disseminate chemical, toxic, and sometimes radioactive debris that will – this is not hypothetical: this is reality -- pose serious risks to the welfare of our oceans, especially the delicate and highly protected Northwestern Hawaiin Islands. Consider….

COMMENT NUMBER	
D-E-0417 (cont.) 2	* The National Marine Fisheries Service (NMFS) - the federal agency charged with protecting our oceans - held that the Navy's use of active sonar was the most likely reason 150 melonhead whales attempted to beach themselves in Hanalei Bay in 2004. * In 1998, three whale calves and one dolphin calf were found dead or abandoned during and immediately following sonar testing, even though in 15 years of research this phenomenon had never been observed. One of these was a distressed whale calf who breached 230 times and pectoral slapped 658 times in front of Dr. Marsha Green's research team in a four-hour period. * In 2003, a study LINKING BEND-LIKE WHALE DEATHS TO SONAR was published and reported in the Washington Pose and Honolulu Advertiser. Sonar caused whales to develop dangerous gas bubbles in some vital organs and blood vessels, to beach themselves and die, according to the study first published in the journal Nature.
3	The Navy has said it is "committed to operating this system in an environmentally responsible manner," but the facts show otherwise. * Fact - From 1980 to 1995 the Navy developed and tested LFAS without obeying any of the applicable environmental laws. (National Environmental Policy Act, the Endangered Species Act, the Marine Mammal Protection Act, and the Coastal Zone Management Act.) * Fact - While the Navy was illegally developing and testing LFAS, they were also building a ship (TAGOS-23) estimated cost $60 million to deploy the sonar. * Fact - In 1995, the Navy agreed to comply with federal laws and prepare an Environmental Impact Statement (EIS) prior to final deployment of the system only after pressure from the Natural Resources Defense Council (NRDC). The Navy has said, "Prior to preparing the Draft Environmental Impact Statement (DEIS) covering proposed system operation, the Navy sponsored an extensive Scientific Research Program (SRP) to specifically evaluate any

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0417 (cont.)	potential effects." * Fact -This SRP tested LFAS on only 4 species of cetaceans (out of over 30) for about one month each in only 3 geographical areas. * Fact - This SRP tested LFAS at an acoustic intensity at least 5,000 times lower than the Navy's planned deployment levels. * Fact - After testing LFAS for only one month the impact on long term reproductive rates of whales, dolphins, fish and all marine life are not known. * Fact - The Marine Mammal Commission, (a federal agency created to help protect marine mammals), expressed grave concerns in their 1997 annual report to Congress about the effects of the sonar on whales and other marine life. Specifically their report states: "If the LFA system were made available for worldwide use as proposed, all species and populations of marine mammals including those listed as endangered and threatened under the Endangered Species Act possibly could be affected. In the name of peace, in the name of protecting whales, the creature with the largest brains on earth, let's use our human brains and stop the madness!
1	The thoughtful, innocent people of Kauai, the Big Island, and all of Hawaii oppose the U. S. Navy's destructive actions. To protect our culture, the pristine land, the open sea, and the vibrant air of this magical paradise, we encourage you to stop your wargames and use your big brains to figure out how to build the peace, not continue with sub-human forms of bloodshed. The mission of the Navy is "to maintain, train and equip combat-ready naval forces capable of winning wars, deterring aggression and maintaining freedom of the seas."
4	The irony of your saying your mission is to win wars when you're creating so many losers is astonishing. The aggression within the military has become so dangerous that suicide is one of the leading causes of death among Navy enlisted men and women! And if you want to maintain the freedom of the seas, let the whales swim free and unfettered by your deadly sonar! Mahalo nui loa, Marya Mann, Ph. D.

COMMENT NUMBER	
D-E-0417 (cont.)	Kailua-Kona, HI Long Live the Loom of Love *¨`) ¸.·´ ¸.·*¨) ¸.·*¨) (¸.·´ (¸.·´ * ø¤º°`°º¤ø,¸¸,ø¤º°`°º¤ø,¸¸,ø¤º°`°º¤ø,¸¸,ø¤º°`°º¤ø

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0418

From: Glenn Giles
To: deis hrc@govsupport.us
Subject: There should be NO ACTION-ALTERNATIVE taken on the Draft Environmental Impact St
Date: 9/17/2007 2:35:30 PM

1 There should be NO ACTION-ALTERNATIVE taken on the Draft Environmental Impact Statement for the Hawaii Range Complex. The alternatives will have detrimental impact upon the health of the Hawaiian people and the environment. It would also be bad for tourism.

Glenn Giles

COMMENT NUMBER
D-E-0419

From: David and Carol Gerow - Kilauea, HI
To: deis hrc@govsupport.us
Subject: Comments to Draft EIS for Navy Operations Hawaii
Date: 9/17/2007 2:46:58 PM

Comments included in this e-mail and as .pdf attached.

David Gerow

Kilauea, Hawaii
September 15, 2007

Re: Comments to Draft Environmental Impact Statement
Hawaii Range Complex

Sirs,

I have reviewed the Draft EIS for the Hawaii Range Complex and would like to reject the request for the Navy to expand it's operations and to reject Alternatives 1 and 2 due to unacceptable environmental risks. 1

I believe that Hawaii bears an unproportional presence of military activities and think that we should reduce the amount of military testing in the area for the peace of Hawaii's residents and the health of the environment. Many of the activities performed and proposed by the Navy are very damaging to the environment, particularly the use of high intensity sonar, high energy laser weapons, underwater detonations, beach assault landings, and the general impacts from the large number of ships and activities in the area. Within the study area is also a Marine National Monument, an area that contains many endangered species of plants and animals that could be harmed by these activities. 2

The impact that I am most concerned about is the use of the high intensity sonar. This technology is extremely damaging to marine life, particularly cetaceans (whales and dolphins). There have been numerous beachings of these animals around the world from the use of this sonar, including an event near my house in Hanalei in 2004. The EIS says that the damage to mammals is minimal above 195 dB, however this level has shown harm in whales who depend on their hearing for their survival. 3

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0419 (cont.)

The Navy has a bad record in Hawaii for destroying the environment, downplaying the damage, and neglecting its responsibility to clean the sites up. Take a look at Pearl Harbor and the massive contamination on the land and in the water and then look at Kahoolawe and the residual munitions there. They should spend the money to clean up those sites and not to contaminate more. 4

Please reject the EIS and stop the increase of the areal extent and use of the Hawaii Range Complex. 1

Sincerely,

David and Carroll Gerow

COMMENT NUMBER
D-E-0420

From: Ka'iulani Huff - Kapa'a, HI
To: deis hrc@govsupport.us
Subject: Naval plans for Kaua'i
Date: 9/17/2007 3:21:15 PM

As an indiginous person, I am in favor of the entire military leaving our island. Your presence here puts us in the middle of the target. Your structures and buildings and tests desecrate our sacred island. You bring fear and evil. Leave our island home, we don't want or need you and your "war games", and your presence here isin fact in violaqtion of international law; you are illegally occupying a peaceful and Sovereign Nation. (See public law 150-President Bill Clinton) 1

Ka'iulani Huff
Kapa'a, Hawaii
Hawaiian Kingdom

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Romi Elnagar - Baton Rouge, LA To: deis hrc@govsupport.us Subject: Alternative Actions regarding a Draft E. I. S. for the Hawaiian Islands Date: 9/17/2007 3:25:02 PM	COMMENT NUMBER D-E-0421
Dear Sir or Madam,	
The Hawaiian Range is a precious natural resource that we MUST pass on to our children undisturbed, as far as is within our means. This will not happen if it is used by the US Government for military purposes, which are entirely unnecessary for a nation that possesses the largest concentration of nuclear firepower on the globe.	1
May I point to the following factors which also militate [pardon the expression!] against the use of the Hawaiian islands for military exercises? the high use of energy the cumulative impacts upon human and animal health the socio/economic injustice to the native Hawaiian Islanders who live in this militarized impacted area, radioactive and chemical hazards and problems associated with storage and waste products the permanency of radioactivity from Uranium munitions in the environment (U-238, for example, has a half-life of 4.5 Billion years) destruction to natural, pristine areas and natural resources and vegetation the erosion of air quality and water quality of the sea the financial taxpayers' burden of these military operations theimpact on Hawaiian tourism and desirability as a place to live the risks to health and safety of humans and all impacted life forms	2
I urge you to not to allow these beautiful islands to be destroyed by unnecessary military operations of any sort.	1
Romi Elnagar Baton Rouge, Louisiana	

From: Judith Heath - Kailua-Kona Big Island, HI To: deis hrc@govsupport.us Subject: Public Comment on Draft EIS regarding Navy Sonar Use Date: 9/17/2007 3:30:21 PM	COMMENT NUMBER D-E-0422
Public Comment on Draft EIS from Judith Heath, retired science teacher, Kailua-Kona. Please Send confirmation that you have received my testimony and entered it into the record.	
I am distressed that the Navy has not complied with the spirit and intent of the regulations in place to protect marine mammals from the deadly barrage of sonar. This is the history, as I know it: --The National Marine Fisheries Service (NMFS) - the federal agency charged with protecting our oceans - held that the Navy's use of active sonar was the most likely reason 150 melonhead whales attempted to beach themselves in Hanalei Bay in 2004. --In 1998, three whale calves and one dolphin calf were found dead or abandoned during and immediately following sonar testing, even though in 15 years of research this phenomenon had never been observed. One of these was a distressed whale calf who breached 230 times and pectoral slapped 658 times in front of Dr. Marsha Green's research team in a four-hour period. --In 2003, a study LINKING BEND-LIKE WHALE DEATHS TO SONAR was published and reported in the Washington Pose and Honolulu Advertiser. Sonar caused whales to develop dangerous gas bubbles in some vital organs and blood vessels, to beach themselves and die, according to the study first published in the journal Nature.	1
The Navy insists it is “committed to operating this system in an environmentally responsible manner,” but their record show otherwise: 1 - From 1980 to 1995 the Navy developed and tested LFAS without obeying any of the applicable environmental laws. (National Environmental Policy Act, the Endangered Species Act, the Marine Mammal	2

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

Protection Act, and the Coastal Zone Management Act.)

2 -While the Navy was illegally developing and testing LFAS, they were also building a ship (TAGOS-23) estimated cost $60 million to deploy the sonar.

3 - In 1995, the Navy agreed to comply with federal laws and prepare an Environmental Impact Statement (EIS) prior to final deployment of the system only after pressure from the Natural Resources Defense Council (NRDC).

The Navy has said, "Prior to preparing the Draft Environmental Impact Statement (DEIS) covering proposed system operation, the Navy sponsored an extensive Scientific Research Program (SRP) to specifically evaluate any potential effects."

1 -This SRP tested LFAS on only 4 species of cetaceans (out of over 30) for about one month each in only 3 geographical areas.

2 - This SRP tested LFAS at an acoustic intensity at least 5,000 times lower than the Navy's planned deployment levels.

3 - After testing LFAS for only one month the impact on long term reproductive rates of whales, dolphins, fish and all marine life are not known.

The Marine Mammal Commission, (a federal agency created to help protect marine mammals), expressed grave concerns in their 1997 annual report to Congress about the effects of the sonar on whales and other marine life. Specifically their report states: "If the LFA system were made available for worldwide use as proposed, all species and populations of marine mammals including those listed as endangered and threatened under the Endangered Species Act possibly could be affected.

Please. Look at the "token gesture" SRP and see it for what it is, inadequate in scope and duration. My friends, family, and neighbors believe you can do better, and trust you to make the effort.

Sincerely,

COMMENT NUMBER

D-E-0422 (cont.)

Judith Heath

Kailua-Kona
Big Island

COMMENT NUMBER

D-E-0422 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER D-E-0423

From: Shannon Rudolph - Holualoa, HI
To: deis hrc@govsupport.us
Subject: Public Comment on Draft EIS
Date: 9/17/2007 3:36:56 PM

Aloha,

1 I can't understand the irony of a military charged with protecting the people of the United States, when in fact this is the very same group that is poisoning us.

The military is the largest polluter in Hawaii; spreading deadly depleted uranium radiation, lead, and many other toxins on land and sea. Not to mention sonar, which are harming whales, dolphins, and human businesses connected with same.

The military is supposed to look out for our welfare but it is doing just the opposite.

Please clean up your act; no war games in Hawaii, stop the contamination of our planet by all military actions that harm us.

The Army has reported 828 contaminated sites in Hawaii..
how many sites does the Navy have... so far?

Mahalo,
Shannon Rudolph

Holualoa, Hi.

COMMENT NUMBER D-E-0424

From: Robert V. Crifasi
To: deis hrc@govsupport.us
Subject: Navy's Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for the Hawaii Range Complex.
Date: 9/17/2007 3:39:19 PM

To the Principals at work in the Department of the Navy:□□The principals of
the US Navy have stated their plans to wage increased military operations on
the Hawaiian Islands and the □Pacific Ocean with increased "war games" and
military exercises in order to □expand military capabilities. □□This email is sent 1
to □strongly oppose Alternative Actions regarding a Draft Environmental Impact
Statement for □the Hawaii Range Complex. These Alternative Actions will have
an adverse, □damaging impact upon the Hawaiian Islands – the Hawaiian
people and all forms of □marine mammals and sea life including fragile and
Endangered Species such as: □humpback whales, green sea turtles, Hawaiian
monk seals, Hawaiian stilt a'eo, □and laysan albatross in the Pacific and
on/around the Islands of: Kauai, Niihau, □Kaula, Oahu, and Hawaii* … within a
total area of 2.1 Million square nautical □miles in the Pacific Ocean. □□This 2
email is my Voice to your ears in STRONG OPPOSITION to the war military
operations buildup/testing program, the high use □of energy, the approval
process for these actions, the cumulative impacts upon □human and animal
health, the socio/economic injustice to the native Hawaiian □Islanders who live
in this militarized impacted area, radioactive and chemical □hazards and
problems associated with storage and waste products, the permanency □of
radioactivity from Uranium munitions in the environment (U-238, for example,
□
has a half-life of 4.5 Billion years), destruction to natural, pristine areas □and
natural resources and vegetation, the erosion of air quality and water □quality
of the sea, the financial taxpayers' burden of these military □operations, impact
on Hawaiian tourism and desirability as a place to live, and □the risks to health
and safety of humans and all impacted life forms.□□Why are you FIENDS so
ready to destroy what you did not and cannot create, nor can you re-create
what you plunder!?□□The damaging effects of these weapons and military
"war □games exercises" are not merely a problem for Hawaiians and those
living near □the Pacific Ocean alone! □□*Affected areas on the Hawaiian
Islands (not □including the Pacific Ocean): □* Kauai, Niihau, Kaula, Pearl
Harbor Oahu, □Coast Guard Air Station Barbers Point/Kalaeloa Airport Oahu,
Marines Marine □Corps Base Hawaii Oahu, Marine Corps Training Area

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-E-0424 (cont.)

Bellows Oahu, Air Force □Hickam Air Force Base Oahu, Army Kahuku Training Area Oahu, Makua Military □Reservation Oahu, Dillingham Military Reservation Oahu, Wheeler Army Airfield □Oahu, K-Pier, Kawaihae Hawaii, Bradshaw Army Airfield Hawaii, □Pohakuloa □Training Area Hawaii.□□STOP! DO NOT PROCEED! BEAT YOUR WEAPONS INTO PLOWSHARES AND FEED THE PEOPLE, NOT THE GREEDY CORPORATE ENEMIES OF WE PEOPLE!□□Ending the so called "war on terror" starts at home! □You have a DUTY to REFUSE an ILLEGAL ORDER. □□Robert V. Crifasi□Representative of the united States of America□□□ □□

COMMENT NUMBER

D-E-0425

From: Cathy Garger - MD
To: deis hrc@govsupport.us
Subject: Hawaii Range Complex Comment
Date: 9/17/2007 3:50:59 PM

To the decision makers for the HRC,

1 With regards to the Hawaii Range Complex, I must urge you to go with the No-Action Alternative. The military actions and exercises in that region are already more than sufficient to train and prepare for the world war-making situation.

2 By saying that you feel the need to gear up for more military action this can only imply that the US feels the need to go forth and invade, attack, and then rob and steal the resources of other nations still yet-to-be invaded and occupied by those imperialists in positions of power.

1 The alternatives that you have stated that would allow many dozens of military operations and exercises to be expanded - and new programs implemented - will do untold harm to the Pacific Ocean, to all life forms therein - to all creatures of the air, land, and sea.

You will further erode the fragile ecosystems of the Hawaiian Islands and devastate the various Endangered Species in that region as well.

Hawaii has already been tragically militarized since 1900 when we first built the now-horribly contaminated Pearl Harbor. It is as if the US Military has chosen Hawaii as its own personal, private, war-making, destructive playground.

3 How dare our government go in and take over these lands that were held in sacred, spiritual reverence for so many centuries? How dare we invade the culture of the Hawaiian people and replace it with tanks, bullets, submarines,
4 jet fighter planes, and guns instead? How dare we radioactively contaminate the Hawaiian lands with chemical toxics and tremendous quantities of radioactive materials such as U-238 already present on many of the military bases?

And now our military want to add insult to injury? We want to add more live-fire DU munitions, more missiles, more torpedoes, more rounds from gunnery

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

ranges and shot from planes and ships and Stryker brigade combat vehicles on the ground?

Have we lost our sanity? Have we honestly all "bought into" this crazed military war-making madness that is only happy when it brings death, devastation, and destruction upon the air, the water, the land, and the wildlife upon which humans depend on for our very survival?

How could we possibly even contemplate even one more day of radioactive weaponry when we know enough to know that this ordnance causes not only cancers, diabetes, kidney disease, respiratory disorders, blood disorders, auto immune system disorders but also alters the genetic materials of cells, our very own ability to reproduce? How can we continue to use Uranium munitions when we realize that the damage is done to the genetics of that individual that will affect all future descendants of that individual forevermore?

Do you study only the studies that the US Army gives you to read? Have you read nothing else but what the federal government, your employer, wishes you to know? Read the scientific works of Rosalie Bertell, Ph.D., and Asaf Durakovic, MD, Ph.D. and Chris Busby, Ph.D. and Ernest Sternglass, Ph.D., and John Goffman, MD and Diane Stearns, Ph.D., and you will find out all about the damage that Uranium does to life - all forms of life (not just human life).

Your desire to expand military operations in Hawaii is deplorable and unacceptable. It will create injustice - social and environmental both - upon the Hawaiian indigenous peoples who live near the bases and the others who DEPEND on clean and NON-contaminated (chemical toxic and radioactive contamination both) waters in which to make their living and eat their food from the sea! 3

The further militarization and degradation of the Hawaiian Islands and surrounding 2.1 million square nautical miles will also harm tourism there and thus, the economics of the Islands. True, you will help to expand the economy brought in by some new military vendors and related contractors, but you will continue to scare tourists away! 5

Then again, come to think of it, perhaps that is precisely what you want? If you scare enough tourists away, perhaps then you can have the Islands all to yourself eventually, in order to exclusively be able to play war? Are you looking

COMMENT NUMBER
D-E-0425 (cont.)

to take over more of the Hawaiian Islands just like you have San Nicolas and San Clemente Islands off the California coast? Meanwhile all of you who work there will get only sicker and die more quickly as radioactive contamination lasts, depending on the material, from thousands to billions of years.

You are also making your own selves sick by this chemical and radiological war-play madness. Do you not even respect your own selves, your own families, and your fellow soldiers and their families there? Do you not know that a sub-micron-sized nanoparticle of Depleted Uranium can lodge itself in your lung and stay there for decades until one day you reap the horrible effects such as cancer or the other afore-mentioned diseases? 4

I resent our American taxpayer monies being used to practice playing war in order to kill countless Millions of innocents. We are killing innocent people in Afghanistan and Iraq as we speak and the fact that the Navy is being told to expand in the Pacific is only telling many of us that there are plans to invade and occupy "multiple theaters". 2

It is time that those who work for the military - who are not all inherently evil - to wake up and realize the harm that you are doing to the planet. As an environmentalist, I weep for the harm our government has already done to our natural resources, to our wildlife, and to the genetic code of humans and all animal life.

If you have any sense of decency, any conscience, any morsel of humanity whatsoever, you will decide to go with No Action Alternative and at least not expand the harm you are currently doing to all forms of life in the Pacific. 1

Thank you for your consideration to my thoughts on this matter. I pray that a human reads this and not a person who has been taught only how to make war and kill.

If you care about life - human life, animal life, marine life - future generations of animal and humans, you will decide to go the No Action Alternative and minimize the damage you are doing in the Pacific.

Our government has already done irreparable damage to Paradise. I beg you to not allow the US to make things go from very bad to even worse.

Sincerely,
Cathy Garger
Maryland

COMMENT NUMBER
D-E-0425 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Camellia May - Houston, TX To: deis hrc@govsupport.us Subject: No Munitions Testing in Hawaii! Date: 9/17/2007 3:55:08 PM I want to go to Hawaii one day! No to testing of live munitions in Hawaii. No to use of depleted uranium! I vote! Camellia May Houston, TX	COMMENT NUMBER D-E-0426 1

From: Jason S. Nichols - Lawai, HI To: deis hrc@govsupport.us Subject: What are you people doing? Date: 9/17/2007 4:20:55 PM Is a weapon or an exercise really worth it, if it does damage to the place it is supposed to be defending? The evidence is overwhelming that sonar is hurting undersea mammals. I personally feel the U.S. Navy should be leaning more towards a humanitarian role on this planet. With climate change there is going to be much more of a need for disaster relief than for fighting. Maybe time and money would be better served practicing helping the many who will soon need help. Jason S. Nichols Lawai, HI	COMMENT NUMBER D-E-0427 1

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Miriam Clarke - Hanalei, HI To: deis hrc@govsupport.us Subject: Opposition to proposed expansion of training facilities at PMRF Date: 9/17/2007 4:54:09 PM	**COMMENT NUMBER** **D-E-0428**
To Whom it May Concern:	
I borrow freely the words of my friend to express my own feelings regarding the proposed expansion of training facilities and exercises at PMRF as follows:	
I stand firmly opposed to the Navy's plans for expansion of training at the Hawai'i Range Complex and Pacific Missile Range Facility.	1
The history of environmental degradation caused by such training exercises around the world leaves no doubt that the plans of the Navy to expand training exercises will cause irreparable harm.	
Mid-Frequency sonar will destroy uncountable numbers of fish and marine mammals.	2
Expeditionary Assault Activities will tear up beaches and dunes between Polihale and Barking Sands.	3
We must also accept the ethical responsibility that arises from our collusion with a plan which is intended to bolster our ability to cause death to countless men, women and children around the world.?	
I urge you to deny the Navy's expansion plans.	1
Sincerely, Miriam Clarke Hanalei, HI	

From: Daniel Hoffman To: deis hrc@govsupport.us Subject: Hawaii Range Complex Environmental Impact Statement Date: 9/17/2007 5:02:08 PM	**COMMENT NUMBER** **D-E-0430**
To Whom It May Concern, US Government:	
Pease do not make the whales become extinct for the good of our nation. Sincerely Yours,	1
Daniel Hoffman	

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Duane Erway - Kailua-Kona, HI To: deis hrc@govsupport.us Subject: Duane D. Erway's comments on the draft EIS Date: 9/17/2007 5:04:26 PM P.O. Box 2807 Kailua-Kona, HI 96745 16 September 2007 Re: Hawaii Range Complex Draft Environmental Impact Statement/ Draft Overseas Environmental Impact Statement	COMMENT NUMBER D-E-0431	On March 15, 2000 17 cetaceans of 4 species, including Cuvier's beaked whales, stranded themselves in the Bahamas right after the Navy conducted a sonar test during an anti-submarine warfare Gap Exercise using mid-frequency sonar. The National Marine Fisheries Service and the Navy considered the strandings to be "highly likely" linked to the sonar tests. High-decibel sonar tests in other parts of the world have also coincided with stranded whales, but the Bahamas' whales showed the first clear sign of internal damage that might have been linked to the tests. And the stranded whales may only have been the tip of the iceberg. Subsequently, Earthwatch teams sighted no Cuvier's beaked whales in the Bahamas. See: http://www.earthwatch.org/site/pp.asp?c=dsJSK6PFJnH&b=1849941	COMMENT NUMBER D-E-0431 (cont.) 4
This text below supercedes any testimony you may or may not have from me from the meeting on 29 August 2007 in Hilo. Please publish this as my comments on the Draft Environmental Impact Statement and delete any comments of mine from Hilo meeting. Sirs/madam:	2	I call the Navy's attention to the workshop organized by Dr. Roger Gentry of NMFS in May, 2002 which examined theoretical reasons why Cuvier's beaked whales beached. At this workshop, Dr John Potter built on the work of Drs. Crum and Mao, showing the likely culprit was due to sound activation of bubbles in the animal's blood, rather than resonance of air cavities in the animal or panic**. Dr. Lee Tepley made important contributions at this workshop and he provides analysis of some aspects of bubble activation in the .pdf file attached to his testimony: "Bubble Activation and Growth in Cetaceans by a Relatively Low Energy Sound Wave." A troubling conclusion of the theoretical work was that the sound level at which this occurs might be very low: only a very small received level might induce the bends in the animal.	7
I wish to focus on the danger from the mid-frequency sonar (3.5-7.5 kHz) operating at 235 decibels. Use of mid-frequency sonar in Hawaiian waters at 235 dB, as planned, will likely injure or kill the Cuvier's beaked whales and we may not get an accurate body count. Other deep diving marine mammals may also be at risk. Use of mid-frequency sonar in Hawaiian waters at 235 dB, as planned, has the potential to disrupt the behavioral patterns essential for survival of the highly endangered monk seals including migration, breathing, nursing, breeding, feeding, or sheltering*.	3	Cuvier's beaked whales have stranded after very modest received levels: 145 to 150 dB. A safe received level is likely to be much lower than this.	6
The EIS makes a totally fallacious statement when it says that there is no indication of any adverse impact on beaked whales from exposure to sonar use for 30 years in Hawaiian waters. Just because there have been no visible/apparent strandings in Hawaii, does not mean that the beaked whales have not been injured. Previously studied pods of Cuvier's beaked whales in the Bahamas disappeared the year following the beaching there. One can assume they died without beaching after exposure to sonar or decided to leave the area.	1	Navy scuba divers had a "very severe aversion" to the low frequency sonar at 148 dB. While the Navy can order scuba divers out of the water during mid frequency sonar tests, Cuvier's beaked whales and monk seals will not be so fortunate. See details at: http://www.surtass-lfa-eis.com/DiverStudies/index.htm The Navy needs to operate the mid-frequency sonar at power levels	5

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER		COMMENT NUMBER
D-E-0431 (cont.)		D-E-0431 (cont.)

that protects Cuvier's beaked whales and the highly endangered monk seals. I will close with these questions:

1 1)□What is a safe received-level of mid-frequency sonar for Cuvier's beaked whales that will not cause injury or death?
2)□At what range will passive listening devices hear the sounds made by Cuvier's beaked whales?
3)□At what power level will it be safe to operate the mid-frequency sonar so that it will NOT exceed the acceptable received level at the ranges where Cuvier's beaked whales will be detected?
4)□What is the safe-received-level of mid-frequency sonar to prevent disrupting the behavioral patterns the highly endangered monk seal including migration, breathing, nursing, breeding, feeding, or sheltering?
5)□At what range will passive listening devices hear the sounds made by monk seals?
6)□At what power level will it be safe to operate the mid-frequency sonar so that it will NOT exceed the acceptable received level at the ranges where monk seals will be detected?
7)□What other deep diving marine mammals are at risk of injury or death due to sound activation of bubbles in the animal's blood?

Sincerely,

Duane D. Erway

* "The Hawaiian monk seal (Monachus schauinslandi) is in crisis: the population is in a decline that has lasted 20 years and only around 1200 monk seals remain. Modeling predicts the species' population will fall below 1000 animals in the next five years. Like the extinct Caribbean monk seal and the critically endangered Mediterranean monk seal, the Hawaiian monk seal is headed to extinction if urgent action is not taken. Implementation of this plan, adequate resources, and improved coordination and cooperation provide hope that the species decline can be reversed. The population is so in decline that NMFS can't calculate a meaningful Potential Biological Removal (PBR) rate that allows the Monk Seal population to survive. The PBR defines the number that may be killed by other than natural causes, without compromising the OSP." (From the August, 2007 NMFS report.)
Details at:
http://www.nmfs.noaa.gov/pr/pdfs/recovery/hawaiianmonkseal.pdf

** Resonance is not very important because of the low "Q" of the air cavities within marine mammals. Panic would in occur in situations where the animals could actually hear the sonar signal but eleven Cuvier's beaked whales beached in Greece in May 1996 after NATO tests of low frequency sonar. This sonar operates at 100 to 500 Hz, completely out of the range of Cuvier's beaked whales hearing. This leaves sound activation of bubbles in the animal's blood as the likely cause of the strandings.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0432

From: Karin Friedemann - Boston, MA
To: deis hrc@govsupport.us
Subject: Preserve Hawaii
Date: 9/17/2007 5:12:34 PM

Dear Sir,

1 I am writing to express my concern about military actions that would pollute the environment of Hawaii. I urge you to do all that is in your power to prevent the contamination of our honeymoon island by Deplete Uranium.

Karin Friedemann, Boston

COMMENT NUMBER
D-E-0433

From: Napuanani McKeague - Kauai, HI
To: deis hrc@govsupport.us
Subject:
Date: 9/17/2007 5:27:53 PM

1 I urge the Military to stop its use of high-intensity, mid-frequency sonar in its training exercises.

Marine life such as whales and dolphins depend on sound to navigate, find food, avoid predators and communicate. Using mid-frequency in this environment disrupts these critical behaviors and threatens their survival.

Marine life should not have to suffer for military training and the Military should no longer ignore the unnecessary harm inflicted by this technology.

Today's Military should be using its vast resources to protect not just our nation but the health of the environment that it surrounds its' self with whether it is land, sea or air.

There are many common-sense precautions that would not compromise military readiness and with a budget that seems to have no limits and comes before the nation's need of focusing education, out of control homelessness, and health care that costs more than even a upper average American citizen can afford it would seem a fair compromise.

Sincerely,

Napuanani McKeague

Resident of Kauai, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0434

From: Jacquelyn Dillon - Maui, HI
To: deis hrc@govsupport.us
Subject: Mid-Frequency Sonar testing in Hawaii
Date: 9/17/2007 5:45:56 PM

To Whom it may concern:

As a citizen of the United States, I wish it to be known that I in no way support the proposed active sonar in Hawaiian waters. 1

The merest intelligent consideration of the evidence of probable destruction to be caused by such tests is all it would take to see need to seriously reconsider such action. I can only assume ignorance and denial on the Navy's part, and their proposal reeks of such qualities.

If any human being making up the organization that is the U.S. Navy is guided by any sense of moral purpose or responsibillity in life, I can only assume one such moral value may be a sense of service to one's country. You do no service to me, you do no service to my family, no service to the children of our country, to the people of Hawaii by callously and arrogantly acting so foolishly and destructive in the name of the preservation of our country. You do not preserve the United States by destroying the very fiber of the natural world in which it is housed. 2

May the God of your choice be willing to turn the tide on such an outdated policy of abuse of power. Grow up. It is a sincere request. Be men and women of sanity and intelligence. Again, THE PRESERVATION OF OUR COUNTRY IS
NOT TO BE HAD IN THE DESTRUCTION OF THE NATURAL WORLD IN WHICH IT IS HOUSED.

Sincerely,
Jacquelyn
Dillon
Maui, HI

COMMENT NUMBER
D-E-0435

From: Kirsten Jackson - Kaua'i, HI
To: deis hrc@govsupport.us
Subject: ATTN: HRC EIS/OEIS
Date: 9/17/2007 6:00:26 PM

To whom it may concern:

The expansion and upgrading of the Hawaii Range Complex (especially PMRF) is of great concern to me. We live in a very fragile ecosystem that supports endangered marine life and plant species. Our actions in altering these natural ecosystems have consequences that are farther reaching that we can imagine. 1

How many underwater fish and mammals will die from increased mid-frequency sonar?

Irreversible damage will be done by tearing up the dunes and beaches in Expeditionary Assault Activities. How thorough will you really be when checking for marine mammals in the target area? When you are already doing so much damage to the environment, what is one monk seal to the Navy?

But, it is the DIrected Energy Laser Weapons that worries me the most. What effects will Hydrogen Fluoride have on us, our beaches, our oceans, our ground water, our air? With a thousand foot dead zone, how often will the beaches I access all of the time be closed? Once they are reopened, are they really safe?

I strongly oppose the expansion of PMRF and Hawaii Range Complex. What good is it to expand our military & safety from foreign attack if f we don't have an inhabitable island left to live on?

Sincerely, Kirsten Jackson
Resident of Kaua'i

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0436

From: Ru Carley
To: deis hrc@govsupport.us
Subject: Sonar Practices in Hawaiian Waters

Date: 9/17/2007 6:07:49 PM

1 I am opposed to the dangerous activities of the U.S. Navy in the sea, on the land, and in the air around the Hawaiian islands.

If you want to maintain freedom of the seas, let the whales, dolphins, seals and any other sealife swim free and unfettered by deadly sonar!

Mahalo nui loa,

Ru Carley

COMMENT NUMBER
D-E-0437

From: Patricia S Port - Oakland, CA
To: deis hrc@govsupport.us
Subject: Comment letter for ER07/615

Date: 9/17/2007 6:16:09 PM

Attached is a copy of the Comment Letter for ER 07/615. The letter was filed today with the Public Affairs Office, Pacific Missile Range. If you have any further questions, please do not hesitate to ask.

Thank you.

Patricia Sanderson Port

Regional Environmental Officer
Office of Environmental Policy & Compliance
US Department of the Interior, Region 9

Oakland, CA

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0437 (cont.)

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
1111 Jackson Street, Suite 520
Oakland, California 94607

IN REPLY REFER TO:
ER#07/615

Filed Electronically

24 September 2007

ATTN: HRC EIS/OEIS
Public Affairs Officer,
Pacific Missile Range
Facility, P.O. Box 128,
Kekaha, Kauai, Hawaii, 96752-0128
deis_hrc@govsupport.us

Subject: Review of the Draft Environmental Impact Statement (DEIS), for the Hawaii Range Complex (HRC) Project, Honolulu, Maui, and Hawaii Counties, HI

Dear Public Affairs Officer:

The Department of the Interior has received and reviewed the subject document and has the following comments to offer:

The Department of the Interior (DOI) is submitting supplemental comments for Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for the Hawaii Range Complex (HRC), including the revised sections, provided by your office on July 27, 2007. Please consider these comments, and disregard our previous no comment letter. 1

These comments are provided in accordance with the National Environmental Policy Act of 1969 [42 U.S.C. 4321 *et seq.*; 83 Stat. 852] (NEPA);]; and other authorities mandating Federal oversight of environmental resources including the Fish and Wildlife Coordination Act of 1934 [16 U.S.C. 661 *et seq.*; 48 Stat. 401], as amended (FWCA); the Federal Clean Water Act [33 U.S.C. 1251 *et seq.*; 62 Stat. 1155], as amended (CWA); the Endangered Species Act of 1973 [16 U.S.C. 1531 *et seq.*; 87 Stat. 884], as amended (ESA); the Migratory Bird Treaty Act of 1918 [16 U.S.C. 703 *et seq.*; 40 Stat. 755] as amended (MBTA); and the Sikes Act of 1960 [16 USC *et seq.*;74 stat. 1052], as amended.

Proposed action would upgrade and modernize capabilities of HRC, which encompasses land, air and sea training ranges in and around the Hawaiian Islands. HRC supports local military units, multi-national exercises, and facilitates rapid deployment of U.S. defense forces, as necessary. Proposed action is intended to fulfill and improve U.S. government national security and alliance requirements in Pacific Region and increase strategic defense role of the Hawaiian Islands.

COMMENT NUMBER
D-E-0437 (cont.)

We have provided general comments on the Draft EIS/OEIS below. Document-specific comments are provided in Appendix 1.

Adequacy and scope

Overall, Draft EIS/OEIS lacks adequate information to assess potential impacts of proposed actions to fish and wildlife resources. Descriptions of affected environment and impact analyses are cursory, and role of other facility and management plans, particularly at facilities not under direct control of the Department of the Navy, are unclear. Due to these deficiencies, we recommend that a Revised Draft EIS/OEIS be prepared and re-submitted for public review. 2

For many facilities or locations, Draft EIS/OEIS only provides a description of proposed HRC actions that will be conducted at the site (*e.g.*, Section 3.4.2.15 Kaena Point, page 3-276 among others); and other key information is missing. For example, federally listed species and other Federal trust species have not been accurately identified for some facilities.
We recommend affected environment section for each facility be reviewed and revised to be accurate and complete. Where appropriate, we recommend relevant reference material is cited and, as necessary, surveys be conducted.

No definition of terms "tempo" or "frequency" is provided and meaning of these terms is unclear. In many instances throughout Draft EIS/OEIS, no specific description of changes in duration (*i.e.*, length of time the action will occur), timing (*i.e.*, month or season of the year), and frequency (*i.e.*, number of events each year) of training action is provided. 3

We believe that to assess potential impacts it is critical to account for duration, timing, and frequency of activities, as all factors will have an effect on magnitude of potential impact to fish and wildlife resources. We recommend each activity be clearly described, including expected duration, timing, and frequency of each proposed action for all alternatives.

Draft EIS/OEIS does not analyze potential threats to vegetation, wildlife, geology, and water resources expected as a result of proposed actions. Analysis in Draft EIS/OEIS generally indicates that effects to wildlife will be minimized or that no impacts are anticipated.

However, few potential impacts are identified or quantified, and little data and few citations to other scientific reports or literature are provided to support determination of minimized impact or no effect. Potential impacts such as wildfire, trampling, downdraft from aircraft, lighting effects, general harassment of animals over multiple seasons and longer durations, noise, dust, debris, explosions and vibrations, soil erosion and sedimentation, introduction of non-native species, construction related impacts, electromagnetic radiation (EMR), and increases in release and accumulation of potential environmental contaminants receive cursory, and in some cases no examination in Draft EIS/OEIS.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0437 (cont.)

We recommend all potential impacts be identified in a Revised Draft EIS/OEIS and quantitative data be included in impact analysis. Where results warrant, we recommend appropriate mitigative measures be developed in cooperation with Fish and Wildlife office in Honolulu, to compensate for damages or losses to fish and wildlife resources as a result of proposed actions.

While Draft EIS/OEIS frequently states that new training activities have not been proposed, we find that numerous new activities and facilities have been included.

4 Currently, Draft EIS/OEIS states that additional environmental documentation and planning for new Directed Energy Operations (page 2-65) will be completed in future, but it does not contain sufficient detail to assess potential impacts associated with many other new activities or facilities, including: conducting Field Carrier Landing Practices; adding new chemical simulants; launching Intercept Targets into the Temporary Operating Area; SM-6s from sea based platforms and Micro-Satellites; testing Unmanned Aerial Vehicles and hypersonic vehicles; implementing Advanced Hypersonic Weapons training; constructing a large area tracking range and installing FORCEnet antenna arrays; implementing electronic warfare training and transient air wings; installing Automatic Identification System equipment; constructing a range operations control building and fiber optic infrastructure at the Pacific Missile Range Facility (PMRF); sinking a vessel to support Mobile Diving and Salvage Unit training; installing new buoys in Kingfisher Underwater Training Area; and developing and installing the Portable Undersea Tracking Range.

This document appears to be "programmatic" in scope and written as if additional environmental review documents will be tiered from it. Therefore, we recommend new actions be clearly identified, and, if additional environmental documentation will *not* be developed for these activities and facilities, we recommend more details regarding specifics of each proposed action, alternatives that were explored, discussion of affected environment, analysis of potential effects to federal trust species, and appropriate compensatory mitigation to compensate for damages to federal trust resources be included in Revised Draft EIS/OEIS.

As we have stated in previous comments provided on earlier versions of the Draft EIS/OEIS, it is unclear how pre-existing management plans and regulations, especially for facilities not operated by the Navy, fit into the structure of HRC. With exception of a 1999 biological opinion for Makua, no other facility-specific document or plan is described in Draft EIS/OEIS.

5 We are concerned that activities proposed in Draft EIS/OEIS may not be covered by management plans, Integrated Natural Resource Management Plans (INRMP), or biological opinions of these other facilities. We recommend Revised Draft EIS/OEIS clearly state the role of these other management documents in framework of proposed activities.

Threatened and Endangered Species

Draft EIS/OEIS provides an incomplete list of threatened and endangered species and presentation of information is inconsistent and at times confusing. For example, threatened and endangered species discussed are sometimes absent from tables. To assist you, we have provided a draft threatened and endangered species lists for facilities included in Draft EIS/OEIS (Enclosure 1).

COMMENT NUMBER
D-E-0437 (cont.)

We recommend that this list, in conjunction with information from the Hawaii Biodiversity and Mapping Program, be used to determine which federally listed species occur at each facility. We also recommend that all federally listed species be included in tables in Revised Draft EIS/OEIS.

6 While many facilities are not located within critical habitat for threatened or endangered species, critical habitat may be located adjacent to or near lands considered in HRC. In many cases these military lands were excluded from critical habitat designation, because of development of an INRMP. This habitat is still considered essential to survival and recovery of species and has not been given consideration in Draft EIS/OEIS. Many proposed actions have potential to affect areas outside property boundaries, including adjacent critical habitat.

For those facilities adjacent to or near critical habitat units, or contain essential habitats, we recommend Revised Draft EIS/OEIS include discussion of these habitats under Environmentally Sensitive Habitat section for that facility.

7 With exception of the 1999 biological opinion for Makua, Draft EIS/OEIS does not acknowledge existing biological opinions for any military lands covered, nor does it adequately describe if any proposed activities would in conformance with those biological opinions. Draft EIS/OEIS does not define policies and procedures regularly implemented by the Navy to avoid and minimize effects to protected species and their habitats.

All Navy activities must be in conformance with most recent, existing biological opinions for areas within HRC. Increases in tempo and frequency could be above and beyond what was analyzed in existing biological opinions.

Draft EIS/OEIS indicates new training operations, enhancements, and/or construction, including adding equipment to existing facilities and communication towers, may be needed to facilitate Navy activities. If Navy activities are not in conformance with existing biological opinions or actions are new or beyond those previously analyzed, the Navy will need to consult with us pursuant to section 7 of the ESA regarding any potential impact to threatened and endangered species and/or critical habitat.

We commend the Navy for its early coordination with National Marine Fisheries Service (NMFS) regarding potential impacts to marine mammals. Due to potential adverse effects of mid-frequency sonar on marine vertebrates, and specifically federally threatened and endangered marine species, we recommend the Navy continue to coordinate with NMFS and Hawaii Division of Aquatic Resources to assess potential impacts of sonar use on these species.

Use of Chemical Simulants

8 Discussion of contaminants contained in Draft EIS/OEIS does not include information on expected concentrations or thresholds at which impacts to fish or wildlife resources are expected to occur. Contaminants are routinely described as environmentally safe, but no references or data are provided to support the determination.

For example, tributyl phosphate (TBP), one of the chemical simulants proposed for use in large quantity and described in Draft EIS/OEIS as without toxic effects, has been identified as "toxic

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0437 (cont.)

to aquatic organisms" by World Health Organization's International Programme on Chemical Safety[1].

While Draft EIS/OEIS correctly assesses importance of dilution when considering environmental impact, we are concerned analysis has not fully taken into account sensitivity of marine organisms to low contaminant concentrations[2,3,4,5]. Concentrations well below levels established for human health and safety can adversely impact marine invertebrates, especially their planktonic larval stages, which can spend up to several months in open ocean. We recommend that Revised Draft EIS/OEIS better describe concentrations of proposed simulants expected as a result of proposed actions and that low impact threshold of marine organisms be incorporated into analysis and discussion of potential impacts.

Electromagnetic Radiation and Electromagnetic Fields

Wildlife species, particularly bats and birds, can be negatively impacted by electromagnetic radiation and electromagnetic fields. For example, bats can experience reduced activities when exposed to electromagnetic field strengths less than 2 volts/meter and have significantly reduced activities when the electromagnetic fields is greater than 2 volts/meter[6].

Bat behavior varies by radar type and may be associated with the characteristics and operating times of individual radar units. Electromagnetic radiation can also exert an aversive behavioral response in bats[7]. A recent literature review described behavioral, reproductive and physiological response of different bird species to electromagnetic fields emanating from powerlines[8]. Response was found to vary by magnitude of exposure and species.

9 Draft EIS/OEIS does not provide analysis of existing electromagnetic radiation and electromagnetic fields for facilities discussed, nor does it provide biological analyses of impacts resulting from increased tempo and frequency or addition of equipment, its operation, or construction of equipment, towers, antennas, or facilities. that will emit electromagnetic radiation and create an electromagnetic field.

Frequencies of radio waves or electromagnetic radiation have not been specified and electromagnetic fields have not been quantified. We recommend analysis be conducted to examine potential impacts of electromagnetic radiation and electromagnetic fields on breeding

[1]International Chemical Safety Card 0584 available online from the Center of Disease Control at http://www.cdc.gov/niosh/ipcsneng/neng0584.html
[2]Heslinga, G. A. 1976. Effects of copper on the coral-reef enchinoid *Echinometra mathaei*, *Mar. Biol.* 35: 155–60.
[3]Negri, A. P., L. D. Smith, N. S. Webster, and A. J. Heyward. 2002. Understanding ship-grounding impacts on a coral reef: potential effects of anti-foulant paint contamination on coral recruitment. *Mar. Poll. Bull.* 44:111-7.
[4]Victor, S. and Richmond, R.H.. 2005. Effect of copper on fertilization success in the coral Acropora surculosa. *Mar. Poll. Bull.* 50: 1448-51.
[5]Reichelt-Brushett, A.J. and P. L. Harrison. 2005. The effect of selected trace metals on the fertilization success of several scleractinian corals species. *Coral Reefs* 24: 524-34.
[6]Nicholls B. and P.A. Racey. 2007. Bats avoid radar installations: could electromagnetic fields deter bats from colliding with wind turbines? PLoS ONE 2(3): e297.
[7]Nicholls B. and P.A. Racey. 2007. *op. cit.*
[8]Fernie, K.J. and J. Reynolds. 2005. The effects of electromagnetic fields from power lines on avian reproductive biology and physiology: a review. Journal of Toxicology and Environmental Health, Part B, 8:127-140.

COMMENT NUMBER
D-E-0437 (cont.)

success, foraging, and behavior of Hawaiian hoary bat (*Lasirus cinereus semotus*) and all federally listed or migratory bird species that are known to breed, forage, or shelter near these facilities and this information should be included in Revised Draft EIS/OEIS.

As appropriate, we also recommend mitigative and conservation measures be developed to offset potential impacts from the proposed activities. 10

In summary, to serve as a decision document, we recommend Draft EIS/OEIS be strengthened and re-released for public comment as Revised Draft EIS/OEIS. As currently written, Draft EIS/OEIS lacks details on proposed actions, affected environment and its analysis to adequately assess potential impacts to fish and wildlife, especially federally listed and other Federal trust species.

If a Revised Draft EIS/OEIS will not be prepared, we recommend you coordinate with Pacific Islands Fish and Wildlife Office to address these concerns prior to issuing Final EIS.

Draft EIS/OEIS contains numerous new proposed activities for which insufficient detail has been provided in order to assess their potential impacts to fish and wildlife resources and their habitats. We believe that separate environmental review should be conducted for these new activities.

This review should include full disclosure of proposed action, alternatives considered, affected environments and complete analysis of impacts. As appropriate, compensatory mitigation will need to be developed.

Coordination with the Service, NMFS, and the Hawaii Department of Land and Natural Resources is recommended during development of detailed mitigation plans. If proposed project, including increased frequency and tempo, new activities, or any construction, is determined to affect listed species, their habitats, or critical habitat, then consultation under the ESA would be required prior to project implementation.

We appreciate the opportunity to comment on this Draft EIS/OEIS.

If you have questions regarding these comments please contact Fish and Wildlife Biologist Dwayne Minton at 808-792-9445.

Appendix 1: Specific Comments
Enclosures1: Draft List of Federally Listed Species

cc:
Director/OEPC, Washington D.C.
Mr. Don Steffeck, USFWS, Region 1, Portland
EPA Region 9, Honolulu
NMFS – PIRO, Honolulu
Hawaii DAR
Hawaii DOFAW

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0437 (cont.)

APPENDIX 1
Specific Comments on the Draft EIS/OEIS for the Hawaii Range Complex

Section ES 1.4 Proposed Action and Alternatives (page ES-12). While the number of training operations per year, including baseline and estimates for proposed alternatives, is described, it is not clear how this baseline number was determined. It is unclear if the baseline at each location includes the number of operations that could be completed by any military organization (including National Guard or other Foreign governments), as evaluated under existing biological opinions, or only the number of existing operations at each location that are completed by the dominant military unit (*e.g.*, the Army actions at Makua but not the Air Force activities that could occur at Makua). We recommend that clarification and supporting documentation that describes how the baseline numbers were established be included in the Revised Draft EIS/OEIS.

12 Section 2.2.3.5.3 Offshore Enhancements (page 2-48). The proposed Portable Undersea Tracking Range is a new activity proposed in this Draft EIS/OEIS. Anchors will be left in place when collecting sensor equipment, requiring the use of new anchors with each deployment. We are concerned that repeated deployment of anchors will result in measurable damage to deep-water coral reefs, especially if consistently deployed in the same area. Insufficient information on proposed location for deployment has been provided to assess its potential impact to deep-water coral reef habitats; as currently described the proposed area of use is extensive, covering many thousands of square kilometers. We recommend that additional information be provided on location(s) for the Portable Undersea Tracking Range and the frequency (*e.g.*, deployments/year) with which it will be relocated.

13 Section 2.2.3.5.3 Offshore Enhancements (page 2-48). The anchor size and weight for the electronic packages of the Portable Undersea Tracking Range are not specified. These anchor packages could adversely impact deep-water coral reef habitat. We recommend more information on the physical parameters of the anchors and any relevant deployment protocols be included in the Revised Draft EIS/OEIS. We also recommend that the Navy coordinate with NMFS and our office regarding buoy placement so that potential environmental impacts are reduced and appropriate mitigative measures can be developed.

14 Section 2.2.3.5.4 PMRF Enhancements (page 2-52). The proposed addition of a new area to the existing Kingfisher Underwater Training Area should be considered a new facility if it was not covered under the original environmental review. Insufficient information on the proposed action and the biological resources in the proposed facility area has been provided to make an assessment of the potential impacts. We recommend inclusion of additional information regarding the proposed locations of the buoys, whether the buoys are intended to be permanently deployed or occasionally relocated, and the deployment/retrieval protocols to ensure buoys are deployed/retrieved in ways that minimize environmental impacts. We also recommend that the Navy begin coordination with NMFS

COMMENT NUMBER
D-E-0437 (cont.)

and our office regarding buoy placement so that potential environmental impacts are reduced and appropriate mitigative measures can be developed.

15 Section 2.2.4.4 Future RDT&E Operations (page 2-65). The Draft EIS/OEIS describes two potential locations for the Maritime Directed Energy Test Center (Test Center) at PMRF and notes that separate/additional environmental documentation will be required for this action. One of the proposed locations is within or adjacent to critical habitat for *Sesbania tomentosa* and *Panicum nihauense*. An analysis of the potential adverse affects of the construction and use of the Test Center on this critical habitat should be conducted. We recommend coordinating with our office regarding any direct or indirect affects from the proposed activity to critical habitat.

16 Section 3.2 Northwestern Hawaiian Islands (page 3-80). The Draft EIS/OEIS incorrectly states that only 12 species of algae, invertebrates and fish are recorded from the Northwest Hawaii Islands (NWHI). The coral reef fauna from the NWHI is rich, with over 1,000 identified species[9]. We recommend that this section be revised to accurately depict the biodiversity present in the NWHI.

17 Section 3.2 Northwestern Hawaiian Islands (page 3-80). The Northwest Hawaiian Islands Ecosystem Reserve is now called Papahanaumokuakea Marine National Monument. We recommend that the Revised Draft EIS/OEIS be updated to reflect the change in status of this area.

18 Section 3.3.1.1.1 Biological Resources – PRMF – Offshore (page 3-92). Opihi have been incorrectly identified as "keyhole limpets" (line 40). We recommend correcting the common name to "limpet."

19, 20 3.3.2.1.3 Biological Resources – PMRF/Main Base (page 3-117). The Biological Resources section for each installation has an Environmentally Sensitive Habitats subsection. The descriptions of wetlands, estuaries, coastal areas and streams appear to reflect aquatic and marine habitat delineation and mapping performed by the Service's National Wetlands Inventory Program (NWI). We recommend that the source information be cited and definitions for habitat types and hydrologic regimes should either be included in the document or incorporated by reference. Note that the NWI maps for Oahu were updated in 2006-2007 and that the new NWI maps should be used to describe aquatic and coastal marine areas in Revised Draft EIS/OEIS.

Section 3.3.2.8 Mt. Kahili (page 3-168). This area is known to have Newell's shearwater (*Puffinus auricularis newelli*) and Hawaiian petrel (*Pterodroma phaeopygia sandwichensis*) traversing the area and may support breeding locations for these species. Hawaiian

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[9] Friedlander, A.M., G. Aeby, R. Brainard, A. Clark, E. DeMartini, S. Godwin, J. Kenyon, R. Kosaki, J. Maragos, and P. Vroom. 2005. The State of Coral Reef Ecosystems of the Northwestern Hawaiian Islands. pp. 270-311. In: J. Waddell (ed.), The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2005. NOAA Technical Memorandum NOS NCCOS 11. NOAA/NCCOS Center for Coastal Monitoring and Assessment's Biogeography Team. Silver Spring, MD. 522 pp.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0437 (cont.)

hoary bats are also likely to be using Mt. Kahili. The EIS has not provided information on the outdoor lighting configuration, the duration of the past and projected use of this facility, the frequencies of radio waves used by the repeater station, or the electromagnetic field created. No assessment of the potential impacts on these federally listed sea bird and mammal species resulting from changes in the intensity or frequency of use for this facility has been included in the Draft EIS/OEIS. We recommend that additional information, including the FCC license and related consultations that evaluate the potential effects of this facility on endangered species, be provided in the Revised Draft EIS/OEIS. 21

22 3.3.2.9.1. Biological Resources – Niihau Vegetation (page 3-169). No threatened or endangered plants have been identified in the Draft EIS/OEIS for Niihau. However, Niihau supports populations of several listed plants (see Enclosure 1), including designated critical habitat for olulu or alula (*Brighamia insignis*). We recommend that the Revised Draft EIS/OEIS be updated to reflect the presence of these endangered species.

23 Section 3.3.2.9 Niihau (page 3-169). Based on its close proximity, it appears that the Microwave and EMESS 1 site may impact the endangered Newell's shearwater[10] and other MBTA seabird species nesting on Lehua. We recommend that additional information is provided about the potential area of effect for the microwave facilities on Niihau, and, as necessary, that the area of influence for Niihau be expanded to include Lehua and its biological resources.

24 Section 3.4.2.1.1 Biological Resources – Naval Station Pearl Harbor (page 3-209). The Draft EIS/OEIS indicates that there are no threatened or endangered plant species at the Naval Station Pearl Harbor. Recently, three endangered plants, kooloaula (*Abutilon menziesii*), ohai (*Sesbania tomentosa*) and loulu (*Pritchardia kaalae*) were established at the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge as mitigation for past projects. Due to the proximity of the endangered plants to the Naval Station Pearl Harbor we recommend that these plant populations be included in the discussion of the affected environment and that they are considered in the analysis of potential impacts resulting from the proposed actions.

Section 3.4.2.6.2 Biological Resources – U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport (page 3-237). The Kalaeloa Unit, which was once part of the former Barbers Point Naval Air Station, has been added to the Pearl Harbor National Wildlife Refuge and should be included under Environmentally Sensitive Habitat. The Kalaeloa Unit supports the second largest population of endangered ewa hina hina (*Achyranthes splendens*), which is not included in the list of threatened and endangered plant species. We recommend that the current status of this unit be corrected in the Revised Draft EIS/OEIS and that *A. splendens* be included in the list of threatened and endangered plant species for this area.

[10] VanderWerf, E.A., K.R. Wood, C. Swenson, M. LeGrande, H.Eijzenga, and R.L. Walker. 2007. Avifauna of Lehua Islet, Hawaii: Conservation value and management needs. Pacific Science 61(1):39-52.

COMMENT NUMBER
D-E-0437 (cont.)

25 Section 3.4.2.9.2 Biological Resources – Hickam AFB (page 3-252). Federally endangered Hawaiian waterbirds, primarily Hawaiian Stilts (*Himantopus mexicanus knudseni*), are regular visitors to Hickam Air Force Base, having been observed foraging and nesting on Base and adjacent to the runway. On March 2006, at least two separate stilt pairs nested adjacent to the runway where dewatering ponds were in place on Hickam AFB[11]. We recommend that the discussion of threatened and endangered wildlife species be amended to include this information and address ways to minimize this issue (*e.g.*, remove the attraction of stilts to the ponds). 26

Section 3.4.2.11.1 Biological Resources – Makua Military Reservation (page 3-259). The consultation completed in 1999 for Makua Military Reservation (Makua) has been reinitiated three times, most recently in June 2007[12]. The new consultation covers 38 endangered or threatened plant species, critical habitat units for 36 plant species, the Oahu elepaio (*Chasiempis sandwichensis ibidis*), critical habitat for the Oahu elepaio, and an Oahu tree snail (*Achatinella mustelina*). The Oahu tree snail was not included in Table 3.4.2.11.1-1 and the plant list is incomplete. Figure 3.4.2.11.1-1 indicates that there is critical habitat within the boundary of Makua; however, the text indicates there is no critical habitat on site. The Makua action area includes areas outside of the reservation boundary, 27 as training actions could impact species and critical habitat adjacent to Makua proper. We recommend that the Revised Draft EIS/OEIS include a discussion regarding whether the Navy's actions will be in compliance with the biological opinion.

28 3.4.2.11.1 Biological Resources - Makua Military Reservation (page 3-259 through 3-261). We recommend that the description of the intermittent stream and estuary that is found at the Makua Military Reservation be clarified. These aquatic features may be found on U.S. Geological Survey topographic maps and current NWI maps.

Section 3.4.2.12.1 Biological Resources - Kahuku Training Area (page 3-267) and Section 3.4.2.13.1 Biological Resources – Dillingham Military Reservation (page 3-272). The Kahuku Training Area and the Dillingham Military Reservation were addressed in the 2003 biological opinion for routine and transformation training conducted by the U.S. Army[13]. The Draft EIS/OEIS does not reference this biological opinion. We recommend that the Revised Draft EIS/OEIS include a discussion regarding whether or not the Navy's actions are in compliance with the biological opinion.

[11] A. Hebshi, personal communication, 2007. Electronic mail dated May 24, 2007 with twelve attachments including "Hawaiian Stilt Incidental Take Biological Assessment Revised March 8, 2007

[12] Reinitiation of the 1999 Biological Opinion of the U.S. Fish and Wildlife Service For U.S. Army Military Training at Makua Military Reservation Island off Oahu June 22, 2007 (1-2-2005-F-0356). This document is available from the Department of Army.

[13] Biological Opinion of the U.S. Fish and Wildlife Service for Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light) U.S. Army Installations Island of Oahu. October 23, 2003. (1-2-2003-F-0004). This document is available from the Department of Army.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-E-0437 (cont.)

29 Section 3.4.2.15 Kaena Point (page 3-276) and 4.4.2.15 Kaena Point (page 4-423). Kaena Point provides habitat for several listed plant species, nesting habitat for wedge-tailed shearwater (*Puffinus pacificus cholrorhynchus)* and Laysan albatross (*Phoebastria immutabilis*), and resting areas for the endangered monk seal (*Monachus schauinslandi*). The Draft EIS/OEIS does not provide information on the duration of the past and proposed future use of this area, particularly the frequencies of radio waves or strength of the electromagnetic field used. No assessment of the potential impacts to these species resulting from changes in the intensity or frequency of use for this site has been included. We recommend that additional information be provided in the Revised Draft EIS/OEIS to better evaluate potential impacts to the breeding sea birds and monk seal resulting from the proposed actions.

30 Section 3.6.2.1.2 Biological Resources – PTA (page 3-295); 4.6.2.1.1 Biological Resources – Pohakuloa Training Area (page 4-445) and 4.6.2.2.2 Biological Resources – Bradshaw Army Airfield (page 4-454). Routine and transformation training actions at Pohakuloa Training Area (PTA) and Bradshaw Army Airfield were addressed in the 2003 biological opinion for PTA[14]. We recommend that the Revised Draft EIS/OEIS include a discussion regarding whether or not the Navy's actions are in compliance with the biological opinion. We also recommend that Figure 3.6.2.1.2-1 be revised to include palila (*Loxioides bailleui*) critical habitat designated within and adjacent to PTA.

31 Section 4.1.2.2.1 No-action Alternative (Fish – Biological Resources – Open Ocean) (page 4-15). Information on peak sonar levels and length of operation at peak levels is not provided. "Normal Operation" is not described. We recommend that additional information be provided on sonar peak levels and operation in order to allow assessment of the potential impacts of these proposed activities.

32 Section 4.1.2.2.2 Alternative 1 (Fish – Biological Resources – Open Ocean) (page 4-17). The Draft EIS/OEIS states that Alternative 1 will increase Anti Submarine Warfare (ASW) training to 4,027 hours, but does not provide a baseline value with which to compare this figure. We recommend that Revised Draft EIS/OEIS include in the text the hours of ASW training for the No-action Alternative to allow readers to better assess the magnitude of the training increase.

33 Section 4.1.2.2.2 Alternative 1 (Fish – Biological Resources – Open Ocean) (page 4-18). The text contained in the Draft EIS/OEIS is confusing and appears contradictory. It states that "[t]he number of hours of sonar for Alternative 1 is the same as the No-action Alternative" (line 5-7), but later in the same paragraph states "the number of sonar and the number of underwater detonations would increase" (line 9-10). We recommend clarifying the text in this section.

[14]Biological Opinion of the U.S. Fish and Wildlife Service for Routine Military Training and Transformation of the 2nd Brigade 25th Infantry Division (Light) U.S. Army Installations Island of Hawaii. December 23, 2003. (1-2-2003-F-0002). This document is available from the Department of Army.

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34 Section 4.1.2.2.2 Alternative 1 (Fish – Biological Resources – Open Ocean) (page 4-19). The Draft EIS/OEIS states that Alternative 2 will have 1,590 hours of sonar activity, but does not provide a baseline value with which to compare this value. We recommend that Revised Draft EIS/OEIS include in the text the number of hours of sonar activity for the No-action Alternative to allow better assessment of the magnitude of the proposed training increase.

35 Section 4.1.2.3 Sea Turtles (Biological Resources – Open Ocean) (page 4-21). It is unclear if collisions with sea turtles have occurred in the past. We recommend that any collisions with sea turtles be disclosed in order to assess the Navy's Standard Operating Procedures (SOP) to reduce collisions.

36 Section 4.1.2.3 Sea Turtles (Biological Resources – Open Ocean) (page 4-20 through 4-21). The Draft EIS/OEIS states that "[e]xtrapolation from human and marine mammal data to turtles is inappropriate" (page 4-20, line 10) for potential sonar impacts to hearing, but in the discussion of impacts to hearing associated with underwater detonations, marine mammal data are extrapolated to turtles (page 4-21, line 35). We recommend that this apparent discrepancy be explained.

37 Section 4.1.4.1.1 HRC Training operations (page 4-178). Marine organisms have been shown to be susceptible to low concentrations of contaminants. No data has been provided in the Draft EIS/OEIS on expected concentrations or known toxicity thresholds for marine organisms to support the determination of no effect. We recommend that additional data be provided in the Revised Draft EIS/OEIS to support the determination of no effect.

38 Section 4.2.2 Northwestern Hawaiian Islands Onshore (page 4-202 through 4-205). Both Alternatives 1 and 2 include an increase in the use of chemical simulants, but no analysis or data has been provided to support the determination of no effect to fish and wildlife resources. We recommend that details of the analysis conducted to reach the determination of no effect, including the estimated probability of debris striking each island as conducted in Section 4.1.1.1.1.1 for marine mammals, be provided in the Revised Draft EIS/OEIS.

39 Section 4.2.2 Northwestern Hawaiian Islands Onshore (page 4-202 through 4-205). Quantitative data on the amount of debris and its impacts on the ecosystems of the NWHI are lacking. We recommend that the Navy coordinate with the NMFS's debris removal effort and our office to better quantify the amount of debris and its impacts resulting to fish and wildlife on and around the NWHI.

40 Section 4.3.1.1.1 Biological Resources – PMRF Offshore (page 4-209) and Section 4.3.1.2.1 Biological Resources – Niihau Offshore (page 4-221). No data on potential impacts to coral reefs resulting from Expeditionary Assault or SPECWAROPS amphibious landing exercises have been provided. We recommend that these potential impacts be analyzed and discussed in the Revised Draft EIS/OEIS and that appropriate compensatory mitigative measure be developed in cooperation with NMFS and our office.

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41 Section 4.3.1.2 Niihau Offshore (pages 4-220 though 4-222). Buoys deployed at Kingfisher Underwater Training Area can act Fish Aggregating Devices (FAD), and in Hawaii can attract pelagic species such as tuna, mahimahi, wahoo, and numerous shark species[15]. The Draft EIS/OEIS fails to discuss the possibility that deployed buoys may act as FADs and attract fishermen. We recommend that Revised Draft EIS/OEIS include an analysis of the buoys as FADs and include a discussion of the proposed provisions for public safety and management.

42 Section 4.3.1.3.1 Biological Resources – Kaula Offshore (page 4-223 through 4-225) and 4.3.2.10.2.1 No-action Alternative (Biological Resources – Kaula) (page 4-320). It is unclear from the text whether Alternatives 1 and 2 will result in increased GUNEX training operations. Many species of seabirds nest on Kaula and any training activities near or on Kaula need to be assessed pursuant to each action. In addition, a revised avian survey should be conducted to determine if any threatened or endangered seabirds nest at Kaula and this information should be included in the Revised Draft EIS/OEIS. Increased GUNEX operations would likely result in increased soil erosion from Kaula and Niihau that may adversely impact nearshore coral reefs. No analysis of this potential impact has been conducted. We recommend that the Revised Draft EIS/OEIS clarify if an increase (including its magnitude over the No-action alternative) in GUNEX operations will occur under the two alternatives. If an increase is proposed, we recommend that an analysis of the potential impact of soil erosion and coastal sedimentation be conducted.

43 4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Vegetation* (page 4-240 through 2-241). We are concerned that military inspectors do not inspect goods and personnel transferred to Hawaii from the U.S. mainland. Non-native species can be brought to Hawaii from the mainland, and, if they become established, can result in significant damage to Federal trust species. We recommend that in order to assist in the effort to prevent the introduction of non-native species to Hawaii that the Navy consider inspecting all inbound flights in a manner similar to those originating from foreign areas.

44 4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Vegetation* (page 4-241). The Draft EIS/OEIS indicates that vegetation near the Strategic Target System launch pad can be temporarily impacted from missile launches, but that no long-term adverse effects have been detected. Neither the impact radius from the missile launch pad nor the duration of the detected effects and their recovery time has been provided. Short-term or temporary effects may potentially have lasting negative impacts to listed plants. To prevent potential impacts to listed plant species or critical habitat, we recommend that all launch sites be located such that no listed species or their habitat, including critical habitat, is within the impact radius. We further recommend that adequate fuel or fire breaks be established around the impact area.

[15]For information on FADs in Hawaii, check the State of Hawaii's Fish Aggregation Device Program's webpage at http://www.hawaii.edu/HIMB/FADS/

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45 4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Wildlife* (page 4-241). The Draft EIS/OEIS indicates that if marine mammals or sea turtle are found on the beach at PMRF, planned exercises are "…delayed until the animals leave the area" (line 23), but no time limit is provided for the length of the delay. We recommend that the length of the delay be included in the Revised Draft EIS/OEIS.

46 4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Wildlife* (page 4-241). No discussion about the potential impacts of amphibious landings on nesting seabirds (*e.g.*, wedge-tail shearwater and Laysan albatross) has been provided in the Draft EIS/OEIS. We recommend that an analysis of these potential impacts on nesting seabirds be conducted to include avoidance measures such as conducting amphibious landings only after nestlings have fledged, or prior to the start of the next nesting season, or move activities to unoccupied areas.

47 4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Wildlife* (page 4-241). The Draft EIS/OEIS provides no discussion of the potential effect on Laysan albatross resulting from the proposed increased in activity at PMRF. Laysan albatross nest at PMRF and are currently the focus of facility management actions. We recommend the current management Standard Operating Procedures (SOPs) for the Laysan albatross (*e.g.*, egg and chick removal) and the potential impacts resulting from the proposed actions on this species be discussed in the Revised Draft EIS/OEIS. We also recommend that PMRF continue to work with our office, the U.S. Department of Agriculture's Animal and Plan Health Inspection Service, and the Bird Aircraft Strike Hazard Program to further reduce impacts to this federally protected species while better facilitating military actions.

48 4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Wildlife* (page 4-241). The Draft EIS/OEIS does not provide sufficient analysis of the potential impacts resulting from the launching of drones. No impact radius associated with the launches is provided. Potential impacts from wildfire are not analyzed for vegetation and wildlife resources. We recommend that additional information and analysis of the potential impacts of drone launches be provided in the Revised Draft EIS/OEIS.

49 4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Noise* (page 4-241 through 4-242). The Draft EIS/EIS states that wildlife in the vicinity of missile launches resume normal behaviour patterns after a launch; however, no data or citation is provided to support this statement. We recommend that supporting data be cited. We also recommend that the terms "severe" and "repeated" (page 4-241, line 41) be defined and the species routinely affected by the noise be specified.

50 4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Air Emissions* (page 4-242). The Draft EIS/OEIS provides no discussion regarding the chemical breakdown, by-products, or the biological impacts of these products for aluminium oxide and hydrogen chloride. We recommend that a discussion of the chemical breakdown and the by-products of these chemicals be

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included in the Revised Draft EIS/OEIS. We also recommend that analysis of the potential impacts of these products on wildlife resources, including both affects on species and the possibility of bioaccumulation, be conducted as appropriate.

51 <u>4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Debris* (page 4-242 through 4-243)</u>. No information is provided on the launch safety zone (page 2-242, line 29), and little information has been provided on the location of the safety zones or the SOPs for sea turtles or monk seals that are observed in the safety zone prior to launch. We recommend that additional information on the location of the safety zone and the duration of delays for animals in the safety zone be provided.

52 <u>4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Debris* (page 4-242 through 4-243)</u>. A launch mishap involving a liquid-propelled missile has been described as an "unlikely event" (page 2-242, line 35) that could result in contaminated soil. No discussion of soil mitigative measures and no analysis of potential impacts to vegetation and wildlife have been provided. We recommend that information on the expected burn area and the vegetation and wildlife that could be impacted be provided and that appropriate mitigation measures, such as restoring other habitat to attract species away from the potential burn zone, be considered in the Revised Draft EIS/OEIS.

53 <u>4.3.2.1.3.1 No-action Alternative (Biological Resources – PMRF/Main Base) *Environmentally Sensitive Habitat* (page 4-243)</u>. While training does not occur within environmentally sensitive dune systems or wetlands, it is unclear if these areas may potentially be impacted by debris or wildfire. We recommend that a map depicting the locations of sensitive habitat and the potential areas of debris and wildfire impact be included in the Revised Draft EIS/OEIS. If appropriate, we also recommend that conservation measures to minimize adverse effects to sensitive habitats be developed. The minimization measures should be such that the primary constituent elements are maintained intact within any critical habitat, even if currently unoccupied, so that it remains viable for future occupation.

54 <u>4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *New Training Operation* (page 4-244)</u>. The Draft EIS/OEIS states that sound levels from adding Field Carrier Landing Practice will be similar to existing sound levels. However, no data are provided for comparison. We are concerned that night time activities could impact migratory and federally listed seabird species that disperse at night and Hawaiian hoary bats that actively forage at night. As the proposed activity is new for PMRF, we recommend a more detailed evaluation of potential effects of Field Carrier Landing Practices on these nocturnally active species.

55 <u>4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *HRC Enhancements* (page 4-245 through 4-246)</u>. The Navy is proposing to use existing towers for the placement of new equipment to enhance electronic warfare training capability; however, the Draft EIS/OEIS provides no biological analyses of impacts resulting from the addition of equipment and its operation. Many bird species are known to strike objects, such as antennas or guy-wires that protrude above the surrounding vegetation height. In Hawaii there are several species of federally listed seabirds that are attracted to lights and are known to collide with buildings, light poles,

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wires, and other tall objects. Additional equipment added to existing towers may impact species via changes to lighting, electromagnetic radiation or electromagnetic fields, or the physical size of the structure. We recommend that an analysis of potential impacts to biological resources from the proposed activities, including the development of appropriate mitigative and minimization measures be included in the Revised Draft EIS/OEIS. The following website may help in avoiding and minimizing impacts to wildlife species from communications towers, http://www.fws.gov/migratorybirds/issues/towers/comtow.html.

56 <u>4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *HRC Enhancements* (page 4-245)</u>. The Draft EIS/OEIS states that PMRF will provide "dedicated equipment and other support to Strike Groups" (line 33), but the nature of this support is not described. We recommend that additional details about the dedicated equipment and other support be provided as well as the details of the analysis used to reach the determination of no effect.

57 <u>4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *Construct Range Operations Control Building* (page 4-246)</u>. The construction of a Control Range Operations Control Building is a new activity, and currently, the analysis conducted as part of this Draft EIS/OEIS lacks sufficient data and analysis to assess the potential impacts to fish and wildlife resources. The Draft EIS/OEIS indicates that construction would not likely directly impact any wetlands, but provides no supporting data. The analysis fails to consider indirect effects from construction to the wetlands, nor does it adequately address any avoidance, minimization, or mitigation measures to offset impacts to federally listed and other Federal trust species. The Hawaiian duck (*Anas wyvilliana*), Hawaiian moorhen (*Gallinula chloropus sanvicensis*), Hawaiian coot (*Fulica alai*), and Hawaiian stilt (*Himantopus mexicanus knudseni*) are known from this area and could be using the wetlands for nesting; however, potential impacts to these species from the construction of a new Control Building are not addresses. We recommend that additional detailed environmental information be prepared for this new proposed action.

58 <u>4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *Enhanced and Future RDT&E Operations* (page 4-246)</u>. The Draft EIS/OEIS correctly states that additional environmental documentation will be needed for the construction of a permanent facility to house and operate a high energy laser system. Without completing appropriate environmental planning and review, it is premature to determine that "…impacts [from constructions of the facility] would be similar to those from other constructions…" (lines 34-35) described in other sections of the Draft EIS/OEIS. We recommend that this statement is removed from the Revised Draft EIS/OEIS.

59 <u>4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *Advanced Hypersonic Weapon* (page 4-247)</u>. The Draft EIS/OEIS indicates that the Advanced Hypersonic Weapons will have payloads that impact on Illeginni Island in U.S. Army Kwajalein Atoll. No information has been provided on the resources present at the impact location and no analysis of the potential impacts to these resources has been included in the Draft EIS/OEIS. Without additional information, it is unclear if this new activity is addressed in existing

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management plans or environmental documentation for Illeginni Island. We recommend that additional information be provided in order to fully assess the potential impacts of this proposed activity.

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4.3.2.1.3.2 Alternative 1 (Biological Resources – PMRF/Main Base) *Additional Major Exercises – Multiple Strike Group Training* (page 4-247) and 4.3.2.2.2.3 Alternative 2 (Biological Resources – Makaha Ridge) (page 4-297). The Draft EIS/OEIS does not indicate if separate environmental documentation will be prepared to analyze the Multiple Strike Group Training activity. If a separate document will not be prepared, additional information and analysis is needed with respect to changes in lighting, fire potential, noise, electromagnetic radiation/ electromagnetic fields from increased operations, and the introduction of non-native species. We recommend that the Navy clarify its intentions regarding environmental documents and, as necessary, provide adequate information in the Revised Draft EIS/OEIS to assess the potential impacts of this proposed activity.

61

4.3.2.2.2.2 Alternative 1 (Biological Resources – Makaha Ridge) *Vegetation* (page 4-296) and 4.3.2.3.2.2 Alternative 1 (Biological Resources – Kokee) *Vegetation* (page 4-303). We are concerned about impacts to Federal trust species resulting from SPECWAROPS training. In the event that these species cannot be avoided, we recommend that the Navy coordinate with us regarding potential impacts from this proposed training.

62

4.3.2.3.2.2 Alternative 1 (Biological Resources – Kokee) *HRC Enhancements* (page 4-303). No analysis of the potential impacts resulting from the proposed FORCEnet Integration Laboratory or antenna arrays is presented in the Draft EIS/OEIS. Equipment, including antenna arrays, added to existing towers may potentially impact Federal trust species via changes to lighting, electromagnetic radiation or electromagnetic fields, or by altering the physical size of the structure. We recommend that an analysis of the potential impacts to fish and wildlife resources from these proposed activities be provided in the Revised Draft EIS/OEIS and that appropriate avoidance and minimization measures be developed.

63

4.3.2.3.2.2 Alternative 1 (Biological Resources – Kokee) *HRC Enhancements* (page 4-303). The Draft EIS/OEIS does not include an analysis of potential impacts to Federal trust species resulting from the installation of fiber optic cables to existing and new poles. Federally listed seabirds and birds protected under the MBTA in Hawaii are prone to collisions with powerlines and other structures[16,17,18,19]. The federally listed Newell's shearwater and Hawaiian petrel have been observed colliding with powerlines and

[16]Reed, J.R., J.L. Sincock, and J.P. Hailman. 1985. Light attraction in endangered procellariiform birds: reduction by shielding upward radiation. The Auk, 102:377-383.
[17]Telfer, T.C., J.L. Sincock, G.V. Byrd, and J.R. Reed. 1987. Attraction of Hawaiian seabirds to lights: conservation efforts and effects of moon phase. Wildlife Society Bulletin, 15:406-413.
[18]Cooper, B.A., and R.H. Day. 1998. Summer behavior and mortality of dark-dumped petrels and Newell's shearwaters at power lines on Kauai. Colonial Waterbirds, Vol. 21, No. 1, pp. 11-19.

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poles[20]. The risk of adult seabird mortality at powerlines is correlated to the number and spread of lines in the array[21]. We recommend that a complete analysis of the potential impacts to federally listed species from the installation of additional cables be included in the Revised Draft EIS/OEIS.

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4.3.2.6 Port Allen and 4.3.2.7 Kikiaola Small Boat Harbor (pages 4-310 through 4-311) and 4.6.2.3. Kawaihae Pier (page 4-457 through 4-458). Ports and harbors can be initial invasion sites for non-native species transported via ships. The Draft EIS/OEIS has not provided information on the proposed increase in berthing or arrival of vessels from new areas and the potential impacts of the inter-island transport of non-native species. We recommend that additional information, including and procedures used to prevent the introduction of non-native species, be provided in the Revised Draft EIS/OEIS.

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Section 4.3.2.9.1 Biological Resources – Niihau (page 4-314). Niihau supports populations of several listed plants (Enclosure 1), and fire is a significant threat. The Draft EIS/OEIS details measures "…to deal with potential fire hazard…" (line 9), but contains no analysis of potential impacts of wildland fire on federally listed species that may occur as a result of the proposed increase in training operations. We recommend that an analysis of wildland fire impact impacts on federally listed plant species be in included in the Draft EIS/OEIS, and, as appropriate, mitigative measures be developed in cooperation with our office.

66

Section 4.3.2.9.1 Biological Resources – Niihau (page 4-314) and Section 4.3.2.10.4 Geological Resource – Niihau (page 4-322). Increased GUNNEX training operation can alter terrestrial fire regimes, increasing soil erosion and sedimentation on nearshore coral reefs. No analysis has been conducted examining the potential impact of altered wildfire regimes associated with the proposed activities on nearshore coral reefs. We recommend that an analysis of wildfire impacts on soil stability, erosion, and coastal sedimentation be in included in the Revised Draft EIS/OEIS, and, as appropriate, mitigative measures to stabilize soils and reduce sediment impacts be developed in cooperation with the U.S. Environmental Protection Agency, NMFS, and our office.

67

4.3.2.10.2.1 No-action Alternative (Biological Resources – Kaula) (page 4-320); 4.4.2.7.2 Biological Resources – MCBH (page 4-387); 4.4.2.9.2 Biological Resources – Hickam AFB (page 4-401); 4.4.2.10.1 Biological Resources – Wheeler Army Airfield (page 4-404); 4.4.2.10.1 Biological Resources – Wheeler Army Airfield (page 4-404). These sections of the Draft EIS/OEIS state that migratory seabirds may be impacted by the various proposed training operations and exercises, but do not identify which species may be affected

[19]Podolsky, R., D.G. Ainley, G. Spencer, L. DeForest, and N. Nur. 1998. Mortality of Newell's shearwaters caused by collisions with urban structures on Kauai. Colonial Waterbirds, Vol. 21, No. 1, pp. 20-34.
[20]Cooper, B.A., and R.H. Day. 1995. Interactions of dark-rumped petrels and Newell's shearwaters with utility structures in Kauai, Hawaii. Final report, EPRI TR-105847-VI, Electric Power Research Institute, Palo Alto, CA.
[21]Podolsky, R., D.G. Ainley, G. Spencer, L. DeForest, and N. Nur. 1998. *op. cit.*

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nor provide data to describe the magnitude of the impact. We recommend that the Navy provide the data and analysis to support their conclusions regarding effects to the migratory birds for each facility where migratory birds may be impacted.

68 Section 4.4.1.1.1 Biological Resources – Puuloa Underwater Range (page 4-327) and Section 4.4.1.1.1 Biological Resources – Naval Defense Sea Area (page 4-332). Prior to the sinking of any vessels or deployment of steel frames for Naval Special Warfare exercises, appropriate environmental documents need to be developed and reviewed. We recommend that the Navy begin early coordination with NMFS and our office to assist with the planning and appropriate placement of the vessel to reduce environmental impacts and to assist with the development of appropriate mitigative measures.

69 Section 4.4.1.9.1 Biological Resources – SESEF (page 4-354). Under Alternative 1, the total number of training hours per day is unclear. The Draft EIS/OEIS states that "…12 to 16 tests per day and an average duration of about 2 hours per test…" (lines15-16) will be conducted. This suggests 24 to 36 hours of training per day. We recommend that the total hours of training be clarified.

70 4.4.2.1.1 Biological Resources – Naval Station Pearl Harbor (page 4-360). The Draft EIS/OEIS indicates that the proposed activities have a low probability of affecting migratory birds (lines 24-25) and that current activities "…have not resulted in any significant impacts to the four endangered waterbirds…" identified at the site (lines 20-21). The term "low probability" has not been quantified and no data to support the determination of no significant impact to endangered waterbirds has been provided. We recommend that the term "low probability" be defined quantitatively and that the data be used to determine if there is a potential impact to endangered waterbirds from current training operations. This information should be provided in the Revised Draft EIS/OEIS.

71 4.4.2.3.1 Biological Resources – Naval Inactive Ship Maintenance Facility, Pearl Harbor (page 4-368) and 4.4.2.5.1 Biological Resources – Lima Landing (page 4-377). The Naval Inactive Ship Maintenance Facility is located adjacent to the Pearl Harbor National Wildlife Refuge, which supports breeding populations of endangered waterbirds. Lima Landing is located near known waterbird habitat. Explosives are currently used in these facilities, but the potential impacts (*e.g.*, noise, vibration, etc.) resulting from the increase in underwater explosions on endangered waterbirds are unclear. We recommend that additional detail regarding the potential impacts from explosives on endangered waterbirds be provided in the Draft EIS/OEIS.

72 4.4.2.4.1 Biological Resources – EOD Land Range – NAVMAG Pearl Harbor West Loch (page 4-371). The EIS/OEIS indicates that explosions at the EOD pit could startle wildlife at the Pearl Harbor National Wildlife Refuge. A discussion of noise levels that could be generated is included, but information on the noise level at which a startle response is generated in birds and the actual noise levels occurring at the Refuge during the current training operations are not provided. We recommend that additional detail be provided so that potential affects of explosive noise on birds at the Refuge as a result of the proposed actions can be evaluated.

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73 4.4.2.6.2 Biological Resources – U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport (page 4-382). Mitigative measures to protect endangered plants from aircraft downdraft, wildfire, and the introduction of non-native species are not described. We recommend that the mitigative measures to decrease potential impacts from these issues be included in the Revised Draft EIS/OEIS.

74 4.4.2.6.2 Biological Resources – U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport (page 4-382). The Draft EIS/OEIS states that "…[m]ajor exercises do not appear to affect threatened green turtles …or the endangered Hawaiian stilt" (lines 25-26), but no supporting data are provided. We recommend data to support this determination be provided in the Revised Draft EIS/OEIS.

75 4.4.2.9.2 Biological Resources – Hickam AFB (page 4-401). Hickam AFB has had recent airstrikes with federally protected birds[22]. We anticipate that increased operations would increase the chance of further airstrikes. The EIS/OEIS does not examine the potential impact of increased airstrikes to threatened and endangered bird species that may result from the proposed actions. We recommend that a full analysis of the potential impacts to federally listed species be included in the EIS/OEIS and that the Navy and Hickam AFB coordinate with us to develop an action plan that would reduce the possibility of airstrikes.

76 4.4.2.11.1 Biological Resources – Makua Military Reservation (page 4-408). A more recent biological opinion (June 22, 2007) has been completed for Makua[23] that addressed training impacts to listed plants, Oahu elepaio, and Oahu tree snail. Beaches and the species using them are not included in the 2007 biological opinion, and the proposed SPECWAROPS are not covered in the biological opinion. We recommend that this section be revised to describe how the Navy will be compliant with the ESA for this action.

77 Section 4.4.2.16 Mt. Kaala (page 4-424). The Draft EIS/OEIS does not provide an assessment of the use of the facility and potential impacts to plant and wildlife resources. We recommend that additional information be provided in the Revised Draft EIS/OEIS, including the identity of the leaser and any prior reviews of the use of this site for impacts to plant and wildlife resources.

78 Section 4.4.2.17 Wheeler network Segment Control / PMRF Communication sites (page 4-425); Section 4.4.2.18 Mauna Kapu Communication Site (page 4-426);Section 4.4.2.19 Makua Radio/Repeater/Cable Head (page 4-427); Section 4.5.2 Maui Space Surveillance System (page 4-434); Section 43.5.2.3 Sandia Maui Haleakala Facility (page 4-436); Section 4.5.2.4 Molokai Mobile Transmitter Site (page 4-437). The Draft EIS/OEIS has not provided information on the duration of the current use of these facilities nor proposed future use. The frequencies of radio waves or electromagnetic radiation have not been specified. No assessment of the potential impacts to Federal trust resources resulting from the proposed actions has been included. We recommend that additional

[22]Aaron Hebshi. 2007. *op. cit.*
[23]Reinitiation of the 1999 Biological Opinion of the U.S. Fish and Wildlife Service For U.S. Army Military Training at Makua Military Reservation Island off Oahu June 22, 2007 (1-2-2005-F-0356). This document is available from the Department of Army.

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information and analysis, particularly in relation to electromagnetic radiation and wildlife species, be provided to support the determination of no effect.

79 Section 4.8 Conflicts with Federal, State, and Local Land Use Plans, Policies, and Controls (page 4-461 to 4-462). We recommend that Executive Order 13089 (Coral Reef Protection) and Wildlife Coordination Act of 1934 [16 U.S.C. 661 et seq.; 48 Stat. 401] be added to table 4.8-1.

80 Section 6.1.2 General Maritime Mitigation Measures (page 6-2). The SOPs do no appear to include instructions for handling or reporting marine life that has been accidentally struck. We recommend that the Navy develop SOPs to potentially assist injured animals and to report the collision to NMFS.

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ENCLOUSRE 1

Draft List of Federally Listed Species at Military Facilities in the Hawaiian Islands.

Species Scientific Name	Pohakuloa Training Area	Bradshaw Air Force Base	Pearl Harbor Naval Station	Hickam Air Force Base	Barbers Pt. Coast Guard Airfield	Makua Military Reservation	Wheeler Air Force Base	Schofield Barracks	Dillingham Airfield	Kahuku Training Area	Marine Corps. Base Hawaii	Marine Corps Training Area Bellows	Pacific Missile Range Facility	Makaha Ridge	Mount Kahili	Kokee Air National Guard	Niihau	Nihoa and Necker Islands
Plants																		
Abutilon sandwicense						X		X										
Achyranthes splendens					X	X												
Adenophorus periens										X								
Alectryon macrococcus						X		X										
Amaranthus brownii																		X
Asplenium fragile var.insulare	X	X																
Bonamia menziesii						X												
Brighamia insignis																	X	
Cenchrus agrimonioides						X												
Centaurium sebaeoides						X												
Chamaesyce celastroides						X												
Chamaesyce herbstii						X												
Chamaesyce rockii								X		X								
Chamaesysce skottsbergii skottsbergii					X													

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Species Scientific Name	PTA	Bradshaw AFB	Pearl Harbor	Hickam AFB	Barbers Pt.	Makua	Wheeler AFB	Schofield	Dillingham	KTA	MCBH	Bellows	PMRF	Makaha	Mt. Kahili	Kokee	Niihau	Nihoa & Necker
Ctenitis squamigera						X												
Cyanea acuminata								X										
Cyanea grimesiana						X		X		X								
Cyanea koolauensis								X		X								
Cyanea longiflora						X				X								
Cyanea superba						X												
Cyperus trachysanthos						X			X								X	
Cyrtandra dentata						X												
Cyrtandra subumbellata								X										
Cyrtandra viridiflora								X										
Delissea subcordata						X		X										
Diellia falcata						X		X										
Dubautia herbstobatae						X												
Eugenia koolauensis										X								
Euphorbia haeleeleana						X												
Flueggea neowawraea						X		X										
Gardenia mannii								X		X								
Gouania vitifolia						X												
Haplostachys haplostachya	X	X																
Hedyotis coriacea	X	X																
Hedyotis degeneri						X												
Hedyotis parvula						X												
Hesperomannia arborescens								X		X								

COMMENT NUMBER
D-E-0437 (cont.)

Species Scientific Name	PTA	Bradshaw AFB	Pearl Harbor	Hickam AFB	Barbers Pt.	Makua	Wheeler AFB	Schofield	Dillingham	KTA	MCBH	Bellows	PMRF	Makaha	Mt. Kahili	Kokee	Niihau	Nihoa & Necker
Hesperomannia arbuscula						X												
Hibiscus brackenridgei						X			X									
Isodendrion hosakae	X	X																
Isodendrion laurifolium						X												
Isodendrion longifolium								X										
Isodendrion pyrifolium						X												
Labordia cyrtandrae								X										
Lepidium arbuscula						X		X										
Lipochaeta tenuifolia						X												
Lipochaeta venosa	X	X																
Lobelia gaudichaudii ssp. koolauensis								X										
Lobelia niihauensis						X											X	
Mariscus pennatiformis						X												
Melicope hiiakae								X										
Neraudia angulata						X												
Neraudia ovata	X	X																
Nototrichium humile						X			X									
Panicum niihauense													X				X	
Peucedanum sandwicense						X												
Phlegmariurus nutans								X										
Phyllostegia hirsuta								X		X								
Phyllostegia kaalaensis						X		X										
Phyllostegia mollis								X										

COMMENT NUMBER
D-E-0437 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

Species Scientific Name	PTA	Bradshaw AFB	Pearl Harbor	Hickam AFB	Barbers Pt.	Makua	Wheeler AFB	Schofield	Dillingham	KTA	MCBH	Bellows	PMRF	Makaha	Mt. Kahili	Kokee	Niihau	Nihoa & Necker
Plantago princeps						X		X										
Portulaca sclerocarpa	X	X																
Pritchardia aylmer-robinsonii																	X	
Pritchardia kaalae						X												
Pritchardia remota																		X
Psychotria grandiflora																X		
Pteris lidgatei								X										
Sanicula mariversa						X												
Sanicula purpurea								X										
Schiedea hookeri						X		X										
Schiedea kaalae						X		X	X									
Schiedea nuttallii						X												
Schiedea obovatum						X												
Schiedea trinervis								X										
Schiedea verticillata																		X
Sesbania tomentosa						X							X				X	X
Silene hawaiiensis	X	X																
Silene lanceolata	X	X				X												
Solanum incompletum	X	X																
Solanum sandwicense						X												
Spermolepis hawaiiensis	X	X				X								X				
Stenogyne angustifolia	X	X																
Tetramolopium arenarium spp arenarium	X	X																

COMMENT NUMBER

D-E-0437 (cont.)

Species Scientific Name	PTA	Bradshaw AFB	Pearl Harbor	Hickam AFB	Barbers Pt.	Makua	Wheeler AFB	Schofield	Dillingham	KTA	MCBH	Bellows	PMRF	Makaha	Mt. Kahili	Kokee	Niihau	Nihoa & Necker
Tetramolopium filiforme						X												
Tetraplasandra gymnocarpa								X		X								
Vigna o-wahuensis	X	X				X												
Viola chamissoniana						X		X										
Viola oahuensis								X										
Wilkesia hobdyi														X				
Zanthoxylum hawaiiense	X	X																
Reptiles																		
Chelonia myda			X	X	X				X		X	X	X				X	X
Eretmochelys imbricata											X	X						
Birds																		
Acrocephalus familiaris kingi																		X
Anas wyvilliana			X	X					X		X	X	X		X		X	
Branta sandvicensis	X	X											X	X	X			
Buteo solitarius	X	X																
Chasiempis sandwichensis ibidis						X		X	X	X								
Fulica americana alai			X	X					X		X	X	X		X		X	
Gallinula chloropus sandvicensis			X	X					X		X	X	X		X			
Hemignathus munroi	X																X	
Himantopus mexicanus knudseni			X	X	X				X		X	X	X		X		X	
Loxioides bailleui	X																	
Paroreomyza maculata								X	X	X								
Pterodroma phaeopygia sandwichensis	X	X									X	X	X	X	X	X		

COMMENT NUMBER

D-E-0437 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

Species Scientific Name	PTA	Bradshaw AFB	Pearl Harbor	Hickam AFB	Barbers Pt.	Makua	Wheeler AFB	Schofield	Dillingham	KTA	MCBH	Bellows	PMRF	Makaha	Mt. Kahili	Kokee	Niihau	Nihoa & Necker
Puffinus auricularis newelli	X	X									X	X	X	X	X	X		
Telespyza ultima																		X
Mammals																		
Lasiurus cinereus	X		X	X		X	X	X	X	X		X	X	X	X	X		
Invertebrates																		
Achatinella bulimoides										X								
Achatinella byronii								X										
Achatinella caesia										X								
Achatinella curta										X								
Achatinella decipiens								X										
Achatinella dimorpha										X								
Achatinella elegans										X								
Achatinella leucorraphe								X										
Achatinella mustelina						X		X										
Achatinella sowerbyana								X		X								
Achatinella valida										X								
Drosophila aglaia								X										
Drosophila hemipeza								X										
Drosophila montgomeryi								X										
Drosophila musaphila																X		
Drosophila obatai						X												
Drosophila substenoptera								X										
Drosophila tarphytrichia								X										

COMMENT NUMBER

D-E-0437 (cont.)

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC
FWS, HI
FWS, Portland

COMMENT NUMBER

D-E-0437 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0438

From: DJ Colbert - Kilauea, HI
To: deis hrc@govsupport.us
Subject: EIS for the Navy's proposed expansion of training facilities and exercises at PMRF.
Date: 9/17/2007 6:22:28 PM
To Whom It May Concern:

I stand firmly opposed to the Navy's plans for expansion of training operations at the Hawai'i Range Complex and Pacific Missile Range Facility.

The history of environmental degradation caused by such training exercises around the world leaves no doubt that the plans of the Navy to expand training exercises will cause irreparable harm.

Mid-frequency sonar will destroy uncountable numbers of fish and marine mammals. 2

Expeditionary Assault Activities will tear up beaches and dunes between Polihale and Barking Sands. 3

Further, I would like to quote Juan Wilson, a Kaua'i citizen who has studied the EIS extensively:

"Worse is the Directed Energy Laser Weapons Program. These are chemical lasers in which use hydrogen fluoride, a corrosive material which can be made to release a powerful burst of infrared radiation. The laser can be focused and aimed as a weapon (death ray). These laser can generate least 25 megawatts of energy that could destroy a missile 2,000 miles away. For the scale of this realize 25megawatts is half the electrical power generating capacity of Kauai. The firing of this weapon also destroys the lasing device and contaminates its site with hydrogen fluoride. A thousand foot radius danger zone, that could close the state park, will persist for days. 1

The Navy has not told us what effect on the environment hydrogen fluoride waste will have. What if there is a heavy rain and runoff after a test? What effect on coral reefs and offshore marine life would there be from hydrogen fluoride contaminated runoff into the ocean? What efforts will guarantee the safety of people using the access road to Poli Hale State Park after a test?

COMMENT NUMBER
D-E-0438 (cont.)

In its Navy's EIS executive summary it simply says, "Appropriate remedial procedures would be taken before initiation of potentially hazardous laser operations on PMRF".

That's it?!! That is unacceptable. "

We must also accept the ethical responisiblity that arises from our collusion with a plan which is intended to bolster our ability to cause death to countless men, women and children around the world.

We must not blindly follow wherever the military leads in a knee-jerk desire for "security." True security rises from a people's ability to provide for their basic needs in a sustainable way while protecting their environment. 4

I urge you do deny the Navy's expansion plans.

Sincerely,
Ms. DJ Colbert

Kilauea HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0439

From: Andrea Brower - Anahola, HI
To: deis hrc@govsupport.us
Subject: EIS comment
Date: 9/17/2007 6:42:31 PM

To whom it may concern,

I am deeply concerned about the Navy's proposed plan to expand training operations at the Hawai'i Range Complex and Pacific Missile Range Facility. After reading the draft EIS, I remain firmly opposed to the operation. 1

The degradation of environment and culture that results from such Navy activity is already well document. Instead of spending resources on expanding Navy testing and training, we should be working to clean up the damage the Navy has already done. I am infuriated that my tax dollars are spent on such ethically wrong activites.

It is already proven that mid-frequency sonar harms marine wildlife. 2

Expeditionary Assault Activities will destroy the delicate dune ecosystems of the west side of Kaua'i. 3

The Directed Energy Laser Weapons Program is deeply concerning for its potential risks to human health and the environment. Why are we continuing to test such dangerous war weapons? Why do we insist on maintaining such a strong military? Are we protecting our economic and resource interests at the cost of human lives? 1

We must question the military industrial complex that Eisehower warned us about. It is unethical to continue to kill other human beings and the earth to insure that Americans can maintain their consumptive and gluttonuos lifestyles. 4

Sincerely,
Andrea Brower

Anahola, HI.

COMMENT NUMBER
D-E-0440

From: Julie Penny - Sag Harbor, NY
To: deis hrc@govsupport.us
Subject: NO ACTION ALTERNATIVE for Hawaii Range Complex
Date: 9/17/2007 6:53:40 PM

STATEMENT BY JULIE PENNY FOR THE RECORD
September 17, 2007

What's good for the military/industrial/Congressional complex is not good for we citizens and our nation. Certain individuals in the military, defense companies, and enablers in Congress have proven themselves to be completely wasteful, corrupt, and out of control and represent a great threat to our nation. This is a continuation of business as usual without taking into account the injurious ramifications that will accrue from this project. 2

As someone who has dealt with government and read many a DEIS one can only conclude that the impacts from this will be thoroughly monstrous and grotesque. The NO ACTION-ALTERNATIVE should be taken on the Draft Environmental Impact Statement for the Hawaii Range Complex. 1

The deleterious effects of the war military operations buildup/testing program, along with the high use of energy, the approval process for these actions, the cumulative impacts upon human and animal health, the socio/economic injustice to the native Hawaiian Islanders who live in this militarized impacted area, radioactive and chemical hazards and problems associated with storage and waste products, the permanency of radioactivity from Uranium munitions in the environment (U-238, for example, has a half-life of 4.5 Billion years), destruction to natural, pristine areas and natural resources and vegetation, the erosion of air quality and water quality of the sea, the financial taxpayers' burden of these military operations, impact on Hawaiian tourism and desirability as a place to live, and the risks to health and safety of humans and all impacted life forms--not only in Hawaii but throughout the Pacific and West Coast represents an untoward AND IRREVERSIBLE risk to humans and the environment.

Julie Penny
Sag Harbor, NY

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0442

From: Kelley Burg
To: deis hrc@govsupport.us
Subject: whales draft environmental impact
Date: 9/17/2007 7:28:54 PM

9/17/07

To Whom It May Concern:

1 My family, which includes my husband, Eric Hannah, PhD, myself, Kelley Burg, JD, my daughter, Kelley Withy, MD, my son-in-law, Shaun Berry, MD, my mother, Delores Burg, age 95, and my grandsons, ages 12, 10 and 8 DO NOT APPROVE OF NAVAL SONAR TESTING AND SUB TRAINING. Hawaii is a whale sanctuary. Whales pick up sound for thousands of miles and it has never been shown that such testing is harmless. In fact, the opposite is more certain. We do not support blanket authorization. Thank you. Kelley Burg

COMMENT NUMBER
D-E-0443

From: John P. Shannon
To: deis hrc@govsupport.us
Subject: Re: The Rogue Army of the Pacific (comment by Major Jack Shannon)
Date: 9/17/2007 7:38:47 PM

Date: Mon, 17 Sep 2007 19:00:08 EDT
Subject: Re: The Rogue Army of the Pacific

Ace: Send this to any one you wish. I'm tired of howling at the moon.

The exemption that the Navy claims is actually no exemption at all. The exemption the Navy claims comes from Executive Order 12344, written by none other than Ronald Reagan [the hero of the right wing nut cakes].

The Executive Order, 12344 (XO for short) is nothing more than a document written to show where the Naval Reactor program fits into the DOE organizational chart, and who should head the program [Namely a Navy Admiral]. Not a single word mentions exemption of any kind. The Navy (specifically the Naval Reactor organization - NR) took the organizational exemption and inserted a reference to XO 12344, to all DOE orders that apply to all other DOE organizations, and exempted NR from having to comply with those orders. 1

I doubt that a single member of the House or the Senate has ever read a DOE order or XO 12344 for that matter. The net effect is to guarantee that NR has no oversight at all. The NR Program needed these exemptions since even a cursory investigation would have forced a shutdown of the entire program. NR runs land based power plants [2 at the last count] without the benefit of containment vessels, emergency core cooling systems, pressure suppression systems, or separate operating rooms for the reactor operators [the operators die at the same moment that the plants have a loss of coolant accident - so who is left to explain what went wrong].

All Nuclear Powered Surface Ships and Submarines enter and leave all American and Foreign Ports under Nuclear Power Generated steam [i.e. the Nuclear Reactors are operating].

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0443 (cont.)
2

All Nuclear Powered Surface Ships and Submarines are refueled [old core taken out - new core put in] within a baseball throw of most cities located in or near a shipyard, Cities such as Norfolk Virginia, Pearl Harbor, etc..

With the lack of even rudimentary safety measures the Nuclear Navy is run under no oversight, and no legal protection for those Nuclear Power experts who work for Naval Reactors. No one will dare raise a voice [except the undersigned], and NR keeps on rolling along just like old man river.

The King has no clothes, in this case the King[s] are the President, the Senate, the House, all Navy Officers, All Marine Corps Officers, all Army Officers, all Coast Guard Officers, the DOE, the NRC, the National Resource Defense Council, River keepers, all Judges within the Northern District of the Second Circuit Court, basically everyone in Washington with any power knows about the outrageous behavior of the Nuclear Navy. I think it's fair to say that we live in a land of cowards and blind men. I keep getting notices that one or more of the sirens at Indian Point have been found to be not working, or a guard has fallen asleep, etc. ad nauseam. Who cares when the Navy is running around the Oceans with hundreds of the most unsafe Nuclear Power Plants in the World and no one raises a bleep? A Navy that refuels ships within spitting distance of grade schools, high schools City Halls, etc..

I have heard the arguments that Navy Nuclear Plants run at only about 10% of commercial plants. So what. The comment is irrelevant because any Nuclear Power, including Navy plants, during an accident scenario can easily raise to 10 times, 100 times, 1000 times or even 1,000,000 times rated power and the consequences are the same. Commercial or Navy. Catastrophe beyond description. And deaths and injuries beyond repair.

No one in the industry can contradict me because all Nuclear Engineers/Nuclear Physicists [even those who work for NR] are familiar with the equations for a power excursion. Ignoring the fact does not make the fact disappear.

A FACT IS A FACT!!!! WAKE UP AMERICA.

Major John P. Shannon
Nuclear Physicist/Nuclear Engineer Retired

==
Sent by Ace Hoffman:
==

****
** THE ANIMATED SOFTWARE COMPANY
** Russell "Ace" Hoffman, Owner & Chief Programmer
Carlsbad CA

****

IF YOU RECEIVED THIS EMAIL IN ERROR AND/OR DO NOT WISH TO RECEIVE ANY
MORE EMAILS FROM US FOR ANY REASON, PLEASE CONTACT RUSSELL HOFFMAN

COMMENT NUMBER
D-E-0443 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Gordon La Bedz To: deis hrc@govsupport.us Subject: Surfrider Founddation, Kaua'i on Sonar Blasting in Hawai'i Date: 9/17/2007 7:41:31 PM	**COMMENT NUMBER** **D-E-0444**
The Navy consistently claims that they do not harm whales with no evidence whatsoever and plenty of evidence and common sense to the contrary. The EIS should have a serious body of evidence that the Navy will not harm whales and not disobey the Marine Mammal Protection Act or the Endangered Species Act with their sound blasting active sonar. Gordon LaBedz Surfrider Foundation	1

From: Alika Parks To: deis hrc@govsupport.us Subject: environmental impact Date: 9/17/2007 7:46:57 PM	**COMMENT NUMBER** **D-E-0445**
Aloha I would like to comment about the proposed expansion that is being talked about. I will say that I am whole heartedly against any further degradation and exploitation of the environment in the name of training and preparedness.	1
I have spent time as a US navy sailor, and in my time I have seen blatant disregard by my fellow sailors for the care of the environment. For example I have seen a dozen open paint cans laughingly dumped straight into the ocean, and miscellaneous rubbish of every type carelessly thrown overboard. Although the navy has policies against this type of behavior, it is often overlooked and these rules are hardly even mentioned. You see it is almost a navy tradition to treat the environment in this way. What safegaurds are in place to insure navys compliance with its own procedures? None. They are out in the ocean and they do as they please.	2
Ive also seen Sailors during gunnery exercises purposely aim for sea life when they come into range, dolphins are a favorite target. Is it a coincidence that the declining of monk seal populations has coincided with increased naval activity in the training range?	3
The US navy is a beast with an appetite for more and more and more. 13 aircraft carriers is a good example, heck one of those things alone can take out an entire country. Us military does not have the intelligence to conduct its operations in a reasonable manner. And unless kept in check by US citizens the military will conduct and increase its training to a point where they will have good reason to do anything, and go anywhere. To the detriment of all.	1
I also hold firmly that the armed forces are little more than a government welfare program, and honest communication within its own walls regarding the footprint its leaving on the environment is non existent as doing so would amount to treason, especially if it is in opposition to its sacred and precious training and preparedness. I could go on but i feel it is futile in that this whole EIS is just a charade. I live in an ignorant time. I just have one last thing, what type of opposition or concerns would have to be raised in order for the Navy to conclude that it is not in its best interest to continue? Like I said the Military is a beast. Thanks for the charade Alika	4

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0446

From: None MomBurgess@aol.com
To: deis hrc@govsupport.us
Subject: Military games in Hawaii
Date: 9/17/2007 7:56:26 PM

1 I strongly oppose using our islands in preparing for war. The justification that we need a trained military for security does not solve the problems created. Damage to the environment and to people is dangerous and ruins the existence of the people and land it hopes to defend. We who live in the Pacific Region are aware of the ongoing tragedies in the region of bomb practice and other military operations. Before more exercises are even considered, the damage done in the past must be cleaned up. An environmental assessment is a
waste of time and money because it is already established that military exercises damage the environment. Let the duty of the military be to defend the
environment by cleaning up their mess and directing their skills and abilities to helping people who have their lives
ruined by past activities of the kind proposed.

COMMENT NUMBER
D-E-0447

From: Maren Orion - Kilauea, HI
To: deis hrc@govsupport.us
Subject: Navy plans for Kaua'i
Date: 9/17/2007 8:11:44 PM

1 Dear folks...Please do not allow the Navy to further expand their operations on Kaua'i and the rest of the Hawai'ian Islands. Having the PMRF on Kaua'i makes us a target for terrorist activity, it does not make us safer. The military of the US already spends more than all the rest of the governments of the world put together...isn't enough, enough? Let's work on making Peace...not on making WAR. Sincerely, Maren Orion Oppenheimer, Kilauea, Hawai'i.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0448

From: Linda Harmon
To: deis hrc@govsupport.us
Subject: stop the expansion of the Military
Date: 9/17/2007 8:38:30 PM

1 I am against the expansion of the Military. We spend more money on it than all other nations combined. Its time we help people around the globe cope with global warming and down play the military.We can make friends that way and avoid confrontation.

COMMENT NUMBER
D-E-0449

From: Ellen Caldwell - Koloa, HI
To: deis hrc@govsupport.us
Subject: Do not increase Navy exercises
Date: 9/17/2007 9:03:27 PM

Dear Navy Personnel,

2 As a citizen of the United States and Hawaii, I am writing to urge you NOT to increase the number, size or frequency of your exercises around the Hawaiian Islands.

1 As you yourself have acknowledged, mid-frequency active sonar can harm marine life. You are proposing to use a higher decibel level in your sonar exercises, which will certainly hurt marine life. If you recall the incident of the marine life killed after sonar usage in the Bahamas in 2000, you will realize the decibels used in that incident were over one million times less than the 229-decibel range you plan to use now. If your exercises cause harm and death to marine life, not only is it an intrinsically tragic event but could be devastating to Hawaii's tourism industry.

2 Please consider decreasing, not increasing, your military activities around the Hawaiian Islands.

Sincerely,

Ellen Caldwell
Koloa, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0450

From: Jose Bulatao, Jr. - Kekaha, HI
To: deis hrc@govsupport.us
Subject: Response from: Kauai Westside Watershed Council
Date: 9/17/2007 9:05:14 PM

From: Kauai Westside Watershed Council
Attn: Jose Bulatao, Jr., Vice-chairman
P.O. Box 640
4614 Kokee Road, Kekaha, HI 96752

With a steadfast commitment to maintain and preserve the environmental, cultural and historical integrity of our Beloved Kaua'i, we, as Executive Officers and members of the Kaua'i Westside Watershed Council have been unswerving in our mission. While our "area of responsibility" (regional precedence) is the Kona District of the island of Kaua'i (from the tunnel of trees on the Lihu'e side of Koloa to the entire area covering the leeward portion of the island of Kaua'i), it is also evidently clear that watershed concerns for the entire island of Kaua'i are intertwined.

At the same time, we have sought avenues by which it may be possible for us to be cognizant of the presence and purpose of the United States Navy in our midst with the Pacific Missile Range Facility serving as the vanguard and exponent of strategic and defense mechanisms for the enitre "free world" with technological capabilities that range from subsurface, surface, to space arenas. It is a "fact of life". as it may be, that sovereign entities on our planet have opposing and territorial perspectives that often bring confrontational and adversarial conflicts against each other.

It has been a delicate walk in considering the realm of possibilities as to how the environmental, cultural, and historical aspects may be preserved, honored and respected in light of the impacts that may result from the range of testing, applications, and proposals that are part and parcel of the Navy's perspectives, intents, and reasons for being.

We have been assured of the Navy's concerns and awareness of our island's fragile eco-system. The Navy has clearly demonstrated its willingess to work with, contribute to, and support our island communities. Opportunites have been explored on both sides in which the scope of understanding and mutual respect has been fostered between the Navy and Kaua'i's public officials and grass-roots constituency.

COMMENT NUMBER
D-E-0450 (cont.)

Good intentions, however, must be followed with specific actions to maintain the cordial relationships that have been built. In this respect, there needs to be an extremely close monitoring of our ocean's resources. PMRF is at a pivotal point, geographically, with the marine reserve conservancy that has been recently established. As such, PMRF is "front and center" on how it will affect the vast region it uses for its sub-surface and surface testing and other relevant activities. It is in that process that we raise our concerns on how our ocean's resources may be directly impacted irreparably.

PMRF hugs a major portion of the coastline that stretches from the black sand beach of Waimea to the white sand beaches of Kekaha that continue unbroken on to the far, far west coast of Kauai that reaches to Polihale and the north shore of our island. The reefs within that coastal stretch reflect the history of the planet, Earth, that dates back to millions of years. Indeed, the whales that come from the Alaskan coastline traverse to our warmer ocean waters in their north-south treks across the Pacific Ocean. More so, the ahupua'a system conceived by the Hawaiian people who tended the land and the surrounding waters in the most isolated spot on Earth also needs to be respected and held in highest esteem.

The three main areas of concern where we need assurances and clear plans 1
that protect the land, air and water are: The mid frequency Sonar Operations
where there will be underwater detonation which definitely impacts all marine
life; Expeditionary Assaults which will tear up and disrupt land vegetation and 2
wildlife; and the use of Flouride Directed Energy Laser Weapons that can 3
negatively affect our water table for human consumption.

As we continue that delicate walk together, let us keep in mind the following: "The land belongs to God. We are but stewards of the land. It is our responsibility to take care of that land (and in this case, all of the surrounding waters.)" as we pursue to maintain the integrity of our respective missions.

Let us not have history repeat the mistakes that came with the way past deeds may have diminished the islands the Navy used for testing elsewhere. The opportunity for us to make "pono" (to do things right) is the challenge that is before us.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0450 (cont.)

Sincerely,

Kauai Westside Watershed Council,

Rhoda Libre-Hayton, Chairperson Jose Bulatao, Jr., Vice-chairperson
Erik Coopersmith, Secretary-Treasurer

Paullie Purdy, Board Member Patrick Pereira, Board Member Mary Buza-Sims, Board Member Lyndon Yamane, Board Member

COMMENT NUMBER
D-E-0451

From: Kyle Kajihiro - Honolulu, HI
To: deis hrc@govsupport.us
Subject: Comments Hawaii Range Complex Draft EIS/OEIS
Date: 9/17/2007 9:23:01 PM

Hawai'i Area Program

Honolulu, HI

Setpember 15, 2007

Public Affairs Officer,

Pacific Missile Range Facility,

P.O. Box 128, Kekaha, Kauai, Hawaii, 96752-0128,

ATTN: HRC EIS/OEIS

Fax 808-335-4520

e-mail to deis_hrc@govsupport.us. <mailto:deis_hrc@govsupport.us>

To: Commander, Hawaii Range Complex

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Kyle Kajihiro Subject: Comments on the Draft EIS/OEIS for Hawai'i Navy Range Complex	**COMMENT NUMBER** **D-E-0451 (cont.)**
We strongly oppose any U.S. military expansion in Hawai'i, including the proposed expansion of the activities in the Hawai'i Range Complex.	3
Scoping	
Although we requested inclusion of scoping comments in the Draft EIS/OEIS, the Draft EIS/OEIS failed to include scoping comments. As a result the public cannot assess the completeness and accuracy of recorded comments nor evaluate whether their concerns were given consideration in the analysis. We again request that the written scoping comments and transcripts of oral scoping comments be printed for public review, and that all comments on the Draft EIS/OEIS be included in the final draft of the document.	1
The scope of the Draft EIS/OEIS is overly broad and the document contains repetitive and pat answers to many of the issues, while providing relatively little original or substantive investigation and analysis. The one notable exception is the section on ocean noise.	2
This document leaves many of the specific elements yet undefined and unstudied. This Draft EIS/OEIS must not be a substitute for NEPA analysis of specific projects.	1

Many of the RDT&E projects are experimental and speculative. In many instances the projects have not even been funded or described in any detail. It must be made clear that these are required to have additional project specific NEPA analysis before embarking on these projects.	**COMMENT NUMBER** **D-E-0451 (cont.)**
Alternatives Analysis	
The Draft EIS/OEIS fails to consider alternative sites for the proposed actions because of its circular logic, i.e. that all alternatives studied will occur in Hawai'i because the criteria states that the project must be in Hawai'i ("Use existing Navy ranges and facilities in and around Hawaii"). Alternative locations must be considered.	4
The process is driven solely by the military's definition of purpose and need and fails (again) to consider what is the interest and genuine security for the affected people and environment.	
The Draft EIS/OEIS wrongly dismisses the alternative of reducing Navy training in Hawai'i. We dispute the unstated assumption within the Draft EIS/OEIS that increased militarization and military training and RDT&E in Hawai'i will bring greater security to Hawai'i and the Pacific. On the contrary, aggressive U.S. military exercises and missile defense expansion in the Pacific have increased tensions with China and North Korea. If there is any truth to the overblown threat of North Korea's capability to target Hawai'i, it would be in response to the enormous military presence here that it perceives as a threat to its survival.	

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER		COMMENT NUMBER

Furthermore, the combined environmental, social and cultural impacts of militarization in Hawai'i has been disastrous for the environment and many local communities living in the toxic shadow of military installations, in particular Native Hawaiian communities whose cultural survival is placed in jeopardy by the pervasive negative impacts on cultural sites, resources, and traditional knowledge and practices. For these reasons, a reduction of Navy training will have positive benefits for the Hawaiian environment and cultural sites and practices.

D-E-0451 (cont.)

Hawaiian Sovereignty and Human Rights

5

We appreciate that the Draft EIS/OEIS did include discussion of the so-called "ceded" lands. However the document arrived at the erroneous conclusion that "valid legal title to these lands was vested in the United States." [p. I-1]

International law and the U.S. Constitution do not permit the annexation of the territory of a sovereign country without a lawful treaty of annexation. There was no treaty annexing Hawai'i to the United States, only a joint resolution of Congress claiming to accept the cession of Hawai'i to the U.S. by the illegitimate "Republic of Hawai'i", a government that the U.S. administration refused to recognize after the overthrow of the Hawaiian monarchy in 1893. Two attempted treaties of annexation put forth by the leaders of the illegal U.S. military-backed coup d'etat failed.

If the Navy maintains that it has legal title to these lands, please provide proof of a lawful treaty transferring sovereignty from the Kingdom of Hawai'i to the U.S. Domestic U.S. legislation is insufficient to acquire sovereignty over Hawaiian territory.

D-E-0451 (cont.)

In 1988, the U.S. Department of Justice could not determine how the U.S. annexed Hawai'i when it issued a memo that stated in part, "It is therefore unclear which constitutional power Congress exercised when it acquired Hawaii by joint resolution. Accordingly, it is doubtful that the acquisition of Hawaii can serve as an appropriate precedent for a congressional assertion of sovereignty over an extended territorial sea." [United States Department of Justice, Legal Issues Raised by Proposed Presidential Proclamation to Extend the Territorial Sea, Opinions of the Office of Legal Counsel, vol. 12, p. 238-263, October 4, 1988. Excerpts commenting on the annexation of Hawai'i taken from pp. 250 - 252]

Thus a number of scholars of international law have concluded that proper status of Hawai'i is one of prolonged U.S. occupation. This would also mean that the U.S. does not have clear title to "ceded" lands. This is one of the fundamental sources of conflict with regard to U.S. military installations and activities in Hawai'i. The EIS must address the human rights implications of the continued suppression of Hawaiian sovereignty and self-determination.

Social Impacts Analysis

6

The Draft EIS/OEIS is quick to claim "beneficial" economic impacts due to federal spending. But the document fails to investigate and account for the social costs and impacts on traffic, noise, utilities, schools, social services, water usage and sewage due to changes, including temporary changes, in the number of personnel and dependents in Hawai'i.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
	D-E-0451 (cont.)
How are women affected by the proposed action? Despite specific requests to analyze the issue of prostitution, violence against women and related social impacts on women when large numbers of military personnel are in port during exercises, the Draft EIS/OEIS fails to even mention that this issue was raised in scoping. So here I raise the question again: What will be the impacts on prostitution, alcohol and drug consumption, fights and other crime that may accompany the large influx of military personnel on shore leave during large exercises? Please include relevant incident report data.	17
How will housing prices and homelessness be affected by the proposed action? How will an increased U.S. military presence in Hawai'i aggravate tensions between the community and the military? How will recreation, fishing, surfing, and other activities be affected by the proposed actions.	18 19 20
Ocean Noise	
Describe the Navy's attempts to exempt its sonar exercises from various laws protecting the environment and marine mammals, and explain how these exemptions affect the proposed actions and impacts described in the Draft EIS/OEIS.	7
Migratory Bird Treaty Act	
Describe the military's exemption from the Migratory Bird Treaty Act and how this exemption affects the proposed actions and impacts described in the Draft EIS/OEIS.	8

	COMMENT NUMBER
Energy	D-E-0451 (cont.)
What is the Navy's energy consumption in Hawai'i? How will the proposed action affect the Navy's energy "footprint"?	9
Describe how a 30 megawatt laser would impact Kaua'i.	21
Cultural Impacts Analysis	
What is the significance of kohola (humpback whales), naia (dolphin) and other marine species in Native Hawaiian culture and religion? How will proposed actions impact these species? How will Native Hawaiian cultural and religious practices and beliefs be affected by the proposed actions? Please conduct thorough cultural impact analysis including cultural, ethnographic and oral history investigations to document the significance of affected species to Native Hawaiians.	10 23
Where are cultural sites and resources located, and how are they affected by the proposed actions? What studies have been done to identify cultural impacts? The Navy must conduct new and expanded consultations with Native Hawaiian organizations under section 106 of the National Historic Preservation Act. The list of groups consulted in previous consultations does not include all affected parties.	10 22
Cumulative Impacts	

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
	D-E-0451 (cont.)
The Draft EIS/OEIS includes a 12 page table of cumulative impacts, most of which are "additive" to the impacts of the proposed action. Yet there is no analysis of the significance of these combined impacts to the environment, the community and environmental health and sustainability. In most military NEPA processes, community testimony has overwhelmingly opposed military expansion due to the unbearable combined effects of military activities in Hawai'i. How does the combined burden of military installations and activities in Hawai'i compare to other locations?	11
Live Fire Exercises	
The Draft EIS/OEIS mentions live fire exercises at Makua and Pohakuloa and bombing and gunnery exercises in Kaula. Describe the types of live fire exercises planned for Makua and Pohakuloa, the types and number of munitions to be expended, the environmental impacts of these munitions, and the plans for clean up and removal of shrapnel and unexploded munitions. How are the training activities incorporated into the existing plans and environmental impact studies for both sites? Describe in greater detail the nature of the bombing and gunnery exercises on Kaula and analyze their environmental impacts including impacts on birds, marine life and cultural sites.	12
Environmental Justice and Environmental health impacts:	
What are the existing health conditions in the affected communities? What health conditions may be attributable to environmental factors, and in particular military environmental impacts? How will the proposed actions affect community health?	13

	COMMENT NUMBER
	D-E-0451 (cont.)
The Draft EIS/OEIS mentioned that perchlorate was detected in the ground water. The Navy uses 24 ppb as the level of concern for perchlorate, but based on new toxicity data, states such as California and Oregon have lowered their action levels to 4 ppb. We demand that the Navy utilize the most precautionary standards, in this case action levels of 4 ppb for perchlorate. Since perchlorate was detected for the first time in Kaua'i, we urge the Navy to continue and expand the sampling and testing of groundwater for this toxic substance. Please characterize the groundwater contamination, i.e. the size, shape and movement/behavior of the perchlorate plume. Are any agricultural crops and milk from the vicinity contaminated with perchlorate? What steps are being taken to clean up the perchlorate contamination? What is the source of the perchlorate? What is being done to prevent further contamination?	14
Cost Analysis	
What will be the cost of the proposed expansion? What are the opportunity costs of the proposed expansion, such as alternative uses for the affected areas and their potential benefits to the people and the environment? What will be the cost of mitigation, prevention and restoration of the likely impacts of the proposed actions?	15
Safety and Threat Analysis	
What are the health and environmental impacts of the chemical simulants proposed for launch at PMRF? Describe how hypersonic vehicles will be tested. What are the impacts of hypersonic vehicle launches, flights, noise, accidents, etc.? Describe the directed energy tests proposed for PMRF. What are the impacts and hazards associated with high energy lasers?	16

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0451 (cont.)

Provide a list of military accidents and other incidents that could have threatened the health and safety of the public and/or military personnel. Include collisions and near collisions. How will the increase in proposed activity increase the risk of accidents occurring?

What is the security threat assessment for Hawai'i due to the military presence? And how would expanding the military activities and presence in Hawai'i affect that level of risk?

To reiterate, we oppose the proposed expansion of the Navy Range Complex in Hawai'i and call for the inclusion of our preferred alternative to reduce the military footprint in Hawai'i. Thank you for your attention to these concerns.

Kyle Kajihiro

Program Director

AFSC Hawai'i Area Program

Honolulu, Hawai'i

COMMENT NUMBER
D-E-0452

From: Diana La Bedz
To: deis hrc@govsupport.us
Subject: Comment on the US Navy's draft EIS
Date: 9/17/2007 9:54:19 PM

Public Affairs Officer, Pacific Missile Range
Facility, P.O. Box 128, Kekaha, Kaua'i, Hawaii'i,96752-0128,

ATTN: HRC EIS/OEIS.

What is not address in an EIS is the impact that a degrading environment has on the
the peoples living on the island. People become depressed, disillusioned and fearful.
Is the Navy going to do anything about the state of oppression they are causing by endless war games. While so many earth citizens are trying to save
our planet from global warming and drastic climate changes, the US Navy is not
only doing harm to the islands but the whole planet as well. 1

When sea mammals are carelessly harmed people feel helplessly fooled by the
military message that the Military needs to practice war games for their protection. People are unhappy about the state of their island, angry at the torture of sea mammals during war games, and saddened by the loss of wild life.

When the US military takes actions that are above the law, people be come depressed and fearful. The fear of the US Military is becoming deep and growing with each turn of events. People become distressed and alarmed about the
future for their children and the island. The distrust and alarm has a long term psychological effect on whole families. Grandparents understand best for they suffer sadness and loss of what once was abundant. Parents don't understand and are often confused as to what to tell their children about what is
morally right thinking and right acting. How do parents teach their children

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0452 (cont.)

to obey the laws when their government and military break the laws and are sued by responsible citizens, to obey them. Island citizens feel they are often deliberately deceived by the double speak coming from the military and government officials.

This harm has the most effect on the children. Kaua'i children struggle daily to do the right thing and weigh the right and wrong while witnessing the world around them. This duel correctness has a long term troubling effect on children, especially when harm is coming to their wild life that is so dearly loved. One thing island people understand, Natures Laws. There is no escaping the effects to all when natures laws have been broken.

The US Navy uses clever often underhanded means to achieve an end. I am speaking to the way the Navy tries to convince the Kaua'i Island People that they are environmentally friendly and are concerned for the ocean and all that lives there. Their intentions clearly show us their plans are quite horrible and deadly. This again has a harmful effect on Island People. Where is the Navy accountable. Is there an obligation to do the right thing. Who will suffer the consequences for the feelings and suffering emotional state of the Kaua'i Island Peoples.

COMMENT NUMBER
D-E-0453

From: Keone Kealoha - Kilauea, HI
To: deis hrc@govsupport.us
Subject: EIS Comments
Date: 9/17/2007 9:59:56 PM

To Whom It May Concern:

I stand firmly opposed to the Navy's plans for expansion of training operations
at the Hawai'i Range Complex and Pacific Missile Range Facility.

The history of environmental degradation caused by such training exercises around
the world leaves no doubt that the plans of the Navy to expand training exercises
will cause irreparable harm.

Mid-frequency sonar will destroy uncountable numbers of fish and marine mammals. 2

Expeditionary Assault Activities will tear up beaches and dunes between Polihale
and Barking Sands. 3

Further, I would like to quote Juan Wilson, a Kaua'i citizen who has studied the EIS extensively:

"Worse is the Directed Energy Laser Weapons Program. These are chemical lasers 4
in which use hydrogen fluoride, a corrosive material which can be made to release
a powerful burst of infrared radiation. The laser can be focused and aimed as a
weapon (death ray). These laser can generate least 25 megawatts of energy that could
destroy a missile 2,000 miles away. For the scale of this realize 25megawatts is
half the electrical power generating capacity of Kauai. The firing of this

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

weapon
also destroys the lasing device and contaminates its site with hydrogen fluoride.
A thousand foot radius danger zone, that could close the state park, will persist
for days.

The Navy has not told us what effect on the environment hydrogen fluoride waste
will have. What if there is a heavy rain and runoff after a test? What effect on
coral reefs and offshore marine life would there be from hydrogen fluoride contaminated
runoff into the ocean? What efforts will guarantee the safety of people using the
access road to Poli Hale State Park after a test?

In its Navy's EIS executive summary it simply says, "Appropriate remedial procedures would be taken before initiation of potentially hazardous laser operations
on PMRF".

That's it?!! That is unacceptable. "

We must also accept the ethical responsibility that arises from our collusion with
a plan which is intended to bolster our ability to cause death to countless men,
women and children around the world.

We must not blindly follow wherever the military leads in a knee-jerk desire for
"security." True security rises from a people's ability to provide
for their basic needs in a sustainable way while protecting their environment.

I urge you do deny the Navy's expansion plans.

Sincerely,

COMMENT NUMBER
D-E-0453 (cont.)
5

Keone Kealoha

Kilauea, HI

Keone Kealoha
Director

Malama Kaua'i

COMMENT NUMBER
D-E-0453 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0455

From: Janet Rapoport - Royal Oak, MI
To: deis hrc@govsupport.us
Subject: Please no more weapons!
Date: 9/17/2007 10:11:04 PM

1 Please no more weapons and testing in Hawaii!

Jan Rapoport

Healing Everything
Goddess Healing Arts Inc.

Royal Oak, Michigan

COMMENT NUMBER
D-E-0456

From: Mehana Blaich Vaughan
To: deis hrc@govsupport.us
Subject: Public Comment for Draft EIS
Date: 9/17/2007 10:35:25 PM

Aloha and mahalo for taking time to respond to my comments which are attached.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0456 (cont.)

Thank you for the work that went into preparing this document and for all your careful attention and response to our comments. I humbly request responses to the following:

1) I request a fuller analysis of the potential cumulative effects of bio-toxins released from Navy's existing activities at PMRF, as well as the activities of GMO farming including high levels of pesticide and chemical use in surrounding areas of Mana and Kekaha. GMO crop cultivation was not included in table of related projects considered for cumulative impacts, nor were Navy's existing activities listed. 1

2) Have carbon offsets been considered for massive potential fossil fuel emission increase. Has the projected increase in emissions been quantified? 2

3) The executive summary states that activities "would not affect biodiversity, cultural integrity or humans." Could you please clarify how you have defined and measured each of these? 3

4) Could you please comment on the impacts of increased training on traditional and customary rights including subsistence fishing and gathering, religious exercise etc.? 4

5) DRAFT EIS STATES: "The Navy has appropriate plans in place to manage hazardous materials used and generated. Hazardous materials will continue to be controlled in compliance with OPNAVINST 5090.1B. Fragments of expended training materials, e.g. ammunition, bombs and missiles, targets, sonobouys, chaff, and flares, could be deposited on the ocean floor. The widely dispersed, intermittent, minute size of the material minimizes the impact. Wave energy and currents will further disperse the materials." 5

Please explain what materials debris will consist of and how widely they can be expected to be dispersed. as well as what controlling them in compliance entails. Also, what impacts on the sea floor might impact wider aspects of the system, i.e. food webs etc.

6) Please explain how risk to public health and safety is minimized through standard operating procedures and compliance with DoD Directive 4540.1, OPNAVINST 3770.4 and Commander, Naval Surface Force, U.S. Pacific Fleet (COMNAVSURFPAC) Instruction 3120.8F. Specifically, how is accumulation of biotoxins and hazardous materials in **fresh water, ground water, sea floor, ocean water, and soils** (as well as movement in air) to be controlled? 6

- What systems are used to measure levels of the above? What are existing and projected levels under each alternative?
- What levels are considered to pose a risk to human health?
- Please provide a list of environmental contaminants and biotoxins used and how much of each is emitted for each of the proposed training activites.

COMMENT NUMBER
D-E-0456 (cont.)

7) Could you please detail the notification procedures for training activities on Kaua'i as cited in your Socio-economic impacts assessment. I've lived on Kaua'i all my life, and never received formal notification in newspaper, on radio, or in any public forum of training activities. Please advise. 7

8) Marine debris poses a significant threat to sea birds such as Laysan albatross, sea turtles, and monk seals. The draft EIS recognizes this proposal stands to increase marine debris, both from detonated equipment and out going missiles themselves. Please provide scientific evidence that these particles won't be consumed by any of the above species or fish species. 8

9) Please comment on the current status of clean up efforts on Kaho'olawe and other Hawaiian isles areas previously used by the navy, including off shore naval debris still being recovered throughout our islands. What of making completion of these clean up efforts a pre-requisite for this current expansion? 9

10) Many sea birds nest in proposed expansion areas and research has shown that startle effects and disturbance of nesting sea birds can dramatically decrease growth and survival rates, yet these effects are dismissed as negligible. What scientific evidence supports this claim? 10

11) Please provide the definition of "cultural site" which you are utilizing as many locations you've listed as having "no cultural sites" do indeed. Who conducted this study and made this determination and what are their qualifications? Were cultural practitioners from those areas consulted? If so, please list who. 11

12) Please explain why there are no mitigation measures listed for biological resources in Northwestern Hawaiian Isles? 12

13) How is expansion to Nihoa and Necker sites listed compatible with authorizing statute for the national monument, Papahanaumokunuiakea? 13

14) The mitigations list stopping operations once iwi are uncovered. What mitigations are taken to prevent them being uncovered in the first place when many of these proposed areas contain high concentrations? 14

15) What of species that enter activity areas after this check is performed and before launch. Which species frequent the area that are not considered to be "sensitive wildlife?" 16

16) What levels of electromagnetic generation are to be expected from each activity under each alternative? 15

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0457

From: Dennis Dias
To: deis hrc@govsupport.us
Subject: No to any Training or Testing of Weapons or Sonar in Hawaiian Waters
Date: 9/17/2007 11:02:08 PM

To, Whom it may concern!

1 I am writing to say I do not approve of any kind of "Training", in Hawaiian Waters of any Kind of [Weapons or Sonar] Testing due to the fragile Enviroment that we have here in
the Islands we the people, would like to keep it prestine and beautiful for the next generation
of families here in the islands to enjoy. We don't like seeing it being Desacrated by more -
military testing and being polluted, like explosives & depleted Uranium rounds found on Oahu
and the Makua Army Training areas.

This I already know, with more expantions to the outer Islands of the Big-Island & Kauai.
where more ammunition & explosives left behind and more pollution in Hawaiian waters. Would like you to take your training and excersises, back to the Continental United States,
where you'll have all the space and room to do your training.

"Thank,You"

Dennis Dias

COMMENT NUMBER
D-E-0458

From: Gregory I. Goodwin - Hanalei, HI
To: deis hrc@govsupport.us
Subject: EIS , re: increasing U.S. militarization of Archipelago Hawai'i
Date: 9/17/2007 11:03:25 PM

On environmental, moral, political, economic, social and militarist basis I am opposed to the U.S. Navy□s plan to increase training operations on land, sea and in the air. 1

I am opposed to existing and increased research, development, test and evaluation of operations at the Hawaii Range Complex and Pacific Missile Range Facility.

I do not support existing or increased U.S., or anyone else's, militaristic enterprises in the Hawai`i Archipeligo within at least a 500 mile exclusion zone of said islands.

Gregory I. Goodwin

Hanalei, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0459	From: Mehana Blaich Vaughan To: deis hrc@govsupport.us Subject: Public Comment Date: 9/17/2007 11:07:04 PM
1	Aloha, I have read and requested comment on the NAVY's draft EIS for expansion of training activities in Hawai'i. As a life long, native Hawaiian resident of Kaua'i, I respectfully ask you to deny the NAVY's expansion plans.
2, 3	I found a number of areas of the draft to be insufficient including consideration of impacts to cultural resources and subsistence gathering sites as well as consideration of impacts to
3	ground and surface water as well as to soil, the ocean, and coral reefs. The analysis of which chemicals such as hydrogen flouride are used and created as waste products in these training exercises, falls far short of fully considering, much less protecting against, their potential, hazardous impacts. Hawai'i is rife with examples of areas damaged by Navy training and manuevers, areas yet to be cleaned up.
2, 3	I implore you to deny further expansion without much more in depth analysis of potential impacts, more comprehensive public information, and completion of clean up of areas utilized in the past such as Kaho'olawe and Waikane. Mahalo nui for your time and attention, Mehana Blaich Vaughan

COMMENT NUMBER	
D-E-0460	From: Judy Walker - Hilo, HI To: deis hrc@govsupport.us Subject: Navy EIS comments Date: 9/17/2007 9:56:27 PM
1	Attached are my comments on the Navy EIS. I consider them incomplete. As part of my comments, I would note that a 1742-page document of such complexity should have an extended comment period. Thank you for reviewing my comments, and I hope to receive a written response to them. Judy K. Walker Hilo, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0460 (cont.)

Because the EIS was so lengthy and not arranged intuitively, I have separated out questions generally prompted by reading the EIS and left most others in areas (or one of the areas) that they are drawn from.

General Questions

1. My understanding of military operations is that clean-up may not begin until the operation is ended or, for example, an area is de-commissioned. What is the Navy's policy on clean-up generally, and for the HRC specifically? 2
2. When will clean-up begin, and what will be cleaned up and recovered?
3. Has there been any assessment, particularly in the Northwestern Hawaiian Islands and open ocean areas, of the Navy's impact on the ecosystem? Here I am speaking not of generalizations, but of specific data. Most of the Navy's conclusions that operations will have no effect, particularly in open ocean areas, are based upon the idea of dispersal in a pristine environment, and no place in the Hawaiian archipelago could be considered pristine. Have there been assessments of flora and fauna species diversity, abundance, and general health; toxin levels in the water column; toxin levels in ocean sediments and among benthic organisms; presence of debris, including unexploded ordnance and targets? 3
4. I am particularly concerned about the slipshod analysis of the effect of operations on monk seals and sea turtles. The population on Hawaiian monk seals currently stands at less than 1200 individuals and continues to drop at a rate of 4% per year. A single paragraph (6-18) was devoted to the Hawaiian monk seal recovery plan, draft revision 2006. It is a boilerplate paragraph, applicable to almost any marine organism. This is wholly inadequate and fails to meet the requirements of a meaningful EIS. Further, the new monk seal recovery plan was released by NMFS in August of 2007, and all environmental impacts should be evaluated using the current recovery plan. All portions of the EIS relating to the Hawaiian monk seal or its habitat (particularly the Northwestern Hawaiian Islands) should be reconsidered and redrafted. 4
5. Is depleted uranium or any other radioactive material being used (in any form, including as ballast in missiles) or proposed to be used in Navy operations in the HRC? 5
6. Was the Navy aware, prior to August 20, 2007, that depleted uranium was present at Pohakuloa Training Area?
7. Will the Navy be reconsidering and/or supplementing its environmental assessment of operations at Pohakuloa Training Area in light of the Army's admission that depleted uranium is present there?
8. What radioactive and toxic materials have the Navy disposed of in the HRC, in what quantities, and in what areas, including the open ocean?
9. What effect may current and proposed Navy operations have on previously discarded radioactive or toxic materials?
10. Where will the hazardous waste generated by current and proposed operations be disposed of? 6
11. There are numerous documents, most previously generated by the military, that are referenced and relied upon. (Examples include the SEAWOLF Final EIS and Churchill Final EIS at 4-21; Biological Opinion for RIMPAC 2006 and USWEX Programmatic EA/OEA at 4-31.) These are often the sole and direct source of the conclusions 7

1

COMMENT NUMBER
D-E-0460 (cont.)

contained in the EIS and should have been included in an appendix, or at least listed with url's for web accessibility.

12. The sections devoted to marine mammals and sonar effects require a background in advanced statistics to gain any understanding of them and certainly weren't written for a layperson, as the EIS is required to do. 8
13. I am concerned that the evaluation of TTS in marine mammals relies almost entirely upon a small sample (I disagree with the EIS assertion at 4-40 that five dolphins and two white whales constitute a large number of test subjects) of relatively small, shallow diving odontocetes, generally bottlenose dolphins. There is little data on or analysis of large and/or deep-diving odontocetes, mysticetes and pinnipeds. 9
14. In many areas, for example in the analysis of marine mammals and sonar response, the EIS acknowledges the limitations of the data available. What is being done to remedy this situation? Is the Navy actively seeking to supplement its information (physiological, behavioral, abundance, etc.) about particular species of sea turtles and marine mammals, and if so, how?
15. When I spoke to a Navy representative at the Hilo EIS meeting, he was surprised when I informed him that there had been at least four cetacean strandings on the main Hawaiian Islands in the past year. I attended a public lecture this summer where three of the strandings were discussed (necropsy results were not yet available) and just a few weeks later saw a melon-head whale carcass that had been recovered from the south end of the Big Island. What are the procedures in place to ensure that the Navy is aware of all strandings, and how often does reporting take place? 10
16. My understanding is that the NMFS debris recovery program, touted by the EIS, has been defunded. Please address this. How does this affect the overall picture of debris impact, by the Navy and others, if no one is picking it up? Would the Navy be willing to fund the program or provide support so that it continues? 11

Open Ocean

4-17

17. Table 4.1.2.2.1-1 gives the maximum fish effects range in feet. A Navy representative confirmed for me at the August 29, 2007, Hilo EIS meeting that the values given are a radius, not an area. It is misleading to tell the public that for one-ounce fish, there is a 10% mortality range of 518.3 feet, when in actuality 10% of the fish within a 286,634 square feet area (6.58 acres) will die. Have there been any estimates of fish density in the particular area to be affected? 12
18. What is the scientific basis for expecting fish to return to the area after vacating it?
19. Will a given area be subjected to multiple operations or detonations on multiple occasions? If so, how will this affect the conclusion that fish will return to the area once operations are completed?
20. If fish are expected to leave the area as operations begin, wouldn't the same be true of marine mammals and sea turtles? If so, won't such operations inherently and unavoidably constitute Level B harassment under the MMPA and ESA?

4-20

2

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0460 (cont.)

21. The leatherback turtle is in many ways functionally and physiologically closer to marine mammals than to cheloniids. What is the scientific support for assuming that leatherback TTS will follow that of cheloniids? 13

4-21

22. What is the scientific basis for the assertion that the sea turtles will be affected less by active ASW sonar events because, "although there may be many hours of active ASW sonar events, the actual 'pings' of the sonar signal may only occur several times a minute"? 52
23. How many hours is "many" hours?
24. How many times per minute is "several," and what is the likelihood that there will be more than several pings per minute?
25. If one were to assume that several means, for example, five times per minutes, then a ping would sound every 15 seconds. What, if any, support is there for the idea that 15 seconds is a sufficient recovery time to avoid a TTS, particularly when the sound is repeated for many hours?
26. At 4-21, the EIS states, "Based on the current available data, we have concluded that sonar would not affect sea turtles." What is the "data" referenced here that was relied upon?
27. There is no differentiation here among or reference to the different species of sea turtles, who each have very different life histories (foraging areas and habits, including dive profiles and patterns, nesting behaviors, etc.) and different population levels that would determine their vulnerabilities to impacts by operations. 53
28. At 4-21, referring to the possibility of ships striking sea turtles, the EIS notes,"At all times when ships are underway, there are many people on watch scanning the area around the ship." Does this mean there are specific crews dedicated to watching for marine mammals and sea turtles at all times, not just during and prior to operations? Please clarify with details regarding any dedicated watch system. 54
29. There is no analysis here of the likelihood of seeing a sea turtle present in the area with visual scanning. What is the percentage of time spent (visibly) at the surface by the species of sea turtles commonly found in Hawaii, and how long does a sea turtles remain at the surface while breathing?
30. What is the purpose of a torpedo control wire, and what is the effect of breaking or releasing the wire? 14
31. What is the breaking strength of torpedo wire?
32. Has there been any research done on the possibility of entanglement in torpedo wire by sea turtles, sea birds, marine mammals, or other marine life?
33. What is torpedo wire made of?
34. What is the average length of a torpedo wire?
35. Is it likely to retain that length, or break into smaller pieces?
36. How does the torpedo wire degrade or decompose?
37. What quantity of torpedo wire will be introduced into the HRC open ocean area annually under each of the alternatives?
38. What is the possibility of ingestion of torpedo wire by sea turtles, sea birds, marine mammals, or other marine life?

COMMENT NUMBER
D-E-0460 (cont.)

39. Why is it acceptable to extrapolate the criterion for TTS (p. 4-21) when it was "inappropriate" to extrapolate from marine mammal data when discussing sonar on the previous page? 15

4-22

40. The only date used for sea turtle vulnerability to underwater detonations is marine mammal data. Has there or will there be any effort to procure data pertaining to sea turtles?
41. Do sea turtles (considering both cheloniids and leatherbacks) have vulnerabilities for injury unique from marine mammals (i.e. other than lung and TM)?
42. My understanding from speaking to Navy representatives at the Hilo EIS meeting is that "clearance" is not an active process (herding animals) but rather an acknowledgement that an area is clear. To call this "clearance" gives a false impression to the public as to what's occurring and the likelihood that sea turtles or marine mammals will remain in the area. Again, my understanding from my discussions with Navy representatives is that people simply watch from the deck (and listen for acoustics), that there isn't an active survey of the area performed. Is this accurate? 16
43. 6.1.1-6.1.4 give few details as to clearance procedure. What is clearance procedure, and who determines an area is clear?
44. The EIS gives a lead time of 30 minutes to several hours for set-up and clearance of the impact area, and Navy representatives I spoke with relied upon this timeframe (approximately an hour) for successful clearance, noting that no marine mammal or sea turtles could stay underwater that long and would be seen surfacing for air. Of course, that's not true, either as to the practicality of seeing an animal for the moment it surfaces, or as to the characterization of dive patterns and capabilities for marine mammals and sea turtles. Were dive characteristics (including duration and depth and foraging patterns) taking into account when arriving at the conclusions in the EIS? If so, where?

4-23

45. At 4-23 the EIS states that "The weapons used in most missile and Live Fire Exercises pose little risk to sea turtles unless they were to be near the surface at the point of impact." What depth constitutes "near the surface" in this context, and what is the average depth of these affected areas? 17

4-24

46. At 4-24 the EIS mentions ongoing research into the effects of sound on marine mammals. What studies are ongoing, and under the auspices of which agencies and/or individuals? 18
47. At 4-24, the EIS states that the primary source(s) of potential marine mammal habitat impacts is underwater sound from various exercises and "pressure effects from underwater detonations during mine clearing exercise." Why isn't this mentioned and addressed in the sea turtle section? 19

4-25

48. It appears that the critical habitat designation within the HRC for the Hawaiian monk seal used for this EIS was made by NMFS in 1988 when the previous recovery plan was drafted. According to the EIS, this designation runs out to the 120-fathom line for the Northwestern Hawaiian Islands. There have been breakthroughs since 1988 in our knowledge of Hawaiian monk seal foraging behavior and we now know that they spend much more time in much deeper water than was previously suspected. Has there been a 20

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0460 (cont.)

recent change in the designation of critical habitat for the seal, either in conjunction with its new recovery plan (released 2007, draft revision 2006 examined for this EIS) or associated with the national marine monument designation?

<u>4-26</u>

49. At 4-25, the EIS seems to equate harassment with physical harm rather than using the standards of the Endangered Species Act or Marine Mammal Protection Act. What is the likelihood of harassment (falling short of physical injury) of marine mammals or sea turtles for the 4.1.2.4.1 "potential non-acoustic impacts" section? 21
50. Where is the previous analysis of torpedo launch accessories referenced at 4-26? It should be included in an appendix.
51. How "rapidly" will the launch pieces sink to the bottom?
52. What material is the canopy made of?
53. What is the likelihood of the canopy entangling or becoming a host/habitat to marine organisms other than marine mammals or sea turtles?
54. Where is the scientific support for the assertion that the canopy will not pose an entanglement risk because it is highly visible? Marine mammals often become entangled in perfectly visible materials because they appear to be a food source, either directly or as a host to other organisms.
55. At 4-26, the EIS says that "marine animals would only be vulnerable to entanglement or ingestion impacts if their diving and feeding behaviors place them in contact with the sea floor." Where is the evaluation of the danger to those marine animals that fall into this category? For example, monk seals often feed on the bottom. Green sea turtles crawl into pukas on the bottom to rest. Likewise, although specifically mentioned as vulnerable to ingestion, there is no assessment of bottom-feeding whales in Hawaii. The same is true on the next page when discussing sonobuoy and other parachutes. 22
56. 4-27 58
57. Will MK-48 torpedo and other debris aggregate on the bottom or in the water column?
58. How many flex hoses will be deposited, and in what area (square feet) on an annual basis?
59. Is there any intention to recover any of the torpedo, sonobuoy, or other debris?
60. Have sinking rates of parachute assemblies (from surface to bottom) and time at surface been observed?

<u>4-32</u>

61. I'd like a bibliography of the literature search referenced at 4-32. 23

<u>4-35</u>

62. Ecological information is used to analyze individual species. Is there an overall ecological evaluation, or an ecological evaluation of cumulative effects, within the EIS? If not, why not? 24

<u>4-42</u>

63. Please define the terms "intermittent" and "continuous" in the TS/exposure context.

<u>4-46</u>

64. At what point does intermittent sound have a cumulative effect rather than allowing recovery time?

<u>4-49</u>

5

COMMENT NUMBER
D-E-0460 (cont.)

65. What is the scientific support for the assertion at 4-49 that deep diving animals would dive rather than ascend at times of stress, and how does depletion of oxygen reserves fit into that scenario?

<u>4-51</u>

66. Why is it unacceptable to extrapolate behavioral effects of sound from humans and terrestrial animals to marine mammals but acceptable to extrapolate PTS data? 25

<u>4-60</u>

67. Beaked whales appear twice on Tables 4.1.2.4.9.3-1 and –2. Is one of the beaked whale rows supposed to be designated for harbor porpoises?

<u>4-176</u>

68. What, if any, hazardous shipboard materials may be disposed be disposed of at sea, in near-shore waters, or in any way other than being offloaded in port? 30
69. What, if any, expended training materials will be recovered or attempted to be recovered from the open ocean? 40
70. If any expended training materials may be recovered or attempted to be recovered, what are the protocols for recovery? When will they be recovered and in what manner?
71. The EIS discusses sonobuoys, pyrotechnic residue, and chaff in the No Action alternative section 4.1.4.1.1. However, other expended training materials, including gun ammunition, bombs and missiles, and targets are mentioned in the text but not discussed. Why is this? 41
72. What is a JATO bottle? 42
73. Various missiles and ammunition are listed in Table 4.1.4.1.1-1. They are not discussed. What will be the impact of these approximately 231,400 items? 41
74. For each of the items listed in the Table but not otherwise discussed in Section 4.1.4.1.1, what hazardous materials are produced, and in what quantity?
75. What is the open ocean area (in square feet) over which these materials will be dispersed?
76. What is a training item containing energetic materials?
77. What percent of materials containing energetic materials is likely to fail to detonate? 43
78. Historically, in similar HRC operations, what percent of materials containing energetic materials failed to detonate?
79. What is the policy for recovery of unexploded ordnance? Under what conditions is a recovery attempted, and in what manner, and when is a recovery operation terminated? 44
80. What specific information do you have about: the rate and manner of decomposition of training debris; what toxic substances are released; likely resultant concentrations; the potential effect on benthic flora and fauna; and specific areas (both in location and square footage) likely to be affected? 45

<u>4-178</u>

81. According to the EIS, "A sonobuoy's seawater batteries may release copper, lithium, or other metals." (4-178) What other metals may be released? 31
82. How long may batteries release metals?
83. Are the battery effluents marine organisms may be exposed to for up to 8 hours distinct from the aforementioned releases? If so, what may be released that has not already been named?
84. How is a sonobuoy scuttled?

6

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER D-E-0460 (cont.)

85. The EIS provides information for the types of sonobuoys used on San Clemente Island, but will not commit as to the type that will be used in the HRC, and thus the hazardous materials that may be used in HRC. What hazardous materials other than fluorocarbons, copper and lead may be contained in or released by sonobuoys?
86. Are there sonobuoys that may be used that contain greater levels of fluorocarbons, copper and lead than those set forth in Table 4.1.4.1.1-2? If so, what are those levels?
87. The EIS characterizes the No Action Alternative as about 2200 flares and 300 smoke grenades. However, Table 4.1.4.1.1-1 lists 2220 flares and 478 smoke canisters. Why is there a 63% discrepancy in the number of smoke grenades? 34
88. Do both flares and smoke canisters weigh approximately 0.85 pounds per item, or is that an average of the two items? If their weights are different, what does each one weigh, per item? 46
89. If Table 4.1.4.1.1-1 is accurate, wouldn't 168 more pounds than are enumerated in the EIS of the materials itemized in paragraph 1 of "Pyrotechnic Residues" be deposited on the sea floor each year in the No Action alternative? 47
90. What is the actual area, (i.e. not the 250,000 square nm of HRC unless the entire area will be subjected to flares and smoke grenades), in square feet, that may be directly affected or impacted by pyrotechnic residues? 48
91. According to the EIS, if the materials itemized in paragraph 1 of "Pyrotechnic Residues" were scattered uniformly across the 235,000 square nm of the HRC, the materials would be deposited at a rate of 0.01 lb/square nm per year. What is the actual rate of deposition in affected areas of the materials itemized in paragraph 1 of "Pyrotechnic Residues," using an accurate estimate of both pyrotechnic residues and the areas likely to be impacted? 49
92. What are the Resource Conservation and Recovery Act criteria for characterizing hazardous wastes? 50
93. Do any of the materials that may foreseeably find their way into the open ocean HRC area, through either current or proposed military operations, meet the RCRA criteria under any legally supportable interpretation of the criteria? 51

4-179

94. Does chaff float? 26
95. What chemicals leach out of the chaff?
96. Having admitted that chaff may be ingested by marine life, what will be the effect of the chemicals leaching out of the chaff after being consumed, and how do you know? 35
97. How is chaff in effect different from nurdles and other debris ingested by marine life that results in that marine life's starvation?
98. Has anyone examined deceased marine life, including seabirds in the Northwestern Hawaiian Islands, for the presence of ingested chaff? If so, who performed the examination, under what conditions and with what results?
99. How long specifically are turbidity and clarity of ocean waters affected by chaff (i.e. define "temporarily")? 38
100. What is the area, in square feet, affected by a single discharge of chaff? 36
101. How many packages of chaff are released in a single discharge?
102. How large is a single unit or particle of chaff, and approximately how many of these units is contained in a single package?
103. What is the weight of one package of chaff?

COMMENT NUMBER D-E-0460 (cont.)

104. What is the specific area (i.e. not the 250,000 square nm of HRC unless the entire area will be blanketed), in square feet, that will be affected or impacted or host to chaff discharge on an annual basis? 37
105. How widely (note whether answer is a single radius or area) will chaff be dispersed by wind, waves and currents?
106. Have there been experiments, modeling, or other investigation into the dispersal of chaff by wind, waves and currents? If so, what variables affected the dispersal and what were the results? If not, what is your support for the assertion that, "The fibers are quickly dispersed more widely by wind, waves, and currents." (4-179)
107. What is the difference between ACM chaff and the CHAFFEX MK-36 rapid bloom offboard chaff? Will they have different impacts on the open ocean environment, either in their launch or subsequent dispersal? 39
108. Are or will any used hazardous wastes and chemical by-products generated at sea, materials that would otherwise be considered hazardous wastes when offloaded in port, be disposed of at sea, in near-shore waters, or in any way other than being offloaded in port? 29

Northwestern Hawaiian Islands 27

109. What happens when a missile fails to intercept its target? (Presumably there will be misses or there would be no need of practice.) Where would the missile, and the target, impact and what would be the effect on the area?
110. Would any effort be made to assess damage caused by the failure, and/or to recover any unexploded ordnance or otherwise unconsumed hazardous materials?

4-198

111. What are the 20 coral species alluded to (p. 4-198) as being present offshore of Nihoa, and are any of these species endemic? 32
112. What is the estimated age range of the coral offshore of Nihoa that may be impacted? 55
113. What is the actual area (in square feet) of coral that may be affected? 56
114. If coral cover in the area is approximately 25%, and falling debris is widely scattered over that area, then wouldn't every piece of debris have a 25% chance of impacting coral?
115. What types of chemicals (simulants, accelerants, etc.), heavy metals, or toxic or hazardous materials may a piece of falling debris be contaminated with?
116. If the touch of a human finger can damage some coral organisms, how can falling (possibly chemically contaminated) debris have no impact on coral communities?
117. How were potential impacts on coral communities evaluated? What scientific resources (publications, experts in the field, etc.) were consulted? 57
118. What does "impacts" on coral communities mean is this context—simply direct physical impact or collision?
119. How was the 1 in 1 million chance of a marine mammal (offshore of Nihoa) being affected by falling debris arrived at?

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0460 (cont.)

120. What does "affecting a marine mammal" mean in this context—only being struck by debris? 32

4-199

121. On p. 4-199, "Interceptor missile element test activities associated with the Missile Defense Agency lethality program could include development and testing of Nuclear, Biological, or Chemical material simulants… The only proposed chemical simulant that might be included as part of the No-Action Alternative in a target payload will be small quantities of tributyl phosphate (TBP), which is a non-flammable, non-explosive, colorless, odorless liquid typically used as a solvent in commercial industry." Will any other chemical simulants be used in the No-Action Alternative, Alternative 1, or Alternative 2 in a target payload or any other capacity? 33

122. Will any Nuclear or Biological Material simulants be used in any of the three alteratives?

123. What toxins other than TBP may be present on falling debris?

124. Do the toxicity levels given for aquatic species on 4-199 only include TBP, or are other toxins included as well?

125. Were TBP dispersal patterns analyzed using any scientific models or simulations (laboratory, computer, etc.)? If not, how are these conclusions supported? More specifically, what information does the Navy have about effects and properties of TBP in a marine versus aquatic environment?

126. The Material Safety Data Sheet on TBP advises that, among other things, it may affect the central nervous system. In case of accidental release, the MSDS warns, "Do not flush to sewer!" My understanding, based upon this warning and some cursory research, is that TBP is relatively water-insoluble. What is meant when the EIS says that seawater will "neutralize" TBP?

127. If TBP is relatively water-insoluble and less dense than water, it seems likely that TBP will float on the surface of seawater. What effect will this have on neuston and the organisms who consume it?

128. Is the Navy currently using TBP in its operations in the HRC? If so, what quantity of TBP has been used to date, and over what area (in square feet)? And if so, has there been any follow-up observation or sampling that can prove or disprove the conclusions made in the EIS regarding TBP dispersal and effects?

129. Does the Navy have any data on toxicity levels for marine species?

130. Many things that would not otherwise be considered toxic (meaning chemically toxic or poisonous) are toxic (meaning causing serious injury or death) to some coral organisms. For example, sediment run-off due to shoddy construction practices or unusual rain events can blanket coral communities and cause mortality. What substances or materials that are potentially toxic to coral could be introduced to the Northwestern Hawaiian Islands, and also to other areas of HRC with coral communities, through the Navy's "No-Action" alternative?

131. What additional toxins and differences in quantity and quality may be present for Alternatives 1 and 2?

132. The possibility of debris ingestion, either directly or through ingesting other flora or fauna that have been affected by debris, was not addressed in 4.2.1.1. Why not? Please do so.

COMMENT NUMBER
D-E-0460 (cont.)

4-199

133. According to the EIS (p. 4-199) an exercise is halted if a marine mammal is detected in the target area. Is the exercise halted if a sea turtle is detected in the target area? 28

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0461

From: Gordana Leonard - Kailua Kona, HI
To: deis hrc@govsupport.us
Subject: I OPPOSE the proposed Hawaii/Pacific Range and "Alternative Actions"!
Date: 9/17/2007 11:32:04 PM

Aloha!

As a 10-year Hawaii resident who relocated from the poisoned and polluted area of San Jose CA first to Kaua'i and then to the BIg Island, I became aware _from the outset_ that the paradise which had been Hawaii had already been misused and extensively polluted and abused by various activities of my country's military. Now, with the discovery of DU on Oahu and Hawaii Island, and some awareness of the horrors dumped in the past off the coast of Oahu, I realize that even CA is not as badly toxicly compromised, for the CA poisons of air, water table and earth are not as vile, nor have a half-life of 4.5 million years!!!

1 So, for a great many reasons, I am writing to formally oppose all facets of the Hawaii/Pacific Range and any and all "Alternatives" in the Hawaii Pacific Waters./_
_/
I believe that there is NO justification to /_further destroy_/ Hawaii -- in fact would strongly endorse the closure of the Pohakuloa Training Area if that were to ever be on the table. I believe it unconscionable that the one and ONLY Hawaii, "Paradise on Earth", is being used as a training ground and missile range while our State promotes Hawaii as a tourist mecca and our various tourist agencies are trying to lure tourists from the U.S. and abroad! Tourism is our LIFEBLOOD! Our economy depends on it! I would personally NEVER vacation in an area in which military activities and training exercises are apparent, and where the ocean, watertable, air and earth are being affected by the effects of whatsoever weaponry.

But, more to the point, I participated for years in efforts to protect Hawaiian waters from the potentially deadly impact of SURTASS LFAS, as well as on the effort to protect the Northwestern Hawaiian Islands. I have read enough research, enough so called "objective" EIS assessments to be able to categorically state that each, everything and all you

COMMENT NUMBER
D-E-0461 (cont.)

currently propose will either be de facto damaging to the Pacific Ocean and its life forms -- not merely the endangered monk seals or the whales -- or is laughably inadequate for the prevention of such damage, and the likely death and destruction.

No matter how much I appreciate our military, my top, middle and bottom lines are NO TO THE HAWAII / PACIFIC RANGE. To allow it to proceed could damage human life, WOULD damage tourism, and WOULD damage our precious ocean and its entire ecosystem.

Thank you for considering my input.

Gordana Leonard

Kailua Kona HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0462
1

From: Barbara Saiki
To: deis hrc@govsupport.us
Subject: stop the war games and move on
Date: 9/17/2007 11:43:30 PM

COMMENT NUMBER
D-E-0463

From: Michael Jasny - Santa Monica, CA
To: deis hrc@govsupport.us
Subject: Comments on HRC DEIS
Date: 9/17/2007 11:58:46 PM

Dear Sir or Madam:

Attached are comments from NRDC on the Draft Environmental Impact Statement for the Hawaii Range Complex. Please add these comments to the record.

Thank you,

Michael Jasny

Michael Jasny

Senior Policy Analyst

Natural Resources Defense Council

Vancouver, BC

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

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COMMENT NUMBER

D-E-0463 (cont.)

NRDC
THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

By Electronic and Regular Mail

September 17, 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kauai, Hawaii 96752-0128
ATTN: HRC EIS/OEIS
deis_hrc@govsupport.us

Re: Draft Environmental Impact Statement for the Hawaii Range Complex

Dear Sir or Madam:

On behalf of the Natural Resources Defense Council ("NRDC"), the International Fund for Animal Welfare, Cetacean Society International, the International Ocean Noise Coalition, and Ocean Futures Society and its founder Jean-Michel Cousteau, and on behalf of our millions of members, thousands of whom reside in Hawaii, we are writing to submit comments on the Navy's Draft Environmental Impact Statement/ Overseas Environmental Impact Statement for the Hawaii Range Complex ("DEIS"). See 72 Fed. Reg. 43251 (Aug. 3, 2007).[1]

The Navy's DEIS for the range complex encompasses an astonishing quantity and variety of activity, amounting to more than 1000 annual exercises in ocean waters alone. Individually and collectively, many of these activities pose a risk to Hawaii's unique environment. Some make use of live ordnance, some use live explosives—and still others employ high-intensity active sonar, a technology whose impacts on marine life have in recent years been the subject of broad scientific recognition and concern. During a major exercise in 2004, as sonar sounded some 25 nautical miles offshore, 200 whales from a species that is rarely seen from shore and had never mass-stranded on Kauai came into Hanalei Bay. Many of the exercises proposed in the DEIS would employ the same hull-mounted sonar systems that were used during that incident and, more broadly, have been implicated in mass injuries and mortalities of whales around the globe. The same technology is known to affect marine mammals in countless other ways, inducing panic responses, displacing animals, and disrupting crucial behavior

[1] NRDC is aware that comments may be submitted separately by government agencies, individual scientists, environmental organizations, and the public. The comments that follow do not constitute a waiver of any factual or legal issue raised by any of these organizations or individuals and not specifically discussed herein.

COMMENT NUMBER

D-E-0463 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

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such as foraging. The Navy's proposal for the Hawaii Range Complex ("HRC") would increase current levels of sonar use—already exceeding 3000 hours per year—by almost 70 percent.

It is undisputed that sound is a fundamental element of the marine environment. Whales, fish, and other wildlife depend on it for breeding, feeding, navigating, and avoiding predators—in short, for their survival. Under these circumstances, exercises like the ones proposed for Hawaii must be undertaken with particular care, dictated not by assertions of convenience or of history, but by a recognition that protection of the marine environment and safeguarding of our national defense are mutually dependent national interests that can and must be achieved through compliance with our federal environmental laws.

2, 3, 4 To that end, Congress has dictated through NEPA that, in planning exercises, the Navy must employ rigorous standards of environmental review, including a fair and objective description of potential impacts of the range, a comprehensive analysis of all reasonable
3 alternatives, and a thorough delineation of measures to mitigate harm. Unfortunately, the DEIS released by the Navy falls far short of these standards. To cite just a few examples:

- The Navy throws out nearly the entire literature on behavioral impacts on marine mammals, in support of a standard that lowers previous estimates of predicted harm.

- It presumes, entirely without analysis, that all of its impacts are short-term in nature and that none will have cumulative effects, even though the same populations would repeatedly be affected.

- 4 It disregards numerous studies showing that every Hawaiian population of toothed whales examined to date is genetically distinct from other North Pacific populations, posing a heightened risk of population-level effects.

- 5 It claims, against generations of field experience, that marine mammals—even cryptic, deep-diving marine mammals like beaked whales—can effectively be spotted from fast-moving ships and avoided.

- 6 It adopts mitigation that a federal court recently found to be "woefully inadequate and ineffectual," supported by no more than abstract statements of operational need.

7 The picture that the Navy paints with such an analysis belies common sense. Although mass mortalities of beaked whales have resulted from the single transit of a sonar ship, the DEIS concludes that virtually no animals would suffer injury or die during the HRC's many years of operation. Although the Navy would use sonar extensively in the same areas of ocean, the DEIS concludes that no cumulative impacts would occur. And although marine mammal populations around Hawaii have shown themselves to be discrete, reproductively isolated, and associated with individual islands, the DEIS

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asserts without analysis that all of the Navy's activities have not and will not result in any population-level effects.

Nor is the Navy's analysis of alternatives any more credible. For sonar training, there is 8
no step more crucial to reducing impacts than the careful siting of exercises, avoiding concentrations of vulnerable and endangered species and high abundances of marine life to the greatest extent possible. Yet the Navy did not consider alternative sites or establish a single environmental exclusion zone, either within or outside the vast Hawaii Operating Area, which alone comprises some 235,000 square nautical miles of ocean. And the Navy fails to consider a variety of other options, some employed by other navies, that would reduce its impacts. What it presents instead is an unlawfully narrow set of alternatives, a Hobson's choice that bears no relation to what might be done to mitigate harm in Hawaii's marine environment.

The DEIS is fatally flawed by its inconsistency with the weight of scientific evidence 9
and with the standards of environmental review embodied in NEPA. As a matter of science, it lacks objectivity; as a matter of law, it is insupportable. We urge the Navy to 10
revise its analysis consistent with federal law and to produce a mitigation plan that truly maximizes environmental protection given the Navy's actual operational needs. We 11
also urge the Navy to make available to the public the data and modeling on which its analysis is based.

I. BACKGROUND

A. Impacts of High-Intensity Sonar

Scientists agree, and the publicly available scientific literature confirms, that the intense sound generated by military active sonar can induce a range of adverse effects in whales and other species, from significant behavioral changes to stranding and death. By far the most widely-reported and dramatic of these effects are the mass strandings of beaked whales and other marine mammals that have been associated with military sonar use. Associated strandings have occurred in Greece, during the trial of a NATO sonar system; on the islands of Madeira and Porto Santo, during a NATO event involving subs and surface ships; in the U.S. Virgin Islands, during a training exercise for Navy battle groups; in the Bahamas, the Canaries, Japan, Hawaii, Alaska, and other spots around the world.[2] On several occasions, bodies have been recovered in time to give evidence of acoustic trauma. In a 2004 symposium at the International Whaling Commission, more than 100 whale biologists concluded that the association between

[2] A summary of the strandings record appears below at section II(B)(2)(a) ("Strandings and Mortalities Associated with Mid-Frequency Sonar").

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

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sonar and beaked whale deaths "is very convincing and appears overwhelming."[3] In the United States, an expert report commissioned by the Navy said much the same thing.[4]

Mass mortalities, though an obvious focus of much reporting and concern, are likely only the tip of the iceberg of sonar's harmful effects. Marine mammals are believed to depend on sound to navigate, find food, locate mates, avoid predators, and communicate with each other. Flooding their habitat with man-made, high-intensity noise interferes with these and other functions. In addition to strandings and non-auditory injuries, the harmful effects of high-intensity sonar include:

- temporary or permanent loss of hearing, which impairs an animal's ability to communicate, avoid predators, and detect and capture prey;
- avoidance behavior, which can lead to abandonment of habitat or migratory pathways;
- disruption of biologically important behaviors such as mating, feeding, nursing, or migration, or loss of efficiency in conducting those behaviors;
- aggressive (or agonistic) behavior, which can result in injury;
- masking of biologically meaningful sounds, such as the call of predators or potential mates;
- chronic stress, which can compromise viability, suppress the immune system, and lower the rate of reproduction;
- habituation, causing animals to remain near damaging levels of sound, or sensitization, exacerbating other behavioral effects; and
- declines in the availability and viability of prey species, such as fish and shrimp.

Over the past 20 years, a substantial literature has emerged documenting the range of effects of ocean noise on marine mammals.[5]

Marine mammals are not the only species affected by undersea noise. Impacts on fish are of increasing concern due to several recent studies demonstrating hearing loss and widespread behavioral disruption in commercial species of fish and to reports, both experimental and anecdotal, of catch rates plummeting in the vicinity of noise sources.[6]

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[3] International Whaling Commission, 2004 Report of the Scientific Committee, Annex K at § 6.4 (2004).

[4] H. Levine, Active Sonar Waveform 1 (2004) (JASON Group Rep. JSR-03-200) (describing evidence of sonar causation as "completely convincing"). The strandings record is further described infra at section II(B)(2)(a).

[5] For a review of research on behavioral and auditory impacts of undersea noise, see, e.g., W.J. Richardson, C.R. Greene, Jr., C.I. Malme, and D.H. Thomson, Marine Mammals and Noise (1995); National Research Council, Ocean Noise and Marine Mammals (2003); Whale and Dolphin Conservation Society, Oceans of Noise (2004).

[6] See the discussion below, at section II(C) of "Impacts on Fish and Fisheries."

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Sea turtles, most of which are considered threatened or endangered under federal law, have been shown to engage in escape behavior and to experience heightened stress in response to noise. And noise has been shown in several cases to kill, disable, or disrupt the behavior of invertebrates, many of which possess ear-like structures or other sensory mechanisms that could leave them vulnerable. It is clear that intense sources of noise are capable of affecting a wide class of ocean life.

B. The Proposed Activity

The HRC is one of the focal points for anti-submarine warfare (ASW) training in the Pacific, involving tracking exercises (TRACKEX), torpedo exercises (TORPEX), major integrated exercises (such as USWEX), and exercises with extended echo rangers. A variety of acoustic sources are used in these exercises, deployed from surface ships, submarines, aircraft, training targets, and nodes on the Navy's instrumented ranges off Kauai; and some events involve the use of multiple sources at one time, potentially creating a complex sound field. Among the high-intensity active sonars to be employed are the systems that caused 16 whales to strand in the Bahamas in 2000, following a Navy exercise, and is believed to have been involved in several other mass mortalities; at least one of the systems was also used by the U.S. Navy during the mass embayment of melon-headed whales in July 2004.[7] According to the DEIS, six major Undersea Warfare Exercises (USWEX), close to 900 other ASW training exercises, and approximately 20 ASW research trials would continue to take place each year within the Hawaii Operating Area, both within and outside the 12 nautical mile limit. DEIS at 2-17, 2-19. In addition, the Navy would continue to host the biennial Rim of the Pacific, or RIMPAC, exercise, one of the largest naval training events in the world. 12

These sonar exercises occur amid a host of other activities with the potential to harm marine animals. Such activities include ship maneuvers and amphibious landings, gunnery, bombing, and missile exercises, mine and demolition training, hulk sinking activities, and special warfare operations. In some of these exercises, live bombs, missiles, or ordnance are used. DEIS at 2-17.

The Navy does not consider any reduction of this activity in its DEIS: on the contrary, it proposes to increase it. Its first alternative would double the number of sonar operating hours planned for RIMPAC, and add one half dozen other ASW exercises and a few ASW research trials to the annual battery; it would also (among other things) substantially increase the number of missile and mine countermeasures exercises taking place in the Hawaii Operating Area and establish a portable undersea tracking range within roughly 20 nautical miles of the main islands. DEIS at 2-36 to 2-37, 2-40. The Navy's preferred alternative would add an additional multiple strike-group exercise involving over 900 hours of sonar use – twice as much as currently takes place during RIMPAC exercises; and close to 200 additional unit-level training exercises and research tests. DEIS at 2-52 to 2-58. 13

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[7] Department of Commerce & Secretary of the Navy, Joint Interim Report: Bahamas Marine Mammal Stranding Event of 15-16 March 2000 at iii, 16, 23 (2001).

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II. THE NAVY'S COMPLIANCE WITH THE NATIONAL ENVIRONMENTAL POLICY ACT

Enacted by Congress in 1969, NEPA establishes a national policy to "encourage productive and enjoyable harmony between man and his environment" and "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." 42 U.S.C. § 4321. In order to achieve its broad goals, NEPA mandates that "to the fullest extent possible" the "policies, regulations, and public laws of the United States shall be interpreted and administered in accordance with [NEPA]." 42 U.S.C. § 4332. As the Supreme Court explained,

NEPA's instruction that all federal agencies comply with the impact statement requirement – and with all the requirements of § 102 – "to the fullest extent possible" [cit. omit.] is neither accidental nor hyperbolic. Rather the phrase is a deliberate command that the duty NEPA imposes upon the agencies to consider environmental factors not be shunted aside in the bureaucratic shuffle. Flint Ridge Development Co. v. Scenic Rivers Ass'n, 426 U.S. 776, 787 (1976).

Central to NEPA is its requirement that, before any federal action that "may significantly degrade some human environmental factor" can be undertaken, agencies must prepare an environmental impact statement. Steamboaters v. F.E.R.C., 759 F.2d 1382, 1392 (9th Cir. 1985) (emphasis in original). The fundamental purpose of an EIS is to force the decision-maker to take a "hard look" at a particular action – at the agency's need for it, at the environmental consequences it will have, and at more environmentally benign alternatives that may substitute for it – before the decision to proceed is made. 40 C.F.R. §§ 1500.1(b), 1502.1; Baltimore Gas & Electric v. NRDC, 462 U.S. 87, 97 (1983). The law is clear that the EIS must be a pre-decisional, objective, rigorous, and neutral document, not a work of advocacy to justify an outcome that has been foreordained.

In nearly every respect, the Navy's DEIS fails to meet the high standards of rigor and objectivity established under NEPA. 14

A. Statement of Purpose and Need

It is a fundamental requirement of NEPA that agencies preparing an EIS specify their project's "purpose and need." 40 C.F.R. § 1502.13. Not any statement of purpose and need will suffice: "An agency cannot define its objectives in unreasonably narrow terms" so as to exclude consideration of reasonable alternatives. City of Carmel-by-the-Sea v. United States Dep't of Transp., 123 F.3d 1142, 1155 (9th Cir. 1997) (citing Citizens Against Burlington, Inc. v. Busey, 938 F.2d 190, 196 (D.C. Cir. 1991)). Instead, the statement must reflect the agency's core aim without foreclosing reasonable alternatives. Id.

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Here, the Navy's stated purpose is to "[a]chieve and maintain fleet readiness using the HRC to support and conduct current, emerging, and future training events and RDT&E training and testing events," "[c]onduct missions supported by the HRC, consistent with the requirements of the FRTP and other transformation initiatives," and "[u]pgrade/modernize existing range capabilities to enhance and ensure the sustainability of Navy training and testing." DEIS at 1-11. These statements contain no language that would justify the narrow alternatives analysis that the Navy performs.[8] 15
As the language is somewhat opaque, however, we would remind the Navy that its statement of purpose must allow meaningful review. "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate," Idaho Conservation League v. Mumma, 956 F.2d 1508, 1519 (9th Cir. 1992), and an EIS errs when it accepts "as a given" parameters that it should have studied and weighed. Simmons v. U.S. Army Corps of Eng'rs, 120 F.3d 664, 667 (7th Cir. 1997). 16

B. Impacts on Marine Mammals

Fundamental to satisfying NEPA's requirement of fair and objective review, agencies must ensure the "professional integrity, including scientific integrity," of the discussions and analyses that appear in environmental impact statements. 40 C.F.R. § 1502.24. To this end, they must make every attempt to obtain and disclose data necessary to their analysis. The simple assertion that "no information exists" will not suffice; unless the costs of obtaining the information are exorbitant, NEPA requires that it be obtained. See 40 C.F.R. § 1502.22(a). Agencies are further required to identify their methodologies, indicate when necessary information is incomplete or unavailable, acknowledge scientific disagreement and data gaps, and evaluate indeterminate adverse impacts based upon approaches or methods "generally accepted in the scientific community." 40 C.F.R. §§ 1502.22(2), (4), 1502.24. Such requirements become acutely important in cases where, as here, so much about a program's impacts depend on newly emerging science.

In this case, the Navy's assessment of impacts on marine mammals is consistently undermined by its failure to meet these fundamental responsibilities of scientific integrity, methodology, investigation, and disclosure. As with the Navy's Draft Environmental Impact Statement for the east-coast Undersea Warfare Training Range, the DEIS excludes a great deal of relevant information adverse to the Navy's interests, uses approaches and methods that would not be acceptable to the scientific community, and ignores whole categories of impacts. In short, it leaves the public with an analysis of environmental harm—behavioral, auditory, and physiological—that is at odds with established scientific authority and practice. 17

1. Thresholds of Injury, Hearing Loss, and Significant Behavioral Change

[8] The inadequacy of the Navy's alternatives analysis is discussed below at section II(F).

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At the core of the Navy's assessment of acoustic impacts on the training range are the thresholds it has established for physical injury, hearing loss, and significant behavioral harassment, the levels above which meaningful effects on marine mammals are found to occur. There are gross problems with the Navy's thresholds here.

18, 55, 56, 57, 58, 59

a. Injury Threshold

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The Navy fixes its highest threshold of 215 dB re 1 μPa$^{2\bullet}$s—which it considers the ground floor for direct physical injury—on the amount of energy necessary to induce permanent hearing loss (or "threshold shift") in marine mammals. Beneath this decision lies an assumption that the tissues of the ear are "the most susceptible to physiological effects of underwater sound" (DEIS at 4.39), and, indeed, a few paragraphs are spent in an effort to set aside other types of injury that have been identified or observed. Unfortunately, the Navy's position is inconsistent with the scientific literature and with the legal standard of review.

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First, the DEIS disregards data gained from actual whale mortalities. The best available scientific evidence, as reported in the peer-reviewed literature, indicates that sound levels at the most likely locations of beaked whales beached in the Bahamas strandings run far lower than the Navy's threshold for injury here: approximately 150-160 dB re 1 μPa for 50-150 seconds, over the course of the transit.[9] A further modeling effort, undertaken in part by the Office of Naval Research, suggests that the mean exposure level of beaked whales, given their likely distribution in the Bahamas' Providence Channels, was lower than 140 dB re 1 μPa.[10] (In another context, where it wishes to dismiss evidence of impacts to hearing at lower levels than its standard allows, the Navy refers to the statistical mean as "'the best unbiased estimator.'" DEIS at 4-47.) Factoring in duration, then, evidence of actual sonar-related mortalities would compel a maximum energy level ("EL") threshold for injury on the order of 182 dB re 1 μPa$^{2\bullet}$s, at least for beaked whales. The Navy's claim that no beaked whales would suffer injury because none would be exposed to levels above 215 dB re 1 μPa is simply not tenable.

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Second, the DEIS fails to take proper account of published research on bubble growth in marine mammals, which separately indicates the potential for injury and death at levels far lower than the Navy proposes. According to the best available scientific evidence, as represented by multiple papers in flagship journals such as *Nature* and *Veterinary Pathology*, gas bubble growth is the

[9] J. Hildebrand, "Impacts of Anthropogenic Sound," in T.J. Ragen, J.E. Reynolds III, W.F. Perrin, and R.R. Reeves, Conservation beyond Crisis (2005). See also International Whaling Commission, 2004 Report of the Scientific Committee, Annex K at § 6.3.

[10] J. Hildebrand, K. Balcomb, and R. Gisiner, Modeling the Bahamas Beaked Whale Stranding of March 2000 (2004) (presentation given at the third plenary meeting of the U.S. Marine Mammal Commission Advisory Committee on Acoustic Impacts on Marine Mammals, 29 July 2004).

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causal mechanism most consistent with the observed injuries;[11] in addition, it was singularly and explicitly highlighted as plausible by an expert panel convened by the Marine Mammal Commission, in which the Navy participated.[12] The Navy's argument to the contrary simply misrepresents the available literature. What is more, the default assumption in the DEIS – that whales suffer injury only through the physical act of stranding itself (or through direct tissue injury) – has been soundly rejected in the literature.[13] The Navy's refusal to consider these impacts is insupportable under NEPA. 42 C.F.R. §§ 1502.22, 1502.24.

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Third, the numbers do not reflect other non-auditory physiological impacts, as from stress and from chronic exposure during development, which are discussed further among "Other Impacts on Marine Mammals" (below).

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Fourth, the Navy's exclusive reliance on energy flux density as its unit of analysis does not take other potentially relevant acoustic characteristics into account. For example, an expert group commissioned by the Office of Naval Research in 2003 to provide recommendations on mitigation suggested that peak power may matter more to beaked whale mortalities than integrated energy.[14] Reflecting this uncertainty, the Navy should establish a dual threshold for marine mammal injury.

59

Fifth, the Navy's calculation of permanent threshold shift (which it equates to the onset on injury) is based on studies of temporary threshold shift that, as discussed below, have a number of significant limitations.

b. Hearing Loss Threshold

[11] See, e.g., A. Fernández, J.F. Edwards, F. Rodríguez, A. Espinosa de los Monteros, P. Herráez, P. Castro, J.R. Jaber, V. Martín, and M. Arbelo, 'Gas and Fat Embolic Syndrome' Involving a Mass Stranding of Beaked Whales (Family Ziphiidae) Exposed to Anthropogenic Sonar Signals, 42 Veterinary Pathology 446 (2005); P.D. Jepson, M. Arbelo, R. Deaville, I.A.P. Patterson, P. Castro, J.R. Baker, E. Degollada, H.M. Ross, P. Herráez, A.M. Pocknell, F. Rodríguez, F.E. Howie, A. Espinosa, R.J. Reid, J.R. Jaber, V. Martín, A.A. Cunningham, and A. Fernández, Gas-Bubble Lesions in Stranded Cetaceans, 425 Nature 575-576 (2003); R.W. Baird, D.L. Webster, D.J. McSweeney, A.D. Ligon, G.S. Schorr, and J. Barlow, Diving Behavior of Cuvier's (Ziphius cavirostris) and Blainville's (Mesoplodon densirostris) Beaked Whales in Hawai'i," 84 Canadian Journal of Zoology 1120-1128 (2006).

[12] T.M. Cox, T.J. Ragen, A.J. Read, E. Vos, R.W. Baird, K. Balcomb, J. Barlow, J. Caldwell, T. Cranford, L. Crum, A. D'Amico, G. D'Spain, A. Fernández, J. Finneran, R. Gentry, W. Gerth, F. Gulland, J. Hildebrand, D. Houser, T. Hullar, P.D. Jepson, D. Ketten, C.D. MacLeod, P. Miller, S. Moore, D. Mountain, D. Palka, P. Ponganis, S. Rommel, T. Rowles, B. Taylor, P. Tyack, D. Wartzok, R. Gisiner, J. Mead, and L. Benner, Understanding the Impacts of Anthropogenic Sound on Beaked Whales, 7 Journal of Cetacean Research & Management 177-87 (2006).

[13] Id.

[14] Levine, Active Sonar Waveform at 27.

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The DEIS sets its threshold for temporary hearing loss, or "threshold shift" ("TTS"), at 195 dB re 1 μPa^2•s. DEIS at 4-45. It bases this threshold primarily on a synthesis of studies on two species of cetaceans, bottlenose dolphins and beluga whales, conducted by the Navy's SPAWAR laboratory in San Diego and, to a lesser extent, by researchers at the University of Hawaii. DEIS at 4-40 to 4-41.

First, the Navy's extrapolation of data from bottlenose dolphins and belugas to all cetaceans is not justifiable. Given the close association between acoustic sensitivity and threshold shift, such an approach must presume that belugas and bottlenose dolphins have the best hearing sensitivity in the mid-frequencies of any cetacean. Yet, as noted below at subsection (c) ("Threshold for Significant Behavioral Change"), harbor porpoises and orcas are more sensitive over part of the mid-frequency range than are the two species in the SPAWAR and Hawaii studies.[15] Furthermore, the animals in the studies may not represent the full range of variation even within their own species, particularly given their age and situation (the SPAWAR animals, for example, have been housed for years in a noisy bay).[16]

Second, the small size of the data set generated by the studies leads the Navy to some arbitrary interpretations. For example, the Navy effectively excludes the results of one study that found threshold shift originating in a bottlenose dolphin at 190 re 1 μPa^2•s, which is a full 5 dB re 1 μPa^2•s below its proposed standard. DEIS at 4-42. The basis for this exclusion is the equal energy hypothesis: if you assume that the threshold for hearing loss decreases by a constant amount as the duration of a sound increases, you can fit a straight line connecting the data points that the studies have produced. Yet where the line falls can remain somewhat arbitrary given the small number of points on the chart. In this case, the Navy relied for its line-drawing on a single data point, from a single subject, lying at a distance from the main data cluster (Nachtigall et al. 2003b); alternatively, it might have dropped the line about 5 dB lower, which would have brought it closer to a second cluster, made of multiple data points from multiple subjects. See DEIS at Fig. 4.1.2.4.6-1. That choice would have fit the data just as well (perhaps better) and would have had the advantage of being marginally more conservative—yet there is no justification in the DEIS for the choice it made. The Navy's assumption of a 195 re 1 μPa^2•s EL threshold in the present DEIS, as in all documents that depend on the same methodology, is arbitrary and capricious.

c. Threshold for Significant Behavioral Change 20, 60, 61, 62, 63, 64, 65

[15] Richardson et al., Marine Mammals and Noise at 209.

[16] M.L.H. Cook, Behavioral and Auditory Evoked Potential (AEP) Hearing Measurements in Odontocete Cetaceans (2006) (Ph.D. thesis).

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The threshold used in the DEIS differs the one used by the Navy to estimate marine mammal take during RIMPAC 2006 and during subsequent major exercises off California and Hawaii. In short, instead of using an EL standard of 173 dB re 1 μPa^2•s, which NMFS had insisted the Navy adopt, the Navy rather applies a dose-response function that begins, for some species, below 145 dB re 1 µPa and reaches its mean at a point between 180 and 190 dB re 1 µPa.

The change from the current standard is significant: it substantially accounts for the modeled result of slightly over 48,000 takes from current levels of ASW sonar use (DEIS at 4-104), which while still a large number, represents far less than what the Navy would have predicted had it continued to use the previous EL-based standard of 173 re 1 μPa^2•s. Under the current standard, RIMPAC 2006 was expected to result in slightly less than 33,000 behavioral takes of marine mammals; under the proposed one, RIMPAC events conducted with the same number of hours of sonar use would supposedly cause little more than 2600 takes. DEIS at 4-129. Under the current standard, the conduct of 6 USWEX events was predicted to cause over 30,000 behavioral takes of marine mammals; under the proposed one, annual takes are expected to approach 26,000. DEIS at 4-130. Considering major exercises alone, and only those conducted under the so-called "No-Action Alternative," the difference between the two models amounts to over 34,000 takes – or more than the total number of takes projected for those two classes of events.

As the Navy should well know, agencies are not entitled to substantial deference under the Administrative Procedure Act when they reverse previously held positions. The discussion in the DEIS fails to give a complete description of the new methodology; but even within these limits, it is clear that it is deeply flawed. Among the most significant problems: 20, 60, 61, 62, 63, 64, 65

First, as a threshold matter, it is difficult, if not impossible, to comment on the Navy's methodology. The Navy fails to provide critical information, inter alia, on how its dose-function means were generated from the data; on how the standard deviations were developed; and on whether the effects of multiple pings are considered. Furthermore, as the text makes clear, the Navy remains in negotiation with NMFS over numerous elements of its methodology, including source data, means, and other aspects of the dose-response function. The Navy must provide the public and scientific community an opportunity for fully informed participation on what is plainly a core factual issue. 42 C.F.R. §§ 1502.9(a), 1503.1(a); see also, e.g., The Lands Council v. Powell, 395 F.3d 1019, 1027 (9th Cir. 2005) (citing informed public comment as one of the purposes of NEPA). Accordingly, we urge the Navy to release a supplemental EIS for public comment before finalizing the document. 60 66

Second, the Navy again relies on inapposite studies of temporary threshold shift in captive animals for its primary source of data. Marine mammal scientists have long recognized the deficiencies of using captive subjects in behavioral 61

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experiments, and to blindly rely on this material, to the exclusion of copious data on animals in the wild, is not supportable by any standard of scientific inquiry. Cf. 42 C.F.R. § 1502.22. The problem is exacerbated further by the fact that the subjects in question, roughly two belugas and five bottlenose dolphins, are highly trained animals that have been working in the Navy's research program in the SPAWAR complex for years.[17] Indeed, the disruptions observed by Navy scientists, which included pronounced, aggressive behavior ("attacking" the source) and avoidance of feeding areas associated with the exposure, occurred during a research protocol that the animals had been rigorously instructed to complete.[18]

Remarkably, the Navy cites undisclosed "public comments" as the reason for its shift in approach—ignoring the numerous comments from members of the marine biology community on the Navy's earlier North Carolina DEIS, sharply criticizing the Navy for using those studies in the first place.[19]

62 Third, the Navy ignores a substantial body of research on wild animals (and some research on other experimental animals as well, within a behavioral experimental protocol). By contrast, the record clearly demonstrates significant behavioral impacts from mid-frequency sources, including mid-frequency sonar, on a diverse range of wild species (e.g., right whales, minke whales, killer whales, harbor porpoises, Dall's porpoises) at levels that simply do not support the Navy's mean.[20] There is simply no rationale for taking a study that has little

[17] See, e.g., S.H. Ridgway, D.A. Carder, R.R. Smith, T. Kamolnick, C.E. Schlundt, and W.R. Elsberry, Behavioral Responses and Temporary Shift in Masked Hearing Threshold of Bottlenose Dolphins, Tursiops truncates, to 1-Second Tones of 141 to 201 dB re 1 μPa (1997) (SPAWAR Tech. Rep. 1751, Rev. 1).

[18] C.E. Schlundt, J.J. Finneran, D.A. Carder, and S.H. Ridgway, Temporary Shift in Masked Hearing Thresholds of Bottlenose Dolphins, Tursiops truncates, and White Whales, Delphinapterus leucas, after Exposure to Intense Tones, 107 Journal of the Acoustical Society of America 3496, 3504 (2000).

[19] See comments from M. Johnson, D. Mann, D. Nowacek, N. Soto, P. Tyack, P. Madsen, M. Wahlberg, and B. Møhl, received by the Navy on the Undersea Warfare Training Range DEIS. These comments, and those of the fishermen cited below, are hereby incorporated into this letter. See also Letter from Rodney F. Weiher, NOAA, to Keith Jenkins, Naval Facilities Engineering Command Atlantic (Jan. 30, 2006); Memo, A.R. document 51, NRDC v. Winter, CV 06-4131 FMC (JCx) (undated NOAA memorandum).

[20] See, e.g., id.; R.A. Kastelein, H.T. Rippe, N. Vaughan, N.M. Schooneman, W.C. Verboom, and D. de Haan, The Effects of Acoustic Alarms on the Behavior of Harbor Porpoises in a Floating Pen, 16 Marine Mammal Science 46 (2000); P.F. Olesiuk, L.M. Nichol, M.J. Sowden, and J.K.B. Ford, Effect of the Sound Generated by an Acoustic Harassment Device on the Relative Abundance of Harbor Porpoises in Retreat Passage, British Columbia, 18 Marine Mammal Science 843 (2002); NMFS, Assessment of Acoustic Exposures on Marine Mammals in Conjunction with USS Shoup Active Sonar Transmissions in the Eastern Strait of Juan de Fuca and Haro Strait, Washington, 5 May 2003 at 10 (2005); D.P. Nowacek, M.P. Johnson, and P.L. Tyack, North Atlantic Right Whales (Eubalaena glacialis) Ignore Ships but Respond to Alerting Stimuli, 271 Proceedings of the Royal Society of London, Part B: Biological Sciences 227 (2004); Statements of D. Bain, K. Balcomb, and R. Osborne (May 28, 2003) (taken by NMFS enforcement on Haro Strait incident); Letter from D. Bain to California Coastal

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credibility (with respect to behavioral effects) among marine mammal behaviorists, and then extrapolating its results to cover all other species—even those, like killer whales, for which other data exist—with only minor adjustments.

Fourth, any risk function must take account of the social ecology of some marine mammal species. For species that travel in tight-knit groups, an effect on certain individuals can adversely influence the behavior of the whole. (Pilot whales, for example, are prone to mass strand for precisely this reason; the plight of those 200 melon-headed whales in Hanalei Bay, and of the "J" pod of killer whales in Haro Strait, may be pertinent examples.) Should those individuals fall on the more sensitive end of the spectrum, the entire group or pod can suffer significant harm at levels below what the Navy would take as the mean. In developing any behavioral risk function, the Navy must take account of such potential indirect effects. 42 C.F.R. § 1502.16(b). 63

Fifth, the Navy's exclusive reliance on ELs in setting a behavioral threshold is misplaced. The discussion in the DEIS speaks repeatedly of uncertainty in defining the risk function and recapitulates, in its summary of the earlier methodology, the benefits implicit in the use of a criterion that takes duration into account. It is therefore appropriate for the Navy to set dual thresholds for behavioral effects, one based on ELs and one based on sound pressure levels ("SPLs"). Indeed, that is what has been recommended for NMFS' own acoustic criteria.[21] 64

Sixth, as noted below in the discussion of Cumulative Impacts, the Navy's threshold is applied in such a way as to preclude any assessment of long-term behavioral impacts on marine mammals. It does not account, to any degree, for the problem of repetition: the way that apparently insignificant impacts, such as subtle changes in dive times or vocalization patterns, can become significant if experienced repeatedly or over time.[22] 65

Commission (Jan. 9, 2007); E.C.M. Parsons, I. Birks, P.G.H. Evans, J.C.D. Gordon, J.H. Shrimpton, and S. Pooley, The Possible Impacts of Military Activity on Cetaceans in West Scotland, 14 European Research on Cetaceans 185-190 (2000); P. Kvadsheim, F. Benders, P. Miller, L. Doksaeter, F. Knudsen, P. Tyack, N. Nordlund, F.-P. Lam, F. Samarra, L. Kleivane, and O.R. Godø, Herring (Sild), Killer Whales (Spekkhogger) and Sonar – the 3S-2006 Cruise Report with Preliminary Results (2007).

[21] B. Southall, NMFS, Noise Exposure Criteria: Structure of the Matrix at sl. 5 (2004) (presentation given by NMFS' Acoustic Criteria Panel at the Third Plenary of the Marine Mammal Commission Advisory Committee on Acoustic Impacts on Marine Mammals, San Francisco, Cal., 28-30 Apr. 2004).

[22] The importance of this problem for marine mammal conservation is reflected in a recent NRC report, which calls for models that, inter alia, translate such subtle changes into disruptions in key activities like feeding and breeding that are significant for individual animals. National Research Council. Marine Mammal Populations and Ocean Noise: Determining When Noise Causes Biologically Significant Effects 35-68 (2005).

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For all these reasons, the thresholds of injury, hearing loss, and significant behavioral change utilized by the Navy in this DEIS are fundamentally inconsistent with the scientific literature on acoustic impacts, and, indeed, with marine mammal science in general, and, if used to support a Record of Decision, would violate NEPA.

2. Strandings and Mortalities Associated with Mid-Frequency Sonar

Over the last decade, the association between military active sonar and whale mortalities has become a subject of considerable scientific interest and concern. That interest is reflected in the publication of numerous papers in peer-reviewed journals, in reports by inter-governmental bodies such as the IWC's Scientific Committee, and in evidence compiled from a growing number of mortalities associated with sonar.

In March 2000, for example, sixteen whales from at least three species— including two minke whales—stranded over 150 miles of shoreline along the northern channels of the Bahamas. The beachings occurred within 24 hours of Navy ships using mid-frequency sonar (AN/SQS-53C and AN/SQS-56) in those same channels.[23] Post-mortem examinations found, in all whales examined, hemorrhaging in and around the ears and other tissues related to sound conduction or production, such as the larynx and auditory fats, some of which was debilitative and potentially severe.[24] It is now accepted that these mortalities were caused, through an unknown mechanism, by the Navy's use of mid-frequency sonar.

The Bahamas event is one of numerous strandings coincident with military activities and active sonar that have now been documented:[25]

(1) Canary Islands 1985-1991 – Between 1985 and 1989, at least three separate mass strandings of beaked whales occurred in the Canary Islands, as reported in Nature.[26] Thirteen beaked whales of two species were killed in the February 1985 strandings, six whales of three species stranded in November 1988, and some twenty-four whales of three species stranded in October 1989—all while naval vessels were conducting exercises off shore.[27] An additional stranding of

[23] Commerce and Navy, Joint Interim Report at iii, 16.

[24] Id.

[25] The following is not a complete list, as other relevant events have been reported in Bonaire, Japan, Taiwan, and other locations. See, e.g., R.L. Brownell, Jr., T. Yamada, J.G. Mead, and A.L. van Helden, Mass Strandings of Cuvier's Beaked Whales in Japan: U.S. Naval Acoustic Link? (2004) (IWC SC/56E37); J.Y. Wang and S.-C. Yang, Unusual Cetacean Stranding Events of Taiwan in 2004 and 2005, 8 Journal of Cetacean Research and Management 283-292 (2006); P.J.H. van Bree and I. Kristensen, On the Intriguing Stranding of Four Cuvier's Beaked Whales, Ziphius cavirostris, G. Cuvier, 1823, on the Lesser Antillean Island of Bonaire, 44 Bijdragen tot de Dierkunde 235-238 (1974).

[26] M. Simmonds and L.F. Lopez-Jurado, Whales and the Military, 337 Nature 448 (1991).

[27] Id.

Cuvier's beaked whales, also coinciding with a naval exercise, occurred in 1991.[28] It was reported that mass live strandings occurred each time exercises took place in the area.[29]

(2) Greece 1996, 1997 – In 1996, twelve Cuvier's beaked whales stranded along 35 kilometers on the west coast of Greece. The strandings were correlated, by an analysis published in Nature, with the test of a low- and mid-frequency active sonar system operated by NATO.[30] A subsequent NATO investigation found the strandings to be closely timed with the movements of the sonar vessel, and ruled out all other physical environmental factors as a cause.[31] The following year saw nine additional Cuvier's beaked whales strand off Greece, again coinciding with naval activity.[32]

(3) Virgin Islands 1999 – In October 1999, four beaked whales stranded in the U.S. Virgin Islands as the Navy began an offshore exercise. A wildlife official from the Islands reported the presence of "loud naval sonar."[33] When NMFS asked the Navy for more information about its exercise, the Department's response was to end the consultation that it had begun for the exercise under the Endangered Species Act.[34] In January 1998, according to a NMFS biologist, a beaked whale "stranded suspiciously" at Vieques as naval exercises were set to commence offshore.[35]

(4) Bahamas 2000 – As described above.

(5) Madeira 2000 -- In May 2000, four beaked whales stranded on the beaches of Madeira while several NATO ships were conducting an exercise near shore. Scientists investigating the stranding found that the whales' injuries—including

[28] V. Martín, A. Servidio, and S. Garcia, Mass Strandings of Beaked Whales in the Canary Islands, in P.G.H. Evans and L.A. Miller, Proceedings of the Workshop on Active Sonar and Cetaceans 33-36 (2004).

[29] Simmonds and Lopez-Jurado, Whales and the Military, 337 Nature at 448.

[30] A. Frantzis, Does Acoustic Testing Strand Whales? 392 Nature 29 (1998).

[31] See SACLANT Undersea Research Center, Summary Record, La Spezia, Italy, 15-17 June 1998, SACLANTCEN Bioacoustics Panel, SACLANTCEN M-133 (1998).

[32] Id.; A. Frantzis, The First Mass Stranding That Was Associated with the Use of Active Sonar (Kyparissiakos Gulf, Greece, 1996), in P.G.H. Evans and L.A. Miller, Proceedings of the Workshop on Active Sonar and Cetaceans 14-20 (2004).

[33] Personal communication of Dr. David Nellis, U.S. Virgin Island Department of Fish and Game, to Eric Hawk, NMFS (Oct. 1999); personal communication from Ken Hollingshead, NMFS, to John Mayer, Marine Acoustics Inc. (March 19, 2002).

[34] Letter from William T. Hogarth, Regional Administrator, NMFS Southeast Regional Office, to RADM J. Kevin Moran, Navy Region Southeast (undated); personal communication from Ken Hollingshead, NMFS, to John Mayer, Marine Acoustics Inc. (March 19, 2002).

[35] Personal communication from Eric Hawk, NMFS, to Ken Hollingshead, NMFS (Feb. 12, 2002).

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"blood in and around the eyes, kidney lesions, pleural hemorrhage"—and the pattern of their stranding suggest "that a similar pressure event [*i.e.*, similar to that at work in the Bahamas] precipitated or contributed to strandings in both sites."[36]

(6) Canary Islands 2002 – In September 2002, at least fourteen beaked whales from three different species stranded in the Canary Islands. Four additional beaked whales stranded over the next several days.[37] The strandings occurred while a Spanish-led naval exercise that included U.S. Navy vessels and at least one ship equipped with mid-frequency sonar was conducting anti-submarine warfare exercises in the vicinity.[38] The subsequent investigation, as reported in the journals Nature and Veterinary Pathology, revealed a variety of traumas, including emboli and lesions suggestive of decompression sickness.[39]

(7) Washington 2003 – In May 2003, the U.S. Navy vessel USS Shoup was conducting a mid-frequency sonar exercise while passing through Haro Strait, off the coast of Washington. According to one contemporaneous account, "[d]ozens of porpoises and killer whales seemed to stampede all at once . . . in response to a loud electronic noise echoing through" the Strait.[40] Several field biologists present at the scene reported observing a pod of endangered orcas bunching near shore and engaging in very abnormal behavior consistent with avoidance, a minke whale "porpoising" away from the sonar ship, and harbor porpoises fleeing the vessel in large numbers.[41] Eleven harbor porpoises—an abnormally high number given the average stranding rate of six per year—were found beached in the area of the exercise.[42]

[36] D.R. Ketten, Beaked Whale Necropsy Findings 22 (2002) (paper submitted to NMFS); L. Freitas, The Stranding of Three Cuvier's Beaked Whales Ziphius Cavirostris in Madeira Archipelago—May 2000, in P.G.H. Evans and L.A. Miller, Proceedings of the Workshop on Active Sonar and Cetaceans 28-32 (2004).

[37] Vidal Martin et al., Mass Strandings of Beaked Whales in the Canary Islands, in Proceedings of the Workshop on Active Sonar and Cetaceans 33 (P.G.H. Evans & L.A. Miller eds., 2004); Fernández et al., 'Gas and Fat Embolic Syndrome', 42 Veterinary Pathology at 446-57.

[38] Fernández et al., 'Gas and Fat Embolic Syndrome', 42 Veterinary Pathology at 446; K.R. Weiss, Whale Deaths Linked to Navy Sonar Tests, L.A. Times, Oct. 1, 2002, at A3.

[39] Fernández et al., 'Gas and Fat Embolic Syndrome', 42 Veterinary Pathology at 446-57; Jepson et al., Gas-Bubble Lesions, 425 Nature at 575-76.

[40] Christopher Dunagan, Navy Sonar Incident Alarms Experts, Bremerton Sun, May 8, 2003.

[41] NMFS, Assessment of Acoustic Exposures at 6, 9.

[42] NMFS, Preliminary Report: Multidisciplinary Investigation of Harbor Porpoises (Phocoena phocoena) Stranded in Washington State from 2 May – 2 June 2003 Coinciding with the Mid-Range Sonar Exercises of the USS Shoup 53-55 (2004) (conclusions unchanged in final report). Unfortunately, according to the report, freezer artifacts and other problems incidental to the preservation of tissue samples made the cause of death in most specimens difficult to determine; but the role of acoustic trauma could not be ruled out. Id.

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(8) Alaska 2004 – In June 2004, six beaked whales were found stranded along the Gulf of Alaska, on the state's southern coast. The strandings coincided with a U.S. naval exercise called Northern Edge.[43]

(9) Kauai 2004 – During the Navy's conduct of a major training exercise off Hawaii, called RIMPAC 2004, some 150-200 whales from a species that is rarely seen near shore and had never naturally mass-stranded in Hawaii came into Hanalei Bay, on the island of Kaua'i. The whales crowded into the shallow bay waters and milled there for over 28 hours. Though the whales were ultimately assisted into deeper waters by members of a local stranding network, one whale calf was left behind and found dead the next day. NMFS undertook an investigation of the incident and concluded that the Navy's nearby use of sonar in RIMPAC 2004 was the "plausible, if not likely" cause of the stranding.[44]

(10) Canary Islands 2004 – In July 2004, four dead beaked whales were found around the coasts of the Canary Islands, within one week of an NATO exercise. The exercise, Majestic Eagle 2004, was conducted approximately 100 kilometers north of the Canaries. Although the three whale bodies that were necropsied were too decomposed to allow detection of gas embolisms (see below), systematic fat embolisms were found in these animals.[45] The probability that the whales died at sea is extremely high.[46]

(11) North Carolina 2005 – During and just after a U.S. training exercise off North Carolina, at least thirty-seven whales of three different species stranded and died along the Outer Banks, including numerous pilot whales (six of which were pregnant), one newborn minke whale, and two dwarf sperm whales. NMFS investigated the incident and found that the event was highly unusual, being the only mass stranding of offshore species ever to have been reported in the region, and that it shared 'a number of features' with other sonar-related mass stranding events (involving offshore species which stranded alive and were

[43] S.E. Moore and K.M. Stafford, Habitat Modeling, Ambient Noise Budgets, and Acoustic Detection of Cetaceans in the North Pacific and Gulf of Alaska sl. 27-28 (2005) (presentation given at ECOUS 2005, Office of Naval Research, 16-18 Mar. 2005).

[44] B.L. Southall, R. Braun, F.M.D. Gulland, A.D. Heard, R.W. Baird, S.M. Wilkin, and T.K. Rowles, Hawaiian Melon-Headed Whale (Peponacephala electra) Mass Stranding Event of July 3-4, 2004 (2006) (NOAA Tech. Memo. NMFS-OPR-31).

[45] A. Espinosa, M. Arbelo, P. Castro, V. Martín, T. Gallardo, and A. Fernández, New Beaked Whale Mass Stranding in Canary Islands Associated with Naval Military Exercises (Majestic Eagle 2004) (2005) (poster presented at the European Cetacean Society Conference, La Rochelle, France, April 2005); A. Fernández, M. Méndez, E. Sierra, A. Godinho, P. Herráez, A. Espinosa de los Monteros, F. Rodríguez, F., and M. Arbelo, M., New Gas and Fat Embolic Pathology in Beaked Whales Stranded in the Canary Islands (2005) (poster presented at the European Cetaecan Society Conference, La Rochelle, France, April 2005).

[46] Id.

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atypically distributed along the shore). NMFS concluded that sonar was a possible cause of the strandings and also ruled out the most common other potential causes, including viral, bacterial, and protozoal infection, direct blunt trauma, and fishery interactions.[47]

(12) Spain 2006 – Four Cuvier's beaked whales stranded on the Almerian coast of southern Spain, with the same suite of bends-like pathologies seen in the whales that stranded in the Canary Islands in 2002 and 2004.[48] A NATO response force was performing exercises within 50 miles at the time of the strandings. DEIS at 4-91.

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Some preliminary observations can be drawn from these incidents. For example, beaked whales, a group of deep-water species that are seldom seen and may in some cases be extremely rare, seem to be particularly vulnerable to the effects of active sonar. A 2000 review undertaken by the Smithsonian Institution, and reported and expanded by the IWC's Scientific Committee and other bodies, supports this conclusion, finding that every mass stranding on record involving multiple species of beaked whales has occurred with naval activities in the vicinity.[49] Indeed, it is not even certain that some beaked whales naturally strand in numbers.

But the full magnitude of sonar's effects on these species—or on other marine mammals—is not known. Most of the world lacks networks to identify and investigate stranding events, particularly those that involve individual animals spread out over long stretches of coastline, and therefore the mortalities that have been identified thus far are likely to represent only a subset of a substantially larger problem. For example, most Cuvier's beaked whale casualties (according to NMFS) are bound to go undocumented because of the remote siting of sonar exercises and the small chance that a dead or injured animal would actually strand.[50] In conservation biology

Furthermore, although the physical process linking sonar to strandings is not perfectly understood, the record indicates that debilitating, possibly lethal injuries are occurring in whales exposed to sonar at sea—only some of which may then strand. As first reported in the journal *Nature*, animals that came ashore during

[47] A.A. Hohn, D.S. Rotstein, C.A. Harms, and B.L. Southall, Multispecies Mass Stranding of Pilot Whales (Globicephala macrorhynchus), Minke Whale (Balaenoptera acutorostrata), and Dwarf Sperm Whales (Kogia sima) in North Carolina on 15-16 January 2005 (2006) (NOAA Tech. Memo. NMFS-SEFSC-53).

[48] International Whaling Commission, Report of the Scientific Committee, Annex K at 28 (2006) (IWC/58/Rep1).

[49] Marine Mammal Program of the National Museum of Natural History, Historical Mass Mortalities of Ziphiids 2-4 (Apr. 6, 2000); see also 2 J. Cetacean Res. & Mgmt., Supp., Annex J at § 13.8 (2000) (report of the IWC Scientific Committee, Standing Working Group on Environmental Concerns).

[50] J.V. Carretta, K.A. Forney, M.M. Muto, J. Barlow, J. Baker, and M. Lowry, U.S. Pacific Marine Mammal Stock Assessments: 2006 (2007).

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sonar exercises off the Canary Islands, in September 2002, had developed large emboli in their organ tissue and suffered from symptoms resembling those of severe decompression sickness, or "the bends."[51] It has been proposed that the panic led them to surface too rapidly or because it pushed them to dive before they could eliminate the nitrogen accumulated on previous descents, or because the sound itself precipitated the growth of nitrogen bubbles in the blood, which expanded to devastating effect. This finding has since been supported by follow-on papers, by published work in other fields, and by expert reviews.[52] In any case, the evidence is considered "compelling" that acoustic trauma, or injuries resulting from behavioral responses, has in some way led to the deaths of many of these animals.[53]

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In this light, the Navy's assessment of the risk of marine mammal injury and mortality is astonishingly poor. Despite the presence of several beaked whale species, including Cuvier's beaked whales, within the exercise area, and despite the recognition that has been paid to Hawaii as a global beaked whale hotspot,[54] the DEIS assumes away the potential for strandings and injuries of beaked whales.

In its analysis, the Navy capriciously (1) denies the potential for beaked whale mortalities during the myriad training and testing activities on the HRC; (2) dismisses the potential for sonar to injure whales at sea, mischaracterizing the literature; (3) insists that beaked whale mortality cannot occur absent five "contributory factors" present during the Bahamas 2000 mass strandings in the Bahamas; (4) fails to consider the potential for strandings and mortalities in other species of cetaceans, (5) fails even to consider the larger set of stranding events that have been linked to sonar use or naval exercises, and (6) analyzes the 2004 Hanalei Bay strandings in a manner that is wholly inconsistent with NMFS' technical report.[55] As discussed elsewhere in this letter, NMFS' own analysis is problematic primarily in its conclusions about the injury threshold and in its treatment of the

[51] See P.D. Jepson, M. Arbelo, R. Deaville, I.A.P. Patterson, P. Castro, J.R. Baker, E. Degollada, H.M. Ross, P. Herráez, A.M. Pocknell, F. Rodríguez, F.E. Howie, A. Espinosa, R.J. Reid, J.R. Jaber, V. Martín, A.A. Cunningham, A. Fernández, Gas-Bubble Lesions in Stranded Cetaceans, 425 Nature 575-576 (2003); Fernández et al., 'Gas and Fat Embolic Syndrome', 42 Veterinary Pathology at 415.

[52] Cox et al., Understanding the Impacts. For additional papers, see also the studies referenced at section II(B)(1)(a) ("Injury Threshold"). Of course it would be a mistake to assume that an animal must suffer bends-like injury or some other sort of acoustic trauma in order to strand. Some may die simply because the noise disorients them, for instance. See, e.g., NMFS, Assessment of Acoustic Exposures at 9-10.

[53] Cox et al., Understanding the Impacts; see also P.G.H. Evans and L.A. Miller, Concluding Remarks, in Proceedings of the Workshop on Active Sonar and Cetaceans 74 (2004); K.C. Balcomb and D.E. Claridge, A Mass Stranding of Cetaceans Caused by Naval Sonar in the Bahamas, 8(2) Bahamas Journal of Science 1 (2001); D.E. Claridge, Fine-Scale Distribution and Habitat Selection of Beaked Whales (2006) (M.Sc. thesis).

[54] C. MacLeod, Insights into the Determination of Beaked Whale Hotspots through the Development of a Global Database (2003) (presentation given at the Conference on the Environmental Consequences of Underwater Sound, San Antonio, Texas, 12-16 May 2003).

[55] For a detailed discussion, see NRDC Comment Letter at 18-33.

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potential for injury at sea (71 Fed. Reg. 20995, 21002), which do not reflect the best available science and violate NEPA. 42 C.F.R. § 1502.22 (requiring agencies to evaluate all "reasonably foreseeable" impacts).

3. Modeling of Acoustic Impacts

The Navy bases its calculation of marine mammal impacts on a series of models. Its CASS/GRAB model determines received levels of sound within a limited distance of a sonar array; its MATLAB model converts those received levels into energy levels; its MMEM model translates the Navy's energy levels into a graph of where marine mammal "take" will occur; and its Take Estimation Model calculates the number of animals (and therefore the number of "takes") within the area of harm. In other words, the models estimate the amount of energy received at each point (or "cell") within the immediate area of an exercise and then estimate the number of animals that would therefore suffer injury or disruption.

It is difficult to fully gauge the accuracy and rigor of these models with the paucity of information that the DEIS provides. But even from the limited description in the RSPEA, it is clear that they are deeply flawed. Among the non-conservative assumptions that are implicit in the model: 24

(1) As discussed above, the thresholds established for injury, hearing loss, and significant behavioral change are inconsistent with the available data and are based, in part, on assumptions not acceptable within the field.

(2) The Navy does not properly account for reasonably foreseeable reverberation effects (as in the Haro Strait incident),[56] giving no indication that its modeling sufficiently represents areas in which the risk of reverberation is greatest;

(3) The Navy does not appear to have modeled for surface ducting, a reasonably foreseeable event that can significantly enhance propagation in the upper layers of the water column and that seems to have occurred during the 2004 mass stranding in Hanalei Bay;

(4) The Navy's modeling excludes most of the active acoustic systems that it plans to use during training and testing events, such as some forms of dipping sonar, certain active sonobuoys, some torpedoes, acoustic device countermeasures, training targets, and range sources;

(5) The model fails to consider the possible synergistic effects of using multiple sources, such as ship-based sonars, in the same exercise, which can significantly alter the sound field, and fails to consider the combined effects of multiple

[56] NMFS, Assessment of Acoustic Exposures on Marine Mammals in Conjunction with USS Shoup Active Sonar Transmissions in the Eastern Strait of Juan de Fuca and Haro Strait, Washington, 5 May 2003 (2005).

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exercises, which, as NMFS indicates, may have played a role in the 2004 Hanalei Bay strandings;[57]

(6) The Navy's analysis of marine mammal distribution and abundance does not incorporate recent data (discussed below) that suggests greater densities and smaller population sizes for certain species; and

(7) The model, in assuming that every whale encountered during subsequent exercises is essentially a new whale, does not address cumulative impacts on the breeding, feeding, and other activities of species and stocks.

4. Other Impacts on Marine Mammals

As the Navy's conceptual impact model suggests, the training and testing activities proposed for the HRC can have impacts that are not limited to the overt physiological and behavioral effects of ocean noise. Unfortunately, the Navy's analysis of most of these other impacts is cursory and inadequate.

(1) The Navy fails to adequately assess the impact of "stress" on marine mammals, a serious problem for animals exposed even to moderate levels of sound for extended periods.[58] As the Navy observed, stress from ocean noise—alone or in combination with other stressors, such as biotoxins—may weaken a cetacean's immune system, making it "more vulnerable to parasites and diseases that normally would not be fatal." DEIS at 5-19 to 5-20.[59] And one might add, following studies on terrestrial mammals, that chronic noise can interfere with brain development, increase the risk of myocardial infarctions, depress reproductive rates, cause malformations and other defects in young—all at moderate levels of exposure, well below the Navy's absolute thresholds of harm.[60] Because physiological stress responses are highly conservative across species, it is reasonable to assume that marine mammals would be subject to the same effects, particularly—as appears to be the case here—if they are resident animals exposed repeatedly to a variety of stressors on the range. Yet despite the potential for stress in marine mammals and the significant consequences that can flow from it, the Navy assumes that such effects would be minimal. 25

[57] Southall et al., Hawaii Melon-Headed Whale at 31, 45.

[58] See National Research Council, Ocean Noise and Marine Mammals.

[59] Some additional evidence relevant to the problem of stress in marine mammals is summarized in T.A. Romano, M.J. Keogh, C. Kelly, P. Feng, L. Berk, C.E. Schlundt, D.A. Carder, and J.J. Finneran, Anthropogenic Sound and Marine Mammal Health: Measures of the Nervous and Immune Systems Before and After Intense Sound Exposure, 61 Canadian Journal of Fisheries and Aquatic Sciences 1124, 1130-31 (2004).

[60] See, e.g., E.F. Chang and M.M. Merzenich, Environmental Noise Retards Auditory Cortical Development, 300 Science 498 (2003) (rats); S.N. Willich, K. Wegscheider, M. Stallmann, and T. Keil, Noise Burden and the Risk of Myocardial Infarction, European Heart Journal (2005) (Nov. 24, 2005) (humans); F.H. Harrington and A.M. Veitch, Calving Success of Woodland Caribou Exposed to Low-Level Jet Fighter Overflights, 45 Arctic vol. 213 (1992) (caribou).

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(2) The Navy fails to consider the risk of ship collisions with large cetaceans, which is only exacerbated by the use of active acoustics. Right whales have been shown to engage in dramatic surfacing behavior, increasing their vulnerability to ship strikes, on exposure to mid-frequency alarms above 133 dB re 1 µPa—a level of sound that can occur many tens of miles away from the sonar systems slated for the range.[61] It should be assumed that other large whales, including humpbacks, are subject to the same hazard.

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(3) In the course of its activities, the Navy would release a host of toxic chemicals into the marine environment that could pose a threat to local wildlife over the life of the range. Nonetheless, while there is some brief discussion of potential impacts on human health and safety, the DEIS generally fails to consider the cumulative impacts of these toxins on marine mammals, from past, current, and proposed exercises. Careful study is needed into the way they might disperse and circulate around the islands and how they may affect marine wildlife. The Navy's analysis of hazardous materials is therefore incomplete.

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(4) Finally, the Navy's analysis cannot be limited only to direct effects, i.e., effects that occur at the same time and place as the exercises that would be authorized. See id. § 1508.8(a). It must also take into account the activity's indirect effects, which, though reasonably foreseeable, may occur later in time or at a farther remove. See id. § 1508.8(b). This requirement is particularly critical in the present case given the potential of sonar exercises to cause significant long-term impacts not clearly observable in the short or immediate term (a serious problem, as the National Research Council has observed).[62] Thus, for example, the Navy must not only evaluate the potential for mother-calf separation but also the potential for indirect effects—on survivability—that might arise from that transient change. 42 C.F.R. § 1502.16(b).

C. Impacts on Fish and Fisheries

Though the architecture of their ears may differ, fish are equipped, like all vertebrates, with thousands of sensory hair cells that vibrate with sound; and a number of specialized organs like the abdominal sac, called a "swim bladder," that some species possess can boost hearing. Fish use sound in many of the ways that marine mammals do: to communicate, defend territory, avoid predators, and, in

[61] Nowacek et al., North Atlantic Right Whales, 271 Proceedings of the Royal Society of London, Part B: Biological Sciences at 227.

[62] "Even transient behavioral changes have the potential to separate mother-offspring pairs and lead to death of the young, although it has been difficult to confirm the death of the young." National Research Council, Ocean Noise and Marine Mammals at 96.

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some cases, locate prey.[63] Increasing concern from fishermen and fisheries managers has led to

One series of recent studies showed that passing airguns can severely damage the hair cells of fish (the organs at the root of audition) either by literally ripping them from their base in the ear or by causing them to "explode."[64] Fish, unlike mammals, are thought to regenerate hair cells, but the pink snapper in those studies did not appear to recover within approximately two months after exposure, leading researchers to conclude that the damage was permanent.[65] It is not clear which elements of the sound wave contributed to the injury, or whether repetitive exposures at low amplitudes or a few exposures at higher pressures, or both, were responsible.[66] As with marine mammals, sound has also been shown to induce temporary hearing loss. Even at fairly moderate levels, noise from outboard motor engines is capable of temporarily deafening some species of fish, and other sounds have been shown to affect the short-term hearing of a number of other species, including sunfish and tilapia.[67] For any fish that is dependent on sound for predator avoidance and other key functions, even a temporary loss of hearing (let alone the virtually permanent damage seen in snapper) will substantially diminish its chance of survival.[68]

Nor is hearing loss the only effect that ocean noise can have on fish. For years, fisheries in various parts of the world have complained about declines in their catch after intense acoustic activities (including naval exercises) moved into the area, suggesting that noise is seriously altering the behavior of some commercial species.[69] A group of Norwegian scientists attempted to document these declines in

[63] See, e.g., A.N. Popper, Effects of Anthropogenic Sounds on Fishes, 28(10) Fisheries 26-27 (2003); M.C. Hastings & A.N. Popper, Effects of Sound on Fish 19 (2005) (Report to the California Department of Transportation, Contract No. 43A0139), p., 19; D.A. Croll, Marine Vertebrates and Low Frequency Sound—Technical Report for LFA EIS 1-90 (1999).

[64] R. McCauley, J. Fewtrell, and A.N. Popper, High Intensity Anthropogenic Sound Damages Fish Ears, 113 Journal of the Acoustical Society of America 640 (2003).

[65] Id. at 641 (some fish in the experimental group sacrificed and examined 58 days after exposure).

[66] Id.

[67] A.R. Scholik and H.Y. Yan, Effects of Boat Engine Noise on the Auditory Sensitivity of the Fathead Minnow, Pimephales promelas, 63 Environmental Biology of Fishes 203-09 (2002); A.R. Scholik and H.Y. Yan, The Effects of Noise on the Auditory Sensitivity of the Bluegill Sunfish, Lepomis macrochirus, 133 Comparative Biochemisty and Physiology Part A at 43-52 (2002); M.E. Smith, A.S. Kane, & A.N. Popper, Noise-Induced Stress Response and Hearing Loss in Goldfish (Carassius auratus), 207 Journal of Experimental Biology 427-35 (2003); Popper, Effects of Anthropogenic Sounds at 28.

[68] See Popper, Effects of Anthropogenic Sounds at 29; McCauley et al., High Intensity Anthropogenic Sound Damages Fish Ears, at 641.

[69] See "'Noisy' Royal Navy Sonar Blamed for Falling Catches," Western Morning News, Apr. 22, 2002 (sonar off the U.K.); Percy J. Hayne, President of Gulf Nova Scotia Fleet Planning Board, "Coexistence of the Fishery & Petroleum Industries," www.elements.nb.ca/theme/fuels/percy/hayne.htm (accessed May 15, 2005) (airguns off Cape Breton); R.D. McCauley, J. Fewtrell, A.J. Duncan, C. Jenner, M.-N. Jenner, J.D. Penrose, R.I.T. Prince, A. Adhitya, J. Murdoch, and K. McCabe, Marine Seismic Surveys:

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a Barents Sea fishery and found that catch rates of haddock and cod (the latter known for its particular sensitivity to low-frequency sound) plummeted in the vicinity of an airgun survey across a 1600-square-mile area, an area three times the size of the proposed USWTR range and larger than the state of Rhode Island; in another experiment, catch rates of rockfish were similarly shown to decline.[70] Drops in catch rates in these experiments range from 40 to 80 percent.[71] A variety of other species, herring, zebrafish, pink snapper, and juvenile Atlantic salmon, have been observed to react to various noise sources with acute alarm.[72]

In their comments on the Navy's DEIS for the proposed Undersea Warfare Training Range, off North Carolina, several fishermen and groups of fishermen independently reported witnessing sharp declines in catch rates of various species when in the vicinity of Navy exercises.[73] These reports are indicative of behavioral changes, such as a spatial redistribution of fish within the water column, that could affect marine mammal foraging as well as human fisheries. In addition, as NMFS itself has observed, the use of mid-frequency sonar could affect the breeding behavior of certain species, causing them, for example, to cease their spawning choruses, much as certain echolocation signals do.[74] The repetitive use of sonar and other active acoustics could have significant adverse behavioral effects on some species of fish and those who depend on them.

Finally, high mortalities from noise exposure seen in developmental stages of fish. A number of studies, including one on non-impulsive noise, show that intense sound can kill eggs, larvae, and fry outright or retard their growth in ways that may hinder their survival later.[75] Significant mortality for fish eggs has been shown to occur at

Analysis and Propagation of Air-Gun Signals, and Effects of Air-Gun Exposure on Humpback Whales, Sea Turtles, Fishes, and Squid 185 (2000) (airguns in general).

[70] A. Engås, S. Løkkeborg, E. Ona, and A.V. Soldal, Effects of Seismic Shooting on Local Abundance and Catch Rates of Cod (Gadus morhua) and Haddock (Melanogrammus aeglefinus), 53 Canadian Journal of Fisheries and Aquatic Sciences 2238-49 (1996); J.R. Skalski, W.H. Pearson, and C.I. Malme, Effects of Sound from a Geophysical Survey Device on Catch-Per-Unit-Effort in a Hook-and-Line Fishery for Rockfish (Sebastes spp.), 49 Canadian Journal of Fisheries and Aquatic Sciences 1357-65 (1992). See also S. Løkkeborg and A.V. Soldal, The Influence of Seismic Exploration with Airguns on Cod (Gadus morhua) Behaviour and Catch Rates, 196 ICES Marine Science Symposium 62-67 (1993).

[71] Id.

[72] See J.H.S. Blaxter and R.S. Batty, The Development of Startle Responses in Herring Larvae, 65 Journal of the Marine Biological Association of the U.K. 737-50 (1985); F.R. Knudsen, P.S. Enger, and O. Sand, Awareness Reactions and Avoidance Responses to Sound in Juvenile Atlantic Salmon, Salmo salar L., 40 Journal of Fish Biology 523-34 (1992); McCauley et al., Marine Seismic Surveys at 126-61.

[73] See comments compiled by the Navy and posted on the Undersea Warfare Training Range EIS site.

[74] Letter from Miles M. Croom, NMFS Southeast Regional Office, to Keith Jenkins, Navy (Jan. 31, 2006); see also J.J. Luczkovich, "Potential Impacts of the U.S. Navy's Proposed Undersea Warfare Training Range on Fishes" (2006) (presentation to Navy).

[75] See, e.g., C. Booman, J. Dalen, H. Leivestad, A. Levsen, T. van der Meeren, and K. Toklum, Effecter av luftkanonskyting på egg, larver og yngel (Effects from Airgun Shooting on Eggs, Larvae, and Fry), 3 Fisken og Havet 1-83 (1996) (Norwegian with English summary); J. Dalen and G.M. Knutsen, Scaring

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distances of 5 meters from an airgun source; mortality rates approaching 50 percent affected yolksac larvae at distances of 2 to 3 meters.[76] Also, larvae in at least some species are known to use sound in selecting and orienting toward settlement sites.[77] Acoustic disruption at that stage of development could have significant consequences.[78]

The Navy capriciously dismisses the potential for significant adverse impacts on fish. First, while admitting that mid-frequency sonar can cause significant injury at distances of hundreds of feet, and noting (with reference to Norwegian studies) that "some sonar levels have been shown to be powerful enough to cause injury to particular size classes of juvenile herring from the water's surface to the seafloor," the Navy claims that Hawaiian populations would not suffer significant impacts. DEIS at 4-15. For this conclusion, it offers only a single, qualitative statement (e.g., noting that sound sources would be moving, reducing exposure), unsupported by modeling or any specific consideration of Hawaii's fish populations. 29

Second, while admitting that mid-frequency noise can alter behavior, the DEIS argues that fish are less responsive to mid-frequency than to low- and high-frequency sounds. DEIS at 4-14 to 4-15. For this proposition, it improperly relies entirely on two studies on acoustic deterrent devices, otherwise known as "pingers": a technology used in some American fisheries to ward harbor porpoises and certain other marine mammals away from gillnets. Id. Not only do the deterrents featured in the two papers differ from the Navy's mid-frequency tactical sonar, presenting a different wave form and operating at a source level literally billions of times less intense (130 dB versus 235 dB re 1 μPa); but, in at least one of the studies, it actually altered the behavior of the fish, drawing them into the gillnet for reasons that are not explored.[79] Of course, it is more parsimonious to assume that mid-frequency sound can induce similar kinds of behavioral change.

The Navy must rigorously analyze the potential for behavioral, auditory, and physiological impacts on fish, including the potential for population-level effects, using models of fish distribution and population structure and conservatively estimating areas of impact from the available literature. 42 C.F.R. § 1502.22.

Effects on Fish and Harmful Effects on Eggs, Larvae and Fry by Offshore Seismic Explorations, in H.M. Merklinger, Progress in Underwater Acoustics 93-102 (1987); A. Banner and M. Hyatt, Effects of Noise on Eggs and Larvae of Two Estuarine Fishes, 1 Transactions of the American Fisheries Society 134-36 (1973); L.P. Kostyuchenko, Effect of Elastic Waves Generated in Marine Seismic Prospecting on Fish Eggs on the Black Sea, 9 Hydrobiology Journal 45-48 (1973).

[76] Booman et al., Effecter av luftkanonskyting på egg, larver og yngel at 1-83.

[77] S.D. Simpson, M. Meekan, J. Montgomery, R. McCauley, R., and A. Jeffs, Homeward Sound, 308 Science 221 (2005).

[78] Popper, Effects of Anthropogenic Sounds at 27.

[79] B.M. Culik, S. Koschinski, N. Tregenza, and G.M. Ellis, Reactions of Harbor Porpoises Phocoena phocoena and Herring Clupea harengus to Acoustic Alarms, 211 Marine Ecology Progress Series 255, 258 (2001).

30 Having concluded—without basis—that mid-frequency sonar would have no significant impact on fish and fish habitat, the Navy dismisses the notion that fisheries in the area would suffer economic loss. But, just as in North Carolina, the available evidence underscores the need for a more serious and informed analysis than the DEIS currently provides. The Navy must assess the economic consequences of reduced catch rates on Hawaii's commercial and recreational fisheries and on marine mammal foraging.[80]

D. Other Impacts on Marine Wildlife

31 The Navy's current and proposed activities pose risks to marine wildlife beyond ocean noise: injury or death from live ordnance, entanglement in cables and detritus, collisions with ships, bioaccumulation of toxins, and the like. Indeed, many of the same concerns that apply to marine mammals (and are discussed above) apply to fish, sea turtles, and other biota as well. The Navy must evaluate impacts and propose mitigation for each category of harm. 42 C.F.R. §§ 1502.14, 1502.16.

E. Cumulative Impacts

In order to satisfy NEPA, an EIS must include a "full and fair discussion of significant environmental impacts." 40 C.F.R. § 1502.1. It is not enough, for purposes of this discussion, to consider the proposed action in isolation, divorced from other public and private activities that impinge on the same resource; rather, it is incumbent on the Navy to assess cumulative impacts as well, including the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future significant actions." Id. § 1508.7. 32 Thus, for example, it will be necessary to consider the impacts of the proposed exercise alongside those of other activities in the region, including industrial and commercial activities such as fishing, shipping, and coastal development.

33 As it stands, the Navy says little more than that the behavioral harassment it predicts for the exercise would necessarily be short-term in nature and therefore would not affect

[80] Sea turtles are also effectively excluded from further analysis of acoustic impacts on the grounds that their best hearing range appears to occur below 1 kHz. DEIS at 4-20 to 4-21. But having their best acoustic sensitivity in this range does not mean that sea turtles are oblivious to noise at higher frequencies. Juvenile loggerheads, for example, have their best sensitivity at frequencies all the way up to 1 kHz, suggesting that they continue to detect sounds at higher levels, including potentially the lower end of the intense mid-frequency sources intended for the range. S.M. Bartol, J.A. Musick, and M. Lenhardt, Auditory Evoked Potentials of the Loggerhead Sea Turtle (Caretta caretta), 99 Copeia 836 (1999). Furthermore, they have been shown to engage in startle and escape behavior—behavior that may involve diving and surfacing—and to experience heightened stress in response to vessel noise, which receives no discussion (neither for sea turtles nor for any other species) in the DSPEA. National Research Council, The Decline of Sea Turtles: Causes and Prevention (1990). Given these findings, and given that all of the sea turtles on the proposed sites belong to endangered or threatened populations, a more rigorous analysis of potential impacts is necessary.

vital rates in individuals or populations. DEIS at 5-19 to 5-20. The Navy also offers the bromide that mitigation will preclude any significant or long-term impacts on marine mammals and the marine environment. DEIS at 5-20. Not only are both statements factually insupportable given the lack of any population analysis or quantitative assessment of long-term effects in the document (and the numerous errors in the Navy's thresholds and modeling, discussed above)—but they misapprehend the definition of "cumulative impact," which, according to NEPA's regulations, "can result from individually minor but collectively significant actions taking place over a period of time." 42 C.F.R. § 1508.7.

The Navy's failure of analysis is only compounded by its failure to consider the best 34
available evidence of population structuring in Hawaiian marine mammals. That evidence indicates that a number of populations around the main islands – short-finned pilot whales, false killer whales, bottlenose dolphins, and spinner dolphins, or, in other words, every local odontocete species that has been genetically studied to date – are reproductively distinct from their conspecifics in the tropical Pacific.[81] Cuvier's and Blainville's beaked whales seem to maintain considerable site fidelity around the islands, which is likewise suggestive of residency and additional population structuring.[82] The Navy significantly overestimates the size of these populations in its DEIS and thus significantly underestimates the proportion that would be taken and the effects that its repeated activities would have. All of this only amplifies the need for

[81] K.R. Andrews, L. Karczmarski, W.W.L. Au, S.H. Rickards, C.A. Vanderlip, and R.J. Toonen, Patterns of Genetic Diversity of the Hawaiian Spinner Dolphin (Stenella longirostris), 543 Atoll Research Bulletin 65-73 (2006); R.W. Baird, A.M. Gorgone, A.D. Ligon, and S.K. Hooker, Mark-Recapture Abundance Estimate of Bottlenose Dolphins (Tursiops truncatus) around Maui and Lanai, Hawaii, During the Winter of 2000/2001 (2001) (report prepared for NMFS under Contract #40JGNF000262); R.W. Baird, A.M. Gorgone, and D.L. Webster, An Examination of Movements of Bottlenose Dolphins between Islands in the Hawaiian Island Chain (2002) (report prepared for NMFS under Contract #40JGNF110270); R.W. Baird, D.J. McSweeney, D.L. Webster, A.M. Gorgone, and A.D. Ligon, Studies of Odontocete Population Structure in Hawaiian Waters: Results of a Survey through the Main Hawaiian Islands in May and June 2003 (2003) (report prepared for NMFS under Contract #AB133F-02-CN-0106); R.W. Baird, G.S. Schorr, D.L. Webster, S.D. Mahaffy, A.B. Douglas, A.M. Gorgone, and D.J. McSweeney, A Survey for Odontocete Cetaceans off Kaua'i and Ni'ihau, Hawai'i, during October and November 2005: Evidence for Population Structure and Site Fidelity (2006) (report prepared for NMFS under Order #AB133F05SE5197); S.J. Chivers, R.G. LeDuc, and R.W. Baird, "Hawaiian Island Populations of False Killer Whales and Short-Finned Pilot Whales Revealed by Genetic Analyses," in Abstracts of the 15th Biennial Conference on the Biology of Marine Mammals, 14-19 December 2003, Greensboro, North Carolina 32 (2003); S.J. Chivers, R.W. Baird, D.J. McSweeney, D.L. Webster, N.M. Hedrick, and J.C. Salinas, Genetic Variation and Evidence for Population Structure in Eastern North Pacific False Killer Whales (Pseudorca crassidens), 85 Canadian Journal of Zoology 783-94 (2007); K. Martien, R.W. Baird, and K. Robertson, Population Structure of Bottlenose Dolphins around the Main Hawaiian Islands (2005) (paper presented to the Pacific Scientific Review Group, January 2005).

[82] See, e.g., R.W. Baird, G.S. Schorr, D.L. Webster, D.J. McSweeney, and S.D. Mahaffy, Studies of Beaked Whale Diving Behavior and Odontocete Stock Structure in Hawai'i in March/April 2006 (report prepared for NMFS under Contract #AB133F-06-CN-0053); D.J. McSweeney, R.W. Baird, and S.D. Mahaffy, Site Fidelity, Associations, and Movements of Cuvier's (Ziphius cavirostris) and Blainville's (Mesoplodon densirostris) Beaked Whales off the Island of Hawai'i, 23 Marine Mammal Science 666-687 (2007).

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NMFS' careful consideration of cumulative effects and for biologically meaningful mitigation of the Navy's impacts on Hawaiian marine mammals.

F. Alternatives Analysis

At bottom, an EIS must "inform decision-makers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment." 40 C.F.R. § 1502.1. This requirement has been described in regulation as "the heart of the environmental impact statement." Id. § 1502.14. The agency must therefore "[r]igorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated." Id. § 1502.14(a). Consideration of alternatives is required by (and must conform to the independent terms of) both sections 102(2)(C) and 102(2)(E) of NEPA.

35

First, the Navy declines to consider a reduction in the level of current training in the HRC or the siting of exercises in locations outside the HRC. Yet the Navy's assumption that exercises on the range must increase may well be an artifact of the Navy's Tactical Training Theater Assessment and Planning Program (TAP) process, which, in requiring separate environmental analysis of existing ranges and operating areas, seems to assume a priori that exercises cannot be reapportioned or alternative sites found. Moreover, the Navy does not consider alternative geographic siting within the HRC itself. Avoiding concentrations of vulnerable and endangered populations and high abundances of marine life is perhaps the most critical step the Navy can take in reducing impacts, and a "hard look" at geographical alternatives is plainly required by NEPA and other laws. NRDC v. Evans, 279 F.Supp.2d at 1664-66; NRDC v. Navy, 857 F.Supp. at 734. Because the Navy has failed to undertake an alternatives analysis that allows it to make an informed siting choice, the DEIS is inadequate.

36

Second, the DEIS fails to analyze meaningfully whether a different mix of simulators and at-sea exercises would accomplish its aims. Instead, it rules out the increased use of simulators by stating, in a cursory three sentences, that they do not obviate the need for realistic training. DEIS at 2-11. But its summary treatment of this issue does not sufficiently justify the precise number of exercises that have been proposed. Alternatives that combine greater use of simulators with fewer open-water exercises should have been analyzed, not dismissed out of hand.

37

Third, even aside from the omission of reasonable alternative locations, the Navy fails to consider alternatives of any other kind. While the question of proper siting is crucial, it is not the only factor that must be considered in identifying other, less harmful ways to fulfill the Navy's purpose. Indeed, it appears that many reasonable alternatives are missing from the Navy's analysis that might fulfill that purpose while reducing harm to marine life and coastal resources. For example, and as discussed at greater length below, the DEIS fails to include a range of mitigation measures among its alternatives. Many such measures are employed by other countries in their sonar exercises and even by the U.S. Navy in other contexts; and there are many others that should be considered.

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Such measures are reasonable means of reducing harm to marine life and other resources on the HRC, and their omission from the alternatives analysis renders that analysis inadequate.

38

In sum, the DEIS omits from its analysis reasonable alternatives—with regard to both the siting of the range and other operational choices—that might achieve the Navy's core aim while minimizing environmental harm. These omissions are all the more unreasonable given the long period during which the Navy has worked on this document and its predecessors. For these reasons, we urge the Navy to issue an EIS that adequately informs the public of all reasonable alternatives that would reduce adverse impacts to whales, fish, and other resources. 40 C.F.R. § 1502.1.

G. Mitigation Measures

39

To comply with NEPA, an agency must discuss measures designed to mitigate its project's impact on the environment. See 42 C.F.R. § 1502.14(f). There is a large and growing set of options for the mitigation of noise impacts to marine mammals and other marine life, some of which have been imposed by navies—and by the Navy itself, in other contexts—to limit harm from high-intensity sonar exercises. Yet here the Navy does little more than set forth a cribbed set of measures, falling short even of what other navies have implemented for transient exercises and providing no discussion on a variety of other options.

All of the mitigation that the Navy has proposed for acoustic impacts boils down to the following: a very small safety zone around the sonar vessel, maintained primarily with visual monitoring by onboard lookouts, with aid from non-dedicated aircraft (when in the vicinity) and passive monitoring (though the vessel's generic sonar system). Under the proposed scheme, which is identical to that in the Navy's current national defense exemption under the MMPA, operators would power down the system by 6 dB if a marine mammal is detected within 1000 yards, power it down by 10 dB if the protected species is detected within 500 yards, and shut it down if the animal is detected within 200 yards. DEIS at 6-3. Operators could resume operations at full levels when, inter alia, the vessel has transited 2000 yards, which, given vessel speeds during ASW exercises, may take only a few minutes.

40

This mitigation scheme disregards the best available science on the significant limits of that technique. Indeed, the species perhaps most vulnerable to sonar-related injuries, beaked whales, are among the most difficult to detect because of their small size and diving behavior. It has been estimated that in anything stronger than a light breeze, only one in fifty beaked whales surfacing in the direct track line of a ship would be sighted; as the distance approaches 1 kilometer, that number drops to zero.[83] The Navy's reliance on visual observation as the mainstay of its mitigation plan is therefore profoundly misplaced.

[83] J. Barlow and R. Gisiner, Mitigating, Monitoring, and Assessing the Effects of Anthropogenic Noise on Beaked Whales, 7 Journal of Cetacean Research and Management 239-249 (2006).

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41 The Navy's analysis ignores or improperly discounts an array of options that have been considered and imposed by other active sonar users, including avoidance of coastal waters, high-value habitat, and complex topography; the employment of a safety zone more protective than the 1000-yard power-down and 200-yard shutdown proposed by the Navy; general passive acoustic monitoring for whales; special rules for surfacing ducting and low-visibility conditions; monitoring and shutdown procedures for sea turtles and large schools of fish; and many others.[84]

42 Measures that the Navy should consider must include, inter alia:

(1) Establishment of a coastal exclusion zone for acoustics training and testing that would run 25 nm from the 200 meter isobath;[85]

(2) Seasonal avoidance of humpback calving grounds, including the Hawaiian Islands Humpback Whale National Marine Sanctuary and other areas,[86] given the high incidence of estimated takes;

(3) Avoidance of federal and state marine protected areas, including seasonal avoidance of the Hawaiian Islands Humpback Whale National Marine Sanctuary and year-around avoidance of the Papahanaumokuakea Marine National Monument;

(4) Avoidance of bathymetry likely to be associated with high-value habitat for species of particular concern, including seamounts rising within 1000 m of the ocean surface, or bathymetry whose use poses higher risk to marine species;[87]

(5) Avoidance of oceanographic fronts, such as cyclonic eddies, that have the potential to attract offshore concentrations of animals;[88]

(6) Avoidance of areas with higher modeled takes or other high-value habitat;

(7) Concentration of exercises to the maximum extent practicable on the Navy's instrumented range or in surveyed offshore habitat of low value;

[84] See, e.g., Royal Australian Navy, "Maritime Activities Environmental Management Plan," Procedure S-1 and Planning Guide 16 (July 8, 2005); NATO Undersea Research Centre, Human Diver and Marine Mammal Risk Mitigation Rules and Procedures (2006) (NURC-SP-2006-008); ICES, Report of the Ad-hoc Group on the Impacts of Sonar on Cetaceans and Fish 33-36 (2005) (ICES CM 2005/ACE:06). The U.S. Navy has also used additional mitigation measures for various exercises in the past.

[85] J. Barlow, Cetacean Abundance in Hawaiian Waters Estimated from a Summer/Fall Survey in 2002, 22 Marine Mammal Science 457-58 (2006); see also discussion of population structuring in Hawaiian marine mammal populations, above.

[86] D.W. Johnston, M.E. Chapla, L.E. Williams, and D.K, Mattila, Identification of Humpback Whale Megaptera novaeangliae Wintering Habitat in the Northwestern Hawaiian Islands Using Spatial Habitat Modeling, 3 Endangered Species Research 249-57 (2007).

[87] Letter from R.W. Baird, Cascadia Research, to S.L. Leathery (May 20, 2006) (comments on RIMPAC 2006).

[88] M.P. Seki, R. Lumpkin, and P. Flament, Hawaii Cyclonic Eddies and Blue Marlin Catches: The Case Study of the 1995 Hawaiian International BillfishTournament, 58 J. Oceanography 739, 739-45.

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(8) Use of sonar and other active acoustic systems at the lowest practicable source level, with clear standards and reporting requirements for different testing and training scenarios;

(9) Expansion of the marine species "safety zone" to a 4 km shutdown, reflecting international best practice, or 2 km, reflecting the standard prescribed by the California Coastal Commission;[89]

(10) Suspension of relocation of exercises when beaked whales or significant aggregations of other species, such as melon-headed whales, are detected by any means within the orbit circle of an aerial monitor or near the vicinity of an exercise;

(11) Use of simulated geography to reduce or eliminate chokepoint exercises in near-coastal environments, particularly within channels;

(12) Restriction or capping of training during surface ducting conditions;

(13) Avoidance of beaked whale habitat, or requiring the powering down of sonar during surface ducting conditions;

(14) Planning of ship tracks to avoid embayments and provide escape routes for marine animals;

(15) Suspension or postponement of chokepoint exercises during surface ducting conditions and scheduling of such exercises during daylight hours;

(16) Use of dedicated aerial monitors during chokepoint exercises;

(17) Use of dedicated passive acoustic monitoring to detect vocalizing species, through established and portable range instrumentation and the installation of hydrophone arrays;

(18) Modification of sonobuoys for passive acoustic detection of vocalizing species;

(19) Suspension of acoustic exercises or power-down of sonar outside daylight hours and during periods of low visibility;

(20) Use of aerial surveys and ship-based surveys before, during, and after exercises;

(21) Use of all available range assets for marine mammal monitoring, including unique assets available on the Navy's instrumented ranges off Kauai;

(22) Use of third-party monitors for marine mammal detection;

(23) Establishment of long-term research, to be conducted through an independent agent such as the National Fish and Wildlife Foundation, on the distribution, abundance, and population structuring of protected species in the HRC, with the goal of supporting adaptive geographic avoidance of high-value habitat;

[89] California Coastal Commission, Adopted Staff Recommendation on Consistency Determination CD-086-06 (2007); Approved Letter from M. Delaplaine, California Coastal Commission, to Rear Adm. Len Hering, Navy (Jan. 11, 2007).

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(24) Application of mitigation prescribed by the California Coastal Commission, by other navies or research centers, or by the U.S. Navy in other contexts;

(25) Avoidance of fish spawning grounds and of important habitat for fish species potentially vulnerable to significant behavioral change, such as wide-scale displacement within the water column or changes in breeding behavior.

(26) Dedicated research and development of technology to reduce impacts of active acoustic sources on marine mammals;

(27) Prescription of specific mitigation requirements for individual classes of testing and training activities, in order to maximize mitigation given varying sets of operational needs; and

(28) Timely, regular reporting to NOAA, state coastal management authorities, and the public to describe and verify use of mitigation measures during testing and training activities.

Consideration of these measures is minimally necessary to satisfy the requirements of NEPA, and we note that similar or additional measures may be required under the Marine Mammal Protection Act, Endangered Species Act, and other statutes.

H. Project Description and Meaningful Public Disclosure

Disclosure of the specific activities contemplated by the Navy is essential if the NEPA process is to be a meaningful one. See, e.g., LaFlamme v. F.E.R.C., 852 F.2d 389, 398 (9th Cir. 1988) (noting that NEPA's goal is to facilitate "widespread discussion and consideration of the environmental risks and remedies associated with [a proposed action]").

With regard to noise-producing activities, for example, the Navy must describe source levels, frequency ranges, duty cycles, and other technical parameters relevant to determining potential impacts on marine life. The Hawaii DEIS and its predecessors provide some of this information, indicating, for example, the nominal source level of the SQS-53 system, which is deployed on surface ships. But it fails to disclose sufficient information about helicopter dipping sonar, active sonobuoys, acoustic device countermeasures, training targets, or range sources that would be used during the exercise; and, even with respect to the SQS-53 system, refrains from giving any indication of platform speed, pulse length, repetition rate, beam widths, or operating depths—that is, most of the data that the Navy presumably used in modeling acoustic impacts.

Just as important, the Navy has not released or offered to release any of the modeling systems (CASS/GRAB, MATLAB, MMEM, or the Take Estimation Model) it used to calculate acoustic harassment and injury. These models must be made available to the public, including the independent scientific community, for public comment to be meaningful under NEPA and the Administrative Procedure Act. 42 C.F.R. §§ 1502.9(a), 1503.1(a) (NEPA); 5 U.S.C. § 706(2)(D) (APA). And guidelines adopted

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under the Data (or Information) Quality Act also require their disclosure. The Office of Management and Budget's guidelines require agencies to provide a "high degree of transparency" precisely "to facilitate reproducibility of such information by qualified third parties" (67 Fed. Reg. 8452, 8460 (Feb. 22, 2002)); and the Defense Department's own data quality guidelines mandate that "influential" scientific material be made reproducible as well.[90] We encourage the Navy to contact us immediately to discuss how to make this critical information available.

I. Scope of Review

As a threshold issue, we are concerned about the Navy's understanding of its obligations under applicable law. The Navy indicates that its analysis of "extraterritorial" activities, those activities that would take place outside U.S. territorial waters, was prepared under the authority of Executive Order 12114 rather than under NEPA. See DEIS at 1-16. Not only is this position on the scope of review inconsistent with the statute (see, e.g., Environmental Defense Fund v. Massey, 968 F.2d 528 (D.C. Cir. 1994) and NRDC v. Navy, No. CV-01-07781, 2002 WL 32095131 at *9-12 (C.D. Cal. Sept. 19, 2002)), but, insofar as it represents a broader policy, it suggests that current operations off Hawaii may likewise be out of compliance. Nearly all of the vast HRC is sited beyond the 12nm territorial boundary, within the U.S. Exclusive Economic Zone. If, as we expect, activities currently taking place there have not received their due analysis in a prior environmental impact statement, then the Navy is operating in ongoing violation of NEPA.

J. Compliance with Other Applicable Laws

A number of other statutes and conventions are implicated by the proposed activities, considering their marine acoustic impacts alone. Among those that must be disclosed and addressed during the NEPA process are the following:

(1) The Marine Mammal Protection Act ("MMPA"), 16 U.S.C. § 1361 et seq., which requires the Navy to obtain a permit or other authorization from NMFS or the U.S. Fish and Wildlife Service prior to any "take" of marine mammals. The Navy has applied for an Incidental Harassment Authorization under the MMPA, and NRDC will submit comments regarding the Navy's application to NMFS at the appropriate time.

(2) The Endangered Species Act, 16 U.S.C. § 1531 et seq., which requires the Navy to enter into formal consultation with NMFS or the U.S. Fish and Wildlife

[90] Navy, Ensuring the Quality of Information Disseminated to the Public by the Department of Defense: Policy and Procedural Guidance § 3.2.3.1 (Feb. 10, 2003). The Defense Department defines "influential" to mean "that the Component can reasonably determine that dissemination of the information will have or does have clear and substantial impact on important public policies or important private sector decisions"—which is clearly the case here. See Ensuring the Quality of Information Disseminated to the Public by the Department of Defense: Definitions § 3 (Feb. 10, 2003).

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Service, and receive a legally valid Incidental Take Permit, prior to its "take" of any endangered or threatened marine mammals or other species, including fish, sea turtles, and birds, or its "adverse modification" of critical habitat. See, e.g., 1536(a)(2); Romero-Barcelo v. Brown, 643 F.2d 835 (1st Cir. 1981), rev'd on other grounds, Weinberger v. Romero-Carcelo, 456 U.S. 304, 313 (1982). The Navy must consult with the NMFS over humpback whales, blue whales, fin whales, North Pacific right whales, sei whales, sperm whales, Hawaiian monk seals, green sea turtles, hawksbill sea turtles, leatherback sea turtles, loggerhead sea turtles, Pacific ridley sea turtles, Hawaiian dark-rumped petrels, and Newell's Townsend's shearwaters, all of which are listed under the Act. 46

(3) The Coastal Zone Management Act, and in particular its federal consistency requirements, 16 U.S.C. § 1456(c)(1)(A), which mandate that activities that affect the natural resources of the coastal zone—whether they are located "within or outside the coastal zone"—be carried out "in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs." The Navy must engage in a new consistency determination given the "significant new information" that has come to light since any previous determinations were undertaken. 47

(4) The Magnuson-Stevens Fisheries Conservation and Management Act, 16 U.S.C. § 1801 et seq. ("MSA"), which requires federal agencies to "consult with the Secretary [of Commerce] with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken" that "may adversely affect any essential fish habitat" identified under that Act. 16 U.S.C. § 1855 (b)(2). In turn, the MSA defines essential fish habitat as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 16 U.S.C. § 1802 (10). The HRC contains such habitat. PEA at E-3 to 5. As discussed at length above, Anti-Submarine Warfare exercises along have the significant potential to adversely affect at least the waters, and possibly the substrate, on which fish in these areas depend. Under the MSA, a thorough consultation is required. 48

(5) The Marine Protection, Research and Sanctuaries Act, 33 U.S.C. § 1401 et seq., which requires federal agencies to consult with the Secretary of Commerce if their actions are "likely to destroy, cause the loss of, or injure any sanctuary resource." 16 U.S.C. § 1434(d)(1). Since, in this case, the Navy's exercises would cause injury and mortality of humpback whales, the titular resource of the Hawaiian Islands Humpback Whale National Marine Sanctuary, consultation is clearly required. In addition, the Sanctuaries Act is intended to "prevent or strictly limit the dumping into ocean waters of any material that would adversely affect human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities" (33 U.S.C. § 1401(b)), and prohibits all persons, including Federal agencies, from dumping materials into ocean waters, except as authorized 49

COMMENT NUMBER: D-E-0463 (cont.)

by the Environmental Protection Agency. 33 U.S.C. §§ 1411, 1412(a). The Navy has not indicated its intent to seek a permit under the statute.

(6) The Migratory Bird Treaty Act, 16 U.S.C. § 703 et seq. ("MBTA"), which makes it illegal for any person, including any agency of the Federal government, "by any means or in any manner, to pursue, hunt, take, capture, [or] kill" any migratory birds except as permitted by regulation. 16 U.S.C. § 703. After the District Court for the D.C. Circuit held that naval training exercises that incidentally take migratory birds without a permit violate the MBTA, see Center for Biological Diversity v. Pirie, 191 F. Supp. 2d 161 (D.D.C. 2002) (later vacated as moot), Congress exempted some military readiness activities from the MBTA but also placed a duty on the Defense Department to minimize harms to seabirds. Under the new law, the Secretary of Defense, "shall, in consultation with the Secretary of the Interior, identify measures-- (1) to minimize and mitigate, to the extent practicable, any adverse impacts of authorized military readiness activities on affected species of migratory birds; and (2) to monitor the impacts of such military readiness activities on affected species of migratory birds." Pub.L. 107-314, § 315 (Dec. 2, 2002). As the Navy acknowledges, migratory birds occur within the HRC. The Navy must therefore consult with the Secretary of the Interior regarding measures to minimize and monitor the effects of the proposed range on migratory birds, as required. 50

(7) Executive Order 13158, which sets forth protections for marine protected areas ("MPAs") nationwide. The Executive Order defines MPAs broadly to include "any area of the marine environment that has been reserved by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein." E.O. 13158 (May 26, 2000). It then requires that "[e]ach Federal agency whose actions affect the natural or cultural resources that are protected by an MPA shall identify such actions," and that, "[t]o the extent permitted by law and to the maximum extent practicable, each Federal agency, in taking such actions, shall avoid harm to the natural and cultural resources that are protected by an MPA." Id. The Navy must therefore consider and, to the maximum extent practicable, must avoid harm to the resources of all federally- and state-designated marine protected areas, including the Hawaiian Islands Humpback Whale National Marine Sanctuary and Papahanaumokuakea Marine National Monument, potentially affected by activities taking place on its proposed range. 51

The proposed activities also implicate the Clean Air Act and Clean Water Act as well as other statutes protecting the public health. Exercises on the HRC cannot legally be undertaken absent compliance with these and other laws.

K. Conflicts with Federal, State, and Local Land-Use Planning

NEPA requires agencies to assess possible conflicts that their projects might have with the objectives of federal, regional, state, and local land-use plans, policies, and controls. 40 C.F.R. § 1502.16(c). HRC training and testing activities may certainly affect resources in the coastal zone and within other state and local jurisdictions, in conflict 52

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0463 (cont.)

Public Affairs Officer
September 17, 2007
Page 36

52 with the purpose and intent of those areas. The consistency of Navy operations with these land-use policies must receive more thorough consideration.

L. Alternatives Analysis under Section 102(2)(E) of NEPA

53 Above and beyond the EIS requirement, NEPA directs agencies to "study, develop, and describe appropriate alternatives" to any project that presents "unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. § 4332(2)(E). Courts have concluded that this duty is "both independent of, and broader than, the EIS requirement." Bob Marshall Alliance v. Hodel, 852 F.2d 1223, 1229 (9th Cir. 1988), cert. denied, 109 S.Ct. 1340 (1989). Because its offshore range proposal presents "unresolved conflicts" about the proper use of "available resources," the Navy must explicitly address its separate and independent obligations under section 4332(2)(E).

III. CONCLUSION

54 For the reasons set forth above, we urge the Navy to withdraw its DEIS on the Hawaii Range Complex and to revise the document prior to its recirculation for public comment. In particular, we call on the Navy immediately to undertake a thorough, detailed assessment of a broad range of alternatives and mitigation measures, to ensure that its decision will result in the least practicable adverse impact on marine species.

Very truly yours,

Michael Jasny
Senior Policy Analyst

COMMENT NUMBER
D-E-0465

From: Amy Dunn - Hilo, HI
To: deis hrc@govsupport.us
Subject: HRC DEIS
Date: 9/18/2007 12:20:52 AM

Department of the Navy
Commander, United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii

Public Affairs Officer
Pacific Missile Range Facility
HRC EIS/OEIS
P.O. Box 128
Kekaha, Kauai, Hawaii

imited deployment of sonar with respect to impacts on dolphins and whales. Although I am aware that there are other factors that could be involved in marine mammal strandings [Kirschvink et al 1986], the extreme audiosensitivity of this taxa makes it uniquely vulnerable to neural disturbance, disorientation and even physical cochlear and tympanic damage when exposed to intense sound pulses [Nachtigall 2004]. Although death or auditory nervous system damage may not occur, disorientation can be sufficient to disrupt normal feeding behaviour [Croll et al, 2001]. That said, research on the short and long term physiological and ecological effects of 'sound pollution' [from multiple sources, not merely sonar usage] remains inadequate [Nowacek, D.P, 2007].

Therefore I respectfully request that you ensure the safety of these animals before proceding with the proposed expansion. In the event that the expansion will go forward, may I suggest that you increase threat identification efforts for marine mammals in the area via employment of independent observers, airborne, on and below sea surface, to ensure there are not animals in the area when the sound pulses will be deployed. Additionally I would suggest that the mammal survey perimeter be enlarged as the sound pulses can travel far before attenuating, depending on the frequency of the pulse. Finally I would like to request that you ensure that the sound pulses do not enter the SOFAR channel to be accidentally transmitted over great distance to animals outside the possible perimeter of the pre-pulse survey. 1

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-E-0465 (cont.)

Students in the Marine Science department have made good use of Navy public records on marine mammal research over the yearss, and will follow this expansion proposal/program with much interest. May I state for the record that I am aware that the US Navy treats its cetaceans very well, and trainers develop profound bonds with the animals with which they work. I am therefore aware of the esteem in which the Navy holds these mammals. Let us please extend that esteem to those that remain in the wild.

Thank you for taking the time to read this letter.

Mahalo nui loa,

Amy Dunn

Hilo, Hawaii

COMMENT NUMBER

D-E-0466

From: Judy Walker - Hilo, HI
To: deis hrc@govsupport.us
Subject: Additional EIS comments

Date: 9/17/2007 10:14:38 PM

I recently sent comments on the Navy's HRC EIS. I would like to supplement with the following:

NOAA had two important press releases in August 2007 about marine mammals. On August 10, 2007, the headline read, "SCIENTISTS RECORD FIRST 'MEGAPCLICKS' FROM FEEDING HUMPBACK WHALES IN NOAA'S STELLWAGEN BANK NATIONAL MARINE SANCTUARY." On August 28, 2007, the headline read, "STUDY REVEALS HAWAII'S FALSE KILLER WHALES ARE A DISCRETE POPULATION." I would like the Navy to respond to these developments. If humpback whales have been documented to use megapclicks, the impacts of acoustics on mysticetes need to be reevaluated. Likewise, if the Hawaiian false killer whales are a discrete population, they must be evaluated separately from false killer whales as a whole, which is not done in the current EIS. 1

Thank you--

Judy Walker

Hilo, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0467	

From: Harriet Smith
To: deis hrc@govsupport.us
Subject: militarytraining in hawaiian waters
Date: 9/18/2007 12:52:23 AM

I have come toa place wherel feel as much endangered as protected by the U.S.military. 1

COMMENT NUMBER	
D-E-0469	

From: Elizabeth Freeman - Kilauea, HI
To: deis hrc@govsupport.us
Subject: Draft EIIS Commentary
Date: 9/18/2007 1:34:13 AM

Elizabeth Freeman

Kilauea, HI

To: Public Affairs Officer
Pacific Missile Range Facility

I wish to express my strong opposition to the proposed increase in training operations on land, sea and air well as the proposed increase in the research, development, test and evaluation of operations at the Pacific Missile Range Facility. I don't feel environmental concerns have been adequately addressed. Kauai has a fragile ecosystem and the increases noted in this proposal are unacceptable. 1

Thank you,
Elizabeth Freeman

PS You have already been conducting testing that is harmful to whales and marine life so I do not wish to see testing expanded. I saw for myself the stranded melon- head whales about 2 years ago in Hanalei Bay. I participated in helping usher them back out to sea. Although the Navy claimed the stranding had nothing to do with their sonar testing, I don't feel this to be true. I, too, have the upmost respect for the Navy; however, considering the fragile ecosystems on land, sea and air that make up the soul of Kauai I feel a program of this magnitude is dangerous and unacceptable on our tiny island. 2

I am including this letter from James Taylor.

Dear Friend,

The Navy's sonic assault on whales should be stopped

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0469 (cont.)

immediately. I'm asking for your help to make it happen.

Let me be clear: I have the deepest respect for the U.S. Navy. When I was growing up, my father was a doctor and commander in the Navy. His role in helping to establish a base at the South Pole in 1957, as part of the International Geophysical Year, had a lifelong impact on me.

We loved the Navy because it helped win World War II. But we also loved the Navy because it was a leader in the scientific study of the natural world.

That's why I feel so strongly that today's Navy should be using its vast resources to protect not just our nation but the health of our planet's oceans as well.

And it's why I am so distressed by the acoustic onslaught the Navy is now waging beneath our planet's oceans -- an onslaught that is regularly killing whales with dangerous mid-frequency sound waves.

Mid-frequency sonar is designed to detect enemy submarines. The Navy's warships tow underwater speakers that blast the ocean with noise up to 245 decibels -- a sonic barrage roughly comparable to a Saturn V rocket at blast-off.

That explosive level of noise can cause whales -- who have an exquisite sense of hearing -- to panic, surface too quickly, and hemorrhage internally. Many beached whales have been found bleeding around their brains and ears after their fatal encounters with sonar systems.

Imagine a sound so painful that you jump out of the sea and die on the beach rather than be subjected to it for another minute! From a whale's point of view, the Navy's sonic assault almost seems designed to torture them.

But that torture isn't just cruel, it's unnecessary.

You see, the Navy could adopt simple safety measures when training with sonar that would prevent the infliction of pain and death on these magnificent animals. For example, the Navy could avoid marine habitats where whales are known to migrate and raise their young. These commonsense precautions would not compromise military readiness.

But the Navy refuses. So the maiming and killing of whales goes on.

This callousness toward nature -- toward the ocean itself -- does not reflect the Navy I grew up with. We deserve better. And, as Americans, it's our right to demand better.

Our message is simple: Whales should not have to die for military practice.

Please join me and millions of other people in getting that message to the U.S. Navy and to Congress. Go to www.nrdcactionfund.org/sonaraction and tell the Navy to do the right thing.

Then please help us build a nationwide outcry by forwarding this message to your friends and family members who would want to know about the Navy's reckless killing of whales.

Let's not wait for hundreds, or even thousands, more whales to suffer and die. Please stand with me in demanding a more humane Navy right now.

Sincerely,

James Taylor
NRDC Action Fund

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0470

From: Bruce Pleas - Waimea, HI
To: deis hrc@govsupport.us
Subject: Comments on DEIS/OEIS
Date: 9/18/2007 1:54:19 AM

Public Comments on the Hawaii Range Complex Draft EIS/OEIS from;
Bruce Pleas
Kekaha Resident
Waimea, Hawaii, USA

Section 4.3.2.1.8 Land Use---PMRF/Main Base 2
Section 4.3.2.1.8.1, Page 4-266
On-base Recreation, Lines 3-10

"The installation's approximately 1,000-ft by 2-mi beach in the southern zone of PMRF will remain accessable to Kauai residents possessing an approved beach access pass."
Items that need to be addressed in the final EIS/OEIS are;
1) The beach access pass is available to other persons than Kauai residents. Update this information.
2) The specifics on the beach access pass need to be included.

"The beaches on PMRF only represent a small portion of the available beaches on western Kauai and do not provide any unique recreational coastal opportunities that cannot be provided elsewhere on the island."
This is a completely untrue statement that needs to be researched and corrected.
1) The surf breaks that are on PMRF are unique to themselves like snowflakes are unique to each other. There is only one Majors Bay or Kini Kini on Kauai (and on the entire earth). The entire coastline of PMRF is a very important coastal recreation area for fishing, diving, surfing, sailboarding, kite surfing, stand up paddle boarding, boogie boarding, body boarding, etc..
2) This section needs to have all aspects of coastal recreational use and activities, past and present, researched and presented in a true form that represents the unique area that this 7-8 mile section (PMRF) of the 15 mile western Kauai coastline is to both the residents and visitors of Kauai.
3) With strong North winds and a 6'+ NW swell PMRF is the best (and sometimes only) area for surfing on Kauai. The PMRF area of western Kauai is the heart and soul of surfing of western Kauai.

COMMENT NUMBER
D-E-0470 (cont.)

There is also no reference given for information on this section and that is apparent in the inadequate information given in this section of the DEIS/OEIS.

Appendix I 3
Land Use
Pages I-1 thru I-4

These pages are very uninformative on the land use and come from only one perspective. The perspective of the proponents of Hawaii as a Sovereign Nation that was taken by a group of foreign nationals needs to be included in the DEIS/OEIS with complete disclosure on the KUE (spelling) Petition (over 80% of the living citizens of the overthrown Sovereign Hawaii Nation signed and presented this petition to the President and Senate of the US demanding that the Sovereign Hawaii Nation be restored), President Grover Cleveland's message to Congress, 18 December 1893 and Mr. Blunts findings on the overthrow. There should also be complete disclosure on all aspects of land use and ownership from all different viewpoints.

I find this section completely lacking to what I have come up with in my research of Hawaiian history of land ownership and I am requesting that all aspects and views of Hawaii land ownership be included in Appendix I.

Pages I-5 thru I-20

All of these documents need to be presented in their full text, not just partial documents as they are presented in the DEIS/OEIS. 4

General comments

Following are the statements I presented after the scoping meetings and at this point most of these concerns have not been addressed fully and accurately in the DEIS/OEIS at this point. Please address these concerns fully in the Final EIS/OEIS.

It is of grave concern to me that the EIS/OEIS for the HRC will end up to be a 1

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

document that covers a very large area of vague scenarios that can be loosely interpreted and that pretty much anything can be done within the HRC without any specific investigation being done on the effects that these 'increased activities' will have on the HRC specifically and the populated areas adjacent to the HRC. As I live within 2 miles of the HRC I have grave concerns for the safety of my family with increased activities that are not specifically identified and then put forth to the public for public comments and questions. The 'Capabilities to support high energy laser systems' is a prime example of "What does this statement cover?" type of question that I need answered as to what type of laser, how strong of laser, what is the power requirement, who will supply the power, how will the power be produced, what is the safety range (both ground, water and air) for each specific type of system, what will these laser systems do to the ground air and atmosphere, how many people will be stationed on board, how many people will be on island for each test, where will these people stay, how will they travel to and from the HRC, are these lasers reusable or do they self destruct after one use/multiple uses, what is the contamination to the ground around the laser, how will it affect the publics use of the HRC, and so on.	COMMENT NUMBER D-E-0470 (cont.) 13
Areas to be covered by the Final EIS/OEIS	
Following is a list of topics that need to be covered in the DEIS/OEIS in full;	7
1) Introduction and Summary that should include general information, background, summary of probable impacts and mitigation measures, alternatives considered, compatibility with land/water use plans and policies, necessary permits and approvals, statement of purpose and need for action, purpose and need for this EIS and unavoidable adverse effects.	
2) Project description that should include location and complete information on ownership from pre contact (1700) to present day (2006-07), prior and existing uses, project(s) description(s), cost and phasing of all projects/systems.	
3) Relationship of the proposed project(s) to existing public plans, policies and controls that should cover the following; for the State of Hawaii the Hawaii State Plan, State Functional Plans, State Land Use Laws, and the Coastal Zone Management laws; for the County of Kauai the Special Management Area laws and permits, the General Plan, the regional development plans for the entire island, and the Comprehensive Zoning Ordinance.	

	COMMENT NUMBER D-E-0470 (cont.)
4) Assessment of existing conditions, probable impacts and mitigation for the Physical Environment that includes climate, topography, hydrogeology, soils, agriculture capability, flora, terrestrial fauna, marine environment, historical, cultural and archaeological resources, scenic resources, flood hazards, safety zones for all and specific projects, air quality, noise, interrelationships and cumulative impacts on the physical environment.	8
5) Assessment of existing conditions, probable impacts and mitigation for the Socio-Economic Environment that includes population impacts, economic impacts, fiscal impacts, impacts on housing on both rental and purchase pricing along with availability of housing, impacts on traditional customs and practices, interrelationships and cumulative impacts on the socio-economic environment.	9
6) Assessment of existing conditions, probable impacts and mitigation on Public Facilities that includes transportation studies (including LOS-Level of Service along the main road to and from PMRF) for the entire island, utility usage and additional utilities that could be needed for all proposed projects, wastewater disposal and reuse, grading and drainage plans and permits, solid waste disposal and reuse/recycle, the affect on all recreational facilities and recreational uses on both the land and water, shoreline access, police/fire/emergency services, evacuation routes and safe shelters for employees, contractors and the public, interrelationships and cumulative impacts on Kauai's public facilities and services.	10
7) Alternatives to the proposed action which should include 'No action', alternative #1, alternative #2 and any other scenario/project/system that may be used in the HRC.	11
8) Irreversible and irretrievable commitments to resources.	12
9) Relationship between local short-term uses of the environment and maintenance and enhancement of long-term productivity.	
Mahalo,	
Bruce Pleas	
Waimea, Hawaii	

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

From: Joan Lander - Na'alehu, HI D-E-0471
To: deis hrc@govsupport.us
Subject: =?8bit?Q?Comments_on_the_Draft_EIS/OEIS_for_Hawai=C3=A2 =E2=82=AC=CB=9Ci_Navy_Range_Complex?=
Date: 9/18/2007 1:54:57 AM

I strongly oppose any expansion of military activities in Hawai'i. 1

starting with the attack on Pearl Harbor, the U.S. military presence
in these islands has caused nothing but harmful impacts,
including the contamination of our valleys and bays,
the contamination of air and water,
the presence of dangerous unexploded ordnance on land and undersea,
the stealing of one quarter of our limited land mass,
and the violation of Hawai'i's reputation as a place of aloha
and legal standing as a neutral country.

the U.S. military has no right to be here.

~Joan Lander

Na'alehu, Hawai'i

COMMENT NUMBER

From: Pono Kealoaha - Pearl City, HI D-E-0472
To: deis hrc@govsupport.us
Subject: Time for military Clean-Up NOT Build-Up!
Date: 9/18/2007 1:57:32 AM

Time for military Clean-Up NOT Build-Up! September 17, 2007

I do not support any military expansion in the Hawaii Range Complex. I reject both Alternatives 1 and 2, and I insist on protecting Hawaii (its land, its ocean, its wildlife, and its people) from further harm and degradation caused in large part by the U.S. military, which is the greatest polluter on earth. It is time for military clean up NOT further build up. 1

All of our mother's teach us to clean up after ourselves. It is a basic lesson in life. All of us need to take that lesson to heart, including the U.S. Military – the U.S. Navy.

The Navy says it takes environmental stewardship seriously. If that is the case,
Before the Navy considers Hawaii Range Complex increased Navy training, 2
questions need to be answered.
1. When is the navy going to clean up the 750 contaminated sites, including superfund sites in Pearl Harbor?
2. When is the Navy going to clean up the more than 2000 fifty-five gallon drums of radioactive waste dumped to the ocean floor off Oahu as acknowledged in a Honolulu Star-Bulletin article entitled "Nuclear Waste" of 4 April 1979 by Star Bulletin writer Nadine Scott?
3. When is the Navy going to clean up the nuclear waste dumped directly into Pearl Harbor? The Navy Seas System Command acknowledged discharging 4,843,000 gallons of radioactive liquid waste into Pearl Harbor between 1964-1973, and then it stopped releasing the data.
4. When is the navy going to address its cumulative environmental impacts in Hawaii starting from its direct involvement in the illegal overthrow of the independent nation of hawaii in 1893 when the USS Boston landed 183 armed marines with gattling guns to assist the sugar barons in the treasonous act against the lawful Hawaiian government of Queen Liliuokalani? 3
5. Actually the Navy dirty deeds started six years earlier when the Navy got exclusive use of Pearl Harbor as part of a deal under the so called Bayonet

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

Constitution of 1887 when the sugar planters literally put the bayonets on King David Kalakaua to force concessions. The deal by the Sugar planters giving the U.S. Navy Pearl Harbor appears to have cemented the Navy backing of the Sugar planters in their overthrow of Queen Liliuokalani in 1893.	COMMENT NUMBER D-E-0472 (cont.)

One view of the cumulative impact of navy activities is reflected in a song entitled "Ballad of Pearl Harbor –Matthew 7:6"
"Do not give what is holy to dogs or toss your pearls before swine. They will trample them under foot at best, and perhaps even tear you to shreds."
Matthew 7:6

Some of the words to the song ....
1. We showered you with our pearls but you wanted even more. You took away our mother pearl, raped, plundered, and trampled her. We were blinded by your breath of fire. You made us very proud. We worshipped you not knowing, we were losing our souls.

(Chorus) Take back the pearl for the people, let mother pearl shine again, and give life back to the land, and welcome all of her rainbow children that bridge the ocean of peace.

2. You poisoned the waters and destroyed the fishponds. You killed the fish and the oysters and desecrated holy lands. You put up fences and iron gates. You brought in disease and waves of death.
3. We have been fools but our eyes are now opening. No longer will we worship you or follow in your ways. Depart from us with your poisoned quills and deadly unhatched eggs.

Questions continued:
6. Explain the big oyster kill in 1969 in Pearl Harbor and its relationship to the $80 million dollars in damage to the nuclear powered and armed aircraft carrier Enterprise that was brought into Pearl Harbor for emergency repairs after a rocket accidentally exploded onboard the ship in Hawaiian waters killing 24 and injuring more than 85. Is it a fact that Atomic Energy emergency teams were flown in to Hawaii because of that accident? Release full details of that accident. 4
7. Explain the link between the Navy low frequency navigation and communication towers in Lualualei Valley on the Waianae coast and the increase in Downs syndrome in the area. 5
8. When is the U.S. military going to clean up all the unexploded ordnance 2

COMMENT NUMBER D-E-0472 (cont.)

dumped off the South Kohala coast of Hawaii Island and on Hawaii Island? This one island has more than 57 former military sites, including a land area of 250,000 acres (9 Kaho`olawes in size) littered with unexploded bombs and military toxins. See Army Corps of engineers for details and a map produced by our organization.
9. Pohakuloa Training Area (PTA) on Hawaii Island has now been documented by the Army to be contaminated with Depleted Uranium (DU). Will the navy commit to no fire (live or otherwise) and other training at PTA that could create dust and thereby spread the DU? This action is urged in the interest of community health and safety and the safety of military troops involved in training? 6
10. Where has the Navy used DU as weapons or ballast in Hawaii and the area in the Hawaii Range Complex and the overseas areas addressed in this OEIS? Please explain in detail the quantities used.
11. Navy sonar is reported to be 235dp. That's a lethal level for humans and perhaps other creatures as well. There should be no exemptions for the Navy operating in a whale/marine sanctuary and a marine monument. 7

IN SUMMARY, all of Hawaii (its land, its ocean, its wildlife, and its people) are in the same boat as the Ehime Maru, the Japanese training ship cut in half and sunk causing many deaths by a hot roding U.S. Navy submarine commander. It is time for the U.S. Navy to close its Hawaii Range Complex, pack its bags and ship out of the illegally occupied nation of Hawaii. On your way out, be sure to clean up after yourselves. You have left a big mess in your wake. Your mother, my mother, Mother earth herself, says enough!
It's time for Military Clean-up NOT build up!
Pono Kealoaha McNeil
Kanaka Maoli
Pearlcity ,HI
ILLEAGLLY OCCPUIED SOVEREIGN NATION of HAWAII

alwayz aloha ,
Pono
<img src="http://i17.photobucket.com/albums/b83/ponosize/gg3.gif">

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0473	From: Judy Walker - Hilo, HI To: deis hrc@govsupport.us Subject: EIS comment correction Date: 9/17/2007 10:55:27 PM
1	I'm writing to correct a figure on my previous comments. (In my haste to get my questions sent in a timely manner, I failed to proofread.) On Question # 17, the actual area of 10% mortality for 1 ounce fish is 843,916.5 square feet, or 19.4 acres. Thank you, and I apologize for the confusion-- Judy Walker Hilo, HI

COMMENT NUMBER	
D-E-0474	From: Hugh Y. Starr - Makawao, HI To: deis hrc@govsupport.us Subject: DEIS comments Date: 9/18/2007 2:15:54 AM September 17, 2007 Commander Hawaii Range Complex Pacific Missle Range Facility P.O. Box 128 Kekaha, HI 96752-0128
2	Why is not the elimination of any underwater sonar testing within significant sound range of the Hawaii Humpback Whale National Marine Sanctuary considered as an alternative? If not, why not?
1	Please outline in simple language the discussions regarding "harassment" with respect to sonar activity that is in proximity of marine mammals, especially the various species of whales. Please provide a schedule of relative sound levels (dB's) as one moves away from the source of sonar wave generation.
3	Consider the possible economic impact of the various alternatives on Hawaii's tourism industry.
6	In executive summary ES1.2 Background, please amplify how Hawaii provided advantages to allied forces during Korean and Vietnam wars.
1	Given the critical marine mammal habitat around the Hawaiian Islands, and considering that the PMRF is used for subsurface, surface, air, and space training. Why is not the reduction or elimination of the underwater sonar testing component alone considered?
5	Will the U.S. Navy commit to assuring that frozen mammal head studies are immediately conducted when mammal deaths are found in proximity to sonar testing? If not, why not?

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

Will the U.S. Navy incorporate mitigation measures similar to those implemented by the Australian Navy with respect to sonar testing in proximity to mammal habitat? If not, why not?

Will the U.S. Navy incorporate mitigation measures used by RIMPAC 2006? If not, why not?

Please report on the status of the U.S. Navy's 5-year science and technology objective to ensure adequate research funding for hearing physiology.

Thank you.

Hugh Y. Starr
Makawao, HI

COMMENT NUMBER
D-E-0474 (cont.)

From: Ron Agor
To: deis hrc@govsupport.us
Subject: Draft EIS PMRF
Date: 9/18/2007 2:18:48 AM

Gentlemen/Ladies,

I would like to see a change in the characterization of the beach and shores 1

at PMRF. The Draft EIS refers the beaches and shoreline as being nothing unusual.

The beaches and shores there provide some of the best surfing and swimming areas

on the Island.

The Draft EIS should reflect the importance of the beach and shores of PMRF for

public recreation, in particular surfing. A recommendation to continue keeping the beach

and shores open to the public under existing conditions should certainly be included in

the study.

Aloha!

Ron Agor

Kauai Member

State Board of Land and Natural Resources

COMMENT NUMBER
D-E-0475

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0476

From: Harriet Smith - Pahoa, HI
To: deis hrc@govsupport.us
Subject: EIS Comment from Harriet Smith

Date: 9/18/2007 2:41:50 AM

Please see that this comment is inserted into the record concerning the Navy: EIS on military training in Hawaiian waters

The US Navy is seeking public comment on its hefty study on proposed military training in Hawaiian waters.

I have come to a place where I feel as much endangered as protected by the US military.

I feel that any kind of accelerated/intensified energy in the direction of military might is going a different direction than needed to create the kind of world I want to live in and which may assure the world as we know it exists.

It would help if I could just believe you when you speak but that trust is just missing.

1 I most emphatically want the military to cease and desist anything such as LFAS that would harm sea creatures, especially whales and dolphins.

I have looked deeply into the issue and am fully convinced whales and dolphins are the other intelligent species we have for so long fantasized and looked for, and, as such, must be protected at all costs as absolutely essential to the vibrancy of humanity's future and to the integrity of the planet as we know it and wish it to be.

My deep hope is that the military is less monolithic than it seems from the outside; and that there are new more harmonizing open-minded elements coming up though the ranks that can transform it so it could respond fully to common human needs; because right now from the top down, it is looking pretty lawless and that's pretty scary when you consider that it is you who have the guns.

Yours truly,
Harriet Smith
Pahoa, HI

COMMENT NUMBER
D-E-0477

From: Marguerite Beavers
To: deis hrc@govsupport.us
Subject: Please STOP!

Date: 9/18/2007 2:45:18 AM

1 WE utterly oppose escalation in the Hawaiian Islands of the war military operations buildup/testing program, the high use of energy, the approval process for these actions, the cumulative impacts upon human and animal health, the socio/economic injustice to the native Hawaiian Islanders who live in this militarized, impacted area, radioactive and chemical hazards and problems associated with storage and waste products, the permanency of radioactivity from Uranium munitions in the environment (U-238, for example, has a half-life of 4.5 Billion years), destruction to natural, pristine areas and natural resources and vegetation, the erosion of air quality and water quality of the sea, the financial taxpayers' burden of these military operations, impact on Hawaiian tourism and desirability as a place to live, and the risks to health and safety of humans and all impacted life forms.

Malama Pono,
Marguerite Beavers
by Divine Design

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Maria Walker - Kapaa, HI To: deis hrc@govsupport.us Subject: public hearing on NMFS 062206A Date: 9/18/2007 3:16:12 AM Aloha, I am writing to express my strong opposition to the Navy's conducting of sonar testisng in Hawaiian waters. I believe LFA causes serious and unacceptable damage to marine life where ever it has been tested, and I also strongly believe that the Navy must abide by any and all restrictions placed by coastal commissions or the courts on when and where and at what intensity the sonar can be used. In my opinion, the Navy is not above the law and the interests of national security should not override protecting the ecosystems and animals living in our oceans. I am opposed not only to an expansion of this testing, as the Navy has requested, but am opposed to any further testing of sonar anywhere around the Hawaiian archipelago, a place recognized worldwide as a marine sanctuary for many species, especially whales.	COMMENT NUMBER D-E-0478 1
I am also expressing my appreciation for the extension of the very short public comment period assigned to your deliberations of these important issues. The military presence in the island must make every effort to be a responsible member of our island communities and needs to abide by the wishes of the local community. Giving sufficient time for public comment is the most elementary form of being a "good neighbor" and is the foundation for the trust and continued acceptance of the Hawaiian people. I request that you make your decisions based on the feedback you receive from the residents of the islands, rather that simply acquiescing to whatever requests the Navy makes.	2
In closing, I am calling upon you to prevent the Navy from performing any more sonar testing in and around Hawaii; their request to expand sonar testing, and to test even in the National Marine Sanctuary area, is completely unacceptable. I beleive that even to maintain the status quo is unacceptable, and I strongly urge you to protect all life in the Pacific around Hawaii by preventing the continuation of any LFA testing. Sincerely, Maria Walker Kapaa, HI	3

From: Emil Wolfgramm - Kane`ohe, HI To: deis hrc@govsupport.us Subject: Comments on Navy EIS for Hawai`i Range Complex! Date: 9/18/2007 4:37:13 AM Dear Sirs:	COMMENT NUMBER D-E-0479
The entire idea of using the Hawai`i Range Complex as an experimental site for antisubmarine warfare sonar SHOULD NOT take place due to the fact that the Hawai`i Archipelago is a birthing and nursing site for whale species. The birthing and nursing whale mothers and their offspring will be adversely affected by the sonar warfare use. Select another site other than the Hawaiian Archipelago to do sonar warfare use. Use East Coast sites where there are no whale nursery locations. Go to anothe site where nature will not be harmed. Yours, Emil Wolfgramm. Kane`ohe	1

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-E-0480

From: Sharon Goodwin
To: deis hrc@govsupport.us
Subject: Blanket consent for Hawaii sonar use & military expansion on Kaua'iIsland
Date: 9/18/2007 4:51:07 AM

To the Public Affairs Officer, Pacific Missile Range Facility,

1 I deeply disagree that the US Navy should have blanket authorization for sonar use in and around the Hawaiian Islands.

I do not favor any kind of military expansion on Kaua'i Island.

Sharon Goodwin

COMMENT NUMBER

D-E-0481

From: Marsha Green
To: deis hrc@govsupport.us
Subject: Comments on the Navy's HRC expansion
Date: 9/18/2007 5:09:34 AM

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-E-0481 (cont.)

KAHEA
THE HAWAIIAN-ENVIRONMENTAL ALLIANCE

To: Tom Clements
Pacific Missile Range Facility at Nohili
P.O. Box 128
Kekaha, Kauai 96752-0128

Michael Payne
National Marine Fisheries Service
1315 East-West Highway
Maryland 20910-3225

This is to document our strong opposition to the U.S. Navy's plan to expand wargames in the Hawaiian Archipelago. KAHEA: The Hawaiian-Environmental Alliance is a network of Native Hawaiian cultural practitioners, environmentalists, scientists, and concerned citizens working to protect Hawai'i's unique natural and cultural public trust resources. We have worked along side our allies for more than six years to secure the strongest possible protections Northwestern Hawaiian Islands (NWHI). Due in part to our advocacy, today the state and federal governments both recognize their obligation to protect the profoundly unique marine environment in the NWHI. 1

The Navy's proposed expansion should be rejected because: 1) it contradicts the stated policy of the current President of the U.S. to protect the Northwestern Hawaiian Islands, 2) it lacks sufficient analysis to provide decision-makers with quality information and/or pass the basic EIS-quality inspections, 3) the general public strongly opposes the military presence in Hawai'i.

Naval expansion in the NWHI contradicts the stated policy of the current president

In September 2005, the State of Hawai'i established the visionary NWHI State Marine Refuge (Hawai'i Revised Statutes §13-60.5-1). In June 2006, President George W. Bush followed suit by signing the proclamation establishing the Papahanaumokuakea Marine Monument in the NWHI (50 CFR 404.1). Both regulatory regimes recognize the NWHI as one of the last intact marine ecosystems on earth and impose strict rules to protect the irreplaceable cultural and natural resources in the NWHI. The Navy's proposal to expand its wargames in the Hawaiian Islands, especially the "temporary operating area" (TOA) in the NWHI, directly contradicts the state and federal efforts to protect this cultural and natural wonder of the world. 2

How will the Navy modify its proposed expansion to make it consistent with the state and federal policies to protect the NWHI?

The Public Supports Protecting the NWHI, Rejects Military Expansion

1

COMMENT NUMBER

D-E-0481 (cont.)

The public strongly supports ensuring the strongest possible protections for the NWHI. More than 5,000 people participated in countless public hearings and meetings over the last five years. Most recently, more than 1,000 people have signed a petition in opposition to the Navy's use of sonar.

Insufficient Analysis Upon Which To Base A Decision

This EIS is shocking for its lack of analysis on key issues: 5

a) cultural impact: The Navy's analysis of the impacts on cultural practice and resources from expanded military exercises is woefully insufficient. The Navy must go back and document all of the cultural sites and assess the threat to these irreplaceable resources from their proposed activities. Of key concern are the heiau, ahu, iwi located on the islands of Nihoa and Mokumanamana. 3
b) Chemical pollution: The Navy proposes to release into the environment chemical simulants, chaffe, debris, and other harmful materials, yet fails to adequately analyze the potential harm to the environment and public health. What affect will the accumulation of missile debris have the ecosystem (i.e. toxicity levels)? 4
c) Cumulative impacts: despite the impressive list of identified cumulative impacts from the expanded wargames, that list is not supported by actual analysis of the effect these exercises will have on our beaches, shorelines, and natural predator. 5

Lack of Alternatives Analysis

The Navy's proposal to expand its wargames is deeply flawed because it fails to consider other possible places to impose this sentence. Both state and federal law require an EIS to analyze other locations for the propose activity so as to give the final decision makers all they need to make an informed decision. 6

Navy Expansion Threatens Public Health

The discovery of depleted uranium at Pohakuloa Training Area and likelihood of DU at Makua Training Range means the Navy should cease all live fire events at these locations. The risk of spreading DU to the wider community is simply unacceptable. Please explain how the Navy will aid the community in cleaning up these contaminated locations. How will the Navy modify its proposal to prevent the spread these diseases 7

Navy Plans Jeopardize Significant Cultural Sites 8

The NWHI are extremely important to Native Hawaiian traditional and customary practices. The Draft EIS ignored that the NWHI are revered in Hawaiian history, mele, and oli. The NWHI are the jumping off point into the next life. What mitigations will the Navy undertake to prevent harm to the people and the environment of this true cultural pu'uhonua.

2

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0481 (cont.)

Naval Expansion Harms Endangered Species

9 The NWHI are host to many endangered and threatened species, including the near extinct Hawaiian monk seal and the rare green sea turtle. Falling debris from naval missile interceptions could harm these and other marine wildlife in the NWHI. The Navy also fails to analyze the threat to marine wildlife from the chronic exposure to shrapnel in the sea. In the same way the Navy's presence is killing Albatross chicks today decades after the Navy left Midway, this EIS should anticipate the harm to marine wildlife from decades of exposure to decomposing shrapnel in the environment.

Naval Active Sonar Kills Marine Wildlife

10 Despite the overwhelming evidence supporting a precautionary approach to the introduction of anthropogenic noise into our oceans, the Navy is persisting in planning for the proliferation of ocean noise. This is in total conflict with recognized international environmental practice that promulgates the United Nations Rio Declaration of 1992, which passed through consensus by over 100 member nations, including the United States.

The Navy insists on using selective science and desktop modeling to generate assumptions that cannot be applied in the real and dynamic marine environment, yet dismiss or choose to ignore empirical evidence and calls for caution from the international community.

The mitigation methods proposed by the Navy are woefully inadequate and are not in line with those used by other navies. Our specific concerns follow.

Sound exposure thresholds

11 In the DEIS, the Navy proposes exposing hundreds of thousands of marine mammals to levels of sonar much higher than levels that are known to have caused the stranding and death of whales in the Bahamas in 2000. The whales in the Bahamas stranding died when exposed to between 150 and 160 dB of mid-frequency sonar. Yet the Navy asserts in the DEIS that permanent threshold shift (PTS) and tissue damage will not occur until an exposure level above 215 dB is reached. This argument flies in the face of reason and the best empirical evidence we have.

12 The Navy's argument that behavioral disruption won't occur until above 195 dB (its threshold for Temporary Threshold Shift (TTS)) is equally untenable. Firstly, TTS is not an appropriate indicator of behavioral disruption. It occurs only after much higher exposure levels than more appropriate measurements of behavioral disruption. For example, a published study (Nowacek et al, 2004) indicates that Atlantic right whales stopped foraging and swam rapidly to the surface when exposed to a mid-frequency

COMMENT NUMBER
D-E-0481 (cont.)

alarm of 154 dB. NOAA, NMFS parent agency reportedly characterized this response as "profound."[1]

Additionally, several published studies of harbor porpoises indicate avoidance of mid-frequency sounds at levels well below 140 dB. A study sponsored by the Norwegian navy found that mid-frequency sonar caused killer whales to change their dive pattern and rapidly flee an area at a maximum pressure level of 150 dB (Kvadsheim et al, 2006).

The best available scientific evidence simply does not support the Navy's thresholds and clearly supports the necessity for lower thresholds. In fact, the Navy's 195 and 215 dB thresholds are quite shocking in view of the scientific literature. 13

Stranding data

The Navy commonly argues that it has used sonar for decades without systemic declines in marine mammal populations. This has no meaningful basis since NMFS' stock assessments indicate that no meaningful information on abundance trends is available. 14

Furthermore, if animals are injured or killed around Hawaii the probability of anyone finding their bodies is very remote. Most bodies will sink, be eaten by sharks, or be carried away by the strong currents around Hawaii. If animals do happen to strand the probability of their being found is very low given the many hundreds of miles of unmonitored beaches and the fact that no one was looking. Thus the lack of strandings associated with active sonar use or other anthropogenic noise use is not evidence that animals have not been injured or killed from that use in the past.

Auditory damage is not the only risk

The Navy disingenuously dismisses non-auditory impacts in marine mammals. It assumes that the only risk created by sonar use is auditory damage or PTS which it argues occurs at or above 215 dB. This flies in the face of the scientific evidence and the consensus of leading marine mammal scientists. It is well accepted that the primary threat posed by sonar is not direct tissue damage causing deafness but the fact that cetaceans react to sound at much lower levels in behavioral ways that can indirectly cause injury and death. 15

Scientists agree that sonar can cause a behavioral reaction in that whales (especially beaked whales) panic in response to active sonar and come to the surface too quickly thereby suffering "the bends." The DEIS mentions this phenomenon as a "hypothesis" and states that per Cox et al, 2006, it needs further investigation. It then continues by concluding that rapid ascent would be unlikely to produce the "bends" in beaked whales because they dive deep and remain at depth for long periods and so, per Fahlman et al. (2006) have reduced nitrogen saturation. The converse is true – a rapid ascent from such

[1] Letter from Rodney F. Weiher, Ph.D., NEPA Coordinator, NOAA, to Keith Jenkins, Naval Facilities Engineering Command Atlantic, Jan. 30, 2006 per letter from NRDC to Steve Leathery and Michael Payne, NMFS, May 24, 2006.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0481 (cont.)

16 whales would be and has been lethal. The evidence is that mid-frequency active sonar can kill beaked whales at exposure levels well below the Navy's proposed thresholds for behavioral disruption.

For beaked whales the science indicates that an appropriate and precautionary threshold is a pressure level below 160 dB as indicated by data from the Bahamas stranding (Hildebrand, 2005). A consensus exists in the scientific community that the formation of gas bubbles in tissue, most likely from rapid surfacing in response to sound pressure levels much lower than those that cause tissue damage directly is the most plausible cause of the deaths of beaked whales exposed to noise. Hawaii has been identified as one of the world's 23 known "key areas" for beaked whales (McLeod and Mitchell, 2006) and they will be placed at direct risk from the proposed action.

17 Additionally, the harmful effects of active sonar, in addition to physical injury and death from stranding, include behavioral disruption, habitat displacement and interference with mating, calving, nursing, feeding and communication. Such disruptions can have significant implications for the survival of marine animal populations. The Navy also does not adequately address in the DEIS, the cumulative effects of ocean noise produced by the large number of exercises (1,145 using active sonar alone) around the Hawaiian Islands on the above behaviors.

Geographic issues

18 There are steep seamounts off the Hawaiian Islands which provide a concentrated haven for marine life. To the west of the island of Hawaii there are a number of sea mounts and these waters are also characterized by regular cyclonic eddies which increase productivity and are likely to result in greater densities of cetaceans. These areas should be avoided during sonar use.

The steep seamounts provide important habitat for short-finned pilot whales and three species of beaked whales. Beaked whales are known to be especially sensitive to sonar and their habitat should be avoided in any well-intentioned mitigation plan. Hawaii's oceanic conditions are quite similar to areas where mass strandings have occurred in the past and, thus, it is very risky to conduct war games using sonar around these islands.

Population level impacts

19 The DEIS uses abundance estimated for near shore marine mammals based on aerial surveys (Mobley et al 2000, Mobley et al 2001). These estimates are then used to predict the numbers of affected animals using the Navy's modeling techniques.

Estimates based on estimates can hardly be categorized as good science, especially for deep-diving marine mammal species which are hard to observe and are likely the most susceptible to noise. Furthermore behavioral impacts, including the disruption of foraging or the displacement of marine mammals, could have population level effects especially when the impacts are repeated. Certainly it appears that a single sonar exercise

COMMENT NUMBER
D-E-0481 (cont.)

in the Bahamas resulted in the death or displacement of a population of beaked whales in the area. Yet the Navy is only concerned with species-level impacts.

Dr. Robin Baird, a marine mammal scientist who has conducted extensive research on whale and dolphin populations of the Hawaiian Islands and whose abundance data is used in the DEIS, notes the genetic studies of all species studied so far around the Hawaiian Islands have indicated that these animals are reproductively differentiated from animals elsewhere in the tropical Pacific (Chivers et al, 2001; Martien et al, 2005; Andrew et al, 2006). In the case of spinner and bottlenose dolphins there appears to be multi-population structures within the Hawaiian Islands with genetic differences among populations and no evidence of movements of individuals among the four main groups of islands. Yet the Navy states that the abundance estimates can be based for most populations on the entire Hawaiian Exclusive Economic Zone.

Based on genetic and photo ID evidence (Baird et al 2002, 2003, 2006) there are likely small, reproductively isolated odontocete populations around each island. Thus, it is likely that the Navy has strongly underestimated the proportion of some populations that may be taken by the action and consequently the probability of population level impacts is significantly higher than discussed in the DEIS.

Of particular concern is the potential population-level impacts on melon-headed whales. 20
NMFS most recent stock assessment (Caretta et al, 2006) sets the level of potential biological removal for Hawaiian melon-headed whales at 14 whales per year. By comparison, at least 150 melon-headed whales were embayed off Kauai during the 2004 RIMPAC exercises. Had efforts to lead the whales back to sea not been successful, the loss could potentially have been over ten times greater than what, according to NMFS, the Hawaiian stock can annually absorb. This is a very serious issue that has not been adequately considered.

Mitigation

The DEIS does not include even those few additional mitigation measures it agreed to include during the RIMPAC 2006. The Navy's proposed mitigation measures are ineffective and inadequate. There are no dedicated marine mammal observers and the Navy's paltry description of its 'marine species awareness training' does not appear adequate. Many of the marine mammal species are deep diving and remain beneath the surface for more than an hour.

Whales are difficult to spot in rough water and windy weather and are almost impossible to spot at night. Thus visual detection is very inadequate. Passive acoustic detection is only effective when whales are vocalizing which not all whales do and is only effective at certain frequencies. We do not agree with the Navy's 'mitigation safety zone' of 1,000 yards (175 db RL) and contend that active sonar impacts can occur beyond this isopleth and beyond the field of view of an observer on a ship.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0481 (cont.)

The Navy cannot have much confidence in its marine mammal detection methods since it allows for the eventualities of animals getting as close as 200 yards from the sonar dome. However, if a marine mammal is detected within 1,000 yards of the sonar dome the Navy says that the sonar will be reduced by 6dB from 235 to 229 dB. This is still incredibly loud and many thousands times more intense than the sonar that killed the whales in the Bahamas incident.

Similarly a reduction of 10 dB will be made if an animal is observed within 500 yards of the dome. The Navy will only cease operation of the sonar if a marine mammal is observed within 200 yards of the dome. Whales have been injured and killed at greater distances from the source than 200 yards. The Navy will not slowly ramp up transmissions to allow whales to leave the area before the sonar is intensified, citing operation impediment as the reason.

In the DEIS the Navy appears to have selected training sites where active sonar will be used based entirely on its own operational needs and convenience. It does not make allowances for marine mammal escape routes or require that ships avoid embayments, even though NMFS concluded the Navy's sonar use in 2004 was the "plausible, if not likely, contributing factor" in the causation of Hanalei Bay, Kaua'i incident in which 150-200 melon headed whales 'milled' in an unusual manner in the shallows of Hanalei Bay for over 28 hours.

Other navies use more effective mitigation procedures.

The NATO Undersea Research Center requires much stricter measures for the protection of marine mammals during high intensity active sonar use. Sonar test sites are selected only after an environmental assessment has considered known marine mammal habitat and noise propagation. Sonar test sites are selected to avoid enclosed areas and coastal areas with complex steep sea bed topography. Ship tracks are planned to provide marine mammal escape routes and avoidance of embayments. Operations are suspended if marine mammals enter the safety zone which is defined as the area ensonified to 160 dB for large whales. The safety zone for endangered species, or for Cuvier's beaked whales is twice the above-mentioned safety zone.

The Australian Navy also takes more cautious and significant steps to minimize harm to marine life from sonar exercises. It has seasonal and geographic restrictions on the use of the mid-frequency sonar system at its highest power levels. It avoids transmissions with source levels greater than 210 dB within 30 nautical miles off certain coastlines during times when whales are likely to be present and uses lower power levels in conditions that may produce surface ducting or embayments. The Australian Navy also avoids seamounts and monitors a 4,000 yard safety zone for 30 minutes prior to sonar transmission. Similarly it maintains this 4,000 yard safety zone during active sonar transmissions and institutes immediate shut-down procedures if a marine mammal is detected within the safety zone.

COMMENT NUMBER
D-E-0481 (cont.)

The U.S. Navy can and has complied with the Australian Navy's mitigation methods, for example during Operation Talisman Saber in 2007. Therefore for the Navy to be aware of the existence and implications of more stringent mitigation methods, to have implemented them and then to not use them elsewhere is unsatisfactory.

The Navy has in the past employed more effective mitigation measures in Hawaiian waters than it is proposing in this DEIS. In RIMPAC 2006 the Navy adopted larger marine mammal safety zones, had at least one dedicated marine mammal observer, implemented restrictions on exercises involving the use of active sonar taking place in channels between islands with steep underwater topography and instituted a reduction of power levels in conditions of low visibility. These improved mitigation procedures in RIMPAC 2006 were only implemented after the courts deemed the Navy's proposed mitigation to be inadequate.

The Navy should be adhering to much stricter mitigation methods in use by other navies for similar exercises and to include those that the U.S. Navy when required to, has used before. These stricter mitigation methods should include restrictions on active sonar use to avoid seasonal migrations such as the migration of endangered humpback whales into the US Hawaiian Islands Humpback Whale National Marine Sanctuary and avoiding seamounts and other sensitive habitats frequented by marine mammals, especially vulnerable beaked whales. 21

We appreciate the opportunity to submit these comments and look forward to them being addressed in full.

Sincerely,

Marsha Green
North American Representative

Marti Townsend
Hawaiian Ocean Noise Coalition

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0481 (cont.)

References

Andrews, K. R., Karczmarski, L., Au, W.W.L., Rickards, S.H., Vanderlip, C.A., and Toonen, R.J. (In press) Patterns of genetic diversity of the Hawaiian spinner dolphin (Stenella longirostris), Atoll Research Bulletin.

Baird, R.W., Gorgone, A.M. and Webster, D.L. (2002) An examination of movements of bottlenose dolphins between islands in the Hawaiian Island chain. Report prepared under Contract NO. 40JGLNF110270 for the National Marine Fisheries Service Southwest Fisheries Science Center, La Jolla, Calilfornia.

Baird, R.W., McSweeney, D.J., Webster, D.L., Gorgone, A.M., and Ligon, A.D. (2003) Studies of odontocete population structure in Hawaiian waters: results of a survey through the main Hawaiian Islands in May and June 2003. Report prepared under Contract No. AB133F02-CN-0106 for the National Marine Fisheries Service, NOAA.

Baird, R.W., Schorr, G.S., Webster, D.L., Mahaffy, S.D., Douglas, A.B., Gorgone, A.M., and McSweeney, D.J. (2006) A survey for odontocete cetaceans off Kauai and Niihau, Hawaii during October and November 2005: evidence for population structure and site fidelity. Report prepared under Order No. AB133F05SE5197 for National Marine Fisheries Service Pacific Islands Fisheries Science Center, Honolulu, Hawaii.

Caretta, J.C., Forney, K.A., Muto, M.M., Barlow, J. Baker, J., Hanson, B. and Lowry, M.S. (2006) U.S. Pacific Marine Mammal Stock Assessments: 2005, NOAA Tech. Memo. NOAA TML-NMFS-SWFSC-388.

Chivers, S.J, LeDuc, R.G. and Baird, R.W. (2003) Hawaiian island populations of false killer whales and short-finned pilot whales revealed by genetic analyses. P.32 in Abstracts of the 15th Biennial Conference on the Biology of Marine Mammals, 14-19 December 2003, Greensboro, North Carolina.

Cox, T.M., et. al., Why beaked whales? Report of workshop to understand the impacts of anthropogenic sound. 2006 J. Cetacean Res. Manag. (7), 177 -187.

Fahlman, A., A. Olszowka, B. Bostrom, and D. R. Jones, 2006. Deep diving mammals: dive behavior and circulatory adjustments contribute to bends avoidance. Respiratory Physiology and Neurobiology. 153:66-77.

Hildebrand, J.A. (2005) Impacts of anthropogenic sound. In Marine mammal research: conservation beyond crisis. Edited by J.E. Reynolds, III, Perrin, W. F., Reeves, R. R., Montgomery, S. and Ragen, T. J. Johns Hopkins University Press, Baltimore, Maryland. Pp. 101-124.

Kvadsheim, P., Benders, F. Miller, P., Doksaeter, L., Knudson, F. Tyack, P., Nordlund, N., Lam, FP., Samarra, L. K. and Gode, O.R. (2006) Herring, killer whales and sonar. 3S-2006 cruise report with preliminary results prepared for Norwegian Defense Research Establishment, Maritime Systems, Norway.

MacLeod, C.D.and Mitchell, G. (2006) Known key areas for beaked whales around the world. J. Cetacean Management and Research 7(3): 309-322.

Martien, K., Baird, R. W., and Robertson, K. (2005) Population structure of bottlenose dolphins around the main Hawaiian Islands. Paper presented to the Pacific Scientific Review Group, January 2005.

COMMENT NUMBER
D-E-0481 (cont.)

Mobley, J. R., Spitz, S.S., Forney, K. A., Grotefendt, R., and Forestell, P.H. (2000) Distribution and abundance of odontocete species in Hawaiian waters: preliminary results of 1993-98 aerial surveys. National Marine Fisheries Service Southwest Fisheries Science Center Administrative Report LJ-00-14C.

Mobley, J.R., S.S. Spitz, and R. Grotefendt, 2001. Abundance of humpback whales in Hawaiian waters: Results of 1993-2000 aerial surveys, Report prepared for the Hawaii Department of Land and Natural Resources and the Hawaiian Islands Humpback Whale National Marine Sanctuary, NOAA, U.S. Department of Commerce.

Nowacek, D.P., Johnson, M. P. and Tyack, P. L. (2004) North Atlantic right whales (Eubalaena glacialis) ignore ships but respond to alerting stimuli. Proceedings of the Royal Society of London, B 271, 227-231.

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

From: Akahi Nui - Maui, HI
To: deis hrc@govsupport.us
Subject: DECLARATION OF DEFAULT

Date: 9/18/2007 5:23:16 AM

Kingdom of Hawai i
Majesty Akahi Nui, Trustee Sovereign Nation of God

Moku aina O Wailuku, Mokupuni O Maui,
Ke Aupuni O Hawai I

COMMANDER LEACH
C/O Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawaii [96752]

REFUTATION TO ANSWER WITHIN (7) SEVEN DAY(S) NOTICE OF OFFICIAL PROTEST OF US NAVY LOW/MID FREQUENCY SONAR EXERCISES IN HAWAIIAN WATERS WITH EXHIBIT "A" HAWAIIAN ISLAND ALLODIAL LAND TITLE DEED AND DECLARATION AND COMMON LAW LIEN WITH AN ORDER TO RECIEVE AN ANSWER OF TRUE AND LAWFUL DOCUMENTED FACTS OF EVIDENCE OF JURISDICTION WITHIN (7) SEVEN DAY(S)

DEPARTMENT OF THE NAVY, COMMANDER, UNITED STATES PACIFIC FLEET, Public Affairs Officer Pacific Missile Range Facility, United States National Marine Fisheries Service, Michael Payne, US DEPARTMENT OF DEFENSE, STATE OF HAWAII, STATE OF HAWAII DEPARTMENT OF PLANNING, and 1 THROUGH 1000 John Does and Jane Does.
DECLARATION OF DEFAULT

COMMENT NUMBER D-E-0482

1

IN THE MATTER OF
ownership and jurisdiction of soil of the Hawaiian Islands, and the Pacific Ocean, SEE Bureau of Conveyance document numbers: Deeds 2002-005573 through 2002-005574 (Oahu) ,Deeds 2002- 005579 through 2002-005580 (Maui), 2002-005577 through 2002-005578 (Hawai'i), and 2002-005575 through 2002-005576 (Kauai)

The above Demandant(s) Kingdom of Hawaii, Sovereign Nation of God under His Royal Hawaiian Majesty Akahi Nui King of the Hawaiian islands, indigenous aboriginal inhabitants Na Kanaka maoli, Hawaii Nationals and Hawaiian citizens of the lawful independent nation.

COME NOW, the Demandant(s) Kingdom of Hawaii, Sovereign Nation of God under His Royal Hawaiian Majesty Akahi Nui King of the Hawaiian islands, indigenous aboriginal inhabitants Na Kanaka maoli, Hawaii Nationals and Hawaiian citizens of the lawful independent nation; and hereby file thier Declaration of Default against COMMANDER LEACH, DEPARTMENT OF THE NAVY, COMMANDER, UNITED STATES PACIFIC FLEET, Public Affairs Officer Pacific Missile Range Facility, United States National Marine Fisheries Service, Michael Payne, US DEPARTMENT OF DEFENSE, STATE OF HAWAII, STATE OF HAWAII DEPARTMENT OF PLANNING, and 1 THROUGH 1000 John Does and Jane Does.

That on the 23rd day of August, 2007, time on or about 8:45 P.M., NOTICE OF OFFICIAL PROTEST OF US NAVY LOW/MID FREQUENCY SONAR EXERCISES IN HAWAIIAN WATERS WITH EXHIBIT "A" HAWAIIAN ISLAND ALLODIAL LAND TITLE DEED AND DECLARATION AND COMMON LAW LIEN WITH AN ORDER TO RECIEVE AN ANSWER OF TRUE AND LAWFUL DOCUMENTED FACTS OF EVIDENCE OF JURISDICTION WITHIN (7) SEVEN DAY(S) was

COMMENT NUMBER D-E-0482 (cont.)

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0482 (cont.)

signed for by Commander Leach at the Baldwin High School Cafeteria,
Wailuku,
Maui, Hawaii.

I have hereunto set my hand and caused the Great Seal of the Kingdom and Islands of Hawaii to be affixed on this Seventeenth day of the Ninth month in the holy year of our Lord Iesu Kristo Two Thousand and Seven.

In Sacred Trust, I am;

Majesty Akahi Nui
Lineal Descent Sovereign Heir of Hawaii
& Trustee of the Kingdom of Hawaii Nation Ministry Trust

COMMENT NUMBER
D-E-0484

From: Rayne Regush - Kauai, HI
To: deis hrc@govsupport.us
Subject: Comments-HawaiiRangeComplex-EIS/OEIS
Date: 9/18/2007 9:33:55 AM

September 17, 2007

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128,
Kekaha, Kauai, Hawaii, 96752-0128

ATTN: HRC EIS/OEIS

I do not support any military expansion in the Hawaii Range Complex, and reject both Alternatives 1 and 2. Instead, the Navy should ensure that it protects and defends Hawaii's land, its ocean, its wildlife, and its people from further military harm and degradation. 1

The Navy could avoid all marine habitats where whales are known to migrate, feed, and raise their young. These common-sense precautions would not compromise
military readiness.

The impacts of military expansion is not fully acknowledged or sufficiently mitigated in the DEIS. 2

The social impacts on Kauai have not been sufficiently addressed. 3

Proposed military expansion should be put to a vote of all island residents. 1

I fully reject Alternatives 1 and 2 and the unfair pro-military bias of the DEIS/OEIS.

Sincerely,

Rayne Regush
Kapaa, Kauai, HI

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER	
D-E-0485	From: Jeri Baumgardner - Holualoa, HI To: deis hrc@govsupport.us Subject: Sonar testing Date: 9/18/2007 11:32:38 AM
1	Please add me to the growing list of citizens opposed to the use of low frequency sonar testing in 'war games' near the Hawaiian Islands and anywhere that precious marine mammals are likely to be impacted. Thank You Jeri Baumgardner Holualoa, HI

COMMENT NUMBER	
D-E-0486	From: J.J. Holt Jr. - Kailua-Kona, HI To: deis hrc@govsupport.us Subject: Citizen's Input on Draft EIS/OEIS - Hawaii Range Complex Date: 9/18/2007 7:22:54 PM One citizen and Hawaii resident's views on the Navy's Draft EIS/OEIS for the Hawaii Range Complex: Greetings:
1	While I certainly recognize the need for military exercises and weapons testing, I would urge the Navy and those in charge to consider the following: Hawaii is one of the earth's most unique and fragile ecosystems. While consideration in military exercises nowadays incorporates environmental concerns to a greater, or lesser extent, I would urge you to take vastly more stringent steps to safeguard the Hawaiian islands, their ecosystem and the ocean life in all surrounding waters. Next to human life, this is one of our most precious resources. If any exercises could be transferred to other areas, that would be a good first step. Obviously all military services operate on a budget, but consider the possibility for procuring additional funds and transferring some of the exercises and testing elsewhere. The public, such as myself could be a formidable ally in this regard. Bottom-line, if it turns-out that military exercises and weapons testing are not only ongoing, but become much more prevalent in this geographic area, then every possible precaution should be taken to eliminate, or mitigate any harm and damage from occurring to Hawaii, the environment and the ocean life. This may have to go far above-and-beyond the actual regulations, regardless of cost and proximity. If exercises are conducted (as it indeed seem they will be), I would further urge that they be held as far away from the Hawaiian island

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0486 (cont.)

as is possible, while still staying within your dictated area.

Finally, thank you for this opportunity to give my input and I hope that it falls on responsive ears, of individuals who are not afraid to take action, and will consider alternatives to their plans.

Sincerely,

Mr. J.J. Holt Jr.

Kailua-Kona, Hawaii
U.S.A.

COMMENT NUMBER
D-E-0487

From: Claire Mortimer - Kilauea, HI
To: deis hrc@govsupport.us
Subject: Public comment on Navy EIS
Date: 9/18/2007 8:15:04 PM

To Whom It May Concern:

I stand firmly opposed to the Navy's plans for expansion of training operations at the Hawai'i Range Complex and Pacific Missile Range Facility.

The history of environmental degradation caused by such training exercises around the world, and particularly in Hawaii, leaves no doubt that the plans to expand Navy training exercises will cause irreparable harm to Kauai.

Mid-frequency sonar will destroy uncountable numbers of fish and marine mammals. 2

Expeditionary Assault Activities will tear up beaches and dunes between Polihale and Barking Sands. 3

Worse is the Directed Energy Laser Weapons Program. These are chemical lasers in which use hydrogen fluoride, a corrosive material which can be made to release a powerful burst of infrared radiation. 4

The laser can be focused and aimed as a weapon (death ray).

These laser can generate least 25 megawatts of energy that could destroy a missile 2,000 miles away. For the scale of this, consider that 25megawatts is half the electrical power generating capacity of Kauai.

The firing of this weapon also destroys the lasing device and contaminates the site with hydrogen fluoride. A thousand foot radius danger zone, that could close the state park, will persist for days.

The immediate and long-term health consequences for the people of Kauai,

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-E-0487 (cont.)

expecially children and elderly, are unknown.

The Navy has not told us what effect on the environment hydrogen fluoride waste will have. What if there is a heavy rain and runoff after a test? What effect on coral reefs and offshore marine life would there be from hydrogen fluoride contaminated runoff into the ocean? What efforts will guarantee the safety of people using the access road to Poli Hale State Park after a test?

In its Navy's EIS executive summary it simply says, "Appropriate remedial procedures would be taken before initiatin of potentially hazardous laser operations on PMRF."

That is inadequate and unacceptable.

We must also accept the ethical responisiblity that arises from our collusion with a plan which is intended to bolster our ability to cause death to countless men, women and children around the world.

5

We must not blindly follow wherever the military leads in a knee-jerk desire for "security." True security rises from a people's ability to provide
for their basic needs in a sustainable way while protecting their environment.

I strongly urge you do deny the Navy's expansion plans.

Sincerely,

Claire Mortimer

Kilauea, HI

COMMENT NUMBER

Exhibit 13.4.2-1. Copy of Email Documents - Draft EIS/OEIS (Continued)

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS

Commenter	Comment #	Resource	EIS Section	Response Text
Pearl Johnson	D-E-0038-1	Alternatives	4.1.2.4, 4.1.2.4.11	The use of sonar as presented in the EIS/OEIS does not violate the MMPA. Takes may be authorized as long as negligible impact occurs. Sonar does not violate NEPA, as this is a process statute.
Elizabeth Connors	D-E-0042-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
Randyl Rupar	D-E-0043-1	Biological Resources - Marine	3.2, 4.2, 4.8	The EIS/OEIS provides an analysis of the potential impacts on the Monument in Section 4.2. The EIS/OEIS notes that Presidential Proclamation 8031, which established the Monument, made the prohibitions required in the Proclamation, such as the prohibition on entry into the Monument, inapplicable to activities and exercises of the Armed Forces. The EIS/OEIS also acknowledges that it is the Navy's obligation to ensure that all "activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities."
Joel Fischer --University of Hawai'i	D-E-0050-1	Cumulative Impacts		Detailed analysis for the permanent stationing of the 2/25th Stryker Brigade Combat Team is beyond the scope of this EIS/OEIS but can be found at the following website: http://www.sbct-seis.org/. However, cumulative impacts from Army activity are considered in Chapter 5.0 of this EIS/OEIS.
David H Dinner	D-E-0055-1	Program		Thank you for your comment.
Ru Carley	D-E-0057-1	Alternatives	4.1.2.4, 4.1.2.4.11	There are no known strandings or marine mammal deaths as a result of sonar use in the Hawaiian Islands, but there are uncertainties. While there have been incidents occurring in other locations, the context of those incidents and marine mammals in Hawaii are different. Section 4.1.2.4 of the EIS/OEIS explains the potential effects on marine mammals from Navy mid-frequency active (MFA) sonar in the HRC. MFA sonar use analyzed in the EIS/OEIS is not new and has occurred in the HRC using the same basic sonar equipment and output for over 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. NMFS can authorize mortality as long as negligible impact is found.
Juan Wilson	D-E-0060-2	Cumulative Impacts	5.3.11	Guidance regarding depleted uranium provided to users of Pohakuloa Training Area will be followed. 'Your comments regarding the use of the Superferry for military activities are noted but are outside the scope of this EIS/OEIS. Given the location of the ferry water lanes, it is not anticipated that the increased vessel traffic from this commuting ferry will contribute to the cumulative effects when assessed in combination with the actions proposed in this EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Juan Wilson	D-E-0060-3	Program	4.1.1.3 and 4.1.5.3	Projected RDT&E laser programs do not include the use of hydrogen fluoride, and therefore the use of hydrogen fluoride is not part of the Proposed Action. Construction of the Directed Energy Test Center, which may include a high-energy laser program, would require separate and additional environmental documentation initiated from the program office for Directed Energy. Analysis is included in this EIS/OEIS as Alternatives 2 or 3 and includes the development of the necessary standard operating procedures and range safety requirements necessary to provide safe operations associated with directed energy R & D. Directed energy is discussed in Section 2.2.4.4 and the impacts are analyzed in airspace and health and safety sections (see Sections 4.1.1.3 and 4.1.5.3).
Eric Hanson	D-E-0062-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7, 12	Based on this EIS/OEIS, Navy's Coastal Consistency Determination reviewed the activities proposed internal or external to the Humpback Whale National Marine Sanctuary, and find them to be within the range of activities previously reviewed and allowed by the Sanctuary as indicated in 15 CFR Part 922, Subpart Q. None of the activities have been modified such that they would be likely to destroy, cause the loss of, or injure any Sanctuary resource in a manner significantly greater than what had been previously reviewed by NOAA at the time of the Sanctuary's creation. Under the Sanctuary regulations, military activities are allowed within the sanctuary and not subject to vessel/aircraft approach distances, discharge of materials prohibitions within the sanctuary and consultation requirements if they are "classes of military activities, internal and external to the Sanctuary, conducted prior to 1997" (provided in Exhibit C-1 of the EIS/OEIS). Proposed military activity after 1997 is also allowable but subject to prohibited activities such as vessel/aircraft approach to humpback whales and discharge of materials. Sections 3.2 and 4.2 of the EIS/OEIS reviewed the NWHI Marine Monument. Navy notes that Presidential Proclamation 8031 (71 FR 36443, June 26, 2006), which established the Monument under the authority of the Antiquities Act (16 U.S.C. 431), made the prohibitions required in the Proclamation, such as the prohibition on entry into the Monument, inapplicable to activities and exercises of the Armed Forces. Navy acknowledges, as stated in the Proclamation, that it is their obligation to ensure that all "activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities." Consideration has also been given to Executive Order 13089 of June 11, 1998, "Coral Reef Protection," and consistent with the policies stated in that Order, to the extent permitted by law, the Navy will ensure that the Proposed Actions will not degrade the conditions of U.S. coral reef ecosystems.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Eric Hanson	D-E-0062-2	Alternatives	4.1.2.4, 4.1.2.4.11	Section 4.1.2.4 of the EIS/OEIS explains the potential effects on marine mammals from Navy mid-frequency active (MFA) sonar in the HRC. MFA sonar use analyzed in the EIS/OEIS is not new and has occurred in the HRC using the same basic sonar equipment and output for over 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Over the past 30 years, the numbers of marine mammals around Hawaii appear to be increasing and there are no indications that sonar has affected marine mammals. As discussed in Section 4.1.2.4.11, the Navy believes that evidence not considered previously involving the Hanalei "stranding" of July 2004 indicates that the full moon could have been a contributing factor in terms of bringing the animals closer to the shore. A few strandings of beaked whales have occurred elsewhere (locations far from Hawaii) that seem to be related to MFA sonar in combination with specific ocean conditions. Strandings of beaked whales associated with sonar have not happened in Hawaii to anyone's knowledge.
	D-E-0062-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	The use of hazardous materials is inherent in most military training activities and cannot be avoided. However, analysis within this EIS/OEIS indicates that there will no significant effects on the environment from hazardous materials usage. Discussions of hazardous materials and waste can be found throughout Chapters 3.0 and 4.0 and in Section 5.3.6.
	D-E-0062-4	Cultural Resources	Appendix H	EIS cultural resources analysts comprehensively research affected areas by reviewing reports, histories, maps and databases that describe the types of resources known and expected within the area affected by the proposed activities. Sections of the EIS/OEIS are prepared based on this information, which covers prehistoric, historic, traditional and modern usage of the lands and underwater areas. Documents for the protection of cultural resources at affected locations (which includes mitigation measures such as monitoring during construction) have been developed through consultation with various local agencies and native Hawaiian groups. These include Integrated Cultural Resources Management Plans (ICRMPs), Memoranda of Agreement (MOAs), and Programmatic Agreements (PAs), which specify mitigation measures and contingencies for unexpected discoveries of cultural materials. In addition, there is close coordination between construction personnel and installation cultural resources managers to ensure site protection; additional consultation with agencies and native Hawaiian groups is conducted as situations arise.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Eric Hanson	D-E-0062-5	Program	1.1, 1.2, 1.3	The training events that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. As noted in Sections 1.1 through 1.3, the requirement to have a trained and prepared naval force is not a discretionary matter. The Navy's mission is to maintain, train, and equip combat-ready naval forces capable of winning wars, deterring aggression and maintaining freedom of the seas. This mission is mandated by Federal law. Title 10, Section 5062 of the U.S. Code requires the Navy to be organized, trained, and equipped for prompt and sustained combat incident to operations at sea. The Navy is responsible for the preparation of forces necessary for the effective prosecution of war. Training is a vital component of the Navy's mission obligation.
John Cusick	D-E-0063-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0063-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0063-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0063-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0063-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Email alohajai	D-E-0064-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0064-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0064-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0064-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0064-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jonathan Boyne	D-E-0065-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0065-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0065-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0065-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0065-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kylie Polzin	D-E-0066-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kylie Polzin	D-E-0066-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0066-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0066-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0066-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Janice Brencik	D-E-0067-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0067-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0067-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0067-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0067-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Nancy O'Harrow	D-E-0068-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0068-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0068-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0068-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0068-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
J. Scott Daniels	D-E-0069-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0069-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0069-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0069-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0069-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Maya Moiseyev	D-E-0070-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0070-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0070-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0070-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Maya Moiseyev	D-E-0070-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Momi Wheeler	D-E-0071-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0071-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0071-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0071-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0071-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Donald Stevens	D-E-0072-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0072-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0072-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0072-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0072-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Ilana Waxman	D-E-0073-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0073-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0073-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0073-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0073-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Cheryl Rosenfeld	D-E-0074-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0074-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0074-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0074-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0074-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Mary K Gionson	D-E-0075-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0075-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Mary K Gionson	D-E-0075-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0075-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0075-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jim Albertini	D-E-0076-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0076-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0076-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0076-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0076-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Holly Lazo	D-E-0077-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0077-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0077-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0077-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0077-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Den Mark Wichar	D-E-0078-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0078-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0078-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0078-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0078-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Nadine Newlight	D-E-0079-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0079-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0079-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0079-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0079-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Pat Porter	D-E-0080-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0080-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0080-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0080-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0080-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Dick Artley	D-E-0081-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0081-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0081-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0081-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0081-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Helen Anne Schonwalter	D-E-0082-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0082-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0082-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0082-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0082-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Martha Hodges	D-E-0083-1	Biological Resources - Marine	3.2, 4.2, 4.8	See response to comment D-E-0043-1.
	D-E-0083-2	Alternatives	5	The Navy has made every effort to provide objective, sound environmental analysis based on the best available scientific data. Detailed analysis for the permanent stationing of the 2/25th Stryker Brigade Combat Team is beyond the scope of this EIS/OEIS but can be found at the following website: http://www.sbct-seis.org/. However, cumulative impacts from Army activity are considered in Chapter 5.0 of this EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Martha Hodges	D-E-0083-3	Alternatives	2.2.1.3	As stated in Section 2.2.1.3 of the EIS/OEIS, the use of computer simulation was considered as an alternative. Under this alternative considered, naval training would be completed through the use of simulation in place of actual exercises. Computer simulators and other types of simulation training tools are already used extensively in the Navy's training programs. While computer simulation is essential in training, it cannot substitute the high-stress environment that is encountered during actual non-training situations. This alternative was deemed inadequate since it would fail to meet the purpose and need of the Proposed Action of the EIS/OEIS.
	D-E-0083-4	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The cleanup of existing remediation sites is not discussed in this EIS/OEIS because the proposed activities are unrelated to ongoing or planned remediation of historical contamination.
Philip Simon	D-E-0085-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0085-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0085-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0085-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0085-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Robert Wagner	D-E-0086-1	Alternatives	4.1.2.4.2, 4.1.5.1.1	New low-frequency active (LFA) sonar language has been added to the EIS/OEIS, Section 4.1.2.4.2 and 5.0 to avoid further confusion. Comparisons between humans and marine mammals with regard to hearing are not valid. Furthermore, the reference to "a limit of 145 dB for human divers," does not appear in the HRC EIS/OEIS and may stem from materials presented in reference to use of LFA sonar, which is not part of the Proposed Action in this EIS/OEIS. As stated in Section 4.1.5.1.1, research was conducted for mid-frequency active (MFA) sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonar. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Robert Wagner	D-E-0086-2	Biological Resources - Marine	1.1, 1.2, 1.3, 3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary) - The training exercises that are conducted within the HRC are not recreational but necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. As noted in Sections 1.1 -1.3, the requirement to have a trained and prepared Naval force is not a discretionary matter.
Email stfpare	D-E-0087-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0087-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0087-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0087-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0087-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Chris Perritt	D-E-0088-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0088-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0088-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0088-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0088-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
William Golove	D-E-0089-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0089-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0089-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0089-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0089-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kelly Silberstein	D-E-0090-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0090-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0090-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0090-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kelly Silberstein	D-E-0090-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Harvey Arkin	D-E-0091-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0091-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0091-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0091-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0091-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Pilipo Souza Leota	D-E-0092-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0092-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0092-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0092-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0092-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kathlen Ireland	D-E-0093-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0093-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0093-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0093-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0093-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Email katrinaa	D-E-0094-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0094-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0094-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0094-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0094-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Graham Parkes	D-E-0095-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0095-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Graham Parkes	D-E-0095-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0095-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0095-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Elisha Belmont	D-E-0096-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0096-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0096-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0096-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0096-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Joseph Bateman	D-E-0097-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0097-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0097-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0097-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0097-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Bobbie Alicen	D-E-0098-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0098-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0098-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0098-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0098-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Ralph Davis	D-E-0099-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0099-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0099-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0099-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0099-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Selina Heaton	D-E-0100-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0100-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0100-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0100-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0100-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Dick Miller	D-E-0101-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0101-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0101-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0101-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0101-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Virginia Walden	D-E-0102-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0102-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0102-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0102-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0102-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kaj Dorstenia	D-E-0103-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0103-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0103-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0103-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0103-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Shannon Rudolph	D-E-0104-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0104-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Shannon Rudolph	D-E-0104-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0104-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0104-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jacqueline Remington	D-E-0105-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0105-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0105-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0105-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0105-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Pete Doktor	D-E-0106-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0106-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0106-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0106-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0106-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Alexander Jelinek	D-E-0107-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0107-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0107-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0107-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0107-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Sara Hayes	D-E-0108-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0108-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0108-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0108-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0108-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Odette Rickert	D-E-0109-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0109-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0109-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0109-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0109-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kaleopono Norris	D-E-0110-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0110-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0110-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0110-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0110-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Bryson Embernate	D-E-0111-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0111-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0111-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0111-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0111-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Dawn Wooten	D-E-0112-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0112-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0112-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0112-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0112-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kathy-Lyn Allen	D-E-0113-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0113-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kathy-Lyn Allen	D-E-0113-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0113-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0113-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Hana Hill	D-E-0114-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0114-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0114-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0114-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0114-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Marilyn Mick	D-E-0115-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0115-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0115-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0115-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0115-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Christine Kauahikau	D-E-0116-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0116-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0116-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0116-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0116-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jon Schmitz	D-E-0117-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0117-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0117-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0117-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0117-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Dafydd Nicholas	D-E-0118-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0118-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0118-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0118-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0118-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Douglas Phillips	D-E-0119-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0119-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0119-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0119-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0119-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Carmen Stevens	D-E-0120-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0120-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0120-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0120-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0120-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Dafydd Nicholas	D-E-0121-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0121-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0121-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0121-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0121-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Maureen O'Dea Spencer	D-E-0122-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0122-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Maureen O'Dea Spencer	D-E-0122-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0122-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0122-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
	D-E-0122-7	Socioeconomics		The Navy takes its environmental stewardship role seriously, complies with all applicable environmental laws, and has established procedures to ensure that programs are protective of Hawaii's environment. Your comment regarding competitive commercial fishing is noted, but is beyond the scope of this EIS/OEIS.
David Meanwell	D-E-0123-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0123-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0123-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0123-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0123-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Amanda Sims	D-E-0124-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0124-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0124-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0124-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0124-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Fred Dodge	D-E-0125-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0125-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0125-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0125-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0125-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Roy Kincaid	D-E-0126-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0126-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Roy Kincaid	D-E-0126-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0126-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0126-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kevin Correll	D-E-0127-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0127-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0127-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0127-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0127-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Paul Moss	D-E-0128-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0128-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0128-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0128-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0128-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jacquelyn Baetz	D-E-0129-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0129-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0129-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0129-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0129-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Frederika Ebel	D-E-0130-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0130-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0130-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0130-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0130-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Briana Wagner	D-E-0131-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0131-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0131-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0131-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0131-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Andrew Hina	D-E-0133-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0133-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0133-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0133-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0133-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Lee Bowden	D-E-0134-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0134-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0134-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0134-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0134-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Forrest Hurst	D-E-0135-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0135-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0135-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0135-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0135-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
David Letourneau	D-E-0136-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0136-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
David Letourneau	D-E-0136-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0136-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0136-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Nadine Apo	D-E-0137-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0137-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0137-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0137-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0137-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Marty Wilson	D-E-0138-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0138-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0138-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0138-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0138-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kathryn Letkey	D-E-0139-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0139-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0139-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0139-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0139-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jeff Sacher	D-E-0140-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0140-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0140-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0140-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0140-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Matthew Pintar	D-E-0141-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0141-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0141-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0141-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0141-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Ed Schlegel	D-E-0142-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0142-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0142-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0142-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0142-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Joseph Rodrigues	D-E-0143-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0143-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0143-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0143-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0143-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kalai Kamauoha	D-E-0144-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0144-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0144-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0144-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0144-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Robert Conlan	D-E-0145-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0145-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Robert Conlan	D-E-0145-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0145-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0145-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Melissa Castaneda	D-E-0146-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0146-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0146-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0146-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0146-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Sarah Sharp	D-E-0147-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0147-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0147-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0147-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0147-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Royelen Lee Boykie	D-E-0148-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0148-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0148-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0148-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0148-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Colleen Kelly	D-E-0149-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0149-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0149-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-4.
	D-E-0149-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0149-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kalinke ten Hulzen	D-E-0150-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0150-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0150-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0150-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0150-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Moana Bjur	D-E-0151-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0151-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0151-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0151-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0151-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Colleen Soares	D-E-0152-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0152-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0152-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0152-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0152-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
A. Russell	D-E-0153-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0153-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0153-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0153-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0153-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Linda M. Karr	D-E-0154-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0154-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Linda M. Karr	D-E-0154-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0154-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0154-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Alapaki Luke	D-E-0155-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0155-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0155-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0155-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0155-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Felicita Garrido	D-E-0156-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0156-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0156-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0156-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0156-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Bina Robinson	D-E-0157-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0157-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0157-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0157-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0157-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kekama Galioto	D-E-0158-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0158-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0158-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0158-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0158-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Nina Puhipau	D-E-0159-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0159-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0159-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0159-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0159-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Pumehana Paisner	D-E-0160-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0160-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0160-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0160-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0160-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Sheila Ward	D-E-0161-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0161-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0161-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0161-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0161-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Ka`iana Haili	D-E-0162-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0162-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0162-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0162-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0162-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Sonja and Andy Kass	D-E-0163-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0163-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Sonja and Andy Kass	D-E-0163-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0163-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0163-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Steve LaFleur	D-E-0164-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0164-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0164-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0164-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0164-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Anjali Puri	D-E-0165-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0165-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0165-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0165-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0165-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Pualani Kauila	D-E-0166-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0166-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0166-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0166-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0166-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Aarin Gross	D-E-0167-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0167-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0167-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0167-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0167-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Addie Texeira	D-E-0168-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0168-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0168-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0168-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0168-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Caren Diamond	D-E-0169-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0169-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0169-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0169-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0169-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Patricia Blair	D-E-0170-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0170-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0170-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0170-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0170-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Uhane Pono	D-E-0171-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0171-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0171-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0171-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0171-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kealii Pang	D-E-0172-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0172-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kealii Pang	D-E-0172-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0172-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0172-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Sarah Thornton	D-E-0173-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0173-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0173-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0173-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0173-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Garid Faria	D-E-0174-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0174-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0174-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0174-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0174-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Nola Conn	D-E-0175-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0175-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0175-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0175-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0175-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Pake Salmon	D-E-0176-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1
	D-E-0176-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0176-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0176-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0176-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Randy Tashjian	D-E-0177-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0177-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0177-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0177-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0177-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Pono Kealoha	D-E-0178-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0178-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0178-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0178-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0178-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Zachary Klaja	D-E-0179-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0179-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0179-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0179-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0179-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Thomas Loudat	D-E-0180-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0180-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0180-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0180-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0180-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Alison Hartle	D-E-0181-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0181-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Alison Hartle	D-E-0181-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0181-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0181-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Francisca Sopacua	D-E-0182-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0182-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0182-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0182-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0182-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Beryl Blaich	D-E-0183-1	Biological Resources - Marine	3.2, 4.2	Navy understands and respects the value and importance of the Papahanaumokuakea National Marine Monument (the Monument) to many people. Navy also recognizes that the primary management philosophy for the Monument is protection and preservation and they share that philosophy. The Navy takes precautions when possible to minimize harm to the Monument. There are protections in place to minimize the possibility of any adverse impacts on the Monument. Many of these protections have been in place since the late 1990s, long before the Monument was designated. Sections 3.2 and 4.2 of the EIS/OEIS address the Monument. Navy will do their best, as the President's Proclamation requires, minimizing and avoiding adverse impacts, keeping in mind that their primary mission is defense of the nation. Navy will continue to confer with the three Monument partners (NMFS, Fish & Wildlife, and the State of Hawaii) and seek their opinions and expertise.
	D-E-0183-2	Program	1.1, 1.2, 1.3	The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. As discussed in Sections 1.1 through 1.3, the requirement to have a trained and prepared naval force is not a discretionary matter.
Neil Frazer	D-E-0184-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0184-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0184-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0184-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Neil Frazer	D-E-0184-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Rana Jackson	D-E-0185-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0185-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0185-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0185-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0185-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Dona Van Bloemen	D-E-0186-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0186-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0186-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0186-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0186-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Donna Cussac	D-E-0187-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0187-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0187-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0187-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0187-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Alison Moceri	D-E-0188-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0188-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0188-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0188-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0188-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Katie Velasquez	D-E-0189-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0189-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Katie Velasquez	D-E-0189-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0189-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0189-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Tara Cornelisse	D-E-0190-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0190-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0190-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0190-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0190-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Bill Akiona	D-E-0191-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0191-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0191-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0191-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0191-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Makana Cameron	D-E-0192-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0192-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0192-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0192-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0192-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kanoe Kapu	D-E-0193-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0193-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0193-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0193-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0193-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Fern Holland	D-E-0194-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0194-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0194-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0194-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0194-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Stephen Dinion	D-E-0195-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0195-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0195-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0195-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0195-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kim L. Ramos	D-E-0196-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0196-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0196-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0196-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0196-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Felicia Ann Waialae	D-E-0197-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0197-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0197-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0197-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0197-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Ron Whitmore	D-E-0198-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0198-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Ron Whitmore	D-E-0198-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0198-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0198-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Barbara Leighton	D-E-0199-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0199-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0199-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0199-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0199-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Barbara Long	D-E-0200-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0200-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0200-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0200-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0200-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5
Cara Petty	D-E-0201-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0201-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0201-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0201-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0201-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5
Pi'ilani Akina	D-E-0202-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0202-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0202-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0202-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0202-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Greg Schneider	D-E-0203-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0203-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0203-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0203-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0203-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5
Sam Chung Hoon	D-E-0204-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0204-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0204-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0204-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0204-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5
Masako Uematsu	D-E-0205-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0205-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0205-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0205-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0205-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5
Noyita Saravia	D-E-0206-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0206-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0206-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0206-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0206-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5
Denise Lytle	D-E-0207-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0207-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Denise Lytle	D-E-0207-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0207-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0207-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5
Carrie Ginnane	D-E-0208-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0208-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0208-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0208-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0208-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kahea Stocksdale	D-E-0209-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0209-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0209-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0209-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0209-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Angela Franco	D-E-0210-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0210-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0210-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0210-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0210-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Roy Moss	D-E-0211-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0211-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0211-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0211-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0211-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Lea Padilla	D-E-0212-1	Biological Resources - Marine	3.2, 3.7.4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0212-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0212-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0212-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0212-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
James M. Nordlund	D-E-0213-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0213-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0213-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0213-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0213-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Sandra Phillips --15751 S Eaden Rd	D-E-0214-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0214-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0214-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0214-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0214-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Claire Mortimer	D-E-0215-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0215-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0215-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0215-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0215-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jay Miller	D-E-0216-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0216-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Jay Miller	D-E-0216-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0216-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0216-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Leslie Conder	D-E-0217-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0217-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0217-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0217-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0217-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Vic Maietta	D-E-0218-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0218-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0218-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0218-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0218-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Debbie Burack	D-E-0219-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0219-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0219-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0219-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0219-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Hilary Harts	D-E-0220-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0220-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0220-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0220-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0220-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
James Mason	D-E-0221-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0221-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0221-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0221-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0221-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Tim Brause	D-E-0222-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0222-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0222-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0222-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0222-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kelley Uyeoka	D-E-0223-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0223-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0223-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0223-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0223-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Ruth Callahan	D-E-0224-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0224-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0224-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0224-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0224-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Amber McClure	D-E-0225-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0225-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Amber McClure	D-E-0225-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0225-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0225-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Email Wild Dolphin Foundation --Wild Dolphin Foundation	D-E-0226-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0226-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0226-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0226-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0226-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jordan Davis	D-E-0227-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0227-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0227-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0227-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0227-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Joe Meagher	D-E-0228-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0228-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0228-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0228-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0228-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Cynthia Romero	D-E-0229-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Cynthia Romero	D-E-0229-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0229-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0229-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0229-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Matthew Laclair	D-E-0230-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0230-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0230-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0230-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0230-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Delaney Jeter	D-E-0231-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0231-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0231-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0231-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0231-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Tabitha McCoy	D-E-0232-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0232-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0232-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0232-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0232-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Marti Townsend	D-E-0233-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0233-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0233-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0233-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Marti Townsend	D-E-0233-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Shelby Sargent	D-E-0234-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0234-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0234-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0234-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0234-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Robin Tomer	D-E-0235-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0235-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0235-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0235-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0235-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Estrella Ferrer	D-E-0236-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0236-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0236-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0236-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0236-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Matt Mason	D-E-0237-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0237-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0237-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0237-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0237-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Elyse Rollins	D-E-0238-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0238-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Elyse Rollins	D-E-0238-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0238-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0238-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Catherine Taylor	D-E-0239-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0239-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0239-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0239-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0239-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Susan Rasmussen	D-E-0240-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0240-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0240-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0240-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0240-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
J T Dunlap	D-E-0241-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0241-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0241-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0241-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0241-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jo Greenwald	D-E-0242-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0242-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0242-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0242-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0242-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Melinda Ahn	D-E-0243-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0243-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0243-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0243-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0243-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
David Bishaw	D-E-0244-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0244-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0244-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0244-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0244-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Donna Blackwell	D-E-0245-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0245-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0245-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0245-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0245-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Michele McKay	D-E-0246-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0246-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0246-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0246-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0246-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Lehua Kaulukukui	D-E-0247-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0247-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Lehua Kaulukukui	D-E-0247-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0247-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0247-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Naia Kelly	D-E-0248-1	Biological Resources - Marine		Thank you for your comment.
	D-E-0248-2	Socioeconomics	3.3.1.1.3, 4.3.1.1.3	Disruptions to day-to-day activities of the public and Hawaiian visitors are minimal, and temporary clearance procedures via Notices to Airmen (NOTAMs) and Notices to Mariners (NOTMARs) have been employed periodically over time without significant socioeconomic impacts on tourist-related activities. NOTAMs and NOTMARs provide information to pilots, ship operators, commercial fisherman, recreational boaters, and other area users that the military will be operating in a specific area, allowing them to plan their activities accordingly (see Section 4.1.5.1.1, and Chapter 8.0). NOTAMs and NOTMARs are available through subscription services, email notifications, or via Internet postings. In order to stay current individuals should subscribe to the local notices or check the online version frequently to see what notices have been posted. Additional information can be found at http://www.faa.gov/airports_airtraffic/air_traffic/publications/notices/ and http://www.navcen.uscg.gov/lnm/
	D-E-0248-3	Biological Resources - Marine		Thank you for your comment.
Janice Palma-Glennie	D-E-0249-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0249-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0249-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0249-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0249-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Stela Vasques	D-E-0250-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0250-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0250-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0250-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0250-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
David Nelson	D-E-0251-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0251-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0251-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0251-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0251-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Christy Church	D-E-0252-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0252-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0252-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0252-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0252-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Ursula Brackett	D-E-0253-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0253-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0253-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0253-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0253-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Sara Hult	D-E-0254-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0254-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0254-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0254-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0254-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Janice Saaristo	D-E-0255-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0255-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Janice Saaristo	D-E-0255-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0255-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0255-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Bobby McClintock	D-E-0256-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0256-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0256-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0256-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0256-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Christopher Glenn	D-E-0257-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0257-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0257-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0257-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0257-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Katie Marshall	D-E-0258-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0258-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0258-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0258-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0258-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kourtney Startin	D-E-0259-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0259-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0259-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0259-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0259-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Edgar Guiher	D-E-0260-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0260-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0260-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0260-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0260-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Michael Myers	D-E-0261-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0261-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0261-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0261-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0261-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jamie Oshiro	D-E-0262-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0262-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0262-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0262-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0262-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Denise Weber	D-E-0263-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0263-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0263-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0263-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0263-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Cathy Robinson	D-E-0264-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0264-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Cathy Robinson	D-E-0264-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0264-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0264-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Phin MacDonald	D-E-0265-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0265-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0265-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0265-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0265-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
	D-E-0265-6	Hazardous Materials and Waste	1.1, 1.2, 1.3, 3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.1	Additional information about the levels of depleted uranium (DU) at Pohakuloa Training Area and Makua and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS. HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain DU. The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action.
Andrea Hauck	D-E-0266-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0266-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0266-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0266-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0266-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Robert Tanner	D-E-0267-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0267-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0267-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0267-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0267-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Katt McConiga	D-E-0268-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0268-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0268-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0268-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0268-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Mishelle Morales	D-E-0269-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0269-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0269-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0269-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0269-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jason Leverett	D-E-0270-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0270-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0270-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0270-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0270-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kelsey Peterson	D-E-0271-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0271-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0271-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0271-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0271-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Emily Castro	D-E-0272-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0272-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Emily Castro	D-E-0272-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0272-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0272-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Angela Rosa	D-E-0273-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0273-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0273-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0273-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0273-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Chessa Au	D-E-0274-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0274-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0274-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0274-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0274-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Sarah Daniels	D-E-0275-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0275-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0275-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0275-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0275-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Aaron Warren	D-E-0276-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0276-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0276-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0276-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0276-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Suzanne Kim	D-E-0277-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0277-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0277-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0277-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0277-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Samantha Stewart	D-E-0278-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0278-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0278-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0278-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0278-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Michael Howells	D-E-0279-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0279-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0279-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0279-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0279-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Anna Reycraft	D-E-0280-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0280-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0280-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0280-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0280-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Vanda Hauserova	D-E-0281-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0281-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Vanda Hauserova	D-E-0281-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0281-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0281-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Bryan Milne	D-E-0282-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0282-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0282-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0282-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0282-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Deanna Chang	D-E-0283-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0283-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0283-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0283-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0283-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Scott Jarvis	D-E-0284-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0284-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0284-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0284-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0284-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kevin Stockhausen	D-E-0285-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0285-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0285-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0285-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0285-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Lisa Diaz	D-E-0286-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0286-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0286-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0286-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0286-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jeannette Lyons	D-E-0287-1	Alternatives	4.1.2.4.2, 4.1.5.1.1	See response to comment D-E-0086-1.
	D-E-0287-2	Cultural Resources	3.2.2.2	See response to comment D-W-0091-10.
	D-E-0287-3	Biological Resources - Marine	1.1, 1.2, 1.3, 3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary) - The training exercises that are conducted within the HRC are not recreational but necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. As noted in Section 1.1-1.3, the requirement to have a trained and prepared Naval force is not a discretionary matter.
Don Cooke	D-E-0288-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0288-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0288-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0288-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0288-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Ednette Chandler	D-E-0289-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0289-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0289-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0289-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0289-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Rhonda Black	D-E-0290-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0290-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Rhonda Black	D-E-0290-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0290-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0290-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jerry Taber	D-E-0291-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0291-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0291-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0291-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0291-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Tina Pope	D-E-0292-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0292-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0292-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0292-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0292-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kristin Duin	D-E-0293-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0293-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0293-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0293-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0293-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Angela Macken	D-E-0294-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0294-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0294-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0294-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0294-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Lisa Muehlstein	D-E-0295-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0295-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0295-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0295-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0295-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Angeline Winsor	D-E-0296-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0296-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0296-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0296-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0296-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Joan Lander	D-E-0297-1	Biological Resources - Marine	3.2, 4.2	Navy understands and respects the value and importance of the Papahanaumokuakea National Marine Monument (the Monument) to many people. Navy also recognizes that the primary management philosophy for the Monument is protection and preservation and they share that philosophy. The Navy takes precautions when possible to minimize harm to the Monument. There are protections in place to minimize the possibility of any adverse impacts on the Monument. Many of these protections have been in place since the late 1990s, long before the Monument was designated. Sections 3.2 and 4.2 of the EIS/OEIS address the Monument. Navy will do their best, as the President's Proclamation requires, minimizing and avoiding adverse impacts, keeping in mind that their primary mission is defense of the nation. Navy will continue to confer with the three Monument partners (NMFS, Fish & Wildlife, and the State of Hawaii) and seek their opinions and expertise.
	D-E-0297-2	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0297-3	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0297-4	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0297-5	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0297-6	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Joan Lander	D-E-0297-7	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.
Dawn Stobart	D-E-0298-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0298-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0298-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0298-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0298-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Michal Stover	D-E-0299-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0299-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0299-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0299-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0299-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Sarah Rickerby	D-E-0300-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0300-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0300-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0300-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0300-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Catherine Okimoto	D-E-0301-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0301-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0301-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0301-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0301-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Joy Gardner --Vibrational Healing Program	D-E-0302-1	Alternatives	4.1.2.4.2, 4.1.5.1.1	See response to comment D-E-0086-1.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Sherry Chambers	D-E-0303-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0303-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0303-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0303-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0303-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Aimee Love	D-E-0305-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
Rosemary Alles	D-E-0306-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0306-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0306-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0306-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0306-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Email ocean5	D-E-0307-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0307-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0307-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0307-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0307-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Email rocokona	D-E-0308-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0308-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0308-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0308-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0308-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Lynne Torres	D-E-0309-2	Health and Safety	4.1.7.1.1	More details on the analysis of potential impacts from these depleted uranium (DU) projectiles has been added to Section 4.1.7.1.1. The HRC EIS/OEIS Proposed Action includes the continued use of 20 mm projectiles, some of which may contain DU. The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the HRC EIS/OEIS Proposed Action. Training activities are proposed at the Pohakuloa Training Area. Guidance provided to users of Pohakuloa Training Area will be followed.
	D-E-0309-3	Policy/NEPA Process		The proponent agency (Lead Agency/Sponsor) is responsible for performing the environmental analysis of its actions. Section 1501.5 of the National Environmental Policy Act (NEPA) states that a lead agency shall supervise the preparation of an environmental impact statement. Additionally, Section 1501.2 of NEPA states that "Agencies shall integrate the NEPA process with other planning at the earliest possible time to insure that planning and decisions reflect environmental values, to avoid delays later in the process, and to head off potential conflicts."
	D-E-0309-4	Policy/NEPA Process		Thank you for your comment.
Guenter Monkowski	D-E-0310-1	Policy/NEPA Process		Thank you for your comment.
Charlene Avallone	D-E-0312-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0312-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0312-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0312-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0312-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Marilynn Tolmachoff	D-E-0313-1	Biological Resources - Marine	3.7, 4.7, 12	Sections 3.7 and 4.7 of the EIS/OEIS and the Coastal Consistency Determination in accordance with the CZMA (see Chapter 12 for submittal letter) reviewed the proposed activities internal or external to the Humpback Whale National Marine Sanctuary, and find them to be within the range of activities previously reviewed and allowed by the Sanctuary as indicated in 15 CFR Part 922, Subpart Q. None of the activities have been modified such that they would be likely to destroy, cause the loss of, or injure any Sanctuary resource in a manner significantly greater than what had been previously reviewed by NOAA at the time of the Sanctuary's creation.
Marianne Merki	D-E-0315-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Marianne Merki	D-E-0315-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0315-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0315-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0315-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Doug Fox	D-E-0316-1	Cumulative Impacts		The Navy recognizes that past practices conducted decades ago resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceed with the available funds.
LiLi Townsend	D-E-0317-1	Biological Resources - Marine	1.1., 1.2, 1.3, 3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary). The training exercises that are conducted within the HRC are not recreational but necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. As noted in Section 1.1-1.3, the requirement to have a trained and prepared Naval force is not a discretionary matter.
Katy Fogg	D-E-0318-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0318-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0318-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0318-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0318-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Ruby Roth	D-E-0319-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0319-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0319-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0319-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0319-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Linda Ballou	D-E-0320-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0320-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0320-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Linda Ballou	D-E-0320-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0320-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Michelle DeFelice	D-E-0321-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0321-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0321-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0321-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0321-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Bryan Lovsness	D-E-0322-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1
	D-E-0322-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0322-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0322-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0322-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Lisa Damon	D-E-0323-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0323-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0323-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0323-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0323-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Michael Jones --Univ. of Hawaii	D-E-0324-1	Policy/NEPA Process		The document was placed in seven public libraries in the state of Hawaii (Hilo Public Library-Hilo, Hawaii HI; Kahului Public Library Kahului, Maui HI; Wailuku Public Library Wailuku, Maui HI; Lihue Public Library Lihue, Kauai HI; Princeville Public Library Princeville, Kauai, HI 96722; Waimea Public Library Waimea, Kauai HI; Hawaii State Library Hawaii and Pacific Section Document Unit Honolulu, Oahu HI). As requested, the University of Hawaii, Hamilton Library in Honolulu, HI has been added as an Information Repository for the HRC EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jones --Univ. of Hawaii	D-E-0324-1	Alternatives	2.2	Section 2.2 includes the Proposed Action and alternatives along with alternatives considered, but eliminated from further consideration. The alternatives carried forward were selected based on their ability to meet the following criteria: (a) use existing Navy ranges and facilities in and around Hawaii; (b) be consistent with the stated current and emerging requirements for the range complex; (c) achieve training tempo requirements based on Fleet deployment schedules; (d) meet the requirements of DoD Directive 3200.15, Sustainment of Ranges and Operating Areas; (e) implement new training requirements and RDT&E actions; and (f) support realistic training that replicates expected operating environments for naval forces.
	D-E-0324-2	Policy/NEPA Process		Scoping transcripts/records of scoping comments are not a part of the EIS/OEIS but are included in the Administrative Record. All comments were reviewed and incorporated where appropriate. Some comments may have been outside the scope of the document and therefore were not addressed in the EIS/OEIS.
	D-E-0324-4	Alternatives	1.0, 2.0	As discussed in Chapters 1.0 and 2.0, the HRC provides the geography, infrastructure, space, and location necessary to accomplish complex military training and RDT&E activities. The large area available to deploy forces within the HRC allows training to occur using a geographic scope that replicates possible real world events. In addition, the HRC has the infrastructure to support a large number of forces, has extensive existing range assets, and accommodates Navy training and testing responsibilities both geographically and strategically, in a location under U.S. control. The Navy's physical presence and training capabilities are critical in providing stability to the Pacific Region.
	D-E-0324-5	Program	4.3.2.1.1.1	Operational security guidance prohibits publication of specific propellant information for target or interceptor missiles. When necessary for purposes of analysis, general approximations or ranges of propellant weights are referenced. Relative comparisons of propellant weights are also made by differences/similarities in size (i.e., bigger missiles have more propellant than smaller missiles). Table 4.3.2.1.1.1-2 provides estimated emissions from typical missile launches at PMRF.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jones --Univ. of Hawaii	D-E-0324-6	Program		The Final Missile Defense Agency (MDA) Ballistic Missile Defense System Programmatic Environmental Impact Statement, 2007; the MDA Ground-Based Midcourse Defense Extended Test Rage EIS, 2003; the Theater High Altitude Area Defense (THAAD) Pacific Test Flights, 2002; the North Pacific Targets Program EA, 2001; and the Pacific Missile Range Facility Enhanced Capability EIS, 1998 all address ballistic missile flight corridors across the broad ocean areas of the north and south Pacific Ocean. Within the corridors, the majority of DoD representative target and interceptor missiles have been launched from either Kodiak Launch Complex, AK; Vandenberg AFB, CA; Pacific Missile Range Facility, HI; Ronald Reagan Ballistic Missile Test Site, Marshall Islands, Wake Island, or mobile platforms into the Hawaii Temporary Operating Area.
	D-E-0324-7	Program		Comments pertaining to the INF and START treaties are not applicable to the proposed tests discussed in this EIS/OEIS. The limits and restrictions posed by both the INF and START treaties apply only to those systems specifically captured by the respective treaties. All programs involving ballistic missiles are reviewed for treaty compliance by the DoD Compliance Review Group and/or Missile Defense Agency (MDA) General Counsel. To the extent that MDA utilizes treaty accountable ballistic missiles subject to treaties as targets, it does and will continue to comply with all applicable treaty provisions. A detailed discussion of treaty compliance is outside the scope of this EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jones --Univ. of Hawaii	D-E-0324-8	Airspace	3.1.1	As Figure 3.1.1-1 shows, there are very few routes that cross the Temporary Operating Area (TOA). Four routes enter the south end of the TOA and remain near the edge of the area. Two routes enter the eastern edge of the TOA and remain near the edge of the area. The intercept debris from targets launched from Wake, Kwajalein, or Vandenberg is not likely to affect these routes that are near the edge of the TOA. Route A-450 and route 3MIL20 cross the TOA where debris could fall. However, as stated in the EIS/OEIS, the continuing training will be conducted in compliance with Department of Defense (DoD) Directive 4540.1, as directed by Office of the Chief of Naval Operations Instruction (OPNAVINST) 3770.4A, which specifies procedures for conducting aircraft operations and for missile/projectile firing. Namely, that missile and projectile firing areas shall be selected so that trajectories are clear of established oceanic air routes or areas of known surface or air activity. In addition, before conducting a training event that is hazardous to nonparticipating aircraft, Notices to Airmen (NOTAMs) published by the FAA will be sent in accordance with the conditions of the directive specified in OPNAVINST 3721.20A. Diagrams of the debris areas are therefore not necessary for the EIS/OEIS. As part of the planning process for each missile flight test, intercept debris patterns will be generated and reviewed to minimize potential impacts and to define the area for the NOTAM.
	D-E-0324-9	Program		Explosive Safety Quantity-Distance (ESQD) is based on propellant weight. In this case, the propellant is Class 1.3, which is much less energetic than the Class 1.1 of STARS; thus the ESQD is smaller even though there is more propellant mass. On the other hand, the Ground Hazard Area (GHA) is not directly based on propellant weight. It is largely a function of the dynamic flight environment of the vehicle (acceleration, drag, ability to steer, launcher elevation, etc...). This is an unguided sounding rocket (albeit larger than most), but the analysis shows (through thousands of impact simulations per standard rail launched sounding rocket practice) that the GHA is still contained within the areas typical of smaller sounding rockets. (In fact, some of the smaller sounding rockets might be worse because they can accelerate faster and be more susceptible to wind excursions.) The argument of whether to use a 2000 ft. GHA versus a 1500 ft. GHA is somewhat arbitrary. If PMRF wants to use a the larger number to be consistent with the "unguided systems" GHA sizes they used in the past, the analysis shows that the Super Strypi is contained well within those boundaries.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jones --Univ. of Hawaii	D-E-0324-10	Program		Additional environmental documentation for construction and use of the Maritime Directed Energy Test Center would include analysis of the safety issues associated with such high-power laser beams projected onto air and surface targets. The additional environmental documentation would also examine alternative locations. The HRC EIS/OEIS only addresses potential locations of the center on PMRF as part of the range complex activities.
	D-E-0324-11	Program	4.3.2.1.7.1, K	As described in Appendix K, each missile is evaluated for the toxic release hazard and explosive potential. When appropriate, more-detailed modeling of the transport of the toxic species is performed that incorporates atmospheric effects, such as local winds and turbulence. In addition, the facility flight corridor azimuth limits for PMRF are depicted in Figure 4.3.2.1.7.1-1.
	D-E-0324-12	Geology and Soils	3.3.2.1.5	The reference in Section 3.3.2.1.5 has been changed to: U.S. Department of the Navy, Naval Facilities Engineering Command, Pearl Harbor, 1996. Environmental Baseline Study, Pacific Missile Range Facility, Second Working Copy, January (for official use only).
	D-E-0324-13	Hazardous Materials and Waste	3.3.2.1.5	The Navy continues to recognize the referenced 1993 Lease of Exclusive Easement, which can be found in Appendix C of the Enhanced Capabilities EIS. As described in Chapter 3, soils within 100 feet of the Vandal launch pad have been sampled. The results of metal-in-soil sampling conducted in 1999, 2002, and 2007 in rocket motor staging areas are presented in Sandia National Laboratories, 2008. The results show that most reported values are below the EPA residential screening level. Iron and thallium exceeded the residential screening; however, they are below industrial screening level. Arsenic exceeds the industrial screening level; however, the state of Hawaii has identified special circumstances for arsenic. Sampling for perchlorate was conducted at PMRF in October and November 2006 and the results indicated perchlorate levels were within guidelines.
	D-E-0324-14	Health and Safety	4.3.2.1.7	Flight termination systems, as described in Section 4.3.2.1.7, are used by the Missile Flight Safety Officer at PMRF if a missile malfunctions and leaves a predefined region or violates other predefined mission rules. Due to a shortened response time required for flight termination systems at PMRF, the required hazard area is also reduced.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jones --Univ. of Hawaii	D-E-0324-15	Land Use	3.3.2.1.8, 4.3.2.1.8	Information was added to Section 3.3.2.1.8 regarding the 30 times per year for closures due to missile launches from PMRF. Information on the number of times the easement has been used in the past several years, and anticipated due to Alternatives 1, 2, or 3, was added to Section 4.3.2.1.8. In 2002 it was less than 4 launches; in 2006 less than 9 launches; and in 2007 less than 11 launches. The anticipated times the easement is expected to be used per year due to Alternatives 1, 2 or 3 could be between 7 and 28 (if PMRF provides support for the exercise).
	D-E-0324-16	Utilities	2.2.4.4, 4.1.1.3, 4.1.5.3	Requirements for the Directed Energy program are not yet complete. As discussed in Section 2.2.4.5, "should the Airborne Laser program decide to perform testing at PMRF, separate environmental documentation would be required to analyze potential impacts." At that time, the public will be involved in accordance to the requirements of the National Environmental Policy Act (NEPA). See response to comment D-E-0060-3.
	D-E-0324-17	Cumulative Impacts	5.1	Table 5.2-1 has been revised to include Long-range missile tests in the HRC Temporary Operating Area. Between 2003 - 2007, 68 different types of DoD target and interceptor missiles were launched from either Kodiak Launch Complex, AK; Vandenberg AFB, CA; Pacific Missile Range Facility, HI; Ronald Reagan Ballistic Missile Test Site, Marshall Islands, Wake Island, or mobile platforms in to or near the Hawaii Temporary Operating Area. A total of approximately 628 missile launches occurred during this time period and the majority of this missile activity was associated with the PMRF fleet training.
	D-E-0324-18	Health and Safety		Navy does not see a catastrophic launch failure as a reasonably foreseeable impact, and thus an analysis of the impact would be based on pure conjecture. Navy would establish launch hazard areas to account for a malfunction/catastrophic impact.
	D-E-0324-19	Program	2.2.2.1, 2.2.2.3, 2.2.2.4, 2.2.2.4.1	The HRC EIS/OEIS does evaluate Aegis Ballistic Missile Defense (BMD) tests. Specifically, section 2.2.2.4.1 Pacific Missile Range Facility, subsection Anti-Air Warfare RDT&E, addresses the Aegis BMD tests. Aegis BMD (under Anti-Air Warfare (AAW)) activities are further described in each of proposed training and RDT&E activities. Tables 2.2.2.1-1 through 2.2.2.4-1 describe the alternatives, including Aegis BMD.
	D-E-0324-20	Program		The Missile Defense Agency fiscal year 08 line budget for Classified Programs does not include activities at PMRF.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jones --Univ. of Hawaii	D-E-0324-21	Health and Safety	ES	The proposed Maritime Directed Energy Test Center in Alternatives 2 or 3 includes development of standard operating procedures and range safety requirements necessary to provide safe operations associated with future high-energy laser tests. Should a directed energy program decide to perform tests at PMRF, separate environmental documentation would be required to analyze potential impacts from training activities. There is no current proposal for laser targets on or near Niihau. Table ES-11 has been revised.
Ellen Levinsky	D-E-0325-1	Alternatives	2.0, 4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1. As discussed in Chapter 2.0, the Proposed Action does not include the use of underwater missile testing or high-frequency sonar.
Ravi Grover	D-E-0326-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0326-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0326-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0326-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0326-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Sandy Kamaka	D-E-0327-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0327-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0327-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0327-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0327-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Cynthia Taylor	D-E-0328-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0328-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0328-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0328-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0328-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Essence Satterfield	D-E-0329-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
Emilie Howlett	D-E-0330-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Emilie Howlett	D-E-0330-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0330-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0330-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0330-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Lorraine Howlett	D-E-0331-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0331-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0331-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0331-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0331-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Tom Jackson	D-E-0332-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0332-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0332-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0332-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0332-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Jade Silver	D-E-0333-1	Biological Resources - Marine		Thank you for your comment.
	D-E-0333-2	Policy/NEPA Process		Thank you for your comment.
Ron Howlett	D-E-0334-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
Tom Scallon	D-E-0335-1	Hazardous Materials and Waste		Although the scope of the proposed activities in the EIS/OEIS does not extend to developing new training materials, such as chaff, your suggestion is appreciated. The environmental fate of the chaff now in use has been studied, and it has been found to be environmentally benign. Chaff has undergone a long development process to ensure that it functions as designed and achieves its intended purpose, with a minimal effect on the environment. Any replacement material would need to undergo a similar development process, and would not be ready for deployment in the near future.
Suzanne Chantal Godbout	D-E-0336-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Suzanne Chantal Godbout	D-E-0336-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0336-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0336-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0336-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
John Garvison	D-E-0337-1	Alternatives		Thank you for your comment.
Stephen MacDonald	D-E-0338-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0338-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0338-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0338-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0338-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
JoJo JoJo	D-E-0339-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0339-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0339-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0339-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0339-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Antoinette Tenhunen Tukholmankatu	D-E-0340-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0340-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0340-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0340-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0340-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Kristie Nakasato	D-E-0341-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0341-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kristie Nakasato	D-E-0341-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0341-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0341-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Priscilla Derven	D-E-0343-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0343-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0343-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0343-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0343-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Rob Kinslow	D-E-0344-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0344-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0344-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0344-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0344-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
	D-E-0344-6	Policy/NEPA Process		Thank you for your comment.
Lorena Werner	D-E-0345-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0345-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0345-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0345-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0345-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Lynn Manheim	D-E-0346-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0346-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0346-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0346-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Lynn Manheim	D-E-0346-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Puanani Rogers	D-E-0347-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0347-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0347-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0347-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0347-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Email ponoau	D-E-0348-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0348-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0348-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0348-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0348-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Sam Long	D-E-0349-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0349-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0349-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0349-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0349-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Zena Seeley	D-E-0350-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0350-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0350-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Zena Seeley	D-E-0350-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0350-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Monica Hall	D-E-0351-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0351-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0351-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0351-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0351-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Email ckeala	D-E-0352-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0352-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0352-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0352-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0352-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Email Dolphinaria	D-E-0353-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0353-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0353-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0353-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0353-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Erin Rietow	D-E-0354-1	Biological Resources - Terrestrial	6	As discussed in Chapter 6.0 and Appendix C, Navy policies and procedures that minimize effects of their actions include wash downs, agricultural inspections, brown tree snake inspections, and ballast water procedures.
	D-E-0354-2	Alternatives	6.4.11.1, 6.4.12	The Navy would also like to see more research on mid-frequency active (MFA) sonar. See Sections 6.4.11.1 and 6.4.12 for information regarding future Navy research. There are no records of adverse impacts on marine mammals from MFA sonar around Hawaii, but there are uncertainties. The model presented in the EIS/OEIS represents the best science currently available, and was developed by the Navy and NOAA with input from non-governmental organizations. The EIS/OEIS indicates that we should not see significant impacts on marine mammals from MFA sonar around Hawaii, although the model tells us that in certain circumstances, animals could be exposed to sound levels that may cause them to change their behavior.
	D-E-0354-3	Hazardous Materials and Waste	4.1.4, 4.1.7	See response to comment D-T-0095-1. The HRC EIS/OEIS addresses expended training materials and the potential for leaching of potentially toxic materials in Sections 4.1.4 and 4.1.7. The analysis presented concludes that the amounts and concentrations of these materials will have no noticeable effect on ocean water quality and will affect an insignificant portion of the ocean bottom sediments.
	D-E-0354-4	Air Quality	4.3.2.1.1	Section 4.3.2.1.1 has been updated to include analysis of ozone depleting substances, particularly as they relate to emissions from missile launches at PMRF. Air quality impacts locally would be limited to temporary, short-term missile exhaust emissions from CastorIV, STS, STRYPI, Vandal, PAC-3 MEADS, THAAD, Hera, and Lance missiles.
	D-E-0354-5	Biological Resources - Marine	3.2, 3.7, 4.2, 4.0, 12	Use of the sanctuary areas by the Navy for training and RDT&E activities is historic. See response to comment D-E-0062-1. Geographic training restrictions are not required.
	D-E-0354-6	Program	1.3.3	Section 1.3.3 describes the Tactical Training Theater Assessment and Planning Program (TAP). NEPA and subsequent consultation with regulatory agencies is the protocol within TAP to check impact on the environment.
Margaret Guiler	D-E-0355-1	Program		Thank you for your comment.
David Kane	D-E-0356-1	Biological Resources - Marine		Your comments regarding discovering new species are noted but are outside the scope of this EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
David Kane	D-E-0356-2	Program	1.1, 1.2, 1.3, 1.4	The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The Navy has broadly defined its objectives and offers appropriate alternatives to achieve them. To implement its Congressional mandates, the Navy needs to support and to conduct current and emerging training and RDT&E training events in the HRC and upgrade or modernize range complex capabilities to enhance and sustain Navy training and testing. These objectives are required to provide combat capable forces ready to deploy worldwide in accordance with U.S.C. Title 10, Section 5062. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary.
	D-E-0356-3	Program		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
	D-E-0356-4	Air Quality	4.3.2.1.1.1	See response to comment D-E-0456-2.
	D-E-0356-5	Cumulative Impacts		Examples of Navy's environmental stewardship programs include protection of haulout locations for the Hawaiian monk seal, improved nesting habitat for the wedge-tailed shearwater, beach trash pickup during documentation of marine debris, and active programs to conserve energy and use renewable resources (including solar powered water heating panels and shielded street lights).
Michael Dahlem	D-E-0357-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
Rana Jackson	D-E-0358-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0358-2	Policy/NEPA Process		Thank you for your comment.
Petra Sundheim	D-E-0359-1	Program		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Bob Jacobson --HAWAII COUNTY COUNCIL	D-E-0360-1	Hazardous Materials and Waste	4.1.7.11	The HRC EIS/OEIS Proposed Action includes the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. More details on the analysis of potential impacts from these DU projectiles can be found in Section 4.1.7.1.1. This is the only use of DU in the HRC EIS/OEIS Proposed Action. The Navy recognizes that past practices conducted decades ago resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded with the available funds.
	D-E-0360-2	Biological Resources - Marine	4.1.2	Section 4.1.2 includes analysis regarding marine resources and the Navy's use of sonar.
	D-E-0360-3	Program		Your comment regarding aggressors is noted but is outside the scope of this EIS/OEIS.
Paul Clark --Save Our Seas	D-E-0361-1	Alternatives	4.1.2.4, 4.1.2.4.11, 6.0	See response to comment D-W-0066-1. In addition, the Navy's mitigation measures to protect marine species are presented in Chapter 6.0.
Dmitry Boldvrev	D-E-0362-1	Alternatives		Your comments on the Superferry are noted, but are outside the scope of this EIS/OEIS.
	D-E-0362-2	Cultural Resources		Thank you for your comment.
Claudia Herfurt	D-E-0363-1	Alternatives	4.1.2.4, 4.1.2.4.11, 6.0	See response to comment D-W-0066-1. In addition, the Navy's mitigation measures to protect marine species are presented in Chapter 6.0.
Pat Blair	D-E-0364-1	Alternatives	4.1.2.4, 4.1.2.4.11, 6.0	See response to comment D-W-0066-1. In addition, the Navy's mitigation measures to protect marine species are presented in Chapter 6.0.
Michael Kline	D-E-0365-1	Alternatives	4.1.2.4, 4.1.2.4.11, 6.0	See response to comment D-W-0066-1. In addition, the Navy's mitigation measures to protect marine species are presented in Chapter 6.0.
Michal Stover	D-E-0366-1	Alternatives	4.1.2.4, 4.1.2.4.11, 6.0	See response to comment D-W-0066-1. In addition, the Navy's mitigation measures to protect marine species are presented in Chapter 6.0.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michal Stover	D-E-0366-2	Mitigation Measures	6	What is presented in Chapter 6.0, Mitigation Measures have been standard operating procedures (SOP) for unit-level antisubmarine warfare training since 2004. The effectiveness of the SOPs is addressed on an ongoing basis. It is critical for the Navy to be able to conduct training in a variety of environmental and bathymetric conditions, which may overlap with marine habitat. Seamounts allow the submarine to hide in an area that is shadowed by the seamount because the active transmission cannot reach the submarine via the bottom bounce path. Most coastal restrictions that have been proposed would prohibit operations in a significant portion of the HRC.
Joan Levy	D-E-0368-1	Alternatives	4.1.2.4, 4.1.2.4.11, 2.0	See response to comment D-W-0066-1.
Humberto Blanco	D-E-0369-1	Alternatives	4.1.2.4, 4.1.2.4.11, 6.1.2	See response to comment D-W-0066-1. Section 6.1.2 now discusses habitat avoidance as a mitigation measure that was considered but eliminated. The habitat requirements for most of the marine mammals in the Hawaiian Islands are unknown. Accordingly, there is no information available on possible alternative exercise locations or environmental factors that would otherwise be less important to marine mammals in the Hawaiian Islands.
Ingrid Wedel	D-E-0370-1	Alternatives	5.2.1.6	The proposed action regarding sonar is generally to continue training similar to that which has occurred for decades without any known impacts on marine mammals. Section 4.1.2.4 of the EIS/OEIS explains the potential effects on marine mammals from Navy mid-frequency active (MFA) sonar in the HRC. MFA sonar use analyzed in the EIS/OEIS is not new and has occurred in the HRC using the same basic sonar equipment and output for over 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Over the past 30 years, the numbers of marine mammals around Hawaii appear to be increasing and there are no indications that sonar has affected marine mammals. As discussed in Section 4.1.2.4.11, Navy believes that evidence not considered previously involving the Hanalei stranding of July 2004 indicates that the full moon could have been a contributing factor in terms of bringing the animals closer to the shore. A few strandings of beaked whales have occurred elsewhere (locations far from Hawaii) that seem to be related to MFA sonar in combination with specific ocean conditions. Strandings of beaked whales associated with sonar have not happened in Hawaii to anyone's knowledge.
William D. Perry	D-E-0371-1	Alternatives	4.1.2.4.2, 4.1.5.1.1	See response to comment D-E-0086-1.
Everett Hullum	D-E-0372-1	Alternatives	4.1.2.4, 4.1.2.4.11, 6.1.2	See response to comment D-E-0369-1.
Bill Young	D-E-0373-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
Candy McCaslin	D-E-0374-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Arius Hopman	D-E-0375-1	Program		Thank you for your comment.
	D-E-0375-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
Rebecca Miller	D-E-0376-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea, or airspace; therefore, there is no proposal to expand.
Sandi Sterker --Kauai Republican Women's Club of Kauai	D-E-0377-1	Biological Resources - Marine		Thank you for your comment.
Wendy Raebeck	D-E-0378-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea, or airspace; therefore, there is no proposal to expand. It is true that the proposal includes increases in the frequency of training.
	D-E-0378-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
L. Osterer	D-E-0379-1	Alternatives		Thank you for your comment.
	D-E-0379-2	Alternatives	1.0, 2.0	As discussed in Chapters 1.0 and 2.0, the HRC provides the geography, infrastructure, space, and location necessary to accomplish complex military training and RDT&E activities. The large area available to deploy forces within the HRC allows training to occur using a geographic scope that replicates possible real world events. In addition, the HRC has the infrastructure to support a large number of forces, has extensive existing range assets, and accommodates Navy training and testing responsibilities both geographically and strategically, in a location under U.S. control. The Navy's physical presence and training capabilities are critical in providing stability to the Pacific Region.
	D-E-0379-3	Program		Your comment regarding adversarial threats to the United States is noted but is outside the scope of this EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
L. Osterer	D-E-0379-4	Program	1.0, 2.0	The Navy has broadly defined its objectives and offers appropriate alternatives to achieve them (see Chapters 1.0 and 2.0). To implement its Congressional mandates, the Navy needs to support and to conduct current and emerging training and RDT&E training events in the HRC and upgrade or modernize range complex capabilities to enhance and sustain Navy training and testing. These objectives are required to provide combat capable forces ready to deploy worldwide in accordance with U.S.C. Title 10, Section 5062. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The objectives set forth in this document are both reasonable and necessary. Your comments regarding funding and budgetary matters are noted but are outside the scope of this EIS/OEIS.
Andrea Baer	D-E-0380-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0380-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0380-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0380-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0380-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Eve Powers	D-E-0381-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
	D-E-0381-2	Mitigation Measures		It is critical for the Navy to be able to conduct training in a variety of environmental and bathymetric conditions, which may overlap with marine mammal areas. Seamounts allow the submarine to hide in an area that is shadowed by the seamount because the active transmission cannot reach the submarine via the bottom bounce path. Most coastal restrictions that have been proposed would prohibit operations in a significant portion of the HRC.
Linda Pascatore	D-E-0382-1	Land Use	3.3.2.1.8	As detailed in Section 3.3.2.1.8, the Navy will maintain its current property boundaries at PMRF and has no intention of expanding land ownership in the PMRF/Main Base Area. PMRF does not control the approximately 6,000 acres that make up the Mana Plain. The agricultural land is owned by the State of Hawaii and is leased by the Agribusiness Development Corporation.
	D-E-0382-2	Alternatives	4.1.2.4, 4.1.2.4.11, 2.0	See response to comment D-W-0066-1. As discussed in Chapter 2.0, the Proposed Action does not include the use of low-frequency active sonar.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Linda Pascatore	D-E-0382-3	Alternatives		Projected RDT&E laser programs do not include the use of hydrogen fluoride, and therefore the use of hydrogen fluoride is not part of the Proposed Action.
	D-E-0382-4	Alternatives		Your comments regarding closing PMRF are noted but are outside the scope of this EIS/OEIS.
Sandy Herndon	D-E-0383-1	Program	2	The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore, there is no proposal to expand. It is true that the proposal includes increases in the frequency of training. Chapter 2.0 has been modified to clarify the alternatives that are being proposed.
	D-E-0383-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
	D-E-0383-3	Program	2	As noted in Chapter 2.0, the Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore, there is no proposal to expand PMRF.
Mark Hubbard	D-E-0384-1	Alternatives		Thank you for your comment.
Gabriela Taylor	D-E-0385-1	Land Use	3.3.2.1.8	As detailed in Section 3.3.2.1.8, the Navy will maintain its current property boundaries at PMRF and has no intention of expanding land ownership in the PMRF/Main Base Area.
	D-E-0385-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
Marilyn & Ed Pollock	D-E-0386-1	Alternatives	1.1, 1.2, 1.3, 4.1.2.4, 4.1.2.4.11	See response to comment D-E-0066-1. In addition, use of low-frequency active (LFA) sonar in the HRC is not part of the Proposed Action of this EIS/OEIS.
Donald H. Wilson	D-E-0387-1	Program		Thank you for your comment.
	D-E-0387-2	Socioeconomics		Thank you for your comment.
	D-E-0387-3	Cultural Resources		Thank you for your comment.
	D-E-0387-4	Biological Resources - Terrestrial		The Navy also tries to be a good environmental steward on its other installations.
	D-E-0387-5	Socioeconomics		Thank you for your comment.
	D-E-0387-6	Water Resources		Thank you for your comment.
	D-E-0387-7	Land Use		Thank you for your comment.
	D-E-0387-8	Mitigation Measures		Thank you for your comment.
	D-E-0387-9	Socioeconomics		Thank you for your comment.
	D-E-0387-10	Socioeconomics		Thank you for your comment.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Ron Tuason	D-E-0388-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0388-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0388-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0388-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0388-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Noreen Dougherty	D-E-0389-1	Alternatives		Thank you for your comment.
Doug Fox	D-E-0390-1	Policy/NEPA Process		Thank you for your comment.
	D-E-0390-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
	D-E-0390-3	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0297-1.
	D-E-0390-4	Cumulative Impacts		Thank you for your comment.
Marcia Harter	D-E-0391-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1 regarding strandings across the globe. As discussed in Section 4.1.2.4.11, the Navy believes that evidence not considered previously involving the Hanalei stranding of July 2004 indicates that the full moon could have been a contributing factor in terms of bringing the animals closer to the shore.
Caitlin Odom	D-E-0392-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea, or airspace; therefore, there is no proposal to expand.
Gian Andrea Morresi	D-E-0393-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0393-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0393-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0393-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0393-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Erin Foley	D-E-0394-1	Program		Training that is conducted within the HRC is not recreational but is necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared Naval force is not a discretionary matter.
	D-E-0394-2	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	Use of the sanctuary areas by the Navy for training and RDT&E operations is historic. See response to comment D-E-0062-1.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Erin Foley	D-E-0394-3	Cultural Resources	3.2.2.2	See response to comment D-W-0091-10.
	D-E-0395-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
	D-E-0395-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0395-3	Hazardous Materials and Waste	3.0, 4.0, 5.3.6	See response to comment D-E-0062-3.
	D-E-0395-4	Cultural Resources	Appendix H	See response to comment D-E-0062-4.
	D-E-0395-5	Program	1.1, 1.2, 1.3	See response to comment D-E-0062-5.
Lee Tepley	D-E-0397-1	Alternatives	4.1.2.4.7	There are no answers to the first two specific questions given that they are predicated on the assumption that whales "get the bends", which has not been established. As explained in Section 4.1.2, the issue raised and other potential hypotheses with regards to causes of marine mammal strandings remain highly speculative. With regards to the third question, given that there has never been, to anyone's knowledge, any marine mammal that has died or been injured as a result of sonar use in Hawaiian waters over decades of sonar training, it is unlikely that any marine mammals will be killed or injured by the continuation of training.
Marj Dente	D-E-0398-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea, or airspace, therefore there is no proposal to expand. In addition, the training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared Naval force is not a discretionary matter.
Louis Korn	D-E-0399-1	Program		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment. Navy has provided protected haul-out locations for the Hawaiian monk seal, improved nesting habitat for the wedge-tailed shearwater, and organized volunteers to pick-up beach trash while documenting marine debris. Navy has also participated in a program to remove invasive plants from endangered Hawaiian stilt habitat. Navy has active programs to conserve energy and use renewable resources including solar powered water heating panels and shielded street lights.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
James V. Albertini --Malu `Aina Center for Non-violent Education & Action	D-E-0400-1	Alternatives	3.7, 4.7, 4.1.2.4, 4.1.2.4.11	Sonar at 235dB is the level at the source. It is impossible for that sound level to reach an animal since that is the level measured within the sonar dome (within the bow) of the ship. In addition, it is extremely unlikely that the receiving level could be anywhere near that high, again, because the distances are so short to that received level and the Navy has mitigation measures that require a shut-down of the sonar if a marine mammal comes within 200 yards of the bow. Finally, it is not accurate to compare human physiology to that of marine mammals with regard to the thresholds of injury, which is why Navy and NMFS worked in cooperation to develop the criteria for marine mammals used in this analysis. The Navy respectfully disagrees regarding the need for exemptions to continue training in the Hawaiian Islands Humpback Sanctuary.
	D-E-0400-2	Alternatives		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
	D-E-0400-3	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination.
	D-E-0400-4	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense, are noted but are beyond the scope of this EIS/OEIS.
	D-E-0400-5	Hazardous Materials and Waste		A discussion of a 38-year-old incident that did not result in any public health or safety impact (only Navy personnel were injured) is outside of the scope of the EIS/OEIS for the HRC. The Navy's training materials and safety protocols both have evolved so extensively during the intervening period as to make that incident irrelevant to any discussion of existing or future public health and safety.
	D-E-0400-6	Health and Safety		Your comment regarding the link between the Navy low-frequency navigation and communication towers in Lualualei Valley on the Waianae coast and the increase in Down syndrome in the area is noted but is outside the scope of this EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
James V. Albertini --Malu `Aina Center for Non-violent Education & Action	D-E-0400-7	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.1	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the HRC EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
	D-E-0400-8	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.1	The Navy does not maintain records of the exact quantities of weapons previously used in the HRC.
Susan Scott	D-E-0401-1	Alternatives	1.1, 1.2, 1.3, 4.1.2.4, 4.1.2.4.11, 6.1.2	See response to comment D-W-0066-1. Section 6.1.2 now discusses habitat avoidance as a mitigation measure that was considered but eliminated. The habitat requirements for most of the marine mammals in the Hawaiian Islands are unknown. Accordingly, there is no information available on possible alternative exercise locations or environmental factors that would otherwise be less important to marine mammals in the Hawaiian Islands.
Gia Baiocchi	D-E-0402-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore there is no proposal to expand. It is true that the proposal includes increases in the frequency of training.
Judith Altemus	D-E-0403-1	Alternatives	4.1.2.4, 4.1.2.4.11, 6.0	See response to comment D-W-0066-1. In addition, the Navy's mitigation measures to protect marine species are presented in Chapter 6.0.
Robin W. Baird --Cascadia Research Collective	D-E-0404-1	Mitigation Measures	6.4.12	As described in Section 6.4.12, the Navy is developing a long-term marine mammal monitoring plan to determine behavioral and population level changes to marine mammals within Navy ranges. This plan will continue or initiate studies of abundance, distribution, habitat utilization, etc. for sensitive species of concern using visual surveys, passive and acoustic monitoring, radar and data logging tags (satellite or radio linked to record data on acoustics, diving and foraging behavior, and movements). The plan will include the validation of Navy lookouts that monitor all exercises. As of this EIS/OEIS, the Long-term Marine Mammal Monitoring Plan is under review by NMFS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Robin W. Baird --Cascadia Research Collective	D-E-0404-2	Biological Resources - Marine	4.1.2.4.11	The reason the Rota Stranding was noted is that NMFS considered the Hanalei "Mass Stranding" anomalous when considering causal factors leading to the event. Given the Rota stranding was simultaneous, this and other information were not considered in the NMFS report on the Hanalei event, the previous findings presented in the NMFS report should be re-examined. The Rota event was termed a stranding under the same criteria that the Hanalei event was termed a "Mass Stranding" by NMFS. Section 4.1.2.4.11 includes specific stranding events that have been linked to potential sonar operations. Of note, these events represent a small overall number of animals over an 11 year period (approximately 40 animals) worldwide.
	D-E-0404-3	Mitigation Measures	4.1.2.4.12	Section 4.1.2.4.12 and 'Chapter 6.0, Mitigation Measures, presents the U.S. Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. Navy does not expect that 100% of the animals present in the vicinity of training events will be detected and the acoustic impact modeling quantification is not reduced as a result of mitigation effectiveness. In addition, the probability of trackline detection is for visual observers during a survey. In general, there will be more ships, more observers present on Navy ships, and additional aerial assets all engaged in exercise events having the potential to detect marine mammals, than is present on a single, generally smaller (having a lower height of eye), survey ship from which the 2% figure is derived.
	D-E-0404-4	Biological Resources - Marine	4.1.2	There is no reduction in the number of exposures resulting from the acoustic impact modeling being quantified in the EIS/OEIS. For example, it is argued that large animals, or those generally having a large group size, are likely to be detected by the Navy's standard lookout procedures. Navy agrees with the comment regarding minke whales, and the test has been altered accordingly.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Robin W. Baird --Cascadia Research Collective	D-E-0404-5	Biological Resources - Marine		The Navy is required to assess impacts based on the resources as defined by NMFS, who serves as the regulator for these resources (marine mammals). Research indicating genetic distinctions between possible sub-populations of marine mammals currently considered one stock by NMFS has been discussed during preliminary consultations with NMFS over this EIS/OEIS. The Navy believes that years of site fidelity by individual beaked whales in areas where sonar has operated for years is an indicator that beaked whales in Hawaii are not comparable to resident beaked whales in locations on the other side of the planet. In fact, implicit in the statements, that resident populations have been identified in the Hawaiian Islands and that there is a genetic segregation between some marine mammals of Hawaiian Islands and the rest of the Pacific Stock, is an acknowledgment that the animals of the Hawaiian Islands have coexisted with sonar operations without long term detriment to populations. Findings by Baird and McSweeney are contrary to speculation that large numbers of marine mammals die or abandon sites due to sonar but are not observed, potentially resulting in population level impacts. Residency demonstrates that the animals are remaining in the area despite sonar exercises.
	D-E-0404-6	Biological Resources - Marine	4.1.2.4.11	Section 4.1.2.4.11 includes specific stranding events that have been linked to potential sonar operations. Of note, these events represent a small overall number of animals over an 11-year period (approximately 40 animals), and not all worldwide strandings can be linked to naval activity.
	D-E-0404-7	Mitigation Measures		Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train. In the RIMPAC 2006 After Action Report, passive detection of a marine mammal led to the implementation of mitigation measures (having a detrimental effect on the training event), so the contention that the Navy's mitigation measure involving passive detection was ineffective is incorrect. There is no suggestion that mitigation measures are 100% effective, but are meant to mitigate impacts while still being able to conduct critical training activities around the clock including periods at darkness.
Katy Rose	D-E-0405-1	Program		See responses to comment D-E-0428-1.
	D-E-0405-2	Biological Resources - Marine		See response to comment D-W-0066-1.
	D-E-0405-3	Biological Resources - Terrestrial	4.3.1.1.1.1	As stated in Section 4.3.1.1.1.1, amphibious landings as part of Expeditionary Assault activities on PMRF would occur only at Majors Bay and are restricted to existing routes. The area used is not typically used by sea turtles or Hawaiian monk seals.
	D-E-0405-4	Policy/NEPA Process		Thank you for your comment.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Casey Holaday	D-E-0406-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
	D-E-0406-2	Hazardous Materials and Waste		The comment cites instances of past contamination from military activities, perhaps more than 50 years old. As with other industries and institutions, the military's practices have evolved over the years to be much more environmentally benign, so past effects are not indicative of potential future effects. Congress has created and funded programs to identify those historic sites in need of remediation and to clean them up as funds become available. For example, the Navy received more than $400 million for a 10-year cleanup of Kahoolawe conducted in consultation with the State of Hawaii.
	D-E-0406-3	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	Use of the sanctuary areas by the Navy for training and RDT&E operations is historic. See response to comment D-E-0062-1.
	D-E-0406-4	Program		Thank you for your comment.
Elaine Dunbar	D-E-0407-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore, there is no proposal to expand.
	D-E-0407-2	Alternatives	2.0, 4.1.2.4, 4.1.2.4.11	See response to comment D-E-0066-1. In addition, as noted in Chapter 2.0, the Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace, therefore there is no proposal to expand. It is true that the proposal includes increases in the frequency of training.
	D-E-0407-3	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.
	D-E-0407-4	Hazardous Materials and Waste	2.2.1, 2.2.3, 2.2.4	An accounting of the exact numbers of each type of weapon is neither possible nor pertinent, because it is the expended ordnance - not the weapon that discharged it - that has an effect, The EIS/OEIS provides numbers for each ordnance item to be used in Sections 2.2.1, 2.2.3, and 2.2.4. No nuclear weapons are included in the Proposed Action. The purpose of establishing a safety area (e.g., a 10,000-foot radius) is specifically to prevent risks to personnel. The discussion of electromagnetic hazards to personnel, fuel, and ordnance is an explanation of how the military's procedures avoid such hazards, not a description of the hazards to be expected under the Proposed Action.
	D-E-0407-5	Air Quality		High-frequency Active Auroral Research Program (HAARP) or atmospheric/weather experimentation is not part of the Navy's Proposed Action.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Elaine Dunbar	D-E-0407-6	Miscellaneous		The Navy is not expanding within the HRC. The Proposed Action presented in the EIS/OEIS does not require the Navy to acquire additional land, nor alter on-base or off-base land use patterns. The Navy's mission to maintain, train, and equip combat ready naval forces capable of winning wars deterring aggression, and maintaining freedom of the seas is mandated by Federal law - Title 10 U.S.C. section 5062, which charges the Chief of Naval Operations with the responsibility for ensuring the readiness of the Nation's naval forces.
	D-E-0407-7	Biological Resources - Marine	4.1.2.4.1	Additional information has been added to Section 4.1.2.4.1.
	D-E-0407-8	Transportation	4.1.5.1.1, 8.0	Public notifications are made via Notices to Airmen (NOTAMs) and Notices to Mariners (NOTMARs), which provide information to pilots, ship operators, commercial fisherman, recreational boaters, and other area users that the military will be operating in a specific area, allowing them to plan their activities accordingly (see Section 4.1.5.1.1, and Chapter 8.0). NOTAMs and NOTMARs are available through subscription services, email notifications, or via Internet postings. In order to stay current individuals should subscribe to the local notices or check the online version frequently to see what notices have been posted. Additional information can be found at http://www.faa.gov/airports_airtraffic/air_traffic/publications/notices/ and http://www.navcen.uscg.gov/lnm/
	D-E-0407-9	Policy/NEPA Process		Although the EIS/OEIS states that aircraft at MCBH include, but are not limited to P-3s, C-130s, C-17s, F/A-18s, CH-53Ds, SH-60s, and C-29 20Gs, any proposed "C-17 Runways" are outside the scope of this document.
Ken Posney	D-E-0408-1	Miscellaneous	3.4.1.2.1	More than 40 nations have diesel-electric submarines, which are extremely difficult to detect. They include Iran and North Korea. Littoral (coastal) waters are noisy environments that offer acoustic cover for modern diesel-electric submarines that make no more noise than the fan on your home computer. Active sonar is the most effective way to detect them, but it’s not an easy skill to master, and it cannot be duplicated in a simulator. Commercial shipping areas are very busy places, therefore not conducive to training. The analysis of biological resources in the EIS/OEIS (Section 3.4.1.2.1) includes the native or naturalized vegetations, wildlife, and the habitats in which they occur collectively (open ocean, offshore, and onshore). Coral, fish, sea turtles, and marine mammals (whales, dolphins and seals) are analyzed in the document.
Loreen Walker & family	D-E-0409-1	Program		Thank you for your comment.
Spencer McDonald	D-E-0410-1	Program		Thank you for your comment.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Fred Dente	D-E-0411-1	Environmental Justice	2.2	As noted in Section 2.2, the Navy will be using existing Navy ranges and facilities in and around the state of Hawaii. The Proposed Action does not include plans to acquire any new lands or rights over land, sea, or airspace, therefore there is no proposal to expand. It is true that the proposal includes increases in the frequency of training. Your comments regarding ownership of the Hawaiian Islands are noted but are beyond the scope of this EIS/OEIS.
Debra Baruch	D-E-0412-1	Water Resources	2.2.4.4	Projected RDT&E laser programs do not include the use of hydrogen fluoride, and therefore the use of hydrogen fluoride is not part of the Proposed Action. Because the directed energy programs have not been defined they cannot be fully analyzed in this EIS/OEIS. As stated in Section 2.2.4.5 of the EIS/OEIS, "Should the Airborne Laser program decide to perform testing at PMRF, separate environmental documentation would be required to analyze potential impacts."
	D-E-0412-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0412-3	Biological Resources - Terrestrial	4.3.1.1.1.1	See response to comment D-E-0405-3.
	D-E-0412-4	Policy/NEPA Process		Thank you for your comment.
Ihor Basko	D-E-0413-1	Socioeconomics		The Baseline, Alternatives 1, 2, and 3 for the Proposed Training Operations and RDT&E Activities considered in the HRC EIS/OEIS do not include expanding the HRC or the Temporary Operating Area (TOA). The Navy is not proposing any activities that would have a significant amount of impacts or irretrievable commitment of resources on Kauai. The Navy is a good environmental steward and wants to keep Kauai as a tourist destination.
Healani Trembath	D-E-0414-1	Alternatives	4.1.2.4, 4.1.2.4.11	The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
	D-E-0414-2	Alternatives		Thank you for your comment.
Russell Hoffman	D-E-0415-1	Program		See responses for issues identified at D-N-0071-1.
Jonathan Jay	D-E-0416-1	Program		See responses for issues identified at D-E-0428-1.
	D-E-0416-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-E-0416-3	Biological Resources - Terrestrial	'4.3.1.1.1.1	See response to comment D-E-0405-3.
	D-E-0416-4	Water Resources	2.2.4.4	See response to comment D-E-0412-1.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Jonathan Jay	D-E-0416-5	Policy/NEPA Process		Thank you for your comment.
Marya Mann	D-E-0417-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
	D-E-0417-2	Alternatives	4.1.2.4.7, 4.1.2.4.11	As discussed in Section 4.1.2.4.11, Navy believes that evidence not considered previously involving the Hanalei "stranding" of July 2004 indicates that the full moon could have been a contributing factor in terms of bringing the animals closer to the shore. The 1998 observations referenced were in regard to use of low-frequency active (LFA) sonar. The use of LFA in the HRC is not part of the Proposed Action of this EIS/OEIS. In addition, Section 4.1.2.4.7 contains a discussion of the "bends-like" issue raised in your comment. It has not been demonstrated that sonar causes the effects noted.
	D-E-0417-3	Alternatives	4.1.2.4.2	The use of low-frequency active sonar in the HRC is not part of the Proposed Action of this EIS/OEIS. As discussed in Section 4.1.2.4.2, MFA and LFA sonar are not directly comparable, so operational parameters established for an LFA system are not appropriate for MFA.
	D-E-0417-4	Alternatives		Thank you for your comment.
	D-E-0417-5	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1.
Glenn Giles	D-E-0418-1	Alternatives		Thank you for your comment.
David and Carol Gerow	D-E-0419-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore, there is no proposal to expand. It is true that the proposal includes alternatives that require increases in the frequency of training. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary. The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter, but is required under U.S. Code Title 10. Reduction in training does not meet Federal requirements.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
David and Carol Gerow	D-E-0419-2	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	Use of the sanctuary areas by the Navy for training and RDT&E operations is historic. The Navy is aware of the endangered species and takes their presence into consideration during operations. See response to comment D-E-0062-1.
	D-E-0419-3	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1. As discussed in Section 4.1.2.4.11, the Navy believes that evidence not considered previously involving the Hanalei “stranding” of July 2004 indicates that the full moon could have been a contributing factor in terms of bringing the animals closer to the shore.
	D-E-0419-4	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination.
Ka'iulani Huff	D-E-0420-1	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the illegal presence of the U.S. Department of Defense therein are noted but are beyond the scope of this EIS/OEIS.
Romi Elnagar	D-E-0421-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
	D-E-0421-2	Cumulative Impacts	5	Cumulative impacts of the Proposed Action are addressed by resource area (including socioeconomic and health and safety) in Chapter 5.0 of this EIS/OEIS.
Judith Heath	D-E-0422-1	Alternatives	4.1.2.4.7, 4.1.2.4.11	As discussed in Section 4.1.2.4.11, Navy believes that evidence not considered previously involving the Hanalei “stranding” of July 2004 indicates that the full moon could have been a contributing factor in terms of bringing the animals closer to the shore. The 1998 observations referenced were in regard to use of low-frequency active sonar. The use of low-frequency active sonar in the HRC is not part of the Proposed Action of this EIS/OEIS. In addition, Section 4.1.2.4.7 contains a discussion of the "bends-like" issue raised in your comment. It has not been demonstrated that sonar causes the effects noted.
	D-E-0422-2	Alternatives		See response to comment D-E-0417-3.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Shannon Rudolph	D-E-0423-1	Hazardous Materials and Waste		The Navy recognizes that past practices conducted decades ago resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The training exercises that are conducted within the HRC are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
Robert V. Crifasi	D-E-0424-1	Alternatives		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
	D-E-0424-2	Program		The Navy is particularly sensitive to native Hawaiian cultural concerns, making areas under our control accessible for cultural and religious activities when not in conflict with operational needs (see response to comment D-W-0097-7). The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines.
Cathy Garger	D-E-0425-1	Alternatives		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
	D-E-0425-2	Policy/NEPA Process		Thank you for your comment.
	D-E-0425-3	Environmental Justice		Your concerns and comments are noted. Additionally, the Proposed Action presented in the EIS/OEIS does not require the Navy to acquire additional land, nor alter on-base or off-base land use patterns.
	D-E-0425-4	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.1	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Cathy Garger	D-E-0425-5	Socioeconomics	3.3.1.1.3, 4.3.1.1.3	The 2006 Annual Visitor Research Report published by the State of Hawaii, Department of Business, Economic Development and Tourism noted that Hawaii had 2 years of exceptional growth in 2004 and 2005, and the Hawaii's visitor industry reported more modest increases in 2006 by visitors who came by air to the islands, particularly in terms of total visitor expenditures, visitor days, and arrivals. Growth in visitors who came to Hawaii by cruise ships, on the other hand, rose significantly from the previous year (http://www.hawaii.gov/dbedt/info/visitor-stats/visitor-research/2006-annual-research-r.pdf). See Sections 3.3.1.1.3 and 4.3.1.1.3.
Camellia May	D-E-0426-1	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.1	Live munitions have been safely tested and used for training in Hawaii for more than 50 years. The Proposed Action would continue and enhance existing training and test activities. HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
Jason S. Nichols	D-E-0427-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter, but is required by U.S. Code Title 10. The Navy does take its environmental stewardship role seriously, providing funds, efforts, and professional staff dedicated to this important matter.
Miriam Clarke	D-E-0428-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore, there is no proposal to expand. It is true that the proposal includes alternatives that require increases in the frequency of training. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary. The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
	D-E-0428-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Miriam Clarke	D-E-0428-3	Biological Resources - Terrestrial	4.3.1.1.1.1	See response to comment D-E-0405-3.
Daniel Hoffman	D-E-0430-1	Biological Resources - Marine	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1. In addition, refer to the status of species (Chapter 3.0). Based on the references none of the whale species listed are likely to go extinct due to Navy sonar use. The NEPA process includes coordination with state and Federal regulatory agencies to reduce potential for harm to marine species from Navy training. These agencies include many of the nation's experts on a variety of sensitive species.
Duane Erway	D-E-0431-1	Alternatives	4.1.2.4.5, 4.1.2.4.7, 4.1.2.4.11.2, 4.1.2.7.3, 6.0, 6.1.3	The Hawaii context cannot be compared to the Bahamas (see Southall et al., 2007 for a general discussion of "context"). Regarding the Bahamas stranding, see the discussion of stranding events in Section 4.1.2 and a discussion of the thresholds established injury. There remain many unknowns regarding marine mammals in general and specific answers to the questions posed have not been scientifically investigated. The Navy and NMFS believe the thresholds established for the physiological effects and those established for behavioral effects are comprehensive. Estimated exposures to Cuvier's beaked whales can be found in each discussion of the various Alternatives (e.g., Section 4.1.2.7.3, sub-heading Cuvier's Beaked Whales). Also see the discussion in Chapter 6.0 regarding the limitations of passive acoustic detection of marine mammals. See the discussion in Section 4.1.2.4.5 regarding threshold levels for marine mammals. See the discussion of mitigation measures provided in Section 6.1.3. See Section 4.1.2.4.7 containing discussion of Acoustically Mediated Bubble Growth and Decompression Sickness.
	D-E-0431-2	Miscellaneous	13	All comments received during the public comment period are published. Transcripts from the public meeting held on 29 August 2007 in Hilo cannot be altered or deleted (See D-T-0081-1).
	D-E-0431-3	Health and Safety	4.1.5.1.1	As stated in Section 4.1.5.1.1, research was conducted for mid-frequency active (MFA) sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonar. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy’s most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Duane Erway	D-E-0431-4	Biological Resources - Marine	4.1.2.4.11	Section 4.1.2.4.11 includes specific stranding events that have been linked to potential sonar operations. Of note, these events represent a small overall number of animals over an 11-year period (approximately 40 animals), and not all worldwide strandings can be linked to naval activity.
	D-E-0431-5	Biological Resources - Marine	4.1.5.1.1	As stated in Section 4.1.5.1.1, research was conducted for mid-frequency active (MFA) sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonar. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours.
	D-E-0431-6	Biological Resources - Marine	4.1.2.4.11	See response to D-E-0431-4.
	D-E-0431-7	Alternatives	4.1.2.4.7	Section 4.1.2.4.7 contains a discussion of the issues raised. It has not been demonstrated that sonar causes the effects noted in the referenced paper.
Karin Friedemann	D-E-0432-1	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.1	Live munitions have been safely tested and used for training in Hawaii for more than 50 years. The Proposed Action would continue and enhance existing training and test activities. HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
Napuanani McKeague	D-E-0433-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1. In addition, your comments regarding education, homelessness, and health care are noted but are outside the scope of this EIS/OEIS.
Jacquelyn Dillon	D-E-0434-1	Alternatives		Thank you for your comment.
	D-E-0434-2	Policy/NEPA Process		Thank you for your comment.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kirsten Jackson	D-E-0435-1	Program		The training exercises that are conducted within the HRC are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter, but is required by U.S. Code Title 10. The Navy does take its environmental stewardship role seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy has provided protected haul-out locations for the Hawaiian monk seal, improved nesting habitat for the wedge-tailed shearwater, and organized volunteers to pick up beach trash while documenting marine debris. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
Ru Carley	D-E-0436-1	Alternatives		Thank you for your comment.
Patricia S Port --US Dept of Interior	D-E-0437-1	Miscellaneous		Your latest comments will be considered (see D-W-0076-1).
	D-E-0437-2	Biological Resources - Terrestrial	3.9, 4.0	The affected environment and environmental consequences have been revised as applicable. The role of other facility and management plans has been clarified. Navy activities on other Services' installations will be performed in accordance with all applicable regulations, management plans, and Biological Opinions.
	D-E-0437-3	Program	2.0, 2.2.3.2, 8.0, D	The definitions for tempo and frequency as they apply to the activities in this EIS/OEIS are provided in Section 2.2.3.2 and has been added to the glossary (Chapter 8.0). The terms are applied to the various activities and locations throughout the document and in Chapter 2.0. The foundation for the analysis is also described in Appendix D.
	D-E-0437-4	Program	1.9, 1.9.1	Most of the actions listed within this comment have required additional environmental documentation in the forms of EAs and EISs. Lists of related environmental documents and environmental documents being prepared concurrent with this EIS/OEIS are provided in Sections 1.9 and 1.9.1.
	D-E-0437-5	Biological Resources - Terrestrial	3.0, 4.0	The role of other facility and management plans has been clarified. Navy activities on other Services' installations will be performed in accordance with all applicable regulations, management plans, and Biological Opinions.
	D-E-0437-6	Biological Resources - Terrestrial		Navy activities will be performed in accordance with all applicable regulations, management plans, and Biological Opinions, which provide guidance on avoiding impacts on critical habitat.
	D-E-0437-7	Biological Resources - Terrestrial	4.0, 6.0	Policies and procedures regularly implemented are provided throughout Chapter 4.0 and also in Chapter 6.0.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Patricia S Port --US Dept of Interior	D-E-0437-8	Hazardous Materials and Waste	3.1.7	In most cases, based on the assumptions presented in the EIS/OEIS, the concentrations of potential marine contaminants would be far below the concentrations that are measurable by laboratory analytical methods. Thus, such concentrations could not be correlated with biological effects. To the extent such information is available from governmental or peer-reviewed technical sources, threshold concentrations for biological effects have been added to Section 3.1.7 of the EIS/OEIS.
	D-E-0437-9	Biological Resources - Marine	4.3.2.1.3.1	Results of a study of EMR and bats has been added and the text in the EIS/OEIS biological resources sections has been expanded to include additional analysis of EMR.
	D-E-0437-10	Mitigation Measures		Thank you for your comment.
	D-E-0437-11	Program	2	The training and RDT&E activities covered under the Proposed Action fall into one of three categories: (1) U.S. Navy units (ships, aircraft, personnel) conducting unit-level activities on any military's range within the HRC; (2) any U.S. or foreign military unit conducting activities on U.S. Navy-operated ranges; and, (3) any U.S. or foreign military unit conducting activities on any military's range in Hawaii as part of a Navy-sponsored exercise. Clarifying text has been added to Chapter 2.0 of the EIS/OEIS.
	D-E-0437-12	Biological Resources - Marine	2.2.3.5.3	The anchors (concrete or sand bags) would be approximately 1.5 feet-by-1.5 feet and would weigh approximately 300 pounds. The majority of deep water corals are located at depths between 162 and 774 ft. The anchors would be located at depths greater than 600 ft which should avoid the majority of deep corals. The Portable Undersea Tracking Range could be located anywhere within the area shown on Figure 2.2.3.5.3-1 and not necessarily consistently deployed in the same area. According to Section 2.2.3.5.3, the Navy proposes using the system for only 2 days per month.
	D-E-0437-13	Program	2.2.3.5.3	Additional information on the anchor size and weight has been added to Section 2.2.3.6.3 of the EIS/OEIS. See response to comment D-E-0437-12.
	D-E-0437-14	Program	2.2.3.5.4	The new location of the Kingfisher Underwater Training Area is analyzed in this EIS/OEIS (see Sections 2.2.3.5.4, 3.3.1.1.1, and 4.3.1.1.1). Additional environmental documentation and coordination with USFWS and NMFS would be completed prior to establishment of the new location.
	D-E-0437-15	Biological Resources - Terrestrial	2.2.4.4, 3.3.2.1.3	The circles on Figure 2.2.4.5-1 depicting the proposed locations for the Maritime Directed Energy Test Center do not represent the actual footprint of the area to be disturbed. Construction would not take place in critical habitat for Sesbania tomentosa or Panicum nihauensis shown in Figure 3.3.2.1.3-1.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Patricia S Port --US Dept of Interior	D-E-0437-16	Biological Resources - Terrestrial	3.2	This statement in Section 3.2 is correct. Only 12 species of "alien" marine algae, invertebrates, and fish have been recorded in the Northwestern Hawaiian Islands. However, your statement regarding rich faunal presence has been added to the EIS/OEIS.
	D-E-0437-17	Biological Resources - Terrestrial	3.2	Section 3.2 states that the Papahanaumokuakea Marine National Monument includes the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve among other special areas.
	D-E-0437-18	Biological Resources - Marine	3.3.1.1.1	Keyhole limpet has been replaced with “limpets” in Section 3.3.1.1.1.
	D-E-0437-19	Biological Resources - Terrestrial	3.3.2.1.3, 3.4.2	Citations have been added to the Environmentally Sensitive Habitat sections in Chapter 3.0 as appropriate. Navy has reviewed the 2006-2007 NWI data and has incorporated any changes as a result of the information provided therein.
	D-E-0437-20	Biological Resources - Marine	4.3.2.1.3.1, 4.3.2.9.1.1, 4.3.2.10.2, 4.6.2.1.2.1,	Citations have been added to the Environmentally Sensitive Habitat sections in the EIS/OEIS as appropriate. Navy has reviewed the 2006-2007 NWI data and has incorporated any changes as a result of the information provided therein.
	D-E-0437-21	Biological Resources - Terrestrial	3.3.2.9.1	The presence of the olulu or alula (Brighamia insignis) and its critical habitat are addressed in the EIS/OEIS in Section 3.3.2.9.1. The additional listed plants have been added, although the majority of the plants were historically observed on Niihau.
	D-E-0437-22	Biological Resources - Marine	4.3.1.2.1.1	The Microwave and EMESS 1 on Niihau are focused on PMRF only. A small signal (~5 watts, similar to a cell phone) is transmitted from the sites. Nesting seabirds on Lehua are outside the transmission area and would not be affected.
	D-E-0437-23	Biological Resources - Terrestrial	3.4.2.1.1	The locations of the two units of the Pearl Harbor National Wildlife Refuge mentioned have been added to Figure 3.4.2.1.1-1. Plants within the Honouliuli Unit would not be affected by existing or proposed activities. The text has been revised to state that “Recently, three endangered plants, kooloaula (Abutilon menziesii), ohai (Sesbania tomentosa), and loulu (Pritchardia kaalae) were established as mitigation for past projects at the Honouliuli Unit of the Pearl Harbor National Wildlife Refuge. These three plants are at least 3 mi from the EOD Land Range and Lima Landing, the closest facilities along West Loch.”
	D-E-0437-24	Biological Resources - Terrestrial	3.4.2.6.2	The Kalaeloa Unit of the Pearl Harbor National Wildlife Refuge has been added to the Environmentally Sensitive Habitat, Section 3.4.2.6.2. Achyranthes splendens is already listed in the Endangered Plant Species section as being located in the southwestern corner of Kalaeloa. Activities performed on U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport would avoid this unit of the refuge.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Patricia S Port --US Dept of Interior	D-E-0437-25	Biological Resources - Terrestrial	3.4.2.9.2	Nesting by stilts on Hickam AFB has been added to the discussion of endangered birds in Section 3.4.2.9.2. Hawaiian stilts are low-flying birds and the potential for strikes is not a major concern. All activities would be performed in accordance with both Air Force and Navy Bird/Animal Strike Hazard (BASH) requirements. The BASH programs include ways to minimize impacts on both the birds and planes.
	D-E-0437-26	Biological Resources - Terrestrial	3.4.2.11.1, 4.4.2.11.1.1	Section 3.3.2.11.1 table has been revised as applicable. The text in 3.4.2.11.1 has been clarified to match the depiction of critical habitat shown on the figure. The Navy's compliance has been added to Section 4.4.2.11.1.1.
	D-E-0437-27	Biological Resources - Terrestrial	3.4.2.11.1	The description of the Reservation's intermittent stream and estuary provided in the Makua Military Reservation Implementation Plan has been added to Section 3.4.2.11.1.
	D-E-0437-28	Biological Resources - Terrestrial	4.4.2.12.1, 4.4.2.13.1	Text added to Chapter 4.0 to explain that Navy activities at Kahuku and Dillingham would be performed in accordance with applicable Army/USFWS biological opinions.
	D-E-0437-29	Biological Resources - Marine	3.4.1.6.1	Species have been added as suggested and additional information added as appropriate.
	D-E-0437-30	Biological Resources - Terrestrial	3.6.2.1.2, 4.6.2.2.1, 4.6.2.2.2	Figure 3.6.2.1.2-1 has been revised to include the Pohakuloa Training Area boundary, thus showing where palila (Loxioides bailleui) critical habitat is designated within and adjacent to Pohakuloa Training Area. Text added in Chapter 4.0 to explain that Navy activities at Pohakuloa Training Area and Bradshaw Army Airfield would be performed in accordance with applicable Army/USFWS biological opinions.
	D-E-0437-31	Biological Resources - Marine	4.1.2.2.1	Section 4.1.2 has been fully revised.
	D-E-0437-32	Program	4.1.2.2.1	The baseline number of 3,134 hours is provided in the discussion of the No-action Alternative, under Section 4.1.2.2.1.
	D-E-0437-33	Biological Resources - Marine	4.1.2.2.2	Section 4.1.2 has been fully revised. The number of hours of sonar analyzed in Alternative 1 is greater than the number of hours analyzed in the No-action Alternative. The text will be corrected to eliminate the confusion. 'Section 4.1.2 has been fully revised. The number of hours of sonar analyzed in Alternative 1 is greater than the number of hours analyzed in the No-action Alternative. The text will be corrected to eliminate the confusion. In addition, the number of hours of sonar analyzed includes all AN/SQS-53 and AN/SQS-56 surface ship sonar, the AN/AQS-22 helicopter dipping sonar, the AN/SSQ-62 sonobuoy sonar, and the MK-48 torpedo sonar hours, not just those associated with ASW TRACKEX and ASW TORPEX.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Patricia S Port --US Dept of Interior	D-E-0437-34	Program	4.1.2.2.1, 4.1.2.2.3,	The baseline number of 3,134 hours is provided in the discussion of the No-action Alternative, under Section 4.1.2.2.1. The number of 1,590 hours of sonar activity included in the Alternatives 2 and 3 discussion is not inclusive of all sonar activities. The total number is 5,179, which is noted in Section 4.1.2.2.3 (Alternatives 2 or 3).
	D-E-0437-35	Biological Resources - Marine	4.1.2.3	PMRF does not collect data on collisions with sea turtles. A study of green sea turtle strandings in the Hawaiian Archipelago from 1982-2003 showed that boat strikes and shark attacks each accounted for 2.7 percent of the 3,732 green sea turtle strandings. Green turtle strandings attributable to boat strikes were likely from Kauai and Oahu. The most common cause of the strandings was the tumor-forming disease, fibropapillomatosis (28 percent); 49 percent of the strandings could not be attributed to any known cause. (Chaloupka et al, 2004).
	D-E-0437-36	Biological Resources - Marine	4.1.2.3, 4.1.2.3.1	Section 4.1.2.3 includes the potential impacts of sonar on sea turtles and discusses the measured hearing threshold of green turtles and other hard-shell turtles, the appropriateness of extrapolating marine mammal and human hearing data notwithstanding. The following section, 4.1.2.3.1, discusses the impact of underwater detonations on marine mammals and sea turtles and outlines the criteria and thresholds for injury and harassment. Potential injury and mortality is indexed to charge size and distance as well as animal size. For non-injurious harassment (Level B and onset TTS) two criteria are used: 182dB (Energy Flux Density Level) and 23 psi peak pressure level for charge sizes less than 2,000 lbs. The available experimental and observational data on the effects of detonations/explosives on sea turtles is limited, but using these data in conjunction with the modeling done for ship-shock and other Navy projects (which extrapolated effects on sea turtles) provided the best thresholds for effects.
	D-E-0437-37	Hazardous Materials and Waste	3.1.7	In most cases, based on the assumptions presented in the EIS/OEIS, the concentrations of potential marine contaminants would be far below the concentrations that are measurable by laboratory analytical methods. Thus, such concentrations could not be correlated with biological effects. To the extent such information is available from governmental or peer-reviewed technical sources, threshold concentrations for biological effects have been added to Section 3.1.7 of the EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Patricia S Port --US Dept of Interior	D-E-0437-38	Biological Resources - Terrestrial	4.2.1.1.1.1	Analysis regarding the use of chemical simulants is found in offshore sections of the EIS/OEIS because simulants are dispersed offshore. Section 4.2.1.1.1.1 has additional information regarding debris as follows: "In a successful intercept, both missiles would be destroyed by the impact. Momentum would carry debris along the respective paths of the two missiles until the debris falls to earth. The debris would consist of a few large pieces, (approximately 110 lb) of each missile, many medium pieces, (approximately 11 lb), and mostly tiny particles. This debris is subject to winds on its descent to the surface. The debris would generally fall into two elliptically-shaped areas. Most debris would fall to earth within 3 to 40 minutes after intercept, but some of the lighter particles may drift, airborne, for as long as 2 to 4 hours before landing."
	D-E-0437-39	Biological Resources - Terrestrial		The Navy has participated in the NMFS debris removal efforts. Ocean debris and non-Navy activities such as fishing and whale-watching pose a real, documented threat to marine mammals in Hawaii. For example, in the 2006-07 humpback whale season, there were 26 reports of whales or dolphins entangled in fishing gear, numerous hooked monk seals and eight collisions between humpbacks and whale-watching vessels (see NMFS Stranding Response Network Newsletter [http://www.fpir.noaa.gov/Library/PRD/Marine%20Mammal%20Response/Newsletter%205.pdf]).
	D-E-0437-40	Biological Resources - Marine	4.3.1.1.1.1, 4.3.1.2.1	Expeditionary Assault or SPECWAROPS amphibious landing exercises on PMRF occur at Majors Bay, which has coral coverage of less than 2 percent. The exercises take place in specific routes in order to minimize to the extent practicable impacts on coral and other sensitive marine life (see Section 4.3.1.1.1.1). As stated in Section 4.3.1.2.1, “Reefs offshore of Niihau are poorly developed and SPECWAROPS on Niihau use existing openings, which will minimize the potential for impacts from Major Exercises.
	D-E-0437-41	Biological Resources - Marine	4.3.1.2.1.2	The text in Section 4.3.1.2.1.2 has been clarified. Buoys deployed by the Navy at Kingfisher Underwater Training Area could act as Fish Aggregating Devices (FADs) that could attract pelagic species such as tuna, mahimahi, wahoo, and numerous shark species and thus also attract fishermen. However, this has not been an issue for the current Kingfisher training area offshore of PMRF.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Patricia S Port --US Dept of Interior	D-E-0437-42	Biological Resources - Marine	4.3.1.3.1, 4.3.2.10.2.1	To summarize Sections 4.3.1.3.1 and 4.3.2.10.2.1, two additional Air-to-Ground GUNEX events per year could occur under Alternatives 1, 2, or 3 at Kaula. Niihau is not used for GUNEX training. Only small caliber weapons are used. Only the southern tip of Kaula (less than 10 percent of the total acreage) is used for Navy activities. There are no known threatened or endangered plant species. Some individual migratory seabirds may be lost to GUNEX training in the designated impact area. Gunnery rounds that may occasionally miss the designated impact area may also result in the loss of some individuals elsewhere on the island. However, current migratory seabird populations appear to be healthy and reproducing normally. Kaula is covered by a sparse grass landscape and earthen/rock outcrops, reportedly underlain by a relatively thin soil layer with highly weathered limestone bedrock. Soil erosion is not an issue for the island. The Navy does not agree that a avian survey is necessary at this time because s are being proposed to the nature of activities at Kaula.
	D-E-0437-43	Biological Resources - Terrestrial		The Navy has considered inspections of inbound flights from the U.S. mainland.
	D-E-0437-44	Biological Resources - Terrestrial	4.3.2.1.3.1	Section 4.3.2.1.3.1 now states that no listed plants have been identified adjacent to the Strategic Target System launch pad. The launch pad is kept clear and the surrounding area contains landscaped vegetation. Additional measures from the PMRF Enhanced Capability EIS are now listed that reduce possible environmental impacts around the launch pad. The installation of a portable blast deflector on the launch pad could protect the vegetation on the adjacent sand dunes. The potential for starting a fire would be further reduced by clearing dry vegetation from around the launch pad. Spraying the vegetation adjacent to the launch pad with water just before launch would reduce the risk of ignition. Emergency fire crews would be available during launches to quickly extinguish any fire and minimize its effects. An open (spray) nozzle will be used, when possible, rather than a directed stream when extinguishing fires, to avoid erosion damage to the sand dunes and to prevent possible destruction of cultural resources.
	D-E-0437-45	Biological Resources - Marine	4.3.2.1.3.1	Text revised in Section 4.3.2.1.3.1 to '…delayed as long as necessary until…"
	D-E-0437-46	Biological Resources - Marine	4.3.1.1.1.1	Amphibious landings, which occur at Majors Bay, are not located within nesting areas. As stated in Section 4.3.1.1.1.1, "Within 1 hour prior to initiation of Expeditionary Assault landing exercises, landing routes and beach areas are surveyed for the presence of sensitive wildlife."

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Patricia S Port --US Dept of Interior	D-E-0437-47	Biological Resources - Terrestrial	4.3.2.1.3.2	The Laysan albatross is being discouraged from nesting at PMRF to prevent interaction between the species and aircraft using the runway. Text has been added to Section 4.3.2.1.3.2 regarding the Navy's albatross egg and chick removal surrogate parenting program. This program is anticipated to continue as long as viable eggs are available at PMRF.
	D-E-0437-48	Biological Resources - Terrestrial	4.3.2.9.2.1	As stated in Section 4.3.2.9.2.1, target drones are currently flown along the west coast of the island away from inhabited areas. The drones do not fly over occupied areas; however, there is the potential for a drone to crash and deposit hazardous waste onto the island. The PMRF Hazardous Material Spill Response Team will be dispatched to the crash site of any mishap to ensure proper removal of all hazardous material/hazardous waste.
	D-E-0437-49	Biological Resources - Terrestrial	4.3.2.1.3.1	This statement has been removed from Section 4.3.2.1.3.1. There is supporting data already in the EIS/OEIS regarding launches of NASA rockets and the effects of noise on the wildlife in the vicinity. AT PMRF, an inspection of the launch area follows each launch.
	D-E-0437-50	Biological Resources - Terrestrial	4.3.2.1.3.1	As stated in Section 4.3.2.1.3.1, monitoring data from PMRF show wildlife would not be affected by aluminum oxide and hydrogen chloride exhaust. Birds will not come into contact with the exhaust plume because of their flight away from the initial launch noise. In addition, because aluminum oxide and hydrogen chloride do not bioaccumulate, no indirect effects on the food chain are anticipated from these rocket exhaust emissions.
	D-E-0437-51	Biological Resources - Terrestrial	3.3.2.1.7	Safety zones and their locations are discussed under Health and Safety and shown in Figure 3.3.2.1.7-1. The launch would be delayed until the animal has left the area. Chapter 6.0 provides standard operating procedures and mitigation measures for sea turtles and monk seals observed in the safety zone prior to a launch.
	D-E-0437-52	Biological Resources - Terrestrial	4.3.2.1.6	impacts on soils and any associated mitigation measures are described in Section 4.3.2.1.6--Hazardous Materials and Waste.
	D-E-0437-53	Biological Resources - Terrestrial	4.3.2.1.3.1	See response to comment D-E-0437-44.
	D-E-0437-54	Biological Resources - Marine	4.3.2.1.3	Information from Section 4.3.2.1.9.2 (Noise) has been added to Section 4.3.2.1.3.2. Other touch and go procedures currently take place at the runway.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Patricia S Port --US Dept of Interior	D-E-0437-55	Biological Resources - Marine	4.3.2.1.3.2	The placement of new equipment to enhance electronic warfare training capability would be collocated on an existing communication tower or other structure. Any new towers would not be sited in or near wetlands, other known bird concentration areas (e.g., state or Federal refuges, staging areas, rookeries), in known migratory or daily movement flyways, or in habitat of threatened or endangered species. The towers proposed for use are not located in Newell's shearwater nesting areas. Any required lighting would be shielded in accordance with existing PMRF policy. PMRF works directly with Save our Shearwaters to minimize effects on the birds from its activities.
	D-E-0437-56	Biological Resources - Terrestrial	4.3.2.1.3.2	The text in question has been deleted.
	D-E-0437-57	Biological Resources - Terrestrial	4.3.2.1.3.2	The Control Building would not be constructed in a wetland. Section 4.3.2.1.3.2 states: "The proposed building site is within the previously disturbed administrative area." An environmental review of the proposed Consolidated Range Operations Complex construction was conducted that determined that the effects of the proposed construction on the environment are minimal and a categorical exclusion (CATEX) for the proposed project was approved on 14 May 2004.
	D-E-0437-58	Biological Resources - Terrestrial	4.3.2.1.3.3	This statement has been removed from Section 4.3.2.1.3.3.
	D-E-0437-59	Biological Resources - Terrestrial	4.3.1.1.1.3	Section 4.3.1.1.1.3-Biological Resources—PMRF Offshore now states: Effects from reentry vehicles and missiles impacting Illeginni have been assessed in several documents including the 1977 EA Missile Impacts, Illeginni Island and the 2004 EA for Minuteman III Modification, which includes the Summary of the 1992 EA for Department of Energy (DOE) Reentry Vehicles, Flight Test Program, U.S. Army Kwajalein Atoll, Republic of the Marshall Islands (Ballistic Missile Defense System Command, 1977; U.S. Department of the Air Force, 2004). Reentry vehicles' impacts on Illeginni most often occur in cleared or maintained areas in the center of the island. Mitigation measures include the use of best management practices developed by USAKA to prevent any unnecessary additional disturbance of bird nesting sites and the least possible disruption of vegetation and habitat in the post-test cleanup process.
	D-E-0437-60	Biological Resources - Terrestrial	4.3.2.2.2.3	As stated in Section 4.3.2.1.3.3, Multiple Strike Group activities would occur mainly offshore and would involve many of the training operations identified under the No-action Alternative. No new lighting, fire potential, noise, electromagnetic radiation/ electromagnetic fields from increased operations, or introduction of non-native species would occur.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Patricia S Port --US Dept of Interior	D-E-0437-61	Biological Resources - Terrestrial	4.3.2.2.2.2, 4.3.2.3.2.2	As stated in 4.3.2.2.2.2 and 4.3.2.3.2.2, SPECWAROPS troops would avoid sensitive biological resources, such as the dwarf iliau, when possible since regular existing routes are used. All participants would continue to be briefed on current guidelines to avoid undue impacts on vegetation.
	D-E-0437-62	Biological Resources - Terrestrial	4.3.2.3.2.2	Text in Section 4.3.2.3.2.2 has been added to clarify the impacts: The installation of the antennas would not require additional lighting or changes to the physical size of the structure. Telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the THAAD radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities.
	D-E-0437-63	Biological Resources - Marine	4.3.2.3.2.2	The text has been revised. Newell's shearwaters and Hawaiian dark-rumped petrels often fly into utility wires and poles and fall to the ground. KIUC has implemented a number of conservation measures to benefit listed seabird species on Kauai. The cooperative has shielded all streetlights on utility poles along county and state highways to reduce light-attraction impacts. KIUC has also placed power line marker balls in areas of concentrated seabird flight paths. (Kauai Island Utility Cooperative, 2006) These measures could also be used for the proposed installation of additional poles and cable between PMRF and Kokee.
	D-E-0437-64	Biological Resources - Terrestrial	4.3.2.6 and 4.3.2.7	The text has been revised in Section 4.3.2.6 and 4.3.2.7 to include the following: Activities would follow existing procedures used to prevent the introduction of non-native species. All Navy ships calling on Hawaiian ports are advised of important natural resource issues, including precautions regarding whales, in the reply to their request for a berth. Because this anticipates the actual date of arrival by approximately 2 days, the ships are advised of humpback precautions and other possible issues well before they approach Hawaii.
	D-E-0437-65	Biological Resources - Terrestrial	4.3.2.9.1	Text in Section 4.3.2.9.1 has been deleted. However, the presence of listed plants is acknowledged.
	D-E-0437-66	Biological Resources - Marine		Niihau is not used for GUNEX training. Therefore, nearshore environments would not be affected.
	D-E-0437-67	Biological Resources - Marine	4.3.2.10.2.1	Section 4.3.2.10.2.1 now states that seabirds, such as the sooty tern (Sterna fuscata), brown noddy, red-footed booby, and masked booby will be reduced on Kaula.
	D-E-0437-68	Biological Resources - Marine	4.4.1.1.1.2, 4.4.1.2.1.1	Text added to Sections 4.4.1.1.1.2 and 4.4.1.2.1.1: "Prior to the sinking of any vessels or deployment of steel frames for Naval Special Warfare exercises, environmental documents would be developed and reviewed as appropriate. The Navy would begin early coordination with regulatory agencies as applicable to reduce environmental impacts and to assist with the development of any required mitigative measures."

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Patricia S Port --US Dept of Interior	D-E-0437-69	Biological Resources - Marine	4.4.1.9.1	The exercises are performed concurrently. To clarify, "concurrent" has been added to the text in Section 4.4.1.9.1.
	D-E-0437-70	Biological Resources - Marine	4.4.2.1.1.1	The text has been revised to: "While individual birds may be startled, the training operations (C2, In-port and Personnel Support Operations, SPECWAROPS, and Salvage Operations) being currently performed are not likely to adversely affect a population of one of the 46 migratory species that occur in the Naval Station Pearl Harbor area and thus should exempt the HRC from the take prohibitions."
	D-E-0437-71	Biological Resources - Marine	4.4.2.3.1.1, 4.4.2.5.1	Additional text has been added. The Waiawa Unit of the Pearl Harbor National Wildlife Refuge, which supports breeding populations of endangered water birds, is across the Loch from the Naval Inactive Ship Maintenance Facility, Pearl Harbor. Mine Neutralization activities could startle these birds, but suspension of the mines at least 10 ft underwater would dampen the potential for airborne noise effects. Lima Landing is approximately 3 mi from the Honouiliuli Unit of the refuge. Mine Neutralization activities could startle these birds, but suspension of the mines at least 10 ft underwater would dampen the potential for airborne noise effects.
	D-E-0437-72	Biological Resources - Marine	4.4.2.4.1.1	The following text has been added: "There is no significance cut-off for noise impacts on wildlife, including birds. While individual foraging or transient birds in the vicinity of the EOD pit may be startled, training is unlikely to adversely affect a population of one of the 46 migratory species that occur in Pearl Harbor vicinity. At 4,000 ft from the EOD pit, the noise levels would be reduced to approximately 94 dB. The EOD Land Range is approximately 3 mi from the Honouiliuli Unit of the refuge, which would result in even lower noise levels at that site."
	D-E-0437-73	Biological Resources - Terrestrial	4.4.2.6.2	Mitigation measures are provided in Chapter 6.0. A statement has been added to Section 4.4.2.6.2 to clarify that Navy activities would be conducted in accordance with all applicable Biological Opinions and U.S. Coast Guard regulations.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Patricia S Port --US Dept of Interior	D-E-0437-74	Biological Resources - Marine	4.4.2.6.2	Text in Section 4.4.2.6.2 has been revised to: "Noise and movement of personnel, vehicles, helicopters, and landing craft may temporarily displace sensitive bird species such as the ae`o (Hawaiian stilt) from feeding and resting areas. However, training operations are generally short in duration and they occur in areas regularly used for such training operations. Air operations are a routine occurrence on the installation. All participants in training operations are to adhere to the Navy guidelines provided in Table 4.4.1.2.1.1-1, along with applicable U.S. Coast Guard procedures, to assist in minimizing impacts on biological resources. While individual birds may be startled, the training events (Air Operations, Aircraft Support Operations, and SPECWAROPS) currently being performed are not likely to adversely affect a population of one of the migratory species that occur in the U.S. Coast Guard Air Station Barbers Point/Kalaeloa Airport area and thus should exempt the HRC from the take prohibitions.
	D-E-0437-75	Biological Resources - Marine	4.4.2.9.2.1	The Bird Aircraft Strike Hazard (BASH) Program is at every Air Force base with a runway in order to prevent as many wildlife strikes to aircraft as possible. Habitat and terrain controls include mowing for specific vegetation heights, brush and tree removal, and dewatering and netting small ponds near runways. Navy operations would be performed in accordance with all applicable Air Force Biological Opinions, rules and regulations, including those addressed under the Air Force BASH Program.
	D-E-0437-76	Biological Resources - Terrestrial	4.4.2.11.1	A statement was added to Section 4.4.2.11.1 advising that Navy operations at the site would be performed in accordance with all applicable biological opinions and existing Army regulations.
	D-E-0437-77	Biological Resources - Terrestrial	4.4.2.16	A statement has been added to Section 4.4.2.16 to clarify that telemetry, command and control, and optical sensors are passive systems that do not present the same potential for impacts on wildlife as the radar systems such as the THAAD radar used on the HRC, even though they may use a radar or other active sensors for tracking and pointing activities.
	D-E-0437-78	Biological Resources - Terrestrial	4.4.2.17, 4.4.2.18, 4.4.2.19	See response to comment D-E-0437-77.
	D-E-0437-79	Biological Resources - Marine	4.8	The suggested regulations have been added to Section 4.8.
	D-E-0437-80	Biological Resources - Marine	6.2.1.4, 6.4.11	The Navy has existing standard operating procedures to provide guidance on how to assist injured animals and to report collisions with marine life. Text to that effect has been added to Chapter 6.0.
DJ Colbert	D-E-0438-1	Water Resources	2.2.4.4	See response to comment D-E-0412-1.
	D-E-0438-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
DJ Colbert	D-E-0438-3	Biological Resources - Terrestrial	4.3.1.1.1.1	As clarified in Section 4.3.1.1.1.1--Biological Resources—PMRF Offshore, amphibious landings as part of Expeditionary Assault activities on PMRF would occur only at Majors Bay and are restricted to existing routes. The area used is not typically used by sea turtles or Hawaiian monk seals.
	D-E-0438-4	Policy/NEPA Process		Thank you for your comment.
Andrea Brower	D-E-0439-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore, there is no proposal to expand. It is true that the proposal includes alternatives that require increases in the frequency of training. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary. The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter. The Navy does take its environmental stewardship role seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
	D-E-0439-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
	D-E-0439-3	Biological Resources - Terrestrial	4.3.1.1.1.1	See response to comment D-E-0438-3.
	D-E-0439-4	Policy/NEPA Process		Thank you for your comment.
Julie Penny	D-E-0440-1	Alternatives		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
	D-E-0440-2	Policy/NEPA Process		Thank you for your comment.
Kelley Burg	D-E-0442-1	Biological Resources - Marine		Thank you for your comment.
John P. Shannon	D-E-0443-1	Health and Safety		An evaluation of the adequacy of the Navy's nuclear power management and safety programs is beyond the scope of the Proposed Action. This EIS/OEIS addresses increased levels of personnel training using the current inventory of nuclear-powered ships and land facilities.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
John P. Shannon	D-E-0443-2	Policy/NEPA Process		Thank you for your comment.
Gordon La Bedz --Surfrider Foundation	D-E-0444-1	Biological Resources - Marine	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0062-2.
Alika Parks	D-E-0445-1	Program		Individuals may not follow regulations and controls; however, the Navy does have regulations and controls established to protect the environment. The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
	D-E-0445-2	Hazardous Materials and Waste		Thank you for your comment.
	D-E-0445-3	Biological Resources - Marine		NWHI is experiencing a decline of monk seal population; however, sightings of monk seals have increased in the Main Hawaiian Islands.
	D-E-0445-4	Policy/NEPA Process		Thank you for your comment.
Email MomBurgess	D-E-0446-1	Program		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
Maren Orion	D-E-0447-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore, there is no proposal to expand.
Linda Harmon	D-E-0448-1	Program		It is true that the proposal includes alternatives that require increases in the frequency of training. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary. The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
Ellen Caldwell	D-E-0449-1	Alternatives	4.1.2.4, 4.1.2.4.11. 4.1.2.4.11.2	See response to comment D-W-0066-1. Regarding the Bahamas stranding, see Section 4.1.2.4.11.2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Ellen Caldwell	D-E-0449-2	Program		An alternative that would decrease military training from current levels would not meet the purpose and need of the Proposed Action or support the Navy's ability to meet Federal statutory requirements. In addition, a reduction in training operations could jeopardize the ability of specialty forces, transient units, and Strike Groups using the HRC for training purposes to be ready and qualified for deployment.
Jose Bulatao, Jr. --Kauai Westside Watershed Council	D-E-0450-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
	D-E-0450-2	Biological Resources - Terrestrial	4.3.1.1.1.1	See response to comment D-E-0438-3.
	D-E-0450-3	Water Resources	2.2.4.4	There are currently no plans for chemical lasers. Because the directed energy programs have not been defined, they cannot be fully analyzed in this EIS. As stated in Section 2.2.4.5 of the EIS/OEIS, " Should the Airborne Laser program decide to perform testing at PMRF, separate environmental documentation would be required to analyze potential impacts from training operations."
Kyle Kajihiro --American Friends Service Committee	D-E-0451-1	Policy/NEPA Process		Scoping transcripts/records of scoping comments are not a part of the EIS/OEIS but are included in the Administrative Record.
	D-E-0451-2	Program		Thank you for your comment.
	D-E-0451-3	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace, therefore there is no proposal to expand. It is true that the proposal includes increases in the frequency of training.
	D-E-0451-4	Alternatives	2.2.1.1	Thank you for your comment.
	D-E-0451-5	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.
	D-E-0451-6	Socioeconomics	3.3.2.1.10, 4.3.2.1.11.2, 4.3.2.1.12.2, 4.3.2.1.12, 4.4.6.1, 4.3.2.1.9.2, 4.4.2.7.42, 4.6.2.1.5.2	The social costs of and impacts on the various resources have been considered in the EIS/OEIS. Social costs incorporate the total of all the costs associated with an economic activity and are borne by the economic agent (in this case the U.S. Navy) and by society at large. Sections 3.3.2.1.10, 4.3.2.1.11.2, 4.3.2.1.12.2, 4.3.2.1.12, 4.4.6.1, 4.3.2.1.9.2, 4.4.2.7.42, and 4.6.2.1.5.2 discuss various socioeconomic factors and impacts.
	D-E-0451-7	Alternatives	4.1.2.4.3	See Section 4.1.2.4.3, which describes the analytical framework and history behind the development of the Navy's compliance efforts.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kyle Kajihiro --American Friends Service Committee	D-E-0451-8	Biological Resources - Marine	C.3	The military's responsibility with regard to the Migratory Bird Treaty Act is described in Appendix C, Section C.3 Biological Resources. Military readiness activities are exempt from the take prohibitions of the Migratory Bird Treaty Act, provided they do not result in a significant adverse effect on the population of a migratory bird species. Navy activities in the HRC are not expected to adversely affect populations of a particular bird species.
	D-E-0451-9	Utilities	4.3.2.1.1.1, 5.3.12	As noted in Section 5.3.12, activities proposed within this EIS/OEIS would not significantly increase utility service demand. See response to comment D-E-0456-2 for a quantification of carbon dioxide emissions.
	D-E-0451-10	Cultural Resources	3.1.3, 3.1.2.4.1	The cultural significance of marine species is well documented in numerous documents, many of which can be accessed at local libraries and museums and on various Internet websites. Among these are The Works of the People of Old (Mary Kawena Pukui, 1976); Hawaiian Reflections (Rick Golt, 1978); Feathered Gods and Fishhooks (Patrick Kirch, 1985); An Account of the Polynesian Race (Fornander, 1878); and in several articles by NOAA posted at http://hawaiihumpbackwhale.noaa.gov (including "The Cultural Significance of Whales in Hawaii." Laws that protect cultural resources are not directly applicable to animals, including marine mammals; however, they are protected by the Endangered Species Act and the Marine Mammals Protection Act. Any potential effects on marine mammals and associated mitigation measures are discussed within the biological sections (Open Ocean and Offshore areas) of the EIS/OEIS and supported through consultation with Hawaiian agencies and cultural groups.
	D-E-0451-11	Cumulative Impacts	5.4.1-1	A detailed cumulative impact analysis relative to projects listed in Table 5.4.1-1 is provided in Section 5.
	D-E-0451-12	Program	3.1.4, 4.3.1.3, C.5	Section 3.1.4 of the EIS/OEIS describes various types of ordnance to be used during training. Under the Military Munitions Rule (MMR), the munitions expended on a military range need not be cleaned up until the range is formally closed. Under the MMR, land ranges in the HRC would be cleaned up when the military no longer needs them, and decides to close them. Navy activities on other Services' installations will be performed in accordance with all applicable regulations, management plans, and Biological Opinions associated with each installation. Kaula has been used as a target location by U.S. and Allied forces since 1952. At one time the entire island was used for training in air-to-surface and surface-to-surface weapons delivery. Today only the southeastern tip, approximately 8 percent, of the island is used for training.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kyle Kajihiro --American Friends Service Committee	D-E-0451-13	Health and Safety	5	General community health conditions are outside the scope of this EIS/OEIS. Cumulative effects from the proposed action are discussed in Chapter 5.0.
	D-E-0451-14	Water Resources	3.3.2.1.13	USEPA has recommended 24 parts per billion (ppb) as the level of concern for perchlorate. However, as stated in Section 3.3.2.1.13 of the EIS/OEIS, the Navy has adopted 4 ppb. Results from tests at PMRF have shown the perchlorate level to be below 4 ppb.
	D-E-0451-15	Program		The Navy has broadly defined its objectives and offers appropriate alternatives to achieve them. To implement its Congressional mandates, the Navy needs to support and to conduct current and emerging training and RDT&E training events in the HRC and upgrade or modernize range complex capabilities to enhance and sustain Navy training and testing. These objectives are required to provide combat capable forces ready to deploy worldwide in accordance with U.S.C. Title 10, Section 5062. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The objectives set forth in this document are both reasonable and necessary. Your comments regarding costs and budgetary matters are noted but are outside the scope of this EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kyle Kajihiro --American Friends Service Committee	D-E-0451-16	Health and Safety	4.2.1.1.1.1, 4.2.1.1.1.2, 4.3.2.1.7.2	Sections 4.2.1.1.1.1 and 4.2.1.1.1.2 includes analysis of potential impacts on biological resources from the use of chemical simulants. The potential ingestion of toxins, such as the small amount of propellant or simulant remaining in the spent boosters or on pieces of missile debris, by marine mammals or fish species in the offshore area will be remote because of (1) atmospheric dispersion, (2) the diluting and neutralizing effects of seawater, and (3) the relatively small area that could potentially be affected. Section 4.3.2.1.7.2 includes health and safety analysis of the chemical simulants proposed. The top three preferred stimulants would be TBP, glyceryl tributyrate, and propylene glycol. None of proposed simulants are considered hazardous substances or constituents; however, caution would be used when they are handled. The proposed testing of the Advanced Hypersonic Weapon would include launches using the previously analyzed Strategic Target System boosters. However, launches using the two ORION boosters (Orion 50S XLG first stage and Orion 50S XL second stage) have not been analyzed at PMRF. The effects would be similar to previous launches at PMRF and would have minimal impacts. For the proposed high-energy laser, PMRF would develop the necessary standard operating procedures and range safety requirements necessary to provide safe operations associated. Should a high-energy program decide to perform testing at PMRF, separate environmental documentation would be required to analyze potential impacts from training activities.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kyle Kajihiro --American Friends Service Committee	D-E-0451-17	Socioeconomics		Discussions of these types of social issues are outside the scope of the environmental impact analysis process. The scoping issues raised in this comment were reviewed for applicability. Transcripts/ comments from scoping are available in the Administrative Record. Regarding crime, there does not appear to be a correlation between crime and the largest influx of personnel during RIMPAC, which occurs every 2 years. A review of the Honolulu Crime Index for 1996-2005 indicates the following non-statistically tested correlations regarding the influx of military personnel in Oahu during RIMPAC 2000, 2002, and 2004. In 2000, 46,659 crimes were committed, the population of Oahu was 876,156, and the total number of tourists on Oahu was 4,719,244. The total number of military personnel that could have possibly visited Oahu when they were not participating in RIMPAC 2000 was 25,000, or 2.8 percent of the permanent population and 0.5 percent of the annual tourists. In 2002, crime rose on Oahu by approximately 23 percent. The number of military personnel that participated in RIMPAC 2002 was 44 percent less than the 2000 exercise (a total of 11,000), or 1.2 percent of the permanent population. In 2004 crime decreased by 18.6 percent from 2002 and by 0.07 percent from 2000. The population of Oahu was 897,969. The total number of military personnel that could have possibly visited Oahu when they were not participating in RIMPAC 2004 was 17,000 or only 1.9 percent of the permanent population and 0.4 percent of the tourists that visited Oahu during the entire year of 2004.
	D-E-0451-18	Socioeconomics		Your comment regarding housing prices and homelessness is noted but is outside the scope of this EIS/OEIS.
	D-E-0451-19	Socioeconomics		Your comment regarding tensions between the community and the military is noted but is outside the scope of this EIS/OEIS.
	D-E-0451-20	Land Use		The Proposed Action presented in the EIS/OEIS does not require the Navy to acquire additional land, nor alter on-base or off-base land use patterns. All recreational services available to military personnel and civilians will remain at current status during non-hazardous training operations. Additionally, temporary clearance procedures for safety purposes have been employed regularly over time without significant impact on commercial shipping, commercial fishing, or tourist-related activities.
	D-E-0451-21	Utilities	2.2.4.4	None of the proposed activities described within this EIS/OEIS would increase utility service demands. Once final decisions have been made regarding the directed energy program, additional environmental documents would be prepared (see Section 2.2.4.5).

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kyle Kajihiro --American Friends Service Committee	D-E-0451-22	Cultural Resources	4.2.2.2, Appendix H.2	See response to comment issues identified for comment D-W-0091-12.
	D-E-0451-23	Cultural Resources		Hawaiian cultural and religious practices will remain unaffected by Proposed Actions. Oral histories, interviews and ethnographic studies are not conducted for routine undertakings; however, they are conducted when complex or special circumstances arise or if there is insufficient information available for analysis. For this EIS, there were existing reports, histories, maps and databases that describe the types of resources known and expected within the area affected by the proposed activities. Sections of the EIS/OEIS are prepared based on this information, which covers prehistoric, historic, traditional and modern usage of the lands. Location-specific information of archaeological and traditional resources sites (e.g., shrines, sacred sites, burials) is protected by several laws. Restricting this information ensures the protection of sensitive areas and prevents inadvertent disturbance.
Diana La Bedz	D-E-0452-1	Policy/NEPA Process		Thank you for your comment.
Keone Kealoha	D-E-0453-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
	D-E-0453-3	Biological Resources - Terrestrial	4.3.1.1.1.1	See response to comment D-E-0438-3.
	D-E-0453-4	Water Resources	2.2.4.4	There are currently no plans for chemical lasers. Because the directed energy programs have not been defined they cannot be fully analyzed in this EIS/OEIS. As stated in Section 2.2.4.5, " Should the Airborne Laser program decide to perform testing at PMRF, separate environmental documentation would be required to analyze potential impacts from training operations."
	D-E-0453-5	Policy/NEPA Process		Thank you for your comment.
Janet Rapoport	D-E-0455-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore, there is no proposal to expand.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Mehana Blaich Vaughan	D-E-0456-1	Cumulative Impacts	4.3.2.1.6, 4.3.2.1.13, 5.2.1.4	Sections 4.3.2.1.6 and 4.3.2.1.13 provide an analysis of potential hazardous materials and wastes and water quality impacts (respectively) associated with Navy activities at PMRF. The cumulative impact analysis includes a discussion on environmental contamination and biotoxins. However, there is insufficient information available to determine how, or at what levels and in what combinations, environmental contaminants may affect marine mammals or other marine species. Existing Navy activities are analyzed as part of the No -Action Alternative. Based on the cumulative impact analysis, it was determined that implementation of the Proposed Action in conjunction with the cumulative actions listed in Table 5.2-1 would not result in incremental cumulative impacts. GMO crop cultivation is out of the scope of the cumulative analysis.
	D-E-0456-2	Air Quality	4.3.2.1.1.1	Projected increases in carbon dioxide emissions have been quantified at PMRF. Most propellant systems produce carbon dioxide, which is a greenhouse gas. Greenhouse gas emissions in the troposphere and stratosphere are of concern as they contribute to global warming by trapping re-radiated energy in the atmosphere (e.g., water vapor, carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrofluorocarbons, and perfluorinated carbons). Table 4.3.2.1.1.1-2 shows the total quantity of carbon dioxide emissions ranges from 0 to ½ ton per launch, depending on the missile. The worst case estimated total carbon dioxide emissions from launches into the troposphere for the No-action Alternative would be 36 tons per year (TPY). Alternative 1 emissions of carbon dioxide from launches would be 52 TPY, and Alternatives 2 and 3 emissions of carbon dioxide from launches would be 56 TPY (see Table 2.2.2.3-1 for number of launches per year). In comparison, the total carbon dioxide emissions from all sources in the United States was 5,945 million tons in 2005 (U.S. Office of Energy Statistics, 2005). Although it is not easy to know with precision how long it takes greenhouse gas to leave the atmosphere, missile exhaust emissions per launch are relatively small and short-term. Therefore, carbon dioxide from launches would have an insignificant effect on global warming.
	D-E-0456-3	Cultural Resources	ES1.2.4.3	Biodiversity refers to threatened and endangered species and cultural integrity refers to the condition of the various types of cultural sites, such as archeological or historic sites described in the EIS/OEIS.
	D-E-0456-4	Cultural Resources	4.6.2.1.3	See response to comment D-W-0097-7.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Mehana Blaich Vaughan	D-E-0456-5	Hazardous Materials and Waste	4.1.4, 4.1.7	Sections 4.1.4 and 4.1.7 of the EIS/OEIS describe the expended training and testing materials that would be deposited in the HRC as a result of the proposed activities. Any potential impacts on the bottom sediments and other elements of the ecosystem are also addressed in these sections. The actual dispersal will depend on the exact locations where training and testing events occur.
	D-E-0456-6	Hazardous Materials and Waste	4.1.4, 4.1.7	Standard operating procedures (SOPs) and compliance with the DoD instructions referenced in this comment minimize risks to public safety by insuring that hazardous materials (e.g., ordnance) are stored, handled, and used under controlled conditions by trained individuals, and that non-participants are excluded from potentially hazardous areas. The SOPs and instructions also insure that hazardous wastes are identified, stored, handled, and disposed in an appropriate manner. Sections 4.1.4 and 4.1.7 of the EIS/OEIS describe the expended training and testing materials that would be deposited in the HRC as a result of the proposed activities.
	D-E-0456-7	Socioeconomics	4.1.5.1.1, 8.0	Public notifications are made via Notices to Airmen (NOTAMs) and Notices to Mariners (NOTMARs), which provide information to pilots, ship operators, commercial fisherman, recreational boaters, and other area users that the military will be operating in a specific area, allowing them to plan their activities accordingly (see Section 4.1.5.1.1, and Chapter 8.0). NOTAMs and NOTMARs are available through subscription services, email notifications, or via Internet postings. In order to stay current individuals should subscribe to the local notices or check the online version frequently to see what notices have been posted. Additional information can be found at http://www.faa.gov/airports_airtraffic/air_traffic/publications/notices/ and http://www.navcen.uscg.gov/lnm/
	D-E-0456-8	Biological Resources - Marine	4.1.7.1.1, 4.3.1.1.1	Ocean debris and non-Navy activities such as fishing and whale-watching pose a real, documented threat to marine mammals in Hawaii. For example, in the 2006-07 humpback whale season, there were 26 reports of whales or dolphins entangled in fishing gear, numerous hooked monk seals and eight collisions between humpbacks and whale-watching vessels (see NMFS Stranding Response Network Newsletter [http://www.fpir.noaa.gov/Library/PRD/Marine%20Mammal%20Response/Newsletter%205.pdf]). NMFS is working these issues; they can be contacted at the provided web address; and the stranding network is in need of volunteers interested in marine mammal protection. In addition, Sections 4.1.7.1.1 HRC Training Operations and 4.3.1.1.1 Biological Resources - PMRF Offshore (BARSTUR, BSURE, SWTR, Kingfisher) address training debris and the potential for leaching of toxic materials.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Mehana Blaich Vaughan	D-E-0456-9	Hazardous Materials and Waste		The activities proposed in this EIS/OEIS address a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination.
	D-E-0456-10	Biological Resources - Marine		No expansion of the HRC is being proposed. All locations mentioned have been used in the past or are currently being used for Navy training and RDT&E operations. The best available evidence based on prior installation reports supports the claim, such as no mortality or reduction in habitat use by birds within 820 feet of Titan launch complexes and the continued use of PMRF for successful shearwater nesting.
	D-E-0456-11	Cultural Resources	ES, 7	See responses to issues identified in comments D-E-0062-4 and D-E-0451-23. NEPA analysis is an interdisciplinary process that is conducted by individuals with various experience and educational credentials. The list of preparers for this EIS/OEIS is provided in Chapter 7.0.
	D-E-0456-12	Mitigation Measures		There are no mitigation measures because Northwestern Hawaiian Islands would not be affected by the proposed actions and alternatives in the EIS/OEIS. Conditions associated with laws and regulations of the Sanctuary apply. All Navy mitigation in Chapter 6.0 applies to the location as well.
	D-E-0456-13	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	Navy activities near Nihoa and Necker as discussed in the EIS/OEIS are not new, but a continuation of past and current activities. See response to comment D-E-0062-1.
	D-E-0456-14	Cultural Resources		The exact location of iwi cannot always be pre-determined or anticipated. Cultural resources specialists make every effort to identify high sensitivity areas during project planning and closely monitor any ground disturbing projects. When iwi, or any other type of cultural remain is unexpectedly encountered, work stops in the immediate vicinity of the find and the appropriate individuals and organizations are notified (e.g., the Hawaii SHPO, the affected island Burial Council).
	D-E-0456-15	Health and Safety	4.3.2.1.7	Health and safety concerns regarding electromagnetic radiation (EMR) at PMRF are detailed in Section 4.3.2.1.7. EMR health and safety issues described address hazards of EMR to people, fuel, and ordnance (HERP, HERF, and HERO, respectively). The levels of EMR anticipated vary with the type and length training and RDT&E activity. However, prior to the installation of any new radar or modifications to existing radar, PMRF conducts an EMR hazard review that considers hazards of EMR on personnel, fuel, and ordnance. The review provides recommendations for sector blanking (areas off-limits to EMR) and safety systems. Regular radiation hazard surveys occur of the radar and other EMR generating equipment used on PMRF.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Mehana Blaich Vaughan	D-E-0456-16	Biological Resources - Terrestrial		Every effort is made to ensure that marine mammals and sea turtles are not present in applicable activity (missile testing, detonations, etc.) areas prior to operations. Species that can be found in the activity areas include coral, fish, and nonlisted birds.
Dennis Dias	D-E-0457-1	Program		Thank you for your comment.
Gregory I. Goodwin	D-E-0458-1	Alternatives		Thank you for your comment.
Mehana Blaich Vaughan	D-E-0459-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea, or airspace; therefore, there is no proposal to expand. It is true that the proposal includes increases in the frequency of training.
	D-E-0459-2	Cultural Resources	4.2.2.2	See response to comment D-E-0062-4 and D-W-0097-7. Completion of the cleanup of Kahoolawe and Waianae is beyond the scope of this EIS/OEIS.
	D-E-0459-3	Water Resources	2.2.4.4	There are currently no plans for chemical lasers. Because the directed energy programs have not been defined they cannot be fully analyzed in this EIS/OEIS. As stated in Section 2.2.4.5, “Should the Airborne Laser program decide to perform testing at PMRF, separate environmental documentation would be required to analyze potential impacts.”
Judy Walker	D-E-0460-1	Policy/NEPA Process		Due to the technical and complex issues surrounding the activities and operations performed in the Hawaiian Range Complex, the document had to address them all in detail, which produced the 1,742 pages. The public comment period was extended 15 days beyond the required 30-day review period for a total review period of 45 days.
	D-E-0460-2	Hazardous Materials and Waste	C.5	Under the Military Munitions Rule (MMR), which is explained in Section C.5 of the EIS/OEIS, the munitions expended on a military range need not be cleaned up until the range is formally closed. Under the MMR, land ranges in the HRC would be cleaned up when the military no longer needs them, and decides to close them. The Navy has no plans to recover training materials expended at sea.
	D-E-0460-3	Biological Resources - Marine		Impacts on wildlife from an increase in frequency and tempo of operations would be similar to those described for the No-action Alternative since the additional training operations would be performed throughout the HRC and not confined to one particular area. It is therefore unlikely that an individual listed species or other wildlife offshore would be repeatedly exposed to noise, debris, EMR, or emissions as a result of increased training operations.
	D-E-0460-4	Biological Resources - Marine	3.0, 4.0	Additional information has been added throughout Chapters 3.0 and 4.0 regarding the Hawaiian monk seal.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Judy Walker	D-E-0460-5	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.1	The HRC EIS/OEIS Proposed Action includes the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS. Guidance provided to users of Pohakuloa Training Area will be followed for proposed training activities there. The Navy recognizes that past practices may have resulted in contamination of certain sites. Congress has created and funded programs to identify sites in need of remediation and has proceed with cleanup as funds are available.
	D-E-0460-6	Hazardous Materials and Waste	3.1.4, C.5	As discussed in Section 3.1.4 of the EIS/OEIS, hazardous wastes generated by current and proposed Navy training and test activities are disposed in accordance with standard Navy policy (OPNAVINST 5090.1). On land facilities, hazardous wastes would be characterized, containerized, accumulated, and shipped to transfer, storage, or disposal (TSD) facilities in accordance with the Federal Resource Conservation and Recovery Act (RCRA). Navy vessels would characterize, containerize, and accumulate used hazardous materials generated aboard ship in an appropriate manner, and then offload them to shore-side hazardous waste accumulation points while in port. From there, the wastes generated at sea would enter the same land-side hazardous wastes management system as described for land ranges. Because Hawaii lacks the disposal facilities for most hazardous wastes, much of this material would be shipped to mainland sites for disposal.
	D-E-0460-7	Miscellaneous	9	Due to the size and number of documents used as references for the EIS/OEIS, they will not be included in an appendix. If a document is available on the internet, the words "URL-available" appear in Chapter 9.0. The public can request that the Navy provide information regarding a reference used. If the document is not labeled "For Official Use Only/Confidential," information will be provided.
	D-E-0460-8	Alternatives		Technical terms must be used to present a precise and accurate discussion for some sections of the EIS/OEIS.
	D-E-0460-9	Alternatives	4.1.2	As presented in Southall et al., 2007, "data gaps severely restrict the derivation of scientifically-based noise exposure criteria." As explained in Section 4.1.2, the changed thresholds and method for acoustic analysis take into account behaviors from wild animals where that data was applicable. In addition in Chapter 6.0, the Navy is proposing research and monitoring to obtain more information about the potential impacts resulting from navy operations.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Judy Walker	D-E-0460-10	Biological Resources - Marine	4.1.2.4.11	Section 4.1.2.4.11 includes specific stranding events that have been linked to potential sonar operations are discussed. Of note, these events represent a small overall number of animals over an 11-year period (approximately 40 animals), and not all worldwide strandings can be linked to naval activity.
	D-E-0460-11	Mitigation Measures		The collection of marine debris by Navy forces engaged in training is outside the scope of this EIS/OEIS. Ocean debris and non-Navy activities such as fishing and whale-watching pose a real, documented threat to marine mammals in Hawaii. For example, in the 2006-07 humpback whale season, there were 26 reports of whales or dolphins entangled in fishing gear, numerous hooked monk seals and eight collisions between humpbacks and whale-watching vessels (see NMFS Stranding Response Network Newsletter [http://www.fpir.noaa.gov/Library/PRD/Marine%20Mammal%20Response/Newsletter%205.pdf]).
	D-E-0460-12	Biological Resources - Marine		There have been no estimates of the density of fish where demolition training has been occurring for decades. Given that the activities are intermittent and short in duration, it is likely that any fish generally inhabiting the area will return when activities that displaced them cease. The areas used for demolition training are shallow water and unlikely to contain marine mammals. The setup time for demolition training using explosive charges is lengthy given the necessity to ensure all safety procedures are accomplished. These safety procedures will likely result in the detection of marine mammals and sea turtles in the area, Navy has applying for harassment authorizations as a result of modeled exposures without consideration of the mitigation measures which should most likely preclude those exposures.
	D-E-0460-13	Biological Resources - Marine	4.1.2.3	While leatherbacks might be functionally and physiologically closer to marine mammals than chelonids they are still sea turtles, though of a distinct and different family. Their migratory, breeding, nesting, and developmental behaviors and anatomical features are closer to their chelonid brethren than marine mammals. As such one could argue either way as to which order or family leatherbacks most resemble. In the absence of empirical data it is difficult to say with certainty that leatherbacks will follow the model of chelonid TTS. However, given the best available information regarding the anatomical differences between marine mammal and leatherback auditory structures and data from hard-shell turtles, extrapolations using the chelonid examples were made.
	D-E-0460-14	Biological Resources - Marine	4.1.2.4.1	The potential for impacts from a torpedo guidance wire are discussed in section 4.1.2.4.1. Entanglement and ingestion of this equipment is considered low.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Judy Walker	D-E-0460-15	Biological Resources - Marine	3.1.2.3, 4.1.2.3	Text has been revised to clarify what was meant and to provide the framework for analysis. All discussions regarding sea turtles can be found in Sections 3.1.2.3 and 4.1.2.3.
	D-E-0460-16	Mitigation Measures	6.2	Section 6.2 --underwater detonations mitigation section --has details regarding clearance procedures. The EIS/OEIS states that 30 minutes is based on a typical dive time of 30 minutes for traveling listed species of concern.
	D-E-0460-17	Biological Resources - Marine	4.1.2.3.1	A turtle would have to be near the point of projectile impact on be in the affected area. Given the density of water and the variable direction and energy loss of projectiles hitting the water, there is no accurate average answer in regard to a specific “area” or “depth.”
	D-E-0460-18	Biological Resources - Marine		Section 5.2.1.6 describes current research by NMFS for cetacean work in the wild in the North Pacific.
	D-E-0460-19	Biological Resources - Marine	4.1.2.3.1	As discussed in Section 4.1.2.3.1, pressure effects from underwater detonations are a second criterion for estimating sea turtle threshold.
	D-E-0460-20	Biological Resources - Marine	3.1.2.4.1.3	The critical habitat of Hawaiian monk seals has not changed since 1988; therefore, the NMFS reference document is still relevant. Additional information from National Marine Fisheries Service 2007 Recovery Plan has been added to Chapter 3.0.
	D-E-0460-21	Biological Resources - Marine	4.1.2.4	Green turtles generally do not “crawl” into pukas on the bottom to rest. Resting areas are relatively shallow and more often in proximity to the shore at the edge of the offshore reefs or at the 10 fathom drop off offshore and consist of holes and small caves or openings or shallow depressions in the hard substrate in these waters. Of the large baleen whales found within the HRC none could be classified as bottom feeders. Humpbacks are present only during the winter breeding season and generally do not feed. If observed feeding they concentrate on small schooling fish and crustaceans at or near the surface. Blue, fin, sei and Brÿde’s whales are generally surface to mid-water feeders on small schooling fish, crustaceans and euphausids. The closest to a bottom feeding whale might be the sperm whale which is known to dive to great depths to feed on giant squid. Sperm whales have been found entangled in deep water cables, but the reason(s) for the entanglements are not entirely clear. Other small toothed whales such as beaked whales, pilot whales, false killer whales, pygmy and dwarf sperm whales, and Risso’s dolphins may feed on different species of fish and squid within the water column, but not likely on sea floor.
	D-E-0460-22	Biological Resources - Marine	4.1.2.4	See response to comment D-E-0460-21.
	D-E-0460-23	Alternatives	4.1.2.4.3, 9.0	All literature used and sited in Section 4.1.2.4.3, as well as the remainder of the EIS/OEIS are included in Chapter 9.0, References.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Judy Walker	D-E-0460-25	Alternatives	4.1.2	Cumulative effects analysis is presented in Chapter 5.0 of the EIS/OEIS. The discussion of the framework for derivation and analysis of acoustic effects is provided in Section 4.1.2 of the EIS/OEIS. The recovery time for TTS in marine mammals is believed to be relatively short (less than an hour), so there is no direct physiological cumulative effects given that sonar training is not static in one location relative to marine mammals and acoustic exposures that may result in TTS. Extrapolation from terrestrial animals is appropriate in terms of general mammalian physiology. The table referenced does not appear in the Final EIS/OEIS, given the change to the risk function.
	D-E-0460-26	Hazardous Materials and Waste	3.1.4, 4.1.4	Chaff is neutrally buoyant, and thus does not float. Aluminum, and possibly other metals depending upon the type of chaff used, would leach from the chaff fibers over time as it degraded. Chaff cartridges dispensed by aircraft generally weigh 6 to 7 ounces, while chaff cartridges fired by surface vessels can weigh up to about 28 pounds. Sections 3.1.4 and 4.1.4 for a discussion of chaff.
	D-E-0460-27	Hazardous Materials and Waste	Appendix K	Appendix K, Missile Launch Safety and Emergency Response, discusses in general terms the potential health and safety hazards associated with missile launch operations and the corresponding procedures that are in place to protect people and assets. The Range Safety System is in place to anticipate mishaps and plan responses ahead of time. These response plans both minimize the potential harm and speed recovery from the mishap.
	D-E-0460-28	Biological Resources - Marine	4.2.1.1.1.1	Yes, text in Section 4.2.1.1.1.1 has been revised to include sea turtles.
	D-E-0460-29	Hazardous Materials and Waste		No used hazardous materials generated aboard ship that would be considered hazardous wastes when offloaded in port would be disposed of at sea during Navy training or testing activities described as elements of the Proposed Action in the EIS/OEIS.
	D-E-0460-30	Hazardous Materials and Waste		No used hazardous materials generated aboard ship that would be considered hazardous wastes when offloaded in port would be disposed of at sea during Navy training or testing activities described as elements of the Proposed Action in the EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Judy Walker	D-E-0460-31	Hazardous Materials and Waste	3.14, 3.1.7, 4.1.4, 4.1.7	The sentence cited in the comment actually states, "A sonobuoy's seawater batteries can release copper, silver, lithium, or other metals." These other metals (e.g., lead) are listed in Table 4.1.4.1.1-2. Batteries actively release their constituents during operation, which may last up to 8 hours (as described in the EIS/OEIS), after which trace amounts of their constituents could continue to leach into surrounding seawater for an indefinite period. The battery effluents discussed here are the same as those previously mentioned; all substances having a potential effect on marine organisms are identified. Sonobuoys generally self-scuttle by allowing seawater to flood the device. The types of sonobuoys used for the analysis are those now in the Navy's inventory and in common use; the type of item used is determined by its function, not the training location. San Clemente Island information is used because that is where the Navy's Sonobuoy Quality Assurance testing is done, and detailed information from that program is available. All sonobuoys of a given type are manufactured with the same quantities of constituents. Sections 3.1.4, 3.1.7, 4.1.4, and 4.1.7 of the EIS/OEIS discuss sonobuoys, based on those sonobuoys now in general use by the Navy.
	D-E-0460-32	Biological Resources - Marine	4.2.1.1	Text in Section 4.2.1.1 has been revised to (1) remove "20 species", (2) add discussion of debris size and extent, and (3) add discussion of additional chemical simulants proposed for use. The probability of a marine mammal (offshore of Nihoa) being affected by falling debris is described. "Affecting a marine mammal" in this context means only being struck by debris.
	D-E-0460-33	Biological Resources - Marine	4.2.1.1.1.2	Section 4.2.1.1.1.2 has been revised to add discussion of the additional chemical simulants proposed for use in Alternative 1, 2, or 3. Only TBP will be used in the No-action Alternative.
	D-E-0460-34	Hazardous Materials and Waste	4.1.4	The estimated number of smoke canisters expended in the HRC has been revised in the EIS/OEIS. While the specific number of canisters expended has changed, the overall conclusion - that the rate of discharge and density of such items is insufficient to have an environmental effect - has not changed. (see Section 4.1.4, Table 4.1.4.1.1-1)
	D-E-0460-35	Hazardous Materials and Waste	3.14, 3.1.7, 4.1.4, 4.1.7	Chaff is discussed in Sections 3.1.4, 3.1.7, 4.1.4, and 4.1.7 of the EIS/OEIS. The substances that leach from the chaff fibers are environmentally benign, and chaff concentrations in the water will not be sufficient to affect the digestive systems of vertebrates. Chaff is not comparable to nurdles, in that it is not used in such huge quantities as are nurdles, the fibers are not buoyant as are nurdles, and chaff fibers appear to degrade more quickly than nurdles.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Judy Walker	D-E-0460-36	Hazardous Materials and Waste	3.14, 3.1.7, 4.1.4, 4.1.7	Chaff cartridges dispensed from aircraft generally weigh 6 to 7 ounces, each with approximately 5 million individual chaff fibers, and aircraft can dispense numerous such cartridges. Chaff cartridges fired by vessels can weigh from 10 to 30 pounds, each with up to 100 million individual chaff fibers, and vessels can fire numerous such cartridges. The size and physical characteristics of the individual fibers are similar, so their dispersal in water will be similar. Chaff is discussed in Sections 3.1.4, 3.1.7, 4.1.4, and 4.1.7 of the EIS/OEIS.
	D-E-0460-37	Hazardous Materials and Waste	3.14, 3.1.7, 4.1.4, 4.1.7	See response to comment D-E-0460-36.
	D-E-0460-38	Hazardous Materials and Waste	3.14, 3.1.7, 4.1.4, 4.1.7	Depending upon the altitude at which the chaff is released and weather conditions at the time of release, the area affected will vary, but generally will be so large as to preclude any noticeable effects on turbidity and clarity. Even under worst-case conditions of heavy chaff releases at low altitudes, any surface concentrations of chaff would disperse in a matter of minutes. Chaff is discussed in Sections 3.1.4, 3.1.7, 4.1.4, and 4.1.7 of the EIS/OEIS.
	D-E-0460-39	Hazardous Materials and Waste	3.14, 3.1.7, 4.1.4, 4.1.7	See response to comment D-E-0460-36.
	D-E-0460-40	Hazardous Materials and Waste	4.1.4	Expended training materials are, by definition, those training materials that are generally not recovered because their recovery would be either impractical or hazardous to personnel. The Navy, thus, has no protocols for the recovery of expended materials. Additional information about expended training materials is provided in Section 4.1.4 of the EIS/OEIS.
	D-E-0460-41	Hazardous Materials and Waste	4.1.4, 4.1.4	Sections 4.1.4 and 4.1.7 of the EIS/OEIS contain an expanded discussion of expended training materials, their constituents, and environmental fates and effects. They would be dispersed over the 235,000 square nm of the HRC.
	D-E-0460-42	Hazardous Materials and Waste	8	JATO stands for Jet-Assisted Takeoff. These are bottle rockets, generally weighing from about 70 to about 165 pounds, that can be attached to various types of aerial targets or aircraft to assist their takeoffs. The definition of JATO bottle has been added to the glossary (Chapter 8.0)
	D-E-0460-43	Hazardous Materials and Waste	4.1.4	"Energetic materials" means ordnance. Failure rates for various ordnance items vary widely, and failure rates for the same items vary depending upon the circumstances under which they are used. A failure rate of 5 percent and a low-order detonation rate of 0.02 percent are assumed to be representative, overall, for purposes of analysis. Section 4.1.4 of the EIS/OEIS estimates the amounts of unexploded ordnance (UXO) generated by failures and low-order detonations.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Judy Walker	D-E-0460-44	Hazardous Materials and Waste	C.5	No requirement exists for the removal of unexploded ordnance (UXO) from an active range. UXO on land ranges may be periodically removed or destroyed in place during sweeps by explosive ordnance disposal (EOD) personnel as part of their training, but the frequency and scope of these operations vary from range to range. UXO expended on sea ranges is generally not recovered. The Navy's approach to UXO includes minimizing the risk to its personnel from UXO, restricting access to active ranges to the extent possible, training range users in UXO avoidance, and deferring the general cleanup of UXO until the range is closed (see Appendix C.5)
	D-E-0460-45	Hazardous Materials and Waste	4.1.4, 4.1.7	Deposition and decomposition of expended training materials, and their effects on human health and the environment, are addressed in Section 4.1.4 and 4.1.7 of the EIS/OEIS. These discussions include qualitative discussions about the fate of expended training materials, potential for releases of toxic substances, and anticipated effects on benthic organisms. More-specific information is unavailable because little research in this area has been accomplished. As noted in other responses, the Navy may train in any portion of the HRC, so no specific sub-areas can be identified as more likely than others to be affected by deposits of expended training materials.
	D-E-0460-46	Hazardous Materials and Waste	4.1.4	The 0.85 lb per item is the estimated amount of residue, not the initial weight of the item. The amount of residue will vary, based on the size and type of flare or smoke canister, which will vary from one activity to another, and may change in the future if new versions of these training items are introduced. The average of 0.85 lb per item used in the EIS/OEIS is deemed, based on available data, to be reasonably representative of the actual amounts of debris for purposes of environmental impact analysis (see Section 4.1.4.)
	D-E-0460-47	Hazardous Materials and Waste	4.1.4	The numbers in Table 4.1.4.1.1-1 and the paragraph titled "Pyrotechnic Residues" have been revised for the EIS/OEIS.
	D-E-0460-48	Hazardous Materials and Waste	4.1.4	The Navy intends to fully use the available 235,000 square nm of the HRC, although both areas and activities would vary. In fact, a vital component of advanced training is "free play" in which commanders are encouraged to improvise and their actions, while conforming to standard Navy protocols and procedures, are thus unpredictable. For purposes of analysis only, the EIS/OEIS assumes that >99 percent of the training materials expended at sea would be deposited over no more than 20 percent of the range, or about 47,000 square nm. Additional text has been added to Section 4.1.4 of the EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Judy Walker	D-E-0460-49	Hazardous Materials and Waste	4.1.4	The exact numbers of flares that would be expended in each portion of the range are not known at this time, because decisions about future training locations, schedules, and durations will be made at that time. Furthermore, the deposition pattern of pyrotechnic residues generated in the air will depend upon their initial altitude and the wind speeds and directions at that time. The numbers of flares estimated in the EIS/OEIS for purposes of evaluating their likely impact on human health and the environment are an annual average; actual numbers may vary. The EIS/OEIS provides estimates of the density of training materials expended at sea that are based on an assumption that >99 percent of the materials would be deposited on no more than 20 percent of the range area, yielding a conservative scenario for purposes of identifying the potentially significant effects of these materials.
	D-E-0460-50	Hazardous Materials and Waste	Appendix C.5	RCRA's generic criteria for characterizing hazardous wastes include the characteristics of reactivity, ignitability, corrosivity, and toxicity.
	D-E-0460-51	Hazardous Materials and Waste	Appendix C.5	Some unexploded ordnance (UXO) would meet the criteria for RCRA reactivity and some of the components and residues of expended training materials would meet the criteria for toxicity, assuming that these materials were subject to RCRA. Some materials that did not meet the RCRA criteria for reactivity, such as unburned propellants, may meet the criteria for ignitability. The applicability of RCRA to these materials does not rest on their hazardous characteristics, however, but is prescribed by other laws, regulations, and policies (see Appendix C.5).
	D-E-0460-52	Biological Resources - Marine	4.1.2.3	To summarize Section 4.1.2.3, the intensity of sound and how turtles sense it is dependent on them being able to "hear" at that frequency. Turtles do not hear mid-frequency sounds, so the intensity is irrelevant.
	D-E-0460-53	Biological Resources - Marine	4.1.2.3	The most complete information on distribution is for Hawaiian green turtles and hawksbills that breed, nest and forage in the Hawaiian Archipelago. Distribution data for the other species of sea turtles found within the HRC come mostly from tagging studies conducted on the west coast of the United States and Mexico and from tagged and released loggerheads taken in the Hawaii-based longline fishery. Migration routes and distribution for loggerheads, olive ridleys, and leatherbacks are described in Chapter 3.0. The distribution, behavior, and status of the five sea turtle species discussed in the EIS/OEIS is covered in Chapter 3.0 in some detail. The life history stages of each species found within the HRC are also described. Any differential impacts on specific age classes and behaviors from training operations will be determined in consultation with NMFS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Judy Walker	D-E-0460-54	Biological Resources - Marine	4.1.2.3	Monitoring for sea turtles and marine mammals from ships is covered in the mitigation section of the EIS/OEIS and in the Long-term Monitoring Plan that Navy will prepare per a NMFS permit. The percentage of time spent at the surface by sea turtles depends on many factors. Among these are the behaviors that affect diving and swimming such as foraging, transiting, resting (logging), and migration. These times are also affected by age class, species and gender. It would be extremely difficult to make a general statement about a sight ability index for any sea turtle species, except perhaps loggerheads taken and released with satellite tags in the Hawaii-based longline fishery.
	D-E-0460-55	Biological Resources - Marine	3.2.1.1.1	The following text has been added to Section 3.2.1.1.1: No age data are available for coral communities off Nihoa; however, marine surveys indicate that the rocky bottoms around Nihoa are scoured by powerful surf and has limited coral growth, suggesting that coral communities are composed of relatively young colonies. High-wave energy coral communities appear to be most common and are dominated by cauliflower coral (Pocillopora spp.) and lobe coral (Porites spp.).
	D-E-0460-56	Biological Resources - Marine	4.2.1.1.1.1	The text in Section 4.2.1.1.1.1 has been revised to read: No estimate of the actual area impacted was calculated since the likelihood of impacts on submerged coral reef habitat at Nihoa is anticipated to be low. A debris analysis to identify weight and toxicity of the debris that could potentially impact Nihoa was performed by the Terminal High Altitude Area Defense (THAAD) (one of the missiles with a trajectory that could potentially result in debris offshore of Nihoa) Project Office. Low-force debris (under 0.5 foot-pound) is not expected to severely harm threatened, endangered, or other marine species occurring in offshore waters. Quantities of falling debris (e.g., solid rocket propellant) will be low and widely scattered so as not to present a toxicity issue. The potential exists for debris greater than 0.5 foot-pound to impact the offshore waters of Nihoa. Since most of the 20 species of coral present only survive at depths less than 40 feet, coral cover is not greater than 25 percent, the debris will be widely scattered, and the velocity will be slowed following impact at the water's surface, the likelihood of impacts on submerged coral reef habitat associated with Nihoa will be low.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Judy Walker	D-E-0460-57	Biological Resources - Marine		Criteria for assessing potential impacts on marine biological resources, including coral communities were based on the following: (1) Loss of habitat (destruction, degradation, denial, competition); (2) Over-harvesting or excessive take (accidental or intentional death, injury); (3) Increases in exposure or susceptibility to disease and predation; (4) Decrease in breeding success. Collision with ordnance, debris, or vessels; release of contaminants from munitions constituents or range debris; sound; or human contact could potentially cause impacts. Impacts were considered substantial if they have the potential to result in reduction of population size of Federally listed threatened or endangered species, degradation of biologically important unique habitat, or reduction in capacity of a habitat to support species. If impacts are anticipated, consultation with resources agencies would occur to either minimize or remove such impacts. Existing conditions were determined from an extensive search and review of the literature, including peer-reviewed, technical reports produced by resource agencies, academics, and gray literature. The most current benthic habitat maps and data were provided by the NOAA, prepared by the National Ocean Service, Biogeography Program, in cooperation with Analytical Laboratories of Hawaii (2002).
	D-E-0460-58	Biological Resources - Marine	4.1.2.4.1	The potential for impacts from torpedo guidance wire, launch accessories, flex hoses, and sonobuoys parachutes are discussed in section 4.1.2.4.1. Entanglement and ingestion of these equipment is considered low.
Gordana Leonard	D-E-0461-1	Program		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
Barbara Saiki	D-E-0462-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
Michael Jasny --National Resources Defense Council	D-E-0463-2	Biological Resources - Marine	4.1.2.4, 4.1.2.9	Available literature, including those cited throughout Section 4.1.2, have been reviewed by NMFS and the Navy in the development of the behavioral impact criteria. Having reviewed and considered the available literature, the weight of the evidence has led Navy and NMFS scientists to determine appropriate thresholds.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-3	Cumulative Impacts	4.0, 5.0	The EIS/OEIS includes an analysis of potential impacts of the HRC (Chapter 4.0) as well as a comprehensive analysis of reasonable alternatives. Chapter 2.0 provides a description of alternatives considered and Chapter 4.0 provides an impact analysis by resource area for each of the alternatives carried forward. Cumulative impacts are addressed in detail in Chapter 5.0 of the EIS/OEIS.
	D-E-0463-4	Biological Resources - Marine	4.1.2.4.10, 4.1.2.4.11.1	The Navy believes that years of site fidelity by individual beaked whales in areas where sonar has operated for years is an indicator that beaked whales in Hawaii are not comparable to resident beaked whales in locations on the other side of the planet. In fact, implicit in the statements, that resident populations have been identified in the Hawaiian Islands and that there is a genetic segregation between some marine mammals of Hawaiian Islands and the rest of the Pacific Stock, is an acknowledgment that the animals of the Hawaiian Islands have coexisted with sonar operations without long term detriment to populations. Findings by Baird and McSweeney are contrary to speculation that large numbers of marine mammals die or abandon sites due to sonar but are not observed, potentially resulting in population level impacts. Residency demonstrates that the animals are remaining in the area despite sonar exercises.
	D-E-0463-5	Mitigation Measures		Visual monitoring is critical for ship safety, irrespective mitigation. Navy lookouts and bridge personnel (5 in total on surface ships) are highly qualified and experienced marine observers. Compared to commercial vessels, Navy ships' bridges are positioned forward to allow more optimal scanning of the ocean area from the bridge and bow area. Navy lookouts undergo extensive training to include on-the job instruction under supervision of an experienced lookout followed by completion of Personnel Qualification Standard Program. NMFS-approved Marine Species Awareness training is required before every USWEX exercise using MFA sonar. Navy lookouts use both hand held and “Big Eye” (20X110) binoculars. Aerial platforms also undertake visual monitoring prior to commencement of ASW operations. Passive acoustic systems are used by all platforms to monitor for marine mammal vocalizations, which are then reported to the appropriate watch station for dissemination. Navy ships also monitor their surroundings using all appropriate sensors at night and with night vision goggles as appropriate for activities conducted at night.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-6	Mitigation Measures		The US Navy is best suited to determine what mitigation it can effectively use during its training and testing activities to mitigate harm to marine mammals while still being able to meet its operational needs to train for the real-world conditions it may face. A thorough understanding of tactical sonar acoustic propagation characteristics, marine mammal physiology and population ecology, and oceanographic vagaries in the waters of the Hawaiian Islands Operating area has been a benchmark of the Navy's effective mitigation program. Refer to the discussion of the ASW history/how Navy operates with sonar in the EIS.
	D-E-0463-7	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0066-1.
	D-E-0463-8	Alternatives	2.2, 6.1	As noted in Section 2.2, alternative locations for training and RDT&E activities were considered. The alternatives carried forward were selected based on their ability to meet the following criteria: (a) use existing Navy ranges and facilities in and around Hawaii; (b) be consistent with the stated current and emerging requirements for the range complex; (c) achieve training tempo requirements based on Fleet deployment schedules; (d) meet the requirements of DoD Directive 3200.15, Sustainment of Ranges and Operating Areas; (e) implement new operational training requirements and RDT&E operations; and (f) support realistic training that replicates expected operating environments for naval forces. In addition, Section 6.1 presents the Navy's mitigation measures, outlines steps that would be implemented to protect marine mammals and Federally listed species during HRC training events. This section also presents a discussion of other measures that have been considered and rejected because they are either: (a) not feasible; (b) present a safety concern; (c) provide no known or ambiguous protective benefit; or (d) have an unacceptable impact on training fidelity.
	D-E-0463-9	Policy/NEPA Process		Thank you for your comment.
	D-E-0463-10	Mitigation Measures		See response to comment D-E-0463-6

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-11	Alternatives		The model is new (January 2007) and will eventually be subject to independent peer review for conferences or journal submissions. The EIS/OEIS provides all source levels, frequency ranges, duty cycles, and other technical parameters relevant to determining potential impact on marine life unless this information was classified. Based on the information provided in the EIS/OEIS, others with the required technical expertise can use the existing information to calculate similar results. The CASS/GRAB program is export controlled and not available for public release, however, approximate results can be obtained using other mathematical models commonly available to those with the technical expertise to utilize those tools.
	D-E-0463-12	Alternatives	4.1.2.4.11	The Hanalei Bay "stranding" is discussed in Section 4.1.2.4.11. Investigations of Hanalei Bay concluded that it was not known what caused the pod to enter the bay. The report indicated that sonar “may have contributed to a ‘confluence of events’, including human presence (notably the uncontrolled and random human interactions fragmenting the pods of whales on 3 July) and/or other unknown biological or physical factors.’ The full moon could have been a contributing factor in terms of bringing the animals closer to the shore. Many assumptions and qualifications went into the findings documented in the Hanalei Bay report. Dr. Southall has indicated since the report was written that he is aware of a separate event involving melon-headed whales and rough-toothed dolphins that took place over the same period of time off Rota in the Northern Marianas Islands, which is several thousand miles from Hawaii. No known active sonar transmissions occurred in the vicinity of that event. NOAA’s original report on the Hanalei Bay event was issued before it knew of the events near Rota.” Therefore, coupled with extensive marine mammal awareness training, regulatory reporting and coordination requirements, and investments in scientific, peer-reviewed data, the Navy has safely operated MFA systems in Hawaiian Islands waters in conjunction with major range events for decades.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-13	Alternatives	2.2.1.1	During scoping, the alternative to reduce the level of training operations in the HRC was suggested. As stated in Section 2.2.1.1 of the EIS/OEIS, an alternative that would decrease military training from current levels would not meet the purpose and need of the Proposed Action. A reduction in levels of training within the HRC would not support the Navy's ability to meet United States Code (U.S.C.) Title 10 requirements. In addition, a reduction in training operations could jeopardize the ability of specialty forces, transient units, and Strike Groups using the HRC for training purposes to be ready and qualified for deployment. The Navy has broadly defined its objectives and offers appropriate alternatives to achieve them. To implement its Congressional mandates, the Navy needs to support and to conduct current and emerging training and RDT&E training events in the HRC and upgrade or modernize range complex capabilities to enhance and sustain Navy training and testing. These objectives are required to provide combat capable forces ready to deploy worldwide in accordance with U.S.C. Title 10, Section 5062. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary. In regard to studied alternatives, the No-action Alternative consists of the current baseline of operations at the HRC, including over 9,300 training and RDT&E operations being conducted in the HRC annually. This Alternative appropriately uses current activities as the no-action status quo. CEQ regulations allow the status quo to properly be the No-action Alternative. The "No-action" alternative may be thought of in terms of continuing with the present course of action until that action is changed. In requiring consideration of a No-action Alternative, the CEQ intended that agencies compare the potential impacts of the proposed major Federal action to the known impacts of maintaining the status quo. The Navy has done just that in the EIS/OEIS.
	D-E-0463-14	Policy/NEPA Process		The EIS/OEIS is prepared by the Department of the Navy in compliance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality, the Department of the Navy procedures for implementing NEPA, and Executive Order 12114.
	D-E-0463-15	Alternatives		See response to comment D-E-0463-13.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-16	Program		The Navy in Hawaii complies with all applicable environmental laws, including NEPA and its requirements. The Navy has broadly defined its objectives and offers appropriate alternatives to achieve them. To implement its Congressional mandates, the Navy needs to support and to conduct current and emerging training and RDT&E training events in the HRC and upgrade or modernize range complex capabilities to enhance and sustain Navy training and testing. These objectives are required to provide combat capable forces ready to deploy worldwide in accordance with U.S.C. Title 10, Section 5062. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary. In regard to statement of purpose, studied alternatives, and studied parameters, the Navy is in full compliance with NEPA.
	D-E-0463-17	Biological Resources - Marine	4.1.2	The Navy disagrees and notes that, for example, Section 4.1.2 in the EIS/OEIS includes relevant information even though it may be seen as being adverse to the Navy's interests. This includes discussions of all strandings alleged to have been associated with the use of sonar.
	D-E-0463-18	Alternatives		The Navy respectfully disagrees.
	D-E-0463-19	Alternatives	4.1.2	The explanation for the derivation of the thresholds and the use of the specific data sets is explicit in Section 4.1.2. While there are many limitations on these data sets (as detailed), there remain no other more representative or rigorous data from which to derive alternative thresholds. The thresholds and criteria were developed in cooperation with NMFS and as more data becomes available, the methodology and thresholds will be revised as warranted.
	D-E-0463-20	Alternatives	4.1.2	The EIS/OEIS contains a revised methodology provided by NMFS for the Navy, presented to the public in the Supplement to the Draft EIS/OEIS, and incorporated into the revised discussion in Section 4.1.2. Affects of multiple pings are considered under the energy metric (EFD) criteria beginning with TTS, which is the first measurable physiological effect presently known. A new risk function is used in the present analysis has behavioral response curve with a lower mean (165 dB SPL) than the previously proposed 173 dB SPL.
	D-E-0463-21	Biological Resources - Marine	4.1.2	The marine mammal acoustical analysis is based on the use of the best available and applicable science (see Section 4.1.2) as it applies to mid -frequency and high-frequency sources used during training in Hawaii. The thresholds used in this analysis were developed in cooperation with NMFS, who serves as the regulator for these resources.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-22	Alternatives	4.1.2.4.10, 4.1.2.4.11.2	For the Hawaii context, there are beaked whales with long-term residency in locations where the Navy has been training with sonar for decades, including the range at PMRF and the Alenuihaha Channel. An in-depth discussion is presented in Section 4.1.2.4.10 including a discussion of beaked whales in relation to Navy sonar events. In Hawaii, there have been no known beaked whales strandings associated with the use of mid-frequency active sonar. While the absence of evidence does not prove there have been no affects on beaked whales, 30 years of history with no evidence of any impacts or strandings would seem to indicate that problems encountered in locations far from Hawaii involving beaked whales are location and context specific and do not apply in Hawaiian waters. In addition, see Section 4.1.2.4.11.2 regarding an analysis of stranding events.
	D-E-0463-23	Alternatives	4.1.2.4.10, 4.1.2.4.11.2	Section 4.1.2.4.10 includes a discussion of beaked whales in relation to Navy sonar events. In addition, see Section 4.1.2.4.11.2 regarding an analysis of stranding events.
	D-E-0463-24	Alternatives	4.1.2	The EIS/OEIS contains a revised methodology provided by NMFS for the Navy, presented to the public in the Supplement to the Draft EIS/OEIS, and incorporated into the revised discussion in Section 4.1.2. The Navy and NMFS disagree that the methods for analysis are not accepted within the field, given that the thresholds and criteria were established in cooperation with NMFS and leading scientists. Data from the Haro Strait incident were incorporated into the current risk function. The effects of surface ducting were incorporated into the modeling given that average conditions (including the occasional presence of a surface duct) were taken into account. As discussed in Section 4.1.2.4.11, Navy believes that evidence not considered previously involving the Hanalei “stranding” of July 2004 indicates that the full moon could have been a contributing factor in terms of bringing the animals closer to the shore. The Navy's modeling analyzes the systems that are most likely to affect marine mammals.
	D-E-0463-25	Biological Resources - Marine	4.1.2	There are no data in regards to increased stress on marine mammals as a result of sonar. A discussion of potential effects of stress are presented in Section 4.1.2 and Chapter 5 in sections discussing whale watching, which has been shown to have effects. In general, studies on high levels of continuous noise effects on terrestrial species cannot be correlated with marine mammal species in the ocean exposed to intermittent and temporary exposure to relatively low sound pressure levels.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-26	Biological Resources - Marine	'4.1.2	Ship strikes are discussed in Section 4.1.2 and Chapter 5. Results of the research by Nowacek et al (2004) where right whales reacted to an "alert stimuli", used a sound source that has almost no correlation to MFA sonar. The result of that study were, however, used to develop the risk function from which the quantification of predicted exposures was derived.
	D-E-0463-27	Hazardous Materials and Waste	3.0, 5.0	Past expenditures are part of the baseline environmental conditions described in Chapter 3.0 of the EIS/OEIS. The EIS/OEIS evaluates the proposed future expenditure and environmental fate of a variety of training materials. Both qualitative and quantitative assessments of these expenditures conclude that their effects on water quality and bottom sediments, and on the biota that inhabit these environments, would be negligible. A cumulative impact is the sum of the Proposed Action's effects and the effects of other projects. Thus, while the combined ocean discharges of wastewater treatment plants, urban runoff, marine vessels, and other sources may result in unhealthful concentrations of marine pollutants, the Navy's expended training materials would not contribute to that impact. The EIS/OEIS addresses this issue accordingly.
	D-E-0463-28	Policy/NEPA Process	5	Assessment of indirect effects of the Proposed Action is provided in Chapter 5.0 of the EIS/OEIS. There are no quantified indirect effects identified. In addition, as described in this analysis, the training activities being analyzed have been occurring in Hawaiian waters using the same equipment for many decades. It is not, therefore, reasonably foreseeable that there are significant long-term effects from the continuation of training by the Navy.
	D-E-0463-29	Biological Resources - Marine	4.1.2.2	The EIS/OEIS includes new findings by Popper et al.(2007) who exposed rainbow trout, a fish sensitive to low frequencies, to high-intensity low-frequency sonar (215 dB re 1 µPa2 170-320 Hz) with receive level for two experimental groups estimated at 193 dB for 324 or 648 seconds. Fish exhibited a slight behavioral reaction, and one group exhibited a 20-dB auditory threshold shift at one frequency. No direct mortality, morphological changes, or physical trauma was noted as a result of these exposures. While low-frequency sonar is not included in the Proposed Action, these results of low-frequency sonar effects on low-frequency sensitive rainbow trout are encouraging in that similar results may be found with mid-frequency active sonar use when applied to mid-frequency sensitive fish.
	D-E-0463-30	Socioeconomics	4.1.2.2	Reduced catch rates and any associated economic effects are not anticipated. The potential effects on fish from sonar will be negligible as most fish hear below the range of mid-frequency active sonar. Although some fishes may detect sonar, they will likely not respond to it, and it will not affect their hearing. A discussion of sonar and its effects on fishes is found in Section 4.1.2.2.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-31	Biological Resources - Marine	5	Each of these activities is now described in detail in Chapter 5.0.
	D-E-0463-32	Socioeconomics	3.3.2.10.5	The Navy does consider its activities alongside those of other activities in the region. As an example, near Kaula the Navy opens the Surface Danger Zone for fishing on weekends and holidays in accordance with 33 CFR § 165.1406. The Commander Fleet Air Hawaii, as the controlling and scheduling agency for the military use of Kaula, is responsible for notifying the State of Hawaii Department of Land and Natural Resources, Division of Fish and Game, State of Hawaii, and Commander Fourteenth Coast Guard District, in writing, of the period of time the Surface Danger Zone will be opened for fishing. These agencies then make official notifications to the public (see Section 3.3.2.10.5).
	D-E-0463-33	Cumulative Impacts	5.2.1.3	Section 5.2.1.3 provides additional detail on potential cumulative impacts on marine mammals as it relates to anthropogenic oceanic noise.
	D-E-0463-34	Cumulative Impacts		The Navy is required to assess impacts based on the resources as defined by NMFS, who serves as the regulator for these resources (marine mammals). Research indicating genetic distinctions between possible sub-populations of marine mammals currently considered one stock by NMFS has been discussed during preliminary consultations with NMFS over this EIS/OEIS. The Navy believes that years of site fidelity by individual beaked whales in areas where sonar has operated for years is an indicator that beaked whales in Hawaii are not comparable to resident beaked whales in locations on the other side of the planet. In fact, implicit in the statements, that resident populations have been identified in the Hawaiian Islands and that there is a genetic segregation between some marine mammals of Hawaiian Islands and the rest of the Pacific Stock, is an acknowledgment that the animals of the Hawaiian Islands have coexisted with sonar operations without long term detriment to populations. Findings by Baird and McSweeney are contrary to speculation that large numbers of marine mammals die or abandon sites due to sonar but are not observed, potentially resulting in population level impacts. Residency demonstrates that the animals are remaining in the area despite sonar exercises.
	D-E-0463-35	Alternatives	2.2.1.1	The EIS/OEIS baseline (No-action Alternative) is evaluated for potential impacts just like Alternatives 1, 2 and 3. An alternative that would decrease military training from current levels would not meet the purpose and need of the Proposed Action. A reduction in levels of training within the HRC would not support the Navy's ability to meet Federal statutory requirements. In addition, a reduction in training could jeopardize the ability of specialty forces, transient units and Strike Groups using the HRC for training purposes to be ready and qualified for deployment. Also see response to comment D-E-0463-13.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-36	Alternatives	2.2.1.3	As stated in Section 2.1.1.3 of the EIS/OEIS, computer simulators and other types of simulation training tools are already used extensively in the Navy's training programs. Computer technologies provide excellent tools for implementing a successful, integrated training program while reducing the risk and expense typically associated with training at sea. Simulators may also assist in developing an understanding of basic skills and equipment operation, but cannot offer a complete picture of the detailed and instantaneous interaction within each command and among the many commands and warfare communities that actual training at sea provides. Simulated training does not fully develop the skills and capabilities necessary to attain appropriate military readiness. Conducting all naval training by simulation was deemed inadequate in the EIS/OEIS since it fails to meet the purpose and need of the Proposed Action.
	D-E-0463-37	Mitigation Measures		Each nation has its own training needs based on that nation's forces, capabilities and missions. For the U.S. Navy, the ability to conduct ASW in the littorals is critically necessary in order to fight the diesel submarine threat.
	D-E-0463-38	Alternatives	2.2.1.1	Consideration of alternative geographic siting does not support the Navy's purpose and need and is not required within the choice of alternatives. Consideration of alternative locations for training conducted in the HRC was rejected from further analysis because it does not meet the purpose and need of the Proposed Action. In accordance with the At Sea Policy and the Tactical Training Theater Assessment and Planning Program, the Navy is conducting range-by-range NEPA and Executive Order (EO) 12114 analyses. Naval ranges will be analyzed separately on a case-by-case basis for potential environmental impacts arising from requirements to sustain capabilities at each site. The HRC provides the geography, infrastructure, space, and location necessary to accomplish naval training. The large area available to deploy forces within HRC allows a CSG/ESG to train using a geographic scope that replicates possible real world events, with the channels between islands serving as strategic choke-points to ocean commerce. The presence of the instrumented tracking ranges at PMRF as well as DoD-controlled warning areas and special use airspace also enable submarine warfare training to proceed in a safe and structured manner while retaining the flexibility for controllers to interject tactical challenges to enhance realism for exercise participants.
	D-E-0463-39	Mitigation Measures		Each nation has its own training needs based on that nation's forces, capabilities and missions. For the U.S. Navy, the ability to conduct ASW in the littorals is critically necessary in order to fight the diesel submarine threat.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-40	Mitigation Measures	4.1.2	The Navy's mitigation scheme is more than just visual monitoring. Aerials and sonar power-down protocols are used as well. Section 4.1.2.4.12 and 'Chapter 6.0, Mitigation Measures, presents the U.S. Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. Navy does not expect that 100% of the animals present in the vicinity of training events will be detected and the acoustic impact modeling quantification is not reduced as a result of mitigation effectiveness. In addition, the probability of trackline detection is for visual observers during a survey. In general, there will be more ships, more observers present on Navy ships, and additional aerial assets all engaged in exercise events having the potential to detect marine mammals, than is present on a single, generally smaller (having a lower height of eye), survey ship from which the 1 in 50 figure is derived
	D-E-0463-41	Mitigation Measures		See response to comment D-W-0111-8
	D-E-0463-42	Mitigation Measures		The 28 mitigation measures are covered in other NRDC comments.
	D-E-0463-43	Alternatives	4.1.2.4.13.1	As described in the EIS/OEIS, this information is classified.
	D-E-0463-44	Miscellaneous		The model was first used in January 2007 and will eventually be subject to independent peer review for conferences or journal submissions. The EIS/OEIS provided all source levels, frequency ranges, duty cycles and other technical parameters relevant to determining potential impact on marine life unless this information was classified.
	D-E-0463-45	Policy/NEPA Process		The EIS/OEIS has received extensive legal review to ensure that current operations are in compliance all required Federal, state, and local regulations/laws.
	D-E-0463-46	Biological Resources - Marine	4.1.2.5.4	The Navy is currently in consultation with NMFS and USFWS regarding Endangered Species Act requirements.
	D-E-0463-47	Land Use	12	The Navy has made a Coastal Consistency Determination in accordance with the CZMA. The submittal letter is provided in Chapter 12 of the EIS/OEIS.
	D-E-0463-48	Biological Resources - Marine	4.1.2.2	The Navy does not believe that activities analyzed in the EIS/OEIS will impact any Essential Fish Habitat in Hawaiian waters.
	D-E-0463-49	Biological Resources - Marine		No permit is required based on specific provisions of regulations regarding the Hawaiian Islands. Military activities were deemed to be allowed activities in the sanctuary.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-50	Biological Resources - Marine	4.0, C.3	The military's responsibility with regard to the Migratory Bird Treaty Act is described in Appendix C, Section C.3 Biological Resources. impacts on migratory birds are discussed in Chapter 4.0 biological resources sections. Military readiness activities are exempt from the take prohibitions of the Migratory Bird Treaty Act, provided they do not result in a significant adverse effect on the population of a migratory bird species. Navy activities in the HRC are not expected to adversely affect populations of a particular bird species.
	D-E-0463-51	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
	D-E-0463-52	Land Use	12	The consistency of Navy operations within the HRC with public land use policies was thoroughly considered in the Coastal Consistency Determination in accordance with the CZMA (see submittal letter in Chapter 12 of the EIS/OEIS).
	D-E-0463-53	Alternatives		Thank you for your comment.
	D-E-0463-54	Alternatives	2	The choice of alternatives is bounded by some notion of feasibility, and the Navy is not required to consider alternatives which are infeasible, ineffective, or inconsistent with its basic policy objectives. The scope of environmental impact analysis consists of the range of actions, alternatives and impacts. The CEQ requires consideration of a reasonable range of alternatives in EISs. [40 CFR Section 1508.9 (b)]. Under a rule of reason, an EIS need not consider an infinite range of alternatives, only reasonable, or feasible ones. Navy has considered a wider range of mitigation. Steps would be implemented to protect marine life and Federally listed species during HRC operations as outlined in Chapter 6.0 of the EIS/OEIS. Several of these protective measures are standard operating procedures for training and were implemented for previous HRC exercises such as USWEX.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-55	Alternatives	4.1.2.4.10,	Whale mortalities in other locations (such as the Bahamas) far from Hawaii do not relate to the Hawaiian context. See EIS/OEIS discussion 4.1.2.4.10 on the critical nature of "context" presented in Southall et al. (2007). Since there has never been a stranding or death to any beaked whales associated with the use of sonar in Hawaii, Navy does not believe that continuing what has been decades of sonar use in Hawaii will result in any injury to beaked whales. In spite of this, Navy is not claiming there will be "no injury" and has requested a certain number of mortalities in acknowledgement of the fact that there are uncertainties associated with even very unexpected events. There are significant limitations and challenges to any risk function derived to estimate the probability of marine mammal behavioral responses; these are largely attributable to sparse data. Ultimately there should be multiple functions for different marine mammal taxonomic groups, but the current data are insufficient to support them. The goal is unquestionably that risk functions be based on empirical measurement. The risk function presented in EIS/OEIS Section 4.1.2.4.9.4 is based on three data sets that NMFS and Navy have determined are the best available science at this time. Until additional data are available, NMFS and the Navy have determined that these datasets are the most applicable for the direct use in the development of risk function parameters to describe what portion of a population exposed to specific levels of MFA sonar will respond in a manner that NMFS would classify as harassment. Navy is contributing to an ongoing behavioral response study in the Bahamas that is anticipated to provide some initial information on beaked whales, the species identified as the most sensitive to MFA sonar.
	D-E-0463-56	Alternatives	4.1.2.4, 4.1.2.4.7, 4.1.2.4.11	See response to comment D-W-0066-1. In addition, Section 4.1.2.4.7 contains a discussion of the issues raised.
	D-E-0463-57	Alternatives	5	The discussion of cumulative effects is provided in Chapter 5.0.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael Jasny --National Resources Defense Council	D-E-0463-58	Alternatives	4.1.2	Regarding a dual threshold, as most recently discussed in Southall et al (2007), the Navy is applying a more conservative approach by using the risk function (SPL) for behavior and energy for PTS /TTS onset given that the 230 dB SPL (peak) metric would not reach beyond the sonar dome containing a 235 dB source. The methodology for assessing potential impacts from sound are discussed in Section 4.1.2 including the use of both an energy (EFD) metric and the sound pressure level (SPL) metric developed in coordination with NMFS.
	D-E-0463-59	Alternatives	4.1.2	The methodology for assessing potential impacts from sound are discussed in Section 4.1.2 including a discussion on why TTS reflects the use of best available and applicable science.
	D-E-0463-61	Alternatives	4.1.2.4.6	As explained in Section 4.1.2.4.6 and as presented in Southall et al., 2007, “data gaps severely restrict the derivation of scientifically-based noise exposure criteria.” The analysis presented in the EIS/OEIS represents the use of best available science as developed in cooperation with NMFS.
	D-E-0463-62	Alternatives	4.1.2.4.9.2	As explained in Section 4.1.2.4.9.2, the thresholds established for the risk function did take into account behaviors from wild animals where that data was applicable.
	D-E-0463-63	Alternatives	5.2.1	The modeling undertaken does so, as explained in Appendix J, based on marine mammal densities evenly distributed over the entire area of potential effect. This is conservative since the tendency is to overestimate effects given that marine mammals appearing in pods will be easier to detect and therefore be avoided by use of the Navy's standard operating procedures serving as mitigation measures. Potential indirect effects were discussed in Section 4.1.2.4.12 and Section 5.3.3.2 of the Draft EIS/OEIS. This discussion was expanded in Section 5.2.1 of the EIS/OEIS.
	D-E-0463-64	Alternatives		In this case, the Navy is using dual thresholds for assessing impacts on marine mammals by use of the sound exposure level (SEL) energy metric and the sound pressure level (SPL) behavioral criteria.
	D-E-0463-65	Alternatives	5.2.1	Potential indirect effects were discussed in Section 4.1.2.4.12 and Section 5.3.3.2 of the Draft EIS/OEIS. This discussion was expanded in Section 5.2.1 of the EIS/OEIS.
	D-E-0463-66	Policy/NEPA Process		The Navy released a supplement to the EIS/OEIS for public comment in light of the new sonar data and noise modeling methodology.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Amy Dunn	D-E-0465-1	Mitigation Measures	6.1.2	As noted in Section 6.1.2, use of non-Navy observers is not necessary given that Navy lookouts are extensively trained in spotting and reporting anything detected at or near the water surface. In addition, using non-Navy personnel onboard Navy vessels or having civilian aircraft surveillance of all ASW or other exercise areas is impractical (given the sizes of the areas involved), could adversely impact the effectiveness of the military readiness activities, and raises issues involving survey personnel safety given the distances offshore. The SOFAR channel acts as a waveguide for low-frequency sound waves, which are not part of the proposed actions involving mid- and high-frequency sound sources. Thank you for your comment noting the professionalism of those engaged in the Navy's marine mammal program.
Judy Walker	D-E-0466-1	Biological Resources - Marine	4.1.2	Thresholds for analysis of impacts and the applicable science in this regard were developed in coordination with NMFS. Also see discussion of humpback whale vocalizations in 4.1.2. The Navy is required to assess impacts based on the resources as defined by NMFS, who serves as the regulator for these resources (marine mammals). Research indicating genetic distinctions between possible sub-populations of marine mammals currently considered one stock by NMFS has been discussed during preliminary consultations with NMFS over this EIS/OEIS. The Navy believes that years of site fidelity by individual beaked whales in areas where sonar has operated for years is an indicator that beaked whales in Hawaii are not comparable to resident beaked whales in locations on the other side of the planet. In fact, implicit in the statements, that resident populations have been identified in the Hawaiian Islands and that there is a genetic segregation between some marine mammals of Hawaiian Islands and the rest of the Pacific Stock, is an acknowledgment that the animals of the Hawaiian Islands have coexisted with sonar operations without long term detriment to populations. Findings by Baird and McSweeney are contrary to speculation that large numbers of marine mammals die or abandon sites due to sonar but are not observed, potentially resulting in population level impacts. Residency demonstrates that the animals are remaining in the area despite sonar exercises.
Harriet Smith	D-E-0467-1	Policy/NEPA Process		Thank you for your comment.
Elizabeth Freeman	D-E-0469-1	Program	3.3, 4.3	Refer to Section 3.3 of the EIS/OEIS for the affected environment of locations of current and proposed HRC operations on Kauai and Section 4.3 for the potential environmental consequences of the current and proposed operations.
	D-E-0469-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
Bruce Pleas	D-E-0470-1	Program		Thank you for your comment.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Bruce Pleas	D-E-0470-2	Land Use	4.3.2.1.8.1	Public access to the installation's coastline is outlined in PMRF Instruction 5530.7 (March 2004). The content of this Instruction is explained to unauthorized individuals who request access to PMRF. The on-base recreation section of 4.3.2.1.8.1 has been revised.
	D-E-0470-3	Land Use	Appendix I	Appendix I describes the circumstances by which the lands now known as PMRF came into Federal ownership. This section is not intended to represent the full or complete recitation of law(s) relating to the lands now known as PMRF.
	D-E-0470-4	Land Use	Appendix I	See response to comment D-E-0470-3.
	D-E-0470-5	Program		Refer to the EIS/OEIS table of contents to locate each of the sections cited.
	D-E-0470-6	Program		Your comments regarding ownership from pre-contact, historical data and costs associated with projects are noted but outside the scope of this EIS/OEIS.
	D-E-0470-7	Land Use	12	The Navy has made a Coastal Consistency Determination in accordance with the CZMA. The submittal letter is provided in Chapter 12 of the EIS/OEIS.
	D-E-0470-8	Miscellaneous	3	As stated in Section 3.0, 13 environmental resource areas were evaluated to provide a context for understanding the potential effects of ongoing and proposed naval activities in the Hawaiian Range Complex. These areas include air quality, airspace, biological (fish, sea turtles, marine mammals, terrestrial fauna), cultural, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources. Some potential topics are not listed separately, but that does not mean that they are not considered during training procedures, research and development and analysis of potential impacts (e.g., climate, topography, hydrogeology, agriculture capability, flora, terrestrial fauna, historical, scenic resources, and flood hazards).
	D-E-0470-9	Socioeconomics		The socioeconomic analysis within the EIS/OEIS is based on several metrics, including population size, employment characteristics, income generated, and the type and cost of housing. Analysis of socioeconomic existing conditions, impacts, and mitigation are discussed throughout the EIS/OEIS for each affected location.
	D-E-0470-10	Utilities	4.3.2.1.8, 4.3.2.1.11, 4.3.2.1.12	Utility discussions for PMRF and the local environs are covered in Sections 4.3.2.1.8, 4.3.2.1.11 and 4.3.2.1.12 of the EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Bruce Pleas	D-E-0470-11	Alternatives	1.0, 2.0	The Navy has broadly defined its objectives and offers appropriate alternatives to achieve them. To implement its Congressional mandates, the Navy needs to support and to conduct current and emerging training and RDT&E training events in the HRC and upgrade or modernize range complex capabilities to enhance and sustain Navy training and testing. These objectives are required to provide combat capable forces ready to deploy worldwide in accordance with U.S.C. Title 10, Section 5062. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary.
	D-E-0470-12	Miscellaneous	4.10, 4.11	Sections 4.10 and 4.11 cover these issues as they relate to the Proposed Action discussed in the EIS/OEIS.
	D-E-0470-13	Program	2.2.4.4, 4.1.1.3.2	The proposed Maritime Directed Energy Test Center in Alternatives 2 or 3 includes development of standard operating procedures and range safety requirements necessary to provide safe operations associated with future directed energy tests. Should a direct energy program decide to perform tests at PMRF, separate environmental documentation would be required to analyze potential impacts from training activities.
Joan Lander	D-E-0471-1	Program		Navy practices conducted decades ago resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceed with the available funds.
Pono Kealoaha	D-E-0472-1	Alternatives		Thank you for your comment.
	D-E-0472-2	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination.
	D-E-0472-3	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Pono Kealoaha	D-E-0472-4	Health and Safety		A discussion of a 38-year old incident that did not result in any public health or safety impact (only Navy personnel were injured) is outside of the scope of this EIS/OEIS. The Navy's training materials and safety protocols both have evolved so extensively during the intervening period as to make that incident irrelevant to any discussion of existing or future public health and safety.
	D-E-0472-5	Health and Safety		It is outside the scope of this EIS/OEIS to address an increase in Down syndrome in the Lualualei Valley.
	D-E-0472-6	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
	D-E-0472-7	Biological Resources - Marine	4.1.5.1.1, 3.7, 4.0, 12	As stated in Section 4.1.5.1.1, research was conducted for mid-frequency active (MFA) sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonar. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours. In addition, Sections 3.7 and 4.7 of the EIS/OEIS and the Coastal Consistency Determination in accordance with the CZMA reviewed the proposed activities internal or external to the Humpback Whale National Marine Sanctuary, and find them to be within the range of activities previously reviewed and allowed by the Sanctuary as indicated in 15 CFR Part 922, Subpart Q. None of the activities have been modified such that they would be likely to destroy, cause the loss of, or injure any Sanctuary resource in a manner significantly greater than what had been previously reviewed by NOAA at the time of the Sanctuary's creation.
Judy Walker	D-E-0473-1	Biological Resources - Marine		Thank you for your input and clarification.
Hugh Y. Starr	D-E-0474-1	Alternatives	2.2.1.1, 4.1.2.4.3, 4.1.2.4.4, 4.1.2.4.5,	See Section 4.1.2.4.3 thru 4.1.2.4.4 regarding discussions on harassment. Section 4.1.2.4.5 provides a discussion of relative sound levels. As noted in Section 2.2.1.1, a reduction in the level of current training in the HRC would not meet the purpose and need of the Proposed Action and would not support the Navy's mandate to be prepared.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Hugh Y. Starr	D-E-0474-2	Biological Resources - Marine	1.1, 1.2, 1.3, 3.7, 4.1.2.4, 4.1.2.4.11, 4.7	See response to comment D-E-0472-7.
	D-E-0474-3	Socioeconomics	5.3.10	The cumulative effects of the various alternatives on socioeconomic issues are discussed in Section 5.3.10.
	D-E-0474-5	Mitigation Measures		Regarding necropsies on stranded marine mammals, Navy and NMFS are coordinating on a stranding protocol designed to provide the most effective use of resources from the two agencies. The desire is to investigate all stranded marine mammals in the Hawaiian Islands so that a baseline of common morphology found in stranded marine mammals can be established so if there is a stranding coincident with sonar use any differences could be investigated. Imposing training restrictions from other countries on the U.S. Navy without considering the differences between each navies' capabilities, systems, mission requirements, and threats; and without considering whether the foreign country's training restrictions are more effective in protecting marine mammals from harm than the extensive precautions currently taken by the U.S. Navy, would arbitrarily undermine the U.S. Navy's ability to maintain military readiness. The RIMPAC After Action Report, in Appendix F, provides an analysis detailing the reasons for adoption, modification, or rejection of the RIMPAC 2006 mitigation measures. The programs undertaking research involving the hearing physiology of marine mammals are not part of the proposed action and are therefore beyond the scope of this document.
	D-E-0474-6	Miscellaneous		Due to the extensive historical military support provided by the State of Hawaii we are not able to include all events in the EIS/OEIS.
Ron Agor --State Board of Land and Natural Resources	D-E-0475-1	Land Use	4.3.2.1.8	Any reference to the "uniqueness" of beaches on PMRF has been removed from the document. The document also states, in Section 4.3.2.1.8, that recreation services available to military personnel and civilians at PMRF/Main Base will remain at current status during non-hazardous training operations. The installation's approximately 200-ft by 2-mi beach in the southern zone of PMRF will remain accessible to Kauai residents possessing an approved beach access pass. Potential exists to increase the number of times beaches will be closed. Areas within the region of influence that are typically accessible by the public will not change as a result of the No-action, Alternative 1,2, or 3.
Harriet Smith	D-E-0476-1	Program	4.1.2.4.2	The use of low-frequency active (LFA) sonar is not included in the Proposed Action. Section 4.1.2.4.2 discusses the difference between LFA and the proposed use of mid-frequency active (MFA) sonar.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Marguerite Beavers -- Divine Designs	D-E-0477-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea, or airspace; therefore, there is no proposal to expand. It is true that the proposal includes alternatives that require increases in the frequency of training. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary. The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter, but a Federal legal requirement. The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts and professional staff dedicated to this important matter. The Navy is particularly sensitive to native Hawaiian cultural concerns, making areas under our control accessible for cultural and religious activities when not in conflict with operational needs.
Maria Walker	D-E-0478-1	Alternatives	2, 12, 5.0	The Proposed Action does not include the use of low-frequency active sonar. The Coastal Consistency Determination in accordance with the CZMA (see submittal letter in Chapter 12) reviewed the activities proposed to be conducted internal or external to the Humpback Whale National Marine Sanctuary, and find them to be within the range of activities previously reviewed and allowed by the Sanctuary as indicated in 15 CFR Part 922, Subpart Q. None of the activities have been modified such that they would be likely to destroy, cause the loss of, or injure any Sanctuary resource in a manner significantly greater than what had been previously reviewed by NOAA at the time of the Sanctuary's creation.
	D-E-0478-2	Policy/NEPA Process		Thank you for your comment.
	D-E-0478-3	Biological Resources - Marine	1.1, 1.2, 1.3, 3.7, 4.1.2.4, 4.1.2.4.11, 4.7	See response to comment D-E-0472-7.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Emil Wolfgramm	D-E-0479-1	Alternatives	1.1, 1.2, 1.3, 2.2.1.2, 4.1.2.4, 4.1.2.4.11	As noted in Section 2.2.2.1, alternative locations for training and RDT&E activities were considered. The alternatives carried forward were selected based on their ability to meet the following criteria: (a) use existing Navy ranges and facilities in and around Hawaii; (b) be consistent with the stated current and emerging requirements for the range complex; (c) achieve training tempo requirements based on Fleet deployment schedules; (d) meet the requirements of DoD Directive 3200.15, Sustainment of Ranges and Operating Areas; (e) implement new operational training requirements and RDT&E operations; and (f) support realistic training that replicates expected operating environments for naval forces.
Sharon Goodwin	D-E-0480-1	Alternatives	2.2, 4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1. In addition, Section 2.2 describes the Proposed Action which does not include plans to acquire any new lands or rights over land, sea or airspace, therefore there is no proposal to expand. It is true that the proposal includes increases in the frequency of training.
Marsha Green --KAHEA, the Hawaiian Environmental Alliance	D-E-0481-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter, but a Federal legal requirement.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Marsha Green --KAHEA, the Hawaiian Environmental Alliance	D-E-0481-2	Biological Resources - Marine	3.2, 4.2	The largest portion of the Temporary Operating Area (TOA), i.e., the area north and west of Kauai, is used only 8 to 10 times per year for missile testing and evaluation for short periods of time (usually a few hours). Navy restricts access at those times to protect the public in the unlikely case of falling missile debris. Navy understands and respects the value and importance of the Papahanaumokuakea National Marine Monument (the Monument) to many people. Navy also recognizes and shares the primary philosophy of the Monument, which is protection and preservation. The Navy takes precautions when possible to minimize harm to the Monument. According to the Presidential Proclamation establishing the Monument regarding military activities in the area: "The prohibitions required by this proclamation shall not apply to activities and exercises of the Armed Forces (including those carried out by the United States Coast Guard) that are consistent with applicable laws." "All activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities." "In the event of threatened or actual destruction of, loss of, or injury to a monument resource or quality resulting from an incident, including but not limited to spills and groundings, caused by a component of the Department of Defense or the USCG [U.S. Coast Guard], the cognizant component shall promptly coordinate with the Secretaries for the purpose of taking appropriate actions to respond to and mitigate the harm and, if possible, restore or replace the monument resource or quality."
	D-E-0481-3	Cultural Resources	3.2.2.2	See response to comment D-W-0091-10.
	D-E-0481-4	Hazardous Materials and Waste	3.1.4, 4.1.4	Section 3.1.4 of the EIS/OEIS addresses chemical simulants, chaff, missile debris, and other expended training materials, and Section 4.1.4 analyzes their potential short-term and long-term effects on human health and the environment, including the accumulation of missile debris.
	D-E-0481-5	Cumulative Impacts	5.3	The cumulative impact analysis presented in Section 5.3 provides the adequate level of analysis to determine the potential for cumulative impacts as a result of implementation of the Proposed Action. As a result of the analysis, it was determined that no significant cumulative impacts would occur within the 13 resource areas.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Marsha Green --KAHEA, the Hawaiian Environmental Alliance	D-E-0481-6	Alternatives	2	Consideration of alternative locations for training conducted in the HRC was rejected from further analysis because it does not meet the purpose and need of the Proposed Action. In accordance with the At Sea Policy and the Tactical Training Theater Assessment and Planning Program, the Navy is conducting range-by-range NEPA and Executive Order (EO) 12114 analyses. Naval ranges will be analyzed separately on a case-by-case basis for potential environmental impacts arising from requirements to sustain capabilities at each site. The HRC provides the geography, infrastructure, space, and location necessary to accomplish naval training. The large area available to deploy forces within HRC allows a CSG/ESG to train using a geographic scope that replicates possible real world events, with the channels between islands serving as strategic choke-points to ocean commerce. The presence of the instrumented tracking ranges at PMRF as well as DoD-controlled warning areas and special use airspace also enable submarine warfare training to proceed in a safe and structured manner while retaining the flexibility for controllers to interject tactical challenges to enhance realism for exercise participants.
	D-E-0481-7	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
	D-E-0481-8	Mitigation Measures	3.2.2.2, 4.2.2.2	Sections 3.2.2.2 and 4.2.2.2 state that some of these islands are known to have significant cultural resources sites, and the islands of Nihoa and Necker are listed in the National and Hawaii State Registers of Historic Places. Previous debris analyses of the types, quantities, weights, and sizes associated with the PMRF missile exercises indicate that the potential to impact land resources of any type is very low and extremely remote. In addition, trajectories can be altered under certain circumstances to further minimize the potential for impacts. As a result, impacts on cultural resources within the Northwest Hawaiian Islands are not expected.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Marsha Green --KAHEA, the Hawaiian Environmental Alliance	D-E-0481-9	Hazardous Materials and Waste	4.2.1.1.1.1	Text has been added to Section 4.2.1.1.1.1 clarifying the size and area of an anticipated debris field. The exact size of debris anticipated would vary with each intercept. In a successful intercept, both missiles would be destroyed by the impact. Momentum would carry debris along the respective paths of the two missile until the debris falls to earth. The debris would consist of a few large pieces (approximately 110 pounds [lb]), of each missile, many medium pieces (approximately 11 lb), and mostly tiny particles. This debris is subject to winds on its descent to the surface. The debris would generally fall into two elliptically-shaped areas.
	D-E-0481-10	Alternatives		Thank you for your comment.
	D-E-0481-11	Alternatives	4.1.2.4.10	See response to comment D-W-0111-1.
	D-E-0481-12	Alternatives		See response to comment D-W-0111-2.
	D-E-0481-13	Alternatives	4.1.2.4.6	See response to comment D-W-0111-3.
	D-E-0481-14	Alternatives	4.1.2.4.10	See response to comment D-W-0111-4.
	D-E-0481-15	Alternatives	4.1.2.4.11.1	See response to comment D-W-0111-5.
	D-E-0481-16	Alternatives	4.1.2.4.10	See response to comment D-W-0111-6.
	D-E-0481-17	Alternatives		See response to comment D-W-0111-7.
	D-E-0481-18	Mitigation Measures		See response to comment D-W-0111-8.
	D-E-0481-19	Alternatives		See response to comment D-W-0111-9.

Table 13.4.2-2. Responses to Email Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Marsha Green --KAHEA, the Hawaiian Environmental Alliance	D-E-0481-20	Alternatives	4.1.2.4.11.3	See response to comment D-W-0111-10.
	D-E-0481-21	Mitigation Measures		See response to comment D-W-0111-11.
Akahi Nui --Kingdom of Hawaii	D-E-0482-1	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.
Rayne Regush	D-E-0484-1	Alternatives		Thank you for your comment.
	D-E-0484-2	Mitigation Measures	2	As noted in Chapter 2.0, the Proposed Action does not include plans to acquire any new lands or rights over land, sea, or airspace, therefore there is no proposal to expand.
	D-E-0484-3	Socioeconomics		Thank you for your comment.
Jeri Baumgardner	D-E-0485-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0066-1. In addition, use of low-frequency active sonar in the HRC is not part of the Proposed Action of this EIS/OEIS.
J.J. Holt Jr.	D-E-0486-1	Alternatives		Your comments regarding transferring exercises to other areas are noted but are outside the scope of this EIS/OEIS. The Council on Environmental Quality requires consideration of a reasonable range of alternatives in EIS/OEISs [40 CFR Section 1508.9 (b)]. Under a rule of reason, an EIS/OEIS need not consider an infinite range of alternatives, only reasonable, or feasible ones. The choice of alternatives is bounded by some notion of feasibility, and the Navy is not required to consider alternatives which are infeasible, ineffective, or inconsistent with its basic policy objectives.
Claire Mortimer	D-E-0487-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
	D-E-0487-3	Biological Resources - Terrestrial	4.3.1.1.1.1	See response to comment D-E-0438-3.
	D-E-0487-4	Water Resources	2.2.4.4	There are currently no plans for chemical lasers. Because the directed energy programs have not been defined they cannot be fully analyzed in this EIS/OEIS. As stated in Section 2.2.4.5, “Should the Airborne Laser program decide to perform testing at PMRF, separate environmental documentation would be required to analyze potential impacts.”
	D-E-0487-5	Policy/NEPA Process		Thank you for your comment.

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13.4.3 PUBLIC HEARING COMMENTS

Eighty-three people testified at the public hearings held in Hawaii for the Draft EIS/OEIS.

Table 13.4.3-1 presents individuals who testified at the hearings with their respective commenter identification number. This number can be used to find their testimony in the four transcripts prepared for hearings in Kauai, Oahu, Maui, and the Island of Hawaii and to locate the corresponding table on which responses to each comment are provided.

Exhibit 13.4.3-1 presents reproductions of the hearing transcripts for the Draft EIS/OEIS. Transcripts are identified by commenter ID number, and each statement or question that was categorized as addressing a separate environmental issue is designated with a sequential comment number.

Table 13.4.3-2 presents the responses to testimony on the Draft EIS/OEIS. Responses to specific comments can be found by locating the corresponding commenter ID number and sequential comment number identifiers.

Table 13.4.3-1. Commenters on the HRC Draft EIS/OEIS (Public Hearings)

Commenter	Comment ID	Commenter	Comment ID
Moanikeala Akaka	D-T-0088	Rich Hoeffner	D-T-0020
Jim Albertini	D-T-0083	Pauahi Hookano	D-T-0073
Jasmin Asis	D-T-0062	Michael T. Hyson	D-T-0080
David Bayly	D-T-0065	David Jimenez	D-T-0057
Carl Berg	D-T-0031	Kyle Kajihiro	D-T-0039
Stewart Burley	D-T-0018	Reynolds Kamakawiwoole	D-T-0078
Nicole Carbonel	D-T-0063	L.V. Kelley	D-T-0097
Juliann Castelhuono	D-T-0049	Galen Kelly	D-T-0096
Stephany Cecil	D-T-0042	Amber King	D-T-0061
Jeff Connolly	D-T-0032	Manuel Kuloloio	D-T-0059
Kurt De Keukeleere	D-T-0101	Manuel Kuloloio	D-T-0091
Samuel Dolphin	D-T-0074	Manuel Kuloloio	D-T-0038
Christiane Douglas	D-T-0043	Leslie Kuloloio	D-T-0056
Bruce Douglas	D-T-0054	Diana La Bedz	D-T-0021
Elaine Dunbar	D-T-0027	Home Le'amohala	D-T-0048
Marjorie Erway	D-T-0090	Kahu Charles Maxwell	D-T-0055
Duane Erway	D-T-0081	Kristin McCleery	D-T-0067
Michael Fox	D-T-0028	Bob McDermott	D-T-0037
Aukai Gonsalves	D-T-0022	Lisa Messenger	D-T-0060
Mary Groode	D-T-0071	Mike Moran	D-T-0041
Cory Harden	D-T-0075	Hans Mortensen	D-T-0086

Table 13.4.3-1. Commenters on the HRC Draft EIS/OEIS (Public Hearings) (Continued)

Commenter	Comment ID	Commenter	Comment ID
Kalei'ileihi Muller	D-T-0079	Helen Schonwatter	D-T-0068
Thomas Nakagawa	D-T-0045	Howard Sharpe	D-T-0044
Lynn Nakkim	D-T-0077	Eli Sheetz	D-T-0066
Star Newland	D-T-0094	Lanny Sinkin	D-T-0076
Christine Nonnenmacher	D-T-0072	Bunny Smith	D-T-0100
Paul Norman	D-T-0098	Summer Starr	D-T-0069
Jon Olson	D-T-0089	Hugh Starr	D-T-0053
Jeff Pantukhoff	D-T-0040	Shelley Stephens	D-T-0093
Louis Parraga, Jr.	D-T-0035	Mahelani Sylvia	D-T-0033
Cynthia Piano	D-T-0092	Ken Taylor	D-T-0034
Frances Pitzer	D-T-0047	Lee Tepley	D-T-0084
Bruce Pleas	D-T-0023	Marti Townsend	D-T-0036
Brooke Porter	D-T-0050	James Trujillo	D-T-0025
Wendy Raebeck	D-T-0029	Mark Van Doren	D-T-0095
Kboki Raymond	D-T-0070	Frank Vesperes	D-T-0087
Tony Ricci	D-T-0019	Dwight Vicente	D-T-0085
Puanani Rogers	D-T-0026	Akahi Wahine	D-T-0064
Robert Roggasch	D-T-0046	Judy Walker	D-T-0099
Faith Rose	D-T-0051	Juan Wilson	D-T-0024
Ken Rose	D-T-0052	Anita Wintner	D-T-0058
George W. Saunders, Jr.	D-T-0030		

COMMENT NUMBER

HAWAII RANGE COMPLEX
DRAFT ENVIRONMENTAL IMPACT STATEMENT/
OVERSEAS ENVIRONMENTAL IMPACT
STATEMENT (EIS/OEIS)

AUGUST 21, 2007

Kauai War Memorial Convention Hall
18:00:23 4191 Hardy St., Lihue, Kauai, Hawaii
18:00:23

BEFORE: SANDRA J. GRAN, CSR NO. 424
Registered Professional Reporter

COMMENT NUMBER

Speaker List:

Aunty Aletha Kaohi
Vida Mossman
Captain Aaron Cudnohufsky
Neil Sheehan
Stewart Burley
Tony Ricci
Rich Hoeffner
Diana La Betz
Aukai Gonsalves
Bruce Pleas
Juan Wilson
James Trujillo
Puanani Rogers
Elaine Dunbar
Michael Fox
Wendy Raebeck
George W. Saunders, Jr.
Carl Berg
Jeff Connolly
Mahelani Sylva
Dominic Acain
Ken Taylor
Louis Parraga, Jr.

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P R O C E E D I N G S:

18:00:24 MS. MOSSMAN: Aloha and good evening everyone. Thank you. Thank you very much for coming.

18:00:30 Before we begin, I would like to invite a noted and respected kupuna, Aunty Aletha Kaohi to say a blessing. Aunty Aletha.

18:00:46 (Applause.)

18:00:57 MS. KAOHI: The evening is fragrant with the breath of the land. The land that has sustained us for many generations. I look forward to the essence now that we are together, and that is not where you may come from or where you may go from here, but if there is aloha in your heart, all things will be right.

18:01:17 I haven't been invited to give a pule. I'm not an ordinary person that gets up and says, "Let's pray." You're going to have to bear with me. However, I prefer to -- for all of us who understand what it means to pule, and especially for a Hawaiian. We know that we need pule in every language, that we need to connect with an invisible being, to be a visionary. We experience the truly Hawaii. To call for admiration, to be in congregation, to beg for favor from aouli or heaven, and to seek advice.

18:01:57 We come from different places with different values, with different cultures and traditions, different beliefs and different religious practices. And the invisible being is called by many different names. My presence is to

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18:02:15 see -- to set the tone for the evening. And together we will pray that aloha will prevail. This evening we gather with aloha, the basic and one of the most important Hawaiian covenants, seeking guidance from kupuna, my ohana.

18:02:33 If you're sitting next to someone, reach out and touch that person that their mind and your mind might be intertwined. For when there are many, God hears our call.

18:02:58 Let's bow our heads in prayer.

18:03:04 Kupuna aloha, we gather by invitation to this informational open house which will be followed by public comments. We come to assist, to assess, to make comments that will preserve our aina, our land; the moana, the sea and the ocean that surround the beautiful Kauai. (Statement in Hawaiian.)

18:03:29 That there is presence -- that there is a presence of the Navy in Hawaii and its past global defense. We, the Navy and the public, have different values, yet guided by the spirit of the land and the sea, it can be beneficial to all.

18:03:47 Ke Akua, the God of Creation, help all parties to keep our aina and moana for future generations and to understand the proposal by the Navy. To have an open mind that our input will not be based on emotions, rather, with what is best for all people of this place.

18:04:09 Ke Akua, God of Love, fill our being with

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18:04:12 unconditional love not only for mankind, but for all
18:04:18 creation. Come and share will be said with respect for
18:04:22 people and the place.

18:04:24 Ke Akua, God of Hope, help us work together
18:04:27 to make Kauai a place that visitors and locals can say, Amen,
18:04:33 and that is the visionaries with a clear mission guided by
18:04:38 the values of the ancient Hawaiians remembering that it is
18:04:43 the people of the past that kept Kauai safe and productive.

18:04:47 Let us listen with our naoa, the sea of our
18:04:52 soul, our gut, and together as we listen and respond to this
18:04:56 draft, let us be guided by the spirit reflecting the
18:05:01 diversity of ethnicity, experiences and place with a prayer
18:05:07 unlikely to be found anywhere else, with a rich history and
18:05:13 authority and heritage of the Hawaiian people.

18:05:16 So now, oh, Holy One, address in many
18:05:20 different things come and be with us. (Statement in
18:05:27 Hawaiian.) In the name of Ke Akua, aloha, amen. The prayer
18:05:32 is free.

18:05:33 Thank you.

18:05:37 MS. MOSSMAN: Mahalo, Aunty Aletha.

This is the public hearing on the Draft Environmental Impact Statement - Overseas Environmental
18:05:55 Impact Statement for the Hawaii Range Complex. I am Vida Mossman, and I will be the hearing moderator for tonight's
18:06:02 meeting.

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This hearing is being held in accordance with provisions of the National Environmental Policy Act and implementing regulations. The act requires federal agencies to analyze the potential environmental impacts of certain proposed actions and alternatives, and to consider the findings of those analyses in deciding how to
18:06:31 proceed.

The purpose of tonight's hearing is to receive your comments and suggestions on the Draft EIS. Those of you who have not had an opportunity to review the Draft EIS may want to read the summary of the major findings in the handout available at the registration table. Those findings will also be summarized briefly by one of our panel
18:07:03 members in his presentation.

Let's look at the agenda for tonight. Hopefully you all had the opportunity to talk to the many knowledgeable experts and program officials who were staffing the exhibits during the past hour. After I finish this introduction, Captain Cudnohufsky will give a brief introduction to the Navy's activities in the Hawaii Range Complex. Captain Cudnohufsky is both the commanding officer of the Pacific Missile Range Facility and the Hawaii Range
18:07:39 Complex Commander.

18:07:40 Next, Mr. Neil Sheehan will brief you on the environmental impact analysis process and summarize the

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

results reported in the Draft EIS. Mr. Sheehan is the EIS team leader for the U.S. Navy.

The last item on the agenda, however, is the most important. The comment period is your opportunity to provide information and make statements for the record. This input ensures that the decision makers can benefit from your knowledge of the local area and any environmental effects you think may result from the proposed action or alternatives.

Keep in mind that the EIS is intended to ensure that future decision makers will be fully informed about the environmental impacts associated with the various alternatives before they decide on a course of action. Consequently, comments tonight on issues unrelated to this EIS are beyond the scope of this hearing and cannot be addressed.

To comment verbally tonight, please fill out a verbal comment card available at the registration table and turn it in. After the presentations, we will take a short recess to collect any remaining cards, then I will start calling on speakers in the following order: I will recognize elected officials first, then I will call on members of the public in the order in which the cards were turned in.

Each person will have 3 minutes to speak, including public officials, organizational spokespersons, and

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private individuals. We want to make sure that all who wish to speak have a fair chance to be heard. We have a stenographer here who will be making a verbatim record of everything that is said tonight. The verbatim record will become a part of the Final EIS.

If you don't feel comfortable standing up here tonight and making a statement, you have until September 17th of this year to submit a written statement for consideration in the Final EIS. Keep in mind that written comments are given the same consideration as verbal comments offered here tonight.

Now it is my pleasure to introduce Captain Cudnohufsky.

(Applause.)

CAPTAIN CUDNOHUFSKY: Aloha and good evening to all of you. Thank you. I'm Captain Aaron Cudnohufsky, commanding officer of the Pacific Missile Range Facility and the Hawaii Range Complex Coordinator.

Welcome to tonight's public hearing on our Draft Environmental Impact Statement for the Hawaii Range Complex. In just a few minutes Mr Neil Sheehan will give a brief presentation on the draft document. I have just a couple of things to say, but Neil and I will keep our parts very short so that we can maximize your time for comment.

First of all, I would like to thank Aunty

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18:11:26 Aletha Kaohi for the prayer. Thank you very much for that wonderful prayer to open this event.

18:11:26 Also, I would like to acknowledge Mayor
18:11:31 Baptiste for being here tonight as well.

18:11:33 As many of you know, the Hawaii Range Complex is a collection of significant testing and training
18:11:44 capabilities throughout the state. The new technology that is tested here, along with the vital training that is
18:11:50 conducted, is of incredible importance to this nation. Our
18:11:52 sailors depending on this training to hone their skills
18:11:56 before we send them into harm's way. They also deserve the
18:12:00 best technology our country can provide to them. They also
18:12:05 deserve the opportunity to train and be equipped with our
18:12:07 best so we can help them be as safe as possible when they're
18:12:14 out there protecting our freedoms. The Hawaii Range Complex contributes in both ways, providing premier testing and
18:12:28 training range facilities in order to do that.

18:12:28 At the Pacific Missile Range Facility we employ about 800 civilians. These are predominantly Kauai people from families that have provided generations of dedicated and capable people to our workforce. It is from this talented pool that we entrust our most important work: From management of our Missile Defense Agency programs, to qualifying our nation's newly selected submarine commanders,
18:13:02 you will find people born and raised on Kauai involved in

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18:13:02 each one of our programs.

18:13:03 We are the largest high tech employer on the
18:13:06 island as well. But we're not just all about the technology and employment. We recognize our responsibilities as stewards of a very special place with very special resources. We are very proud of our accomplishments. Hopefully, you had a opportunity to go back to our poster board station on
18:13:28 environmental stewardship that point out a lot of these
18:13:29 programs that we have working on the base.

18:13:31 We take a formal approach to our
18:13:35 environmental management, but our success can also be
18:13:38 attributed to the input received from the community. As I
18:13:44 stated before, Hawaii families work here and they're very
18:13:47 involved and concerned about their surroundings and
18:13:50 environment.

18:13:50 Speaking of input from the community, that's
18:13:52 why we're here tonight, so I'll wrap up my part here. I
18:13:56 can't stress enough how important your part and involvement
18:14:00 and your statements are with this process, this democratic
18:14:04 process that we're going to go through here tonight.

Let's make this a time to share not only our
18:14:12 views, but our respect for one another. Mahalo. Thanks.

18:14:14 (Applause.)

18:14:19 MR. SHEEHAN: Aloha, everyone. As Vida
18:14:24 pointed out, my name is Neil Sheehan. I'm the manager for

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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the Hawaii Range Complex Environmental Impact Statement. I'm here to discuss the findings in the Hawaii Range Complex Environmental Impact Statement or EIS and the Overseas Environmental Impact Statement or OEIS.

The EIS is done under the National Environmental Policy Act and the OEIS, which is set out under Presidential Executive Order 12114, analyzes Navy activities 12 miles and out from land. So that's the distinction between the EIS and OEIS.

The environmental study has been ongoing for several years. In order to receive the public's input, in September the Navy conducted scoping meetings on Maui, Kauai, in Hilo and Oahu. Now the Navy is receiving input from the public at this draft EIS stage. The current schedule shows the Navy could be signing a record of decision in May of 2008, and it's critical that the Navy decision-makers receive comments during the Draft Environmental Impact Statement stage.

In order to help facilitate comments, the Navy will be accepting comments tonight. We will also be accepting comments via fax, regular mail, e-mail and also through our website. The deadline to receive comments is the 17th of September.

This draft EIS/OEIS studies Navy training activities within the Hawaii Range Complex as shown here. It

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also analyzes research, development, test and evaluation of new technologies done by other federal agencies such as the Missile Defense Agency.

The Hawaii Range Complex consists of surface, subsurface and special use airspace in and around the main Hawaiian Islands and is an area in which the Navy has been conducting training for many, many decades. It also includes what is referred to as the Temporary Operating Area or TOA, which is a large area north and west of Kauai. The TOA is used for missile testing and evaluation for very short periods of time.

What this Draft EIS/OEIS does not do is the request the use of any new air, land or sea space. It represents current and anticipated future usage within the existing footprint.

The Hawaii Range Complex is important because it's one of the largest and most capable Navy range complexes in the Pacific region. It provides vast open spaces for large exercises like the biennial Rim-of-the-Pacific Exercise or RIMPAC. It also provides enough air and sea space to conduct missile testing. Its central location allows for other nations' military services from North and South America, Asia and Australia to meet for training exercises.

It's critical for those units stationed in Hawaii to train locally without having to travel great

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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distances in order to remain proficient with their training. The complex provides irreplaceable missile capacity for the Navy to conduct essential training and testing. The training is absolutely vital for the safety of our nation's sailors and marines and ultimately for the well-being of our country.

The Navy's not in this alone. The Navy has been working with many partners in drafting this EIS/OEIS. We have sought assistance from the National Marine Fisheries Services and have worked closely with their experts in trying to quantify potential effects on marine life that may be associated with the Navy's training activities. Additionally, the Missile Defense Agency, the Army and US Department of Energy have been partners in our efforts. Finally, we've coordinating with experts from various state and federal agencies to ensure that impacts on the environment are identified.

This EIS proposes to conduct current and emerging training and effectuate testing and evaluation of new technologies within the Hawaii Range Complex and to upgrade and modernize the range. The action is needed to ensure that our sailors and marines are trained and that they remain in a high state of readiness and that advanced technologies are able to be tested and evaluated and ultimately available to the military. The majority of the training proposed and examined in this EIS/OEIS occurs out in

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the open ocean.

This acts -- This document analyzes three alternatives: The no action alternative, plus two action alternatives. The no action alternative includes those training activities that currently occur in Hawaii, to include a RIMPAC Exercise, up to Undersea Warfare Exercises annually, and typical test and evaluation activities like missile launches from the Pacific Missile Range Facility.

Alternative One includes all those activities from the no action alternative, but additionally studies potential impacts on the environment that might be caused by increases in Navy training in Hawaii, enhancements or improvements to existing training facilities, upgrades for missile launches, and impacts that two aircraft carriers training during a RIMPAC Exercise might have on the environment.

Alternative Two, the preferred alternative, includes all the activities in the no action activity and alternative one and studies a three aircraft carrier exercise, and a slight further increase in training and the support of some future high technology initiatives.

The Draft EIS evaluated 13 separate environmental resource areas, such as biological resources, cultural resources, health and safety, to determine the potential effects of ongoing and proposed activities.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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18:21:02 Additionally, the affected resource areas were analyzed in six different locations within Hawaii: On Oahu, Maui, Hawaii, Northwest Hawaiian Islands and the open ocean and Kauai, obviously.

18:21:17 In this EIS, the analysis to date has not identified significant adverse impacts identified for any resource area in any geographic location within the Hawaiian Range Complex that could not be mitigated. However, this document is at a draft stage and the Navy welcomes any comments on its draft findings or its method of analysis.

18:21:42 The Navy does not expect to cause harm marine mammals, but it recognizes the potential impact on marine mammals caused by use of sonar is very controversial. Based upon input from the National Marine Fishery Service and nongovernmental organizations, the Navy has incorporated best available science to assess potential impacts on marine mammals caused by mid-frequency active sonar. This methodology, called dose function, has been used by the Environmental Protection Agency in other environmental contexts, and now is being used for the first time to assess mid-frequency active sonar's impacts on marine mammals.

18:22:32 What this method cannot do is to include in its calculations all the procedures that the Navy has in place to protect marine mammals. These personnel training, exclusion zones for detonations, power down or power off

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18:22:53 procedures for the sonar when the mammals are within a certain distance of the sound source, and passive detection for marine mammals.

18:23:02 The Navy is also working with the National Marine Fisheries Services to develop a monitoring plan that will assist our agencies in identifying possible effects on marine mammals in the main Hawaiian Islands to better assist us in future analysis.

18:23:17 The schedule provides for four public hearings -- tonight is the first -- on the Draft EIS, and also anticipates the final decision could be made in May of 2008. We're going to -- back to Oahu on Thursday, and then Maui and Hawaii next week.

18:23:42 The Navy welcomes your verbal comments now, your written comments tonight or sent in via fax, mail, e-mail or on our website by September 17th.

18:23:54 Thank you very much.

18:23:59 (Applause.)

18:24:01 MS. MOSSMAN: We are ready to begin listening to your comments. To ensure that we get an accurate record of what is said, please help me respect the following ground rules:

18:24:18 First, speak clearly and slowly into the microphone starting with your name and any organization you represent.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

Second, each person will have three minutes to speak. This time limit includes public officials, organizational spokespersons and private individuals.

Third, if you have a written statement, you may turn it in at the registration table and/or you may read it out loud within the time limit.

Four, please honor any request that I make for you stop speaking if you reach the three-minute time limit. To aid you in knowing when your time is almost up, my assistant will hold up a card when you have 30 seconds left. This should allow you to find a comfortable place to wrap up your comments.

Finally, please remember that no decision is being made tonight. The main purpose for the government representatives being here tonight is to learn of your concerns and suggestions firsthand.

Our first five speakers in order will be: Stewart Burley, Tony Ricci, Richard Hoeffner, Diana La Betz, and Aukai Gonsalves.

Stew.

MR. BURLEY: (Rearranging the podium.)

MS. MOSSMAN: Mr. Burley, you should really be addressing the two people that are here.

CAPTAIN CUDNOHUFSKY: It's okay. You're fine. Any way you want to address us.

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MR. BURLEY: Good evening, everyone. Aloha. My name is Stewart Burley, and I'm the -- I'm the consultant here on the island of Kauai. And I put together a couple of notes here. First of all, I would like to recognize the skipper, Mr. Mayor, and the rest of you residents of Kauai. Welcome here.

My background, I'll do a real fast background. In 1957 I arrived here on Kauai and helped to open the Pacific Missile Range Facility. There were seven of us. And so that means I've been here over 50 years. And today if you look at the PMRF, there's over 1,000 people that work there. So think of that number from seven to 1,000 in 50 years.

Statistically, economically, strategically, PMRF has been good for the nation, the state, and the island. To give you a little bit more information on that, in the year 2000 I took a poll at PMRF and -- to ask how many companies, how many companies were funded -- no matter how much, whether just a small or full amount, how many were funded or received funds from PMRF, because of PMRF being here. And the number was 270 companies actually get some type of funding from PMRF. That was in the year 2000. And with the new programs and the number of companies that have moved in, the number is probably over 300 by now.

On a return on investment, each time there's

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D-T-0018

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-T-0018 (cont.)

a large launch, approximately 200 to 400 people travel to Kauai to watch and be part of that. So in figuring out, using the Kauai Business Bureau formula, each time there's a large launch, the island receives about $3 million just for the island. That means all of you that have someone working in the hotels, the rental agencies, the tourist agencies; some way they're being funded, part of their funds come from PMRF or from the government.

MS. MOSSMAN: Stewart.

MR. BURLEY: Let me skip down here.

So surveillance is conducted continually. Everything is documented or analyzed. Every launch that happens at PMRF has a rate safety approval written up by engineers. Senator Dan Inouye, about ten years ago, indicated that he would like to see before he retires 1,500 people working at Barking Sands.

MS. MOSSMAN: Mr. Burley, your time is up.

MR. BURLEY: The EIS is your document. Embrace it, encourage it, it will make you proud.

MS. MOSSMAN: Mr. Burley, thank you.

Mr. Tony Ricci.

D-T-0019

MR. RICCI: Hi. My name is Tony Ricci. Hi, Captain, Mayor.

It is hard talking with my back to you. But I used to have my paper --

COMMENT NUMBER: D-T-0019 (cont.)

Mr. Burley, you read that whole paper. That was actually pretty good.

I'm a resident of Kauai, been here 14 years. I'm here basically because we have a saying on the west side that the base starts from Lihue to the west side and from Lihue to the north shore, they don't know even know we exist on the west side. The base has been a really good neighbor, a really good part of the west side. Our family interacts with the base. I'm not in the military. Never been in the military, never been in the armed forces in any way.

1

I just wanted to come here -- I usually don't do these kinds of things, never been to one of these before. Just because sometimes we hear this thing about the sonar and whatnot, but, you know, PMRF is a great neighbor to Kauai. They're a great part of Kauai, and I just wanted to say that. And, Captain, welcome here.

And our private family, a lot of the people on the west side really appreciate that PMRF is there and that they do come up with a lot of money. Mr. Burley, he had great stats. I don't have stats. So he can take my other minute. Is that basically done? I know, I'm only kidding.

I just want to say thank you. That's all I wanted to say, is that I really do appreciate PMRF is on Kauai.

MS. MOSSMAN: Next speaker is Mr. Rich

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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Hoeffner.

D-T-0020

MR. HOEFFNER: I speak to all of you and not necessarily to you gentlemen because I realize you're just doing your job, but the futility of this whole thing. I don't know how much was spent on this Environmental Impact Statement, but it's like the convicts in San Quentin making

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the rules on how the prison is run. An Environmental Impact Statement done by the Navy for the Navy is totally ridiculous. Nothing anybody says here tonight is going to make a difference in what the Navy does. This is -- You're here tonight to hear what they're going to do.

2

The Superferry pisses me off. This makes me angry. They're going to be doing things here that are going to hurt this island. The military just admitted they're

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using depleted uranium on the Big Island. In this Environmental Impact Statement, the striker force is going to be here on our island. They have -- And somebody else is going to talk more about this, but they're going to be using weapons here, atomic weapons, nuclear weapons, weapons that have depleted uranium; and nothing we say here tonight is

4

going to change that. They're going to do any damn thing they please because they're the federal government.

How much time do I have left?

MS. MOSSMAN: A minute and a half, about a minute.

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D-T-0020 (cont.)

MR. HOEFFNER: Okay. When the Iraqi War started, I sent letters to our congressmen and to the president saying that you don't fight a war when you have individuals involved. The terrorists are individual criminals. I worked in the police department Berkeley, California. I was a burglary investigator. When we had a burglary committed, we didn't gather the police department together and go attack Oakland. We investigated and we went and arrested the burglars. You cannot fight a war against terrorists because they're individuals.

If you give me five 5-man special forces teams, I'll guarantee you I could eliminate all the terrorists in the world by arresting them, doing a investigation and getting them out of here.

No matter what happens tonight, the Navy is going to do what they want to do and this is all futile. It's a futile effort.

(Applause.)

MS. MOSSMAN: Diana La Betz.

D-T-0021

MS. LA BETZ: Hi there. Well, here's my take. I'm just as angry as him, but I'm really more concerned about the big picture. We have these gentlemen here and you're talking about all the things you've done and blah, blah, blah. Well, I have to tell you something. I am afraid. I am very afraid. I'm not afraid of the wars that

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0021 (cont.)

are going on and the wars that could happen, blah, blah, blah. I'm afraid of the military. I'm afraid of the military.

(Applause.)

MS. LA BETZ: In wars people go out and kill bunches of people. They kill -- They destroy countries. They destroy water. They destroy air. They destroy species. The Navy, you have the capability of destroying the whole entire ocean mammal population.

In my opinion, we are all connected. We are all connected by what, I don't know, but I feel it. I feel that if we feel connected, you feel responsible. So when someone else is hurting someone else, it's hurting yourself. And the military is hurting everything. We are eliminating species. Who gave you the right to do that? I want to know who gave them the right to do that. They -- You believe you are above the law. And what about our resources? [2]

You know, we spent hours and hours and hours trying to pass laws to protect ocean mammals, and you guys disregard it. And you want to be respected? What about our respect? What about the respect that we have for each other and we have in their generations and the citations? I mean, what -- 90 percent of the world's fish are gone. 70 percent of the zooplankton is gone. There is a Pacific Coast gyre in the middle of the Pacific Ocean that at the bottom of it is [3]

COMMENT NUMBER
D-T-0021 (cont.)

six parts plastic to one part plankton.

We have done a tremendous amount of damage, and the military has done the most. And in your bylaws or whatever your rules are, you're supposed to be stewards. And I would like to suggest that you don't do your plan. I suspect that -- I would suspect that you'd listen to the world's citizens because we are all saying the same thing. You don't have the right -- When the ocean die, we die. And we get pretty gosh darn close. [4]

And the Hawaiian area is absolutely full of the most precious species on the planet and you're torturing them. You're torturing them and all the rest of the fish and everything else that is trying to survive because you want to tour around and play war games. It's not fair. It's not right. And we all have a right for a life that is -- [5]

MS. MOSSMAN: Your time is up.

MS. LA BETZ: -- forever after. Please.

MS. MOSSMAN: Thank you very much. Thank you.

(Applause.)

MS. MOSSMAN: Before our next commenter comes up, I would like to announce the next five speakers. That would be Bruce Pleas, Juan Wilson, James Trujillo, Puanani Rogers and Elaine Dunbar.

Aukai.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0022
1

MR. GONSALVES: Excuse my back. I want to talk forward.

My name is Aukai Gonsalves. I live on the west side. Was raised up on the west side for all of my life. I was able to go away to school and ended up deciding that Hawaii was the place to live. So for most of my adult life I've been living on the west side.

When I got back from college, I worked for a Hawaiian employment agency helping the locals find employment here on Kauai. I did that for nine years. And when an opportunity came to work for the Hawaii International Guard, I took it. So I have military activation. I'm not totally unbiased on the situation. But based on what I know and my experiences with the Navy down at Barking Sands, I agree with the second gentleman that the PMRF has been a very good neighbor, especially for those on the west side.

And as long as I have known, my family has been living here on Kauai and I have never heard much of a complaint from them on anything with the military or what they have done or what they propose to do here on Kauai.

I think as with anyone who that comes to Kauai, they will go on to be good neighbors. And I think the Navy and the military has tried their best to meet that goal.

And that's all. Thank you.

(Applause.)

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D-T-0022 (cont.)
D-T-0023
1

MS. MOSSMAN: Before we go further, I would like to explain why we have the podium set up the way it is. It's mainly because these two gentlemen here are here to receive your comments.

In all fairness, we would like to give everyone three minutes to speak. You can also see when you're being cued with the 30 seconds. So we'd appreciate, you know, if you'd just go ahead and provide testimony, then applaud.

Okay. Mr. Pleas.

MR. PLEAS: I am going to move this to a more logical position to address everyone. This way the person speaking can see everybody easily.

My name is Bruce Pleas. I'm a resident of Kekaha. And I will change the scenario here. I will go directly to the EIS and why we are here. The EIS, Section 4.3.2.1.8, Land Use, page 4-266, Section 79, the way it's set up: "The beaches on PMRF only represent a small portion of the available beaches on western Kauai and do not provide a unique recreational coastal opportunity that is not being provided elsewhere on the island."

This is not a true statement. For surfing it is absolutely wrong. Upper Rifle Range, Kokole Point is a unique situation. Between Kokole Point and Family Island are A-frames that do not exist anywhere else on this island.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-T-0023 (cont.)

This is where World Champion Andy Irons, his brother World Champion Mark Hubbard learned how to surf. I watched them grow up there. Without this area, they may not have been where they are. We have access to Family Island and Kinikini. Above that is Airports. Above that is Pill Box and then comes Rocket Reef. These are all unique areas of Kauai that are unique to the world.

This statement is not true. There is no reference given here. This EIS is not complete and has to address this.

3

The Appendix I, this is I.5, this has to do with the ceded land. These are the set asides. In 3, Restrictions on Use Or Disposal, Part B, Executive Orders, No. 945 in A.7 says that, "The land herein described is set aside on the understanding access to the shore for the purpose of fishing will be denied only on the portion used for bombing and that only while same is actually in progress or about to commence."

This is what our access is. What is missing is the complete documentation of this, which also says the set aside, the makai value by the ocean is the high waterline of the year, that is where the set aside goes. Makai of the high waterline, the ocean is state beach. Any documents that indicate the state beach has been leased or transferred to the federal government need to be included in the EIS and I

COMMENT NUMBER

D-T-0023 (cont.)

can go on in the orders here from DLNR.

MS. MOSSMAN: Mr. Pleas, your time is up.

MR. PLEAS: And that is the request I have. Thank you very much.

(Applause.)

MS. MOSSMAN: Juan Wilson.

D-T-0024

MR. WILSON: My name is Juan Wilson. I live in Hanapepe Valley.

3

The US Navy is not really including everything in the EIS. Their representation is that the Hawaii Superferry is part of an aid program to build littoral combat ships to be stationed in Hawaii with public funds and guarantees. The plan of stationing the Striker Brigade on Oahu and training at Kahakalau does not make any sense without the use of the littoral combat ships around the Pacific. It is a strategic decision made without concern for the environment of Hawaii and without an EIS. Like WesPac expressed in Japan, it is a ship masquerading as a military operation that's doing the job of the military, US military.

If there's any doubt about that, just look at the board on the Superferry. As I mentioned at several meetings, its chairman is a former Secretary of the Navy, John Landing and five of his associates, and he control the 11 board -- 11-man board. Four of those are ex-Navy officers.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-T-0024 (cont.)

With few exceptions the Navy impact on the island and on the ocean around Hawaii is catastrophic. We don't want more of it being shoved down our throats. If the Navy wants the Superferry as littoral combat ship, it should buy it, paint it in fleet camo and dock it in Pearl Harbor.

1

I ask that the following questions be answered in the Navy EIS. I think they're linked directly to the Navy with this.

Is it possible that weapons systems in the field at Kahakalau Range could be contaminated with depleted uranium?

Two: Will the military equipment used there be tested for depleted uranium before boarding the Superferry?

Three: Will military equipment used there be decontaminated before boarding the Superferry?

Will the Superferry based on Kauai transport any of this military equipment?

Will the Striker Brigade or associated weapon platforms disembark on Kauai?

Will the Superferry coordinate efforts with the Navy for RIMPAC 2008?

Will the Superferry be part of any ocean littoral combat ship simulations or war games in the future?

Will the Superferry ever be equipped with mid

COMMENT NUMBER: D-T-0024 (cont.)

or low frequency sonar capable of harming whales or other sea life?

Will the Superferry participate in military protocols to prevent whales from hearing military equipment?

Will the Navy be involved with insurrection simulations using the Superferry on any Hawaiian Island?

2

What type of impact could depleted uranium dust have on GML4 experiments within the Navy MRE area?

I've got a lot more, but I'm out of time. Thank you very much.

(Applause.)

MS. MOSSMAN: Mr. Wilson, if you would leave your comments. Thank you.

James Trujillo.

D-T-0025

MR. TRUJILLO: I appreciate the opportunity to speak before you and provide my view. I haven't lived here long. I live in Kapa'a and work on the west side. And I know that you guys have tried to be as good neighbors as you possibly can. I think you folks in this state, they do have appreciation for the Navy and the military, what they have done.

I appreciate the opening pule from the aunty and her connection to the deeper significance of why we're all here and why we feel it important that you receive input from us and why we feel it important going to be here to

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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D-T-0025 (cont.)

present information to you, which might be a little bit more pessimistic than myself. I learned a local term, shibai. Whether this is pure shibai, I hope not.

1 I speak to my desires that the military, specifically the Navy in this, develop a more inclusive process that does take into consideration the things that this guy talked about, when Mr. Juan Wilson was speaking about how bruise place with specification in regards to errors, nonfactual information.

I think that the history of the military in being present in the Polynesian islands is less than ideal. I think that the fact is that citizens from Polynesian, the Hawaiian Islands, that they can attest, I think, to the impacts and their issues with how the military has neglected their responsibilities and obligations to clean up and provide us with ample mistrust.

It's unfortunate that we can't necessarily believe everything that is written down as scenarios being preferred or alternatives that would be acceptable when, in my opinion -- and I do appreciate the opinions of others -- that the military has done a service to our global community and that terrorism is just that, terrorism and war is just that, war. And to equate the two, it's easy to draw that line.

I speak freely. I participate in this

COMMENT NUMBER
D-T-0025 (cont.)

democratic process and I thank you for opening up for us, yet I understand that we're not all here, we haven't all been able to participate and I hope -- I hope that the things that are being presented --

MS. MOSSMAN: Mr. Trujillo, your time is up.

MR. TRUJILLO: -- is taken to heart. Mahalo.

MS. MOSSMAN: Puanani Rogers.

D-T-0026

MS. ROGERS: (Statement in Hawaiian.)

Greetings to all of you on this evening on this beautiful island on Kauai. My name is Puanani Rogers, for the record. Aloha, Captain, Ms. Mossman, Mr. Sheehan, our honorable mayor and all of you people employed with PMRF. Mahalo for this opportunity.

I would like to thank Aunty Aletha for her beautiful prayer. And as she mentioned, that we have taken care of our aina from the beginning. First peoples that lived here have always taken care of our island. So we hope that you continue to do that and to speak against any entity that wishes to destroy it. I believe that it is happening as I speak, that our aina is being destroyed. So sad.

Anyway, I'm Kanaka Maoli. (Statement in Hawaiian.) And I love Kauai. This is the only place I can call home; therefore, I will stand up and defend this aina

1 'til my dying breath. And I believe the US military is the greatest polluter of our islands. Just today, ironically, in

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-T-0026 (cont.)

the newspaper, guess what, DU, depleted uranium, one of the most dangerous chemicals to human beings was found here on our aina, on Pohakuloa. I have reason to believe it is also there in Schofield, Makua Valley, Waikani Valley, all of the many areas of the 240,000 plus acres that the military is occupying. They have left their hewa, their garbage. Instead of building up the military, we should clean up the island first.

(Applause.)

MS. ROGERS: No buildup. I think the strikers coming here to our aina and --

What? 30 seconds? Okay.

Okay. You know where I stand. I speak for our island because our island cannot speak for itself.

(Applause.)

MS. ROGERS: I speak for our kupuna whose spirits are here with us today. They too are crying because of all the hewa that is happening to our aina, our aina, our resources, our water, our air, all things that keep us alive and well and living here on our beautiful aina.

Just remember: Malama aina, aloha aina. Take care of the aina, the aina will take care of you. Mahalo for this opportunity.

(Applause.)

MS. MOSSMAN: Before our next speaker comes

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up, I would like to announce the next five speakers. They are Michael Fox, Dominic Acain, Wendy Raebeck, George W. Saunders, Jr. and Carl Berg.

So Elaine Dunbar.

D-T-0027

MS. DUNBAR: My name is Elaine Dunbar. This is my oral testimony in opposition to Navy expansion at PMRF.

1

I understand that the Navy plans to train with dangerous sonar over 70 percent of the world's oceans. The intense noise that the system generates will have a lethal effect on populations of marine mammals. The Navy was unable to disprove this point in their EIS.

2

I object to the Navy's proposal for expansion because that would violate the treaty still intact between Hawaii and the United States and it would violate other international treaties around the world. Treaties being the supreme of the land. These violations are high crimes against humanity.

I object to the Navy's proposal in that it will be a violation of Public Law 103-150. The Draft EIS did not directly respond to the question of illegal occupation. Instead it proceeded to render an unauthorized, incorrect and diluted interruption or opinion of Public Law 103 and ignorantly overlooked the fact that the resolution was passed into law and used the vague disclaimer in the law as their basis, failing to cite paragraph 29: "Whereas, the

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-T-0027 (cont.)

indigenous Hawaiian people never directly relinquished their claims to their inherent sovereignty as a people or over their national lands to the United States, either through their monarchy or through a plebiscite or referendum."

The Draft EIS serves the Navy, not Hawaii, not the world, and is an extension of the government's manufactured terrorism. The draft dilutes and attempts to skirt the real dangers by not adequately and honestly addressing the issues presented in the scoping last year. It is very incomplete and contrived.

3

What parts of the draft do reveal are premeditated impacts to marine mammals by way of stating their intent to do harm by increasing sonar decibels beyond the already lethal levels. This is document in proven cases

4

and court rulings forbidding this activity. Also it reveals electromagnetic radiation will inadvertently sell or lease that have electronically triggered mechanisms. How do we know that testing didn't already cause the helicopters crashes?

5

In the draft list of weapons they have over 150 different types of weapons. It does not say how many of each type. These weapons aren't a bunch of rifles and pistols. They are the Mortal Combat army deadly weapons that they claim are safe, but the reality is they can destroy the world. And the US military is accident prone and

COMMENT NUMBER

D-T-0027 (cont.)

incompetent.

They don't tell the parents and children that when they put -- when they put on their benign demonstrations

6

at the elementary schools. The US military is famous for poisoning the land and it still has not complied with reparations. The main reason the military has not cleaned up their waste to date is because they can't, the damage is too severe. Depleted uranium has a half-life of 500,000 years, they are here to now to ask permission to do some more damage.

MS. MOSSMAN: Ms. Dunbar, your time is up.

MS. DUNBAR: Okay. Thank you.

(Applause.)

MS. MOSSMAN: If you've got handwritten comments, we'd really appreciate it if you turn them in.

Mr. Michael Fox.

D-T-0028

MR. FOX: Good evening. My comments are not so much directed at this EIS; however, I believe that they're important. The low turnout -- and I would say this is a low turn out -- does not infer that there is not interest in the subject. I think there's a concern amongst many citizens that their presence somehow will get them on a list.

This is a very sad time in American history. Demonstrations are filmed. People are getting on "no fly" lists. Conversations by ordinary citizens are being listened

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

to by the government. This is a sad time in American history. And I want to thank everyone that has come out here tonight and put their name on a list to speak with their address or phone number. How brave of you and how American of you.

There is a distrust of government and there's a distrust of the military; and that distrust has been earned. When our young, when our youth are lied to, when you come on the campuses at the high schools and colleges and you lie to them and tell them that their service is a patriotic act to defend America's freedom in Iraq by going to Iraq and defending America's freedom, that's a lie. That's a lie. They're not going there to defend American freedom. There was -- That's a whole different subject, but there was no reason for us to invade Iraq. There was no reason for us to be occupying Iraq. We should be out of there.

We have -- We have lost our reputation globally and we are going downhill. We need to work with the rest of the world and show that we are a powerful nation, a responsible nation, that we are a world player, that we are part of global network of brothers and sisters on this planet. And this island is a sacred place. Its aina is a sacred place. We do not want a larger bull's eye on this island than is already here.

(Applause.)

COMMENT NUMBER

D-T-0028 (cont.)

1

MR. FOX: When the last time we had a military conflict that involved the state of Hawaii, it was on the island of Oahu and it was against a naval facility there. If there was no naval facility there, the Hawaiian Islands would never have been bombed.

MS. MOSSMAN: Thank you, sir. Your time is up.

MR. FOX: Thank you.

(Applause.)

MS. MOSSMAN: Dominic Acain.

UNIDENTIFIED SPEAKER: Dominic is not here yet.

MS. MOSSMAN: Pardon?

UNIDENTIFIED SPEAKER: She's not here.

MS. MOSSMAN: Wendy Raebeck.

MS. RAEBECK: Thank you. Good evening, everyone. I also want to thank everyone for the opportunity to be here. And I honestly don't feel any personal grudge or hatred for the people that are here. I do think they're doing their jobs, but I also acknowledge that they're getting paid by the hour to be here and the rest of us aren't.

I think right now we're experiencing some terrible things from this administration and that this is part of it. If you acknowledge how tiny is the percentage of people in the country that want the military action that this

COMMENT NUMBER

D-T-0028 (cont.)

D-T-0029

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0029 (cont.)

administration has put us in, I think that would also include what's happening here. I really think that's why it's happening here. It's part of the same thing.

I really believe that you can't possibly live on this island and want more military. It just doesn't -- It just doesn't compute. You just can't live here and wish for more missiles. It doesn't make any sense. I really think that the people that are in the military -- I really don't think you guys want it, either. I really don't. I don't see how you could. I don't.

And I think you are doing your jobs, but I think what I honestly would like to see would be for the military to begin to take a role, a leadership role in helping with the preservation of the planet, starting here. I think that the people who are in the military here are very involved with the ocean and have firsthand experience with the most beautiful waters in the world. And we are in a position to really help and to trigger around -- The whole world is talking about changing, saving things, changing our ways. That's what we need to do. [Comment 1]

We are already did this. We don't want to do it again. It's not right. We all know it's not right. I know that people in the military also know that it's not right. I know you know. And I know it's hard when it's your job, but I think you really need to say your consciousness

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D-T-0030

and be true to yourself and write the truth. Thank you.

(Applause.)

MS. MOSSMAN: George W. Saunders, Jr.

MR. SAUNDERS: Thank you very much.

For 30 years everyone has called me Saunders.

Okay. It's not about the ES. That is just paper. This is not a judgment. This is a discernment. My film recommendation is "The Day the Earth Stood Still," everyone should watch that.

Number one, I'm French Creole, French African and Cherokee. My great, great grandfather was a German sailor and my grandfather is a Halakhic Jew.

When I was 14 in 1944 my best friend was Hawaiian and his mom constantly told me about the country of Hawaii, a nation with its own culture and language. It stuck.

I ran into a police officer recently who said, "If you don't like the laws here, you should leave." Well, I've been out of the country half of my life and when I came back, I didn't think I was coming back to America because I'm in Hawaii, in the nation of Hawaii.

Let me see. Where am I? Okay.

I'm a world citizen. I support the military and what they have done. My dad was in the military for 22 years. He ran the body bag -- in the body bag run, Vietnam,

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0030 (cont.)

in Da Nang and he told me a lot of stories about military officers smuggling things on the black market through

1

military planes because there was no customs. Support the military and what they have done? You mean like drop atom bombs; illegal police actions; support elitist, racist and fascist practices in America; the hypocritical men who maintain them.

Someone once asked me if I would die for my art. I'm an artist that does political and social art all my life. Someone once asked me die for my art, and I guess my normally answered yes, but I do know that the Mother Kauai will take me. And my last comment is that freedom has left the building along with Elvis. Thank you very much.

(Applause.)

MR. SAUNDERS: 55 years old. Not a kid.

MS. MOSSMAN: Mr. Carl Berg.

D-T-0031

MR. BERG: Aloha. My name is Carl Berg and I'm going to try to address just two points that I found most especially offensive in the EIS. And these follow a little bit on what Paunani Rogers said.

1

On page 4-319 I just couldn't believe that they are predominantly continued, quote, bombing exercises and air-to-ground gunnery of Kauo, an island here, a Hawaiian Island that has at times Hawaiian monk seals on it, for those of us who are interested, but this is something that they

COMMENT NUMBER
D-T-0031 (cont.)

want to continue and promote, the bombing and destruction of this island. And to me, the fact that it is 108 acres is not important. If it's any size, we should not be destroying the earth.

(Applause.)

2

MR. BERG: On page ES 30, and this is one volume, they're talking about the effects on the Northwest Hawaiian Islands and they are saying -- I liked the words -- "some current flight activities resulted in missiles" basically falling off and spreading stuff all over the place. And they're -- But don't worry, it will spread out so much it will not hurt the Hawaiian Islands. But on the very next page we start talking about PMRF, the main base, Kekaha and Kekohai and no where in that area do they mention the fact that these missiles could both blow up and spread disease -- or destruction all over our land here on Kekaha.

3

But if you go to the next big volume, Volume 2, Chapter 4, page 252, they mention -- have a paragraph or two that talks about that these things ignite, they will ignite the forest earth, will form nitrous oxide which is soluble in the water, these will also -- the nitrogen dioxide will return to earth from this exploding missile, right, this will come down as nitric acid rains. Isn't that a nice picture for Kekaha and our island?

The precipitation events --

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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D-T-0031 (cont.)

MS. MOSSMAN: Thirty seconds.

MR. BERG: Thank you.

And it could be acid, but the good news, they could -- after they come down in this nitrous oxide rain and eat your flesh off, they could react with the calcium carbonate and form the nitrates which are used in fertilizer for plant life. I find that their, I don't know, way of putting -- justifying this kind of environmental degradation

4

is unacceptable and that at the best, they should take the no action alternative. But, in fact, I wish that they had to pull back and forget them. Thank you.

(Applause.)

MS. MOSSMAN: Is Dominic Acain here?

Our next two speakers will be Mr. Jeff Connolly and Mahelani Sylva.

Mr. Connolly?

D-T-0032

MR. CONNOLLY: I'm ready. Mahalo for the opportunity to offer my personal observations and comments on the Draft EIS and OEIS. For those who don't know me, I'm a retired 30-year Navy veteran. I've had -- My family and I are now Hawaii residents and we intend on living here for an awful long time, especially if my wife has anything to do about it.

I've served in the Navy on ships, squadrons, aircraft throughout the world. Planning and personnel

COMMENT NUMBER

D-T-0032 (cont.)

manning and conducting anti-submarine warfare, mine warfare exercises, training exercises and the support the sailors and marines who find ourselves deployed across the world.

I would like to make three fundamental observations about the Draft EIS. The first is on

1

environmental stewardship. I believe that the document does an excellent job of outlining the Navy efforts in environmental stewardship. And I'm stating that based on my personal observation.

And as, also, the responsible officer in many instances, I can personally affirm that the Navy spends substantial funds and takes great care in conducting operations and exercises and their daily activities with respect to environmental stewardship. This is particularly true at PMRF where the employees themselves are great keepers of the environment. And there are many success stories that they care about Hawaii and I have had the privilege to work with them and see the great pride and personal interest they have in protecting the environment.

The second comment is on the use of sonar during military exercises. Over 30 years in the Navy and thousands of hours on or over the air or over the seas and over land. I've participated in many anti-submarine warfare exercises and mine warfare exercises where the use of active sonar in various shapes and forms was conducted. In the EIS

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0032 (cont.)

and I know this has been discussed in various forums, the impacts of -- they discuss the impacts of sonar on marine mammal behavior at length. I believe the Navy has correctly characterized their efforts based on known scientific evidence with respect to the impacts of active sonar on marine mammal behavior.

2

I personally have never witnessed in 30 years nor have I had reported to me any instance of a change in marine mammal behavior during anti-submarine warfare exercises or mine warfare exercises conducted in Hawaiian waters or the Pacific, the Atlantic and the Mediterranean.

3

And, lastly, the importance of live training. The underpinning of this Draft EIS is the -- is basically how we prepare sailors and marines for combat and mandatory missions. I'll simply state that there is no substitute for live training. Simulations today, while they're great, there's nothing like getting out and flying 200 feet at night in bad weather chasing a submarine, trying to work as a team and conduct an anti-submarine warfare exercise.

4

MS. MOSSMAN: Mr. Connolly.

MR. CONNOLLY: I support the Draft EIS and proposed OEIS. Thank you very much.

MS. MOSSMAN: Mahelani Sylva.

D-T-0033

MS. SYLVA: Aloha. My name Mahelani Sylva. I'm Kanaka Maoli, English, German, Portuguese, Chinese. And

COMMENT NUMBER
D-T-0033 (cont.)

as far as my ancestors are concerned, I speak for those who have passed away and never seen freedom on their face because they lost their country.

The king of Hawaii was neutral in times of war, expressing the meaning of aloha. And now on our islands and our shores we have something that does not express the meaning of aloha. In looking at the EIS, I have a hard time suffering and commenting, only because the more I read into it, the more it twisted my mahalo, the very being of who I am. And it is not okay as far as I'm concerned.

Anything that has to do with the perpetuation of war, whether it be in defense or another issue, is supposed to report and live one nation under our God for truth, justice, freedom, peace. No.

So I'm not going to wait until you hold up that yellow sign. I'm speaking for myself and my kupuna who passed away and for future generations. I am not for the military and that. Mahalo.

1

(Applause.)

MS. MOSSMAN: Is Dominic Acain here?

Well, we're going to take a recess. We'll be here until 9:00 and if there are any other speakers who want to sign up, we'll be back. We'll be here. We're just going to take recess. Thank you very much.

(Pause in Proceedings: 7:20-7:30)

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

MS. MOSSMAN: We have two speakers and I would like to call them up in this order: Ken Taylor, then followed by Louis Parraga, Jr.

Mr. Taylor.

D-T-0034

MR. TAYLOR: Good evening. Thank you for this opportunity. My name is Ken Taylor. The first speaker this evening made a big to-do about the activities that are at your facilities out there and how wonderful all this money is that is spent here on Kauai. I look at it as blood money and I can't be proud, I can't be proud of that money being spent here in Hawaii. No alternative should be the option generated by this activity. 1

Back in the '50s I joined the Navy. I was proud to be in the Navy at that time. I felt obligated to serve my country. But since then I have had a real change of heart. It's really sad where this country has gone. We wouldn't need all this activity if we would learn to treat the people of this world differently than we do. I know that's not your responsibility, but you can take that information back to your superiors, all the way to Washington, because that's where it needs to start.

(Applause.)

MR. TAYLOR: I'm angry. I'm angry. I'm angry that we have to spend this kind of money. Why aren't we out around the world spreading aloha instead of arms and

COMMENT NUMBER

D-T-0034 (cont.)

having to build more and more and more? Where is it going to end?

2

The oceans are full of noise. They're getting noisier every day. We don't know the impacts that are taking place in the oceans because of all the noise. Every time you launch another ship out into the ocean, it's creating more noise, creating more problems for the animals that we don't understand what the impacts are.

We as humans have to stand up and protect these people for what they are. And we need them, we need them desperately. And I'm really sorry that I can't stand here today and be supportive of what's going on with the military in this country. It's a sad state of affairs. Thank you.

(Applause.)

MS. MOSSMAN: Mr. Louis Parraga, Jr.

D-T-0035

MR. PARRAGA: I never thought I would speak tonight, but from all the people that spoke, most of them are outsiders. We local people call them outsiders. Now the outsiders who us local people done more damage in this island than they ever did. They have done some damage, but talk about damage, the outsiders did a lot of damage. Our way of life is completely changed. It used to be what they call a paradise. It's not paradise for local people anymore because too many of these people come here and, plus, other

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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D-T-0035 (cont.)
1

outsiders. And we don't need them fouling up our culture and our way of living. Mainly the rich guys come here, build big houses, and the poor guy right next-door cannot even pay the land tax anymore. For generations they were living there. They cannot pay their land tax anymore because of the rich people that only concerned about making money. Just today passed a house in Wailea just about finished built and it's for sale already. Is that the way to treat our land? The only use for profit and for money and parking?

So we need -- I'm a Korean War veteran, my two sons are veterans, also. We need the military here. Did you people ever hear of a surfer winning a war? The military won wars. And if it wasn't for military, maybe the terrorists take over, so we need the military here. So I think, you know, you outsiders, you need to think twice. Freedom is not free. And if it wasn't for the military, would be no freedom in this world, in this United States of America.

So I think that's about all I have to say. So you outsiders think twice of what are you doing on this island. Our paradise is Paradise Lost to us local people. Thank you very much.

And, sir, don't leave here without -- thinking that the locally people is thinking all like how these people spoke. No, no, no. Local people like the

COMMENT NUMBER
D-T-0035 (cont.)

military, most of them. Maybe few don't want, but most of them like. And without military you wouldn't have nothing. Like I say, surfers win no wars. Thank you.

(Applause.)

MS. MOSSMAN: We'll now take another recess. Thank you very much.

(The proceedings recessed at 7:37 p.m.)

(The proceedings adjourned at 9:02 p.m.)

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

C E R T I F I C A T E

STATE OF HAWAII)
) SS.
CITY AND COUNTY OF MAUI)

I, Sandra J. Gran, Certified Shorthand Reporter for the State of Hawaii, hereby certify that the proceedings were taken down by me in machine shorthand and was thereafter reduced to typewritten form under my supervision; that the foregoing represents to the best of my ability, a true and correct transcript of the proceedings had in the foregoing matter.

I further certify that I am not attorney for any of the parties hereto, nor in any way concerned with the cause.

DATED this 5th day of September, 2007, in Maui, Hawaii.

Sandra J. Gran

Sandra J. Gran
Hawaii CSR 424
Notary Public for Hawaii
My Commission Expires: 5/14/08

SANDRA J. GRAN
Notary Public
State of Hawaii

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

HAWAII RANGE COMPLEX

PUBLIC HEARING ON THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT/
OVERSEAS ENVIRONMENTAL IMPACT STATEMENT
(EIS/OEIS)

THURSDAY, AUGUST 23, 2007
6:00 - 9:00 P.M.

McKINLEY HIGH SCHOOL CAFETERIA
1039 SOUTH KING STREET
HONOLULU, HAWAII 96814

BEFORE: LESLIE L. TAKEDA, RPR, CSR #423

COMMENT NUMBER

THURSDAY, AUGUST 23, 2007; HONOLULU, HAWAII

--o0o--

MS. MOSSMAN: Aloha, and good evening. Thank you for coming tonight.

Before we get started, I'd like to invite Kahu Curt Kekuna, Minister and Director of the Kawaiahao Church, to offer a pule.

KAHU KEKUNA: Kala mai, ladies and gentlemen. I just made a short phone call, and I apologize for walking up late here.

I want to thank you all for coming. I want to make it clear why I'm here. I'm here to ask Ke Akua's blessings; that's why I'm here. That's the only one I trust in, my friends. I love men, I love women, but I trust in Ke Akua. Just like the coin says, In Ke Akua We Trust. That's where I'm at.

And I understand it's going to be a different crowd tonight, a lot of different kinds of folks, so here's what I'd like to do to start off. Would you please stand. And before I give the pule, this would be very good for us to do: I'd like you to turn around and meet at least three people you don't know. Just shake their hands and say, "Good afternoon. Are you hot like me?"

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

All right. Continue standing, ladies and gentlemen. Unless you're a stenographer, please keep on standing.

One of the reasons I do -- I do this all the time. You can ask the people who have been with me, that we meet each other, because, basically, we are all people. We are all people of Ke Akua, of God. Whether we believe that or not, that's another story; but I believe that wholeheartedly. And, therefore, because we're all people, there's one thing that I see that He asks -- well, a couple of things. But first of all to love him, yes, but also to love each other. And what this means is sometimes we're going to be -- especially in my church, we're going to be on different sides of the issue, of any issue. Give me any issue and I can show you those who are going to yell and scream and those on the other side are going to yell and scream; but in the end, when we're done, we're still people of God. So, my encouragement tonight is let's be the people of God. Let's respect each other. Let's not look to see how we can injure someone else. But let's see if we can promote understanding with each other. And, yes, malama each other, caring for each other. So, let's try with that spirit here present because Ke Akua is present.

Let's pray together. Please pray with me.

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(Prayer.)

KAHU KEKUNA: Please be seated.

MS. MOSSMAN: Thank you, Kahu.

This is a public hearing on the Draft Environmental Impact Statement for the Hawaii Range Complex.

I'm Vida Mossman, and I will be the moderator for tonight's meeting.

This hearing is being held in accordance with the provisions of the National Environmental Policy Act and implementing regulations. The Act requires federal agencies to analyze potential environmental impacts of certain proposed actions and alternatives and to consider the findings of those analyses in deciding how to proceed.

The purpose of tonight's hearing is to receive your comments and suggestions on the Draft EIS. Those of you who have had an opportunity to review the Draft EIS may want to read the summary of the major findings in the handout available at the registration table. Those findings will also be summarized briefly by one of our panel members in his presentation.

Let's look at the agenda for tonight. Hopefully you all had the opportunity to talk to the many knowledgeable experts and program officials who were

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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staffing the exhibits during the past hour. After I finish this introduction, Captain Cudnohufsky will give you a brief introduction into the Navy's activities in the Hawaii Range Complex. Captain Cudnohufsky is both the Commanding Officer of the Pacific Missile Range Facility and the Officer in Charge of the Hawaii Range Complex. Next, Mr. Neil Sheehan will brief you on the environmental impact analysis process and summarize the results reported in the Draft EIS. Mr. Sheehan is an EIS Team Leader for the Navy.

The last item on the agenda, however, is the most important. The comment period is your opportunity to provide information and make statements for the record. This input ensures that decision-makers can benefit from your knowledge of the local area and any environmental effects you think may result from the proposed action or alternatives. Keep in mind that the EIS is intended that future decision-makers will be fully informed about the environmental impacts associated with various alternatives before they decide on a course of action. Consequently, comments tonight on issues unrelated to this EIS are beyond the scope of this hearing and cannot be addressed.

To comment verbally tonight, please fill out a verbal comment card available at the Registration and

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turn it in. I will start calling on speakers in the following order: I will recognize elected officials first; then I will call on members of the public in the order in which the cards were turned in. Each person will have three minutes to speak, including public officials, organizational spokespersons, and private individuals. We want to make sure that all who wish to speak have a fair chance to be heard.

Although we will not videotape this hearing, we have a stenographer here who will be recording and making a verbatim record of everything that is said tonight. The verbatim record will become a part of the Final EIS.

If you don't feel comfortable standing up here tonight and making a statement, you have until September 17th of this year to submit a written statement for consideration in the Final EIS. Keep in mind that written comments are given the same consideration as verbal comments offered here tonight.

Now it is my pleasure to introduce Captain Cudnohufsky.

CAPTAIN CUDNOHUFSKY: Thank you, Vida.

Aloha. Good evening to all of you.

I'm Captain Aaron Cudnohufsky. I'm the Commanding Officer of the Pacific Missile Range, and I'm also the Hawaii Range Complex Coordinator. Welcome to

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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tonight's public hearing on our Draft Environmental Impact Statement for the Hawaii Range Complex.

In just a few minutes, Mr. Neil Sheehan will give a brief presentation on the draft document. I have just a couple things to say, but both he and I will keep it brief so that we can get to your comments, which is really why we're here tonight.

First of all I'd like to thank Curt Kekuna. Thank you very much for the prayer. Mahalo, Curt, and thank you for blessing the proceedings tonight and for at least letting us meet three new friends tonight.

As many of you know, the Hawaii Range Complex is a collection of significant testing and training capabilities throughout the state. The new technology that is tested here, along with the critical training that we do, is of prevalent importance and value to this nation of ours. Our sailors, Marines, soldiers, airmen, and Coast Guardsmen depend on training to hone their skills before we send them into harm's way. They also deserve the best technology our country can provide them. We owe them this much to provide the opportunity to train and be equipped with the best so we can help them keep as safe as possible. The Hawaii Range Complex contributes in both ways in providing mere training and testing of range facilities.

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At the Pacific Missile Range Facility we employ nearly 800 civilians. These are predominantly Kauai people from families that have provided generations of dedicated and capable people to our work force. It is from this talented pool that we entrust our most important work, from the management of the Missile Defense Agency support, to qualifying your nation's newly selected submarine commanders. You'll find people born and raised in Hawaii involved in each of these activities. We are the largest high-tech employer on Kauai. But what we do is just not about technology and employment. We recognize our responsibilities as stewards of a very special place. We are very proud of our accomplishments, and hopefully you'll have a chance to visit our poster station that details some of these events. We take a formal approach to our environmental management, but our success can also be attributed to input received from the community. As I stated before, Kauai families work here and they care about their environment and their surroundings.

Speaking about input from the community, that's why we're here tonight, so I'll wrap it up. I can't stress enough how important your involvement here is tonight in this effort. You have taken time from your busy lives to participate in this, and we appreciate it

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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very much. Let's make this a time to share not only our views but our respect for one another.

Mahalo.

MR. SHEEHAN: Aloha, everyone. My name is Neil Sheehan. I am the Manager for the Hawaii Range Complex Environmental Impact Statement. I'm here to discuss the findings contained in the Draft Hawaii Range Complex Environmental Impact Statement, or EIS, and Draft Overseas Environmental Impact Statement, or OEIS. This Draft EIS/OEIS was prepared by the U.S. Navy to comply with the National Environmental Policy Act and under the President's Executive Order 12114, which requires environmental analysis for activities that occur outside 12 miles from land.

This environmental study has been ongoing for several years. In order to receive public's input, the Navy conducted scoping meetings on Oahu, Hawaii, Kauai, and Maui in September of last year. Now the Navy is receiving input from the public at this Draft EIS stage of the process. The current schedule shows that the Navy can be signing a record decision in May 2008, and it's critical that the Navy decision-makers receive comments from the public. In order to help facilitate receiving comments, the Navy will be accepting comments tonight. We will also accept comments via fax, regular mail,

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e-mail, and through our website. The deadline for receiving comments is September 17th.

This Draft EIS/OEIS studies Navy training activities within the Hawaii Range Complex, as shown here. It also analyzes research, development, tests, and evaluation done by other federal agencies, to include the Missile Defense Agency. The Hawaii Range Complex consists of surface, subsurface, and special-use air space in and around the main Hawaiian Islands and is an area for which the Navy has been conducting training for many, many years. It also includes what is referred to as the temporary operating area, or TOA, which is a large area north and west of Kauai. The TOA is used for missile testing and evaluation for short periods of time. What this Draft EIS/OEIS does not do is request the use of any new air, land, or sea space. It represents current and anticipated future usage within the current footprint.

The Hawaii Range Complex is important because it's one of the largest and most used Navy range complexes in the Pacific region. It provides vast open spaces for large exercises, like the Rim of the Pacific, exercise or impact. It also provides enough air and sea space to conduct missile testing. Its central location allows for other nation's military services from North

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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and South America, Asia, and Australia to meet for training exercises. It is critical for those units stationed in Hawaii to train locally without having to travel great distances in order to remain proficient with their training. The Complex provides irreplaceable capability for the Navy to conduct essential training and testing, and this training is absolutely critical and vital for the safety of our nation's sailors and Marines, and ultimately for the well-being of our country.

The Navy has been working with many partners in drafting this EIS/OEIS; we're not doing it alone. We've sought assistance from the National Marine Fisheries Service and have worked closely with their experts in trying to quantify potential effects on marine life that may be associated with Navy training activities. Additionally, the Missile Defense Agency, the Army, Department of Energy have been partners in our efforts. Finally, we've been coordinating with experts from various state and federal agencies to ensure that impacts on the environment are identified.

This EIS/OEIS proposes to conduct current and emergent training and defense-related testing and evaluation of new technologies within the Hawaii Range Complex and to upgrade and modernize the range. The action is needed to ensure that our sailors and Marines

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are trained and that they remain at a high state of readiness and that advanced technologies are able to be tested and evaluated and ultimately available to the military. However, the majority of the training proposed and examined in this EIS/OEIS occurs out in the open ocean.

This document analyzes three alternatives, the No-Action and two Action Alternatives. The No-Action includes those training activities that currently occur in Hawaii, to include RimPac exercise and up to six undersea warfare exercises annually and typical test and evaluation activities like missile launches from the Pacific Missile Range Facility on Kauai.

Alternative 1 includes the activities and the No-Action Alternative, and additionally it cites actual impacts on the environment that might be caused by increases in Navy training in Hawaii, enhancements or improvements to exist in training facilities, upgrades for missile launches, and impacts that two aircraft carriers training together during a RimPac exercise might have on the environment.

The second alternative, the preferred alternative, includes all those activities in the No-Action Alternative and all the activities in Alternative 1 and studies of three carrier exercise and a

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

slight further increase in training and the support required for some future high-technology initiatives.

This EIS/OEIS has taken a hard look and evaluated 13 environmental resource areas, such as biological resources, cultural resources, and health and safety to determine the potential effects of ongoing and proposed activities. Additionally, the affected resource areas were analyzed in six different locations within Hawaii: Oahu, Maui, Hawaii, the Northwest Hawaiian Islands, the open ocean, and Kauai. In this DEIS, the analysis to date does not identify significant adverse impacts identified for any resource area in any geographic location within the Hawaii Range Complex that could not be mitigated. However, this document is at the draft stage, and the Navy welcomes any comments on its draft findings or its methods of analysis.

The Navy does not expect to cause harm to marine mammals, but it recognizes the potential impact on marine mammals caused by its sonar is controversial. Based upon input from the National Marine Fisheries Service and non-governmental environmental organizations, the Navy has incorporated the best available science to assess potential impacts to marine mammals caused by frequency-active sonar. This methodology is called "dose function," and it has been used by the Environmental

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Protection Agency in other environmental contexts and now is being used for the first time to assess mid-frequency active sonars' impacts on marine mammals. What this methodology cannot do is to include in its calculations all the procedures that the Navy has in place to protect mammals. These include personal training, exclusion zones for detonations, power-down and power-off procedures for the sonar when mammals are within certain distances from the sound source, and passive detection of mammals. The Navy is also working with the National Marine Fisheries Service to develop a monitoring plan that will assist our agencies in identifying possible effects on marine mammals in the main Hawaiian Islands to better assist us in future analyses.

Finally, the schedule provides for public hearings on the Draft EIS, which we're currently conducting, and also anticipates that the final decision could be made in May of 2008. As Captain Cudnohufsky said, the Navy welcomes your verbal comments now and your written comments tonight or sent in via fax, mail, e-mail, or via our website by September 17th.

Thank you very much.

MS. MOSSMAN: We are ready to begin listening to your comments. To ensure that we get an accurate record of what is said, please help me respect the following

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

ground rules.

First, please speak clearly and slowly into the microphone, starting with your name and any organization you represent.

Second, each person will have three minutes to speak. This time limit includes public officials, organizational spokespersons, and private individuals.

Third, if you have a written statement, you may turn it in at the registration table and/or you may read it out loud within the time limit.

Fourth, please honor any request that I make for you to stop speaking if you reach the three-minute time limit. To aid you in knowing when your time is almost up, my assistant will hold up a card when you have 30 seconds left. This should allow you to find a comfortable place to wrap up your comments.

Finally, please remember that no decision is being made tonight. The main purpose for the government representatives being here tonight is to learn of your concerns and suggestions first-hand.

Our first speaker in order will be, Manuel Kuloloio.

No?

Okay. How about Marti Townsend?

And Bob McDermott.

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So, Marti?

MS. TOWNSEND: Aloha. My name is Marti Townsend. I'm with Kahea, the Hawaiian Environmental Alliance.

I'm here mostly to speak to the public that's here today because it's been my experience that public comments that I give actually don't make that much difference in the final outcome.

I wanted to draw your attention to something that was in the newspaper yester -- or just today. In the Honolulu Advertiser there was an article about the Hawaiian monk seals' decline is unacceptable and how everything is being done to preserve the monk seals. There's only 1200 monk seals and they're concerned there will be less than a thousand -- which is that critical extinction number -- there will be less than a thousand in three years. And, so, NOAA and congressional leaders are putting up a lot of money and a lot of effort. They've developed a monk seal recovery plan, which took several years to develop. And we even have quotes from the Senator Daniel Inouye talking about how very important it is for the Hawaiian monk seals to be protected, wanting his grandson and granddaughter to be able to sea a monk seal, a live one, not a stuffed toy or a poster; "That's why I'm in this business. That's why I

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D-T-0036

1

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0036 (cont.)
2
3

support this. I think it's well worth it." I'm personally shocked. What we've been hearing, we're suggesting that we blow up missiles right over the monk seals' heads. I mean, the Navy seems to be in direct contradiction to the policies and goals of our congressional leaders and its administration. It's widely known that the Northwest Hawaiian Islands were designated a marine monument; and no sooner is the ink dry on that proclamation then the Navy suggests that it incorporate the entire Northwestern Hawaiian Islands into its missile range. So, I am concerned that we are dealing with a rogue military, and I call upon all the citizens here to question what are the military's motivations, what are the military's obligations to do whatever they can, do everything to abide by the policies and goals of our elected officials, the people who are representing us, that is us. If we're going to be talking about U.S. law here, a tenet of U.S. law is the fact that the U.S. military is subservient to the people, subservient to our elected officials; and the fact that they're doing things that directly contradict other policies and other efforts we're making to protect our environment and protect our culture suggest that we as citizens need to do more to step up and ensure that the Navy stays in line. I just put that out there as food

COMMENT NUMBER
D-T-0037
1
2

for thought for people here who are not part of the Navy.

Thank you very much.

MS. MOSSMAN: Bob McDermott?

MR. McDERMOTT: Good evening, everybody.

Vieques is gone. The training range that we used in Puerto Rico is gone. The only training range the United States has left to conduct these sorts of exercises is PMRF; that's it. A single missile shot on PMRF contributes anywhere between 12 and $20 million to that local economy. Most folks don't know that. It's a lot of jobs. And those jobs are held by local people, local contractors, people who live on the island and contribute to that island.

I'm going to read my written comments. Oh, by the way, I work for the Navy League. I should have told you that. But my comments are not only from the Navy League, but also as a private citizen, because I wrote this testimony and I share these views.

The Navy is well aware of the fragile environment, the possible effects of sonar, radar, and other training devices that may impact marine life. That is why when they plan exercises they avoid major mammal concentration areas whenever possible. The Navy is truly dedicated to protecting marine mammals, as evidenced by the $10 million they spend a year on marine mammal

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-T-0037 (cont.)

research; $10 million a year. And that's not their mission. Their mission is to build ships and protect us, not marine mammal research. But they spend that money in order to avoid detrimental impacts to the marine mammals.

4

There's no doubt that Navy training creates some effects to the environment. I mean, gosh, you can't take a battle group out there and not expect any water ripples or things like that. But that's just a small part of the big picture. There are many other external factors in the ocean at any given time, like eruptions, lightning strikes, super tanks; there's also many other things. These factors combined with pollution, commercial shipping, fishery entanglements, disease, parasite infection, ships striking, and other natural factors lead to a rate of approximately 3500 strandings of marine mammals every year on U.S. shores alone not caused by the Navy.

3

In conclusion, does Naval training have an impact on marine life and mammals?

Yeah, but it's negligent to a minimal extent, especially when one considers the risk/benefit ratio for our national security. The Navy is taking aggressive steps to protect our marine mammals and other sea life and avoid engagement whenever possible, exhibiting all sorts of protective measures. They have -- I mean, they

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D-T-0037 (cont.)

use all this advanced technology; and they even have a guy in front of the ship, several of them, sailors, looking to see if there's any marine mammals out there.

I can tell you from a personal standpoint the Navy is way ahead of the civilian sector as far as environmental cleanup. If you spill some fuel -- if you're out at a Navy base and you spill some fuel on the ground, they make you get a shovel, pick it up, and put it into a trash bag for disposal; they just don't leave it there.

Something funny I found out the other day --

I'm sorry.

Thank you very much.

MS. MOSSMAN: Thank you, sir.

Is Manuel M. Kuloloio here?

Do we have any more speakers?

MR. KULOLOIO: I just want to say aloha and good evening.

D-T-0038

My name is Manuel Makahiapo Kuloloio. I'm from the island of Maui and I'm happy to be here. The last time I was in McKinley I was doing an electric motor contest in my high school.

But as I walked in tonight, I wasn't going to say anything, but I heard Mr. McDermott speak and I -- I'm sure I see you write columns in the paper. I see

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0038 (cont.)

Mr. Young in the back, former DLNR chairman. Still can't figure out why it took him many months to go to Kahoolawe.

The last time I saw police officers in a public hearing was on the island of Vieques. I was sent there as part of a delegation to not only halt the bombing but to remove the military from Roosevelt Road, and I'm not going to tell you what happened.

My family history has been -- my grandma's house has been the headquarters for the Protect Kahoolawe Ohana since its inception, and I'm speaking here as an individual.

The last time you held your public scoping meeting I was very concerned because I saw a particularly disturbing trend in how the NEPA process was being conducted, especially by the Navy. The first EIS I ever read was done by the United States Navy on the island of Kahoolawe. I still have those volumes in my house. And the last one they ever had, which is many, many volumes, was mailed by you, Ms. Vida, to my home because my mentor made the last EIS for PMRF in 1998. And the many EISs I read included the transportation of spent nuclear fuel from Yucca Mountain and the like, many volumes. The disturbing trend I saw was you had no people coming up to speak in public. I love to hear people speak so I can 1

COMMENT NUMBER
D-T-0038 (cont.)

hear what they have to say and if comments and answers produced in your draft is any reflection of the questions that were asked; because when I read your draft, you had many blank pages. Your consultation comments, chapter 14, volume 3, was blank. Your comments and responses to the official agencies were blank. So, I have many concerns.

For me, coming home from the island of Nihoa on the Hokulea's first visit to the Northwest Hawaiian Islands made me feel this place was very special. Let me speak -- I'm probably the only last recognized speaker. The irony for me, having come back from Nihoa, we stopped at Kaula Rock, and it hurt my heart to see what I saw at 2 Kaula rock, to see all these unexploded ordnance, silos there, and for me it hurt. But in terms of environmental 3 stewardship, the United States Navy has not done its job on the island of Kahoolawe. And when you start off your Appendix 1 with public --

MS. MOSSMAN: Sir --

MR. KULOLOIO: -- you should be sensitive to the Hawaiian community.

MS. MOSSMAN: -- your time is up.

MR. KULOLOIO: Thank you.

MS. MOSSMAN: Thank you.

MR. KULOLOIO: I think you could do a better

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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D-T-0038 (cont.)

job; and then we could support you even more if you had done what you promised.

Thank you.

MS. MOSSMAN: Our next speaker is Kyle Kajihiro.

MR. KAJIHIRO: Aloha. Thank you for this opportunity to comment.

D-T-0039

My name is Kyle Kajihiro. I'm the Program Director for the American Friends Service Committee.

I will submit written comments, but I just have some initial thoughts I'd like to share.

First, we requested that this Draft EIS include all the scoping comments, including transcripts, in order to assure the accuracy of the information that was in there, and I don't see any of those. Please include those. 1

I think, second, there's a fallacy in the assumption that the baseline is somehow acceptable and that the need is somehow beyond scrutiny. And I point out the fact that national missile defense deployment is actually exacerbating tension with Russia and China and it's increasing the level of insecurity in our region, and that is not addressed in this EIS. It's just assumed that that's the way we need to go. 2 3

Also, that the baseline assumes that the level of activity is somehow acceptable and it's only

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D-T-0039 (cont.)

considering the increases. I would argue that the cumulative effects historically, and combined with everything else that's happening in Hawaii, is already an unacceptable burden that the people of Hawaii have to bear. 4

This EIS, for all of its many pounds of paper that it uses, has very little in the way of actual analysis, aside from the analysis of the marine -- the impacts of marine mammals and sonar. I don't see -- I see very little original analysis of impacts. For example, you list 12 pages of cumulative impacts that -- many of which are additive to other activities, but there's no analysis about how these combined effects are really playing out in the community. 5

Second, you say that there's no -- there's no listing of -- I would like you to list the accidents, an analysis of what types of accidents have happened over the years of RimPac and -- 6

Socioeconomic impacts, there's a deficiency in that you claim there's a benefit, but you don't look at cost, such as the rising cost of housing. 7

When Navy personnel receive subsidies for housing, how does that affect the price of housing for local residents who do not receive such a subsidy?

Secondly, during the analysis of the efficiency

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0039 (cont.)

of the military economy, you talked about the missile shots.

How much of that money actually leaps out into our economy?

8

Third, prostitution. We requested that the impact of large numbers of military personnel in the community will drive up the level of prostitution.

9

Research development and testing and -- the RTD&E, please include a description of whether these are earmarks and the program elements of their funding appropriation in the defense budget, because I think that some of these you mention -- cooperative engagement capability and some of these -- are networks and welfare programs that are pretty much driven by earmarks; so, that would tell me that these are not exactly driven by military necessity.

10

And, finally, you don't describe some of these events and weapons and directed energy at all, so --

MS. MOSSMAN: Sir, your time is up.

MR. KAJIHIRO: Thank you.

MS. MOSSMAN: Thank you.

Do we have any more speakers?

We'll take a 10-minute recess.

(Recess from 6:42 P.M. to 6:52 P.M.)

MS. MOSSMAN: We're back from recess.

We have no speakers at this time, so we'll be here until 9:00. If there are any other speakers who want to come up, we'll resume this hearing.

Thank you.

(Recess from 6:53 P.M. to 9:00 P.M.)

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COMMENT NUMBER

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

C E R T I F I C A T E

STATE OF HAWAII)
) SS.
CITY AND COUNTY OF HONOLULU)

I, LESLIE L. TAKEDA, RPR, CSR No. 423, do hereby certify;

That on August 23, 2007, commencing at 6:02 P.M., the proceedings was taken down by me in machine shorthand and was thereafter reduced to typewritten form under my supervision; that the foregoing represents, to the best of my ability, a true and correct transcript of the proceedings had in the foregoing matter.

I further certify that I am not an attorney for any of the parties hereto, nor in any way concerned with the cause.

DATED this 5th day of September 2007, in Honolulu, Hawaii.

____

LESLIE L. TAKEDA, RPR, CSR No. 423

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HAWAII RANGE COMPLEX

DRAFT ENVIRONMENTAL IMPACT STATEMENT/

OVERSEAS ENVIRONMENTAL IMPACT

STATEMENT (EIS/OEIS)

AUGUST 27, 2007

Baldwin High School

1850 Kaahumanu Avenue, Wailuku, Maui, Hawaii

BEFORE: SANDRA J. GRAN, CSR NO. 424
Registered Professional Reporter

RALPH ROSENBERG COURT REPORTERS, INC.
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Speaker List:

Chaplain Kahu Kalani Wong
Vida Mossman
Captain Aaron Cudnohufsky
Neil Sheehan
Jeff Panturhoff
Mike Moran
Stephany Cecil
Christiaine Douglas
Howard Sharpe
Thomas Neakagawa
Robert Roggpisch
Frances Pitzer
Holme Le'almohala
Julian Castelbuono
Brooke Porter
Faith Rose
Ken Rose
Hugh Starr
Bruce Douglas
Kahu Charles K. Maxwell, Sr.
Les Kuloloio, Protect Kahoolawe Ohana
David Jimenez
Anita Wintner
Manuel Kulaoio
Lisa Messenger
Amber King
Jasmin Asis
Nicole Carbonel
David Bayly
Eli Sheetz
Kristin McCleery
Helen A. Schonwalter
Summer Starr
Keoki Ramond
Mary Broode
Christine Nonnemacher
Pauahi Hoohana
Samuel Peace Eagle Dolphin
Akahi Wahine

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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P R O C E E D I N G S:

MS. MOSSMAN: Aloha and good evening, everyone. Thank you very much for coming tonight. We really appreciate it. Before we get started, I would like to introduce and invite Kahu Kalani Wong, Chaplain, Kamehameha Schools, Maui Campus, to offer a pule. Kahu.

CHAPLAIN WONG: (Hawaiian.) Please join me in prayer. We thank you, God, for this day, a day to come forward and hopefully discuss. We recognize the words of your psalm: "Hear the Lord throughout the world that they as well know your word." With that in mind, we recognize our responsibilities as stewards of this earth, as those who are charged with the path and care of all that's before us. We are creative owner of all the creatures, include protect ourselves and all that is in the seas, land and air.

As we gather with God, we open our minds to hear the questions that go back and forth both ways. Almighty God, we ask that you show your voice and guide us this evening through the words from our mouths and state of our hearts under your holy sight.

Again, oh, God, we thank you for that time to come forward and to ask for your guidance in this evening and through the process that all goes on that as we care for this place, we care for you. We ask all these things. Amen.

MS. MOSSMAN: Thank you, Kahu.

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This is a public hearing on the Draft Environmental Impact Statement for the Hawaii Range Complex. I'm Vida Mossman and I will be the moderator for tonight's meeting.

This hearing is being held in accordance with provisions of the National Environmental Policy Act and implementing regulations. The act requires federal agencies to analyze the potential environmental impacts of certain proposed actions and alternatives, and to consider the findings of those analyses in deciding how to proceed.

The purpose of tonight's hearing is to receive your comments and suggestion on the Draft EIS. Those of you not had an opportunity to review the Draft EIS may want to read the summary of the major findings in the handout available at the registration table. Those findings will also be summarized briefly by one of our panel members in this presentation.

Let's look at the agenda for tonight. Hopefully, you all had the opportunity to talk with many knowledgeable experts who were staffing the exhibits during the past hour. After I finish this introduction, Captain Cudnohufsky will give a give brief introduction to the Navy's activities in the Hawaii Range Complex. Captain Cudnohufsky is both the commanding officer of the Pacific Missile Range Facility and the officer in charge of the Hawaii Range

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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Complex.

Next, Mr. Neil Sheehan will brief you on the environmental impact analysis process and summarize the results reported in the Draft EIS. Mr. Sheehan is an EIS team leader for the Navy.

The last item on the agenda, however, is the most important. The comment period is your opportunity to provide information and make statements for the record. This input ensures that decision makers can benefit from your knowledge of the local area and any environmental effects you think may result from the proposed action or alternatives.

Keep in mind that the EIS is intended to ensure that future decision makers will be fully informed about the environmental impacts associated with the various alternatives before they decide on a course of action. Consequently, comments tonight on issues unrelated to this EIS are beyond the scope of this hearing and cannot be addressed.

To comment verbally tonight, please fill out a verbal comment card available at the registration table and turn it in. I will start calling -- I will call on speakers in the following order: I will recognize elected officials first, then I will call on members of the public in the order in which the cards were turned in.

Each person will have three minutes to speak,

including public officials, organizational spokespersons and private individuals. We want to make sure that all who wish to speak have a fair chance to be heard. Although, we will not videotape this hearing, although others are videotaping tonight, we have a stenographer here who will be making a verbatim record of everything that is said tonight. This record will become a part of the final EIS.

If you don't feel comfortable standing up here tonight and making a statement, you have until September 17th of this year to submit a written statement for consideration in the Final EIS. Keep in mind that written comments are given the same consideration as verbal comments offered here tonight.

It is now my pleasure to introduce Captain Cudnohufsky.

CAPTAIN CUDNOHUFSKY: Thank you, Vida.

Aloha and good evening to all of you. I'm Captain Aaron Cudnohufsky, commanding officer of the Pacific Missile Range Facility and the Hawaii Range Complex Coordinator.

Welcome to tonight's public hearing on our Draft Environmental Impact Statement for the Hawaii Range Complex. In just a few minutes Mr. Neil Sheehan will get up and present a brief presentation on the draft document. I have just a few things to say, but I promise both Neil and

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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myself will keep our comments short so that we can get to the important part here tonight, which are your comments.

First I would like to thank Kalani Wong for that wonderful prayer. I appreciate it. Thank you for blessing the proceedings here tonight.

I would also like to acknowledge Francis Gout from the mayor's office for joining us here this evening as well.

As many of you know, the Hawaii Range Complex is a collection of significant testing and training capabilities throughout the state. The new technology that is tested here, along with the vital training that is conducted, is of incredible importance and value to our nation. Our sailors, marines, airmen, Coast Guardsmen and soldiers depend on the training to hone their skills before we send them into harm's way. They also deserve the best technology our country can provide them. We owe them this much: The opportunity to train, to be equipped -- and to be equipped with the best so that we can help them keep safe as possible and protect our freedom. The Hawaii Range Complex contributes in both ways, providing premier training and testing range facilities.

At the Pacific Missile Range Facility we employ nearly 800 civilians. These are predominantly Kauai people from families that have provided generations of

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dedicated people to our work force. It is from this talented pool that we entrust our most important work: From management of our Missile Defense Agency programs, to qualifying our nation's newly selected submarine commanders. You'll find people born and raised in Hawaii and on Kauai involved.

We are the largest high tech employee on -- employer on Kauai. But we -- what we do is just not about technology and employment. We recognize our responsibility -- responsibilities as stewards of a very special place. We are very proud of our accomplishments. And, hopefully, you've gotten to see and talk to our folks at the poster stations about our environmental stewardship.

We take a formal approach to our environmental management, but our success can also be attributed to the input we receive from the community. And as I have stated before, Hawaii families work here and they really do care about their environment.

Speaking of input from the community, that's why we're really here tonight, so I'll wrap up my part here. I can't stress enough how important your involvement and your being here is tonight. You have taken the time from your busy lives and from your jobs to participate in this democratic process, and we really do appreciate that.

So let's make this a time to share not only

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our views, but our respect for one another. Mahalo. Thank you.

(Applause.)

MR. SHEEHAN: Good evening, everyone. My name is Neil Sheehan and I am the project manager for the Hawaii Range Complex Environmental Impact Statement. I'm here to discuss the findings contained in the Draft Hawaii Range Complex Environmental Impact Statement or EIS, and the Draft Overseas Environmental Impact Statement or OEIS.

This Draft EIS/OEIS was prepared by the US Navy to comply with both the National Environmental Policy Act and President's Executive Order 12114, which requires environmental analysis for activities that occur outside of 12 miles from land.

This environmental study has been ongoing for several years. In order to receive the public's input, the Navy conducted public scoping meetings on Oahu, Hawaii, Kauai and Maui in September of last year. Now the Navy is receiving input from the public at this Draft EIS stage of the process. The current schedule shows the Navy could be signing a record of decision in May of 2008, and it's critical that the Navy decision makers receive comments from the public. In order to help facilitate receiving comments, the Navy will be accepting comments tonight. The Navy will also accept comments via fax, regular mail, e-mail and

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through the website. And as stated earlier, the deadline for receipt of comments is September 17th.

This Draft EIS/OEIS studies Navy training activities within the Hawaii Range Complex as shown here. It also analyzes research, development, test and evaluation of new technologies done by other federal agencies.

The Hawaii Range Complex consists of surface, subsurface and special use airspace in and around the main Hawaiian Islands and is an area in which the Navy has been conducting training for many decades. It also includes what is referred to as the Temporary Operating Area or TOA, which is a large area north and west of Kauai. The TOA is used for missile testing and evaluation for very short periods of time.

What this Draft EIS/OEIS does not do is request the use of any new air, land or sea space. It represents current and anticipated future usage within the existing footprint.

The Hawaii Range Complex is important because it is one of the largest and most used Navy range complexes in the Pacific region. It provides vast open spaces for large exercises like the Rim-of-the-Pacific Exercise or RIMPAC. It also provides enough air and sea space to conduct missile testing. Its central location allows for other nations' military services from North and South America, Asia

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

Wailuku, Hawaii

and Australia to meet for training exercises.

It is critical for those units stationed in Hawaii to train locally without having to travel great distances in order to remain proficient with their training. The complex provides irreplaceable missile capacity for the Navy to conduct essential training and testing. And the training is absolutely vital for the safety of our nation's sailors and marines and ultimately for the well-being of our country.

The Navy has not been in this alone. It has been working with many partners in drafting this EIS/OEIS. We have sought assistance from the National Marine Fishery Service and have worked closely with their experts in trying to quantify the potential effects on marine life that may be associated with Navy training activities. Additionally, the Missile Defense Agency, the Army and Department of Energy have been partners in the Navy's efforts. The Navy has also been coordinating with experts from various state and federal agencies to ensure that impacts on the environment are identified.

This Draft EIS/OEIS proposes to conduct current and emerging training and effectuate testing and evaluation of new technologies within the Hawaii Range Complex and to upgrade and modernize the range. The action is needed to ensure that our sailors and marines are trained

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and that they remain in a high state of readiness and that advanced technologies are able to be tested and evaluated and ultimately available to the military. The majority of the training proposed and examined in this EIS/OEIS occurs out in the open ocean.

This document analyzes three alternatives: The no action and two action alternatives. The no action includes those training activities that occur -- currently occur in Hawaii, to include the RIMPAC Exercise and up to six Undersea Warfare Exercises annually and also includes typical test and evaluation activities like missile launches at the Pacific Missile Range facility on Kauai.

Alternative One includes the activities in the no action alternative and additionally it studies the potential impacts on the environment that might be caused by increases in Navy training in Hawaii. It studies enhancements or improvements to existing training facilities, upgrades for missile launches, and impacts that two aircraft carriers participating in a RIMPAC Exercise would have on the environment.

Alternative Two, which is the preferred alternative, includes all the activities from the no action alternative and alternative one and studies a three carrier exercise, a slight further increase in training and support for some future high technology initiatives.

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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The Draft EIS/OEIS evaluated 13 environmental resource areas, such as biological resources, cultural resources and health and safety to determine the potential impacts of ongoing and proposed activities. Additionally, the affected resources areas were analyzed in six different locations within Hawaii: Oahu, Maui, Hawaii, Northwest Hawaiian Islands, the open ocean and Kauai.

In this EIS, the analysis to date has not identify significant adverse impacts for any resource area in any geographic location in the complex that could not be mitigated. However, this document is at the draft stage and the Navy welcomes any comments on its draft findings or its methods of analysis.

The Navy does not expect to cause harm to marine mammals, but it recognizes the potential impact on marine mammals caused by its use of sonar is controversial. Based upon input from the National Marine Fishery Service and nonenvironmental organizations, the Navy has incorporated best available science to assess potential impacts to marine mammals caused by mid-frequency active sonar. This methodology is called dose function and it's been used by the Environmental Protection Agency in other environmental contexts. And now it's being used for the first time to assess mid-frequency active sonar's impacts on marine mammals.

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And what this method cannot do yet is to include in its calculations all the procedures that the Navy has in place to protect marine mammals. These include personnel training, exclusion zones for detonations, power down or power off procedures and requirements for the sonar when the mammals are within certain distances of the sound source, and, finally, it does include passive protection of mammals.

The Navy is also working with the National Marine Fishery Service to develop a monitoring plan that will assist our agencies in identifying potential effects on marine animals in the main Hawaiian Islands to better assist in future analysis.

The schedule provides for four public hearings, and this is our third -- we go to Big Island on Wednesday -- on this Draft EIS which it is currently conducting and also anticipates the final decision being made in May of 2008.

The Navy welcomes your verbal comments now, and your written comments tonight or sent in via fax, regular mail, e-mail or via the website by September 17th.

Thank you.

(Applause.)

MS. MOSSMAN: We are ready to begin listening to your comments. To ensure that we get an accurate record

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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of what is said, please help me respect the following rules:

First, speak clearly and slowly into the microphone starting with your name and any organization you represent.

Second, each person will have three minutes to speak. This time limit includes public officials organizational spokespersons and private individuals.

Third, if you have a written statement, you may turn it in at the registration table and/or you may read it out loud within the time limit.

Fourth, please honor any requests that I make for you to stop speaking if you reach the three-minute time limit.

To aid you in knowing when your time is almost up, my assistant will hold up a card when you have 30 seconds left. This should allow you to find a comfortable place to wrap up your comments.

Finally, please remember that no decision is being made tonight. The main purpose for the government representatives being here is to learn of your concerns and suggestions firsthand.

Our first five speakers in order will be: Jeff Panturhoff, Mike Moran, Stephany Cecil, Christiaine Douglas and Howard Sharpe.

Jeff. Jeff, are you here?

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MR. PANTURHOFF: Yes. D-T-0040

MS. MOSSMAN: Okay.

MR. PANTURHOFF: Am I okay to go ahead and start?

MS. MOSSMAN: Yes.

MR. PANTURHOFF: Good evening. My name is Jeff Panturhoff and I'm the president and founder of the Whale Foundation and a founding member of the International Ocean Rights Coalition which represents millions of members worldwide. I'm also a Humpback Whale researcher researching impacts on Humpback Whales working with Dr. Marcia Green in the four island area for more than ten years now.

I, along with our collective members, am very concerned about some of the findings published in the Draft Environmental Impact Statement, or DEIS as it's referred. The DEIS states the Navy will expose whales in the Hawaiian 1
waters including endangered Humpback Whales to levels up to 195 decibels. This statement is not simply untrue, it is blatantly false. There is not adequate science to back this up. The results of our own research as well as extensive 2
studies by other scientists, including the Navy's own research, show that whales start avoiding sounds between 120 to 125 decibels and that exposure to loud sounds over 150 decibels can have deadly consequences.

The only scientific experiment that I can 3

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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D-T-0040 (cont.)

find that literally exposes whales to 195 decibel sounds were the ATOK trials off Pioneer Sea Mounds where three Humpback Whales subsequently stranded and died, the first ever recording of such an incident in that area.

4 The US Navy, NMFS and the US Marine Mammal Division all admit that exposure to active sound sources such as active sonar could kill and does kill whales, including commercially viable fish stocks. There is no argument here, just plenty more evidence in the wake of recent mass strandings in the Florida Keys, North Carolina in 2005, Hawaii during RIMPAC 2004, the Canary Islands in 2004 as well, Washington State 2003, Madeira 2000, Greece 1996, and the most infamous, the Bahamas strandings in 2000.

5 The Navy in the EIS admits to sonar being the causation or the causative factor in five of these cases, including the Bahamas, yet also in the EIS the Navy concluded that it's safe to expose whales in Hawaiian waters to levels up to levels of 195 decibels, even though the deadly level in the Bahamas' case was shown to be somewhere between 150 and 160 decibels. To date, there is not one scientific study that concludes that exposing whales to active sonar at 195 decibels is safe, not one, yet this is what the EIS concludes.

6 What the US Navy is trying to do in this EIS is very similar to the tobacco industry. This EIS is full of

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D-T-0040 (cont.)

tobacco science. You can expect to get the results that one pays for since the Navy funded the science that's in this EIS. Al Gore drove this point home in "The Inconvenient Truth." The Navy in "The Inconvenient Truth" said active sonar kills marine life, and yet they still try to blur and alter the facts.

And the Navy is -- The only ocean state, Hawaii's economic security is at stake here.

MS. MOSSMAN: Thank you. Your time is up.

MR. PANTURHOFF: Okay. Thank you.

MS. MOSSMAN: Thank you.

(Applause.)

MS. MOSSMAN: Thank you very much.

Please remember, we've got a court reporter here. Speak slowly so she can get it all down.

Michael Moran.

D-T-0041 MR. MORAN: Aloha. My name is Michael Moran and I'm just speaking -- Excuse me. Get the mike closer. Obviously I'm not very professional speaker.

Aloha. My name is Mike Moran and I'm just speaking as a private citizen this evening.

The Navy is often called the steward of the sea, but they are not living up to that title. Proposing to conduct active mid-range sonar exercises throughout the Hawaiian Islands near shore waters, home of numerous

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER D-T-0041 (cont.)

endangered species including the Pacific Humpback Whale, Hawksbill turtles, as well as the critically endangered Hawaiian monk seal and numerous other species that are found only in these waters smacks of outlaws rather than stewards.

Countless examples of death and injury to various types of whales and dolphins in close proximity of location of prior sonar testing certainly leads to the conclusion that the use of this weapon should not be done here. In past years various island waters throughout the world have experienced whale strandings including, but not limited to the Canary Islands, the Virgin Islands, the offshore islands of North Carolina, our own island of Kauai, the Bahamas, the Greek islands are all points of active sonar use at the time of the strandings. The Navy's own EIS admits to sonar being causative in many of these cases.

1 — Under these circumstances, why would the Navy be in our islands -- The keyword is islands. This is where they have all these problems -- again to conduct some 1,145 exercises? Remember, these are just some of the reported cases where the evidence is found. How many of these creatures are killed and injured or simply sink to the bottom undetected?

Just this year in my hometown of Kihei only a few miles from here a whale beached on our shores. While the necropsy has not been completed, it's worthy to note that the

COMMENT NUMBER D-T-0041 (cont.)

Navy was conducting exercises in the area at the time.

2 — Remember, this area is part of the Hawaiian Islands Humpback Whale National Marine Sanctuary, the new National Marine Monument in the area of the Northwest Hawaiian Islands is also included in this Hawaiian Range Complex.

3 — Ocean noise also impacts humans in all water activities including swimming, snorkeling and diving. The Navy restricts its own divers when they are conducting sonar tests, yet the Navy will not advice where or when they are conducting specific exercises. Who is looking out for us? Something to think about when you go into the water.

Stewards or outlaws?

Mahalo.

(Applause.)

MS. MOSSMAN: Stephany Cecil.

D-T-0042 — MS. CECIL: Hi. My name is Stephany Cecil. I'm just a concerned citizen of Hawaii and the United States. I would like to start out by thanking each and every one from the Navy for being here, to the scientists that are here. Everybody is so passionate about what you're doing and I really feeling like you're informed. I just really appreciate where you guys are coming from and appreciate the hard work that you put into your jobs. But I would also like to start out with just some facts that I have access to as just a citizen of the United States.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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D-T-0042 (cont.)

[1] Fact No. 1 is the scientific community of the United States, international people and the US Navy both agree that active sonar levels of 150 to 160 decibels killed whales in the Bahamas, Greece, Madeira and the Canary Islands.

[2] Fact No. 2, active sonar testing off the Hawaiian Islands caused a mass evadement of whales at Hanalei Bay in Kauai and the death of at least two whales, one of which washed ashore about three miles from my home in Kihei.

[3] Fact No. 3, if the federal government has passed laws that protect endangered and threatened marine species and have several standards in place for the responsible treatment of their habitats.

Fact No. 4, many US and international scientific communities have extensive research data on oceanic noise pollution and its effect on marine biodiversity, specifically the cetacean populations.

No. 5, the US Navy has full access to and has read and understood this scientific research that we all have access to.

[4] The United States Navy is proposing sonar war games in the coastal waters of Hawaii, an area of the world with vast numbers of endangered marine species and cetacean life, and will conduct these tests using decibels levels well over 200.

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D-T-0042 (cont.)

[5] With these six facts stated, you, the US Navy, are asking the people of Hawaii to support you in breaking federal law, killing endangered marine mammals, upsetting our delicate and already threatened marine biodiversity, and denying our future generations their right to a rich marine world all for the sake of quite plainly testing a new toy that you spent billions of dollars on. I'm here to tell you that the citizens of Hawaii will not ever, ever support you in such destructive activities.

(Applause.)

[6] MS. CECIL: How can we be seen as a model of democracy if our own government breaks the laws of its citizens. And how can we claim to be the world leader of peace if we do not respect all life and its right to live. Command with wisdom, not weapons.

(Applause.)

MS. MOSSMAN: Thank you very much.

In order for the speaker to be heard, I would really appreciate it if you held your applause until he or she was done. Thank you.

UNIDENTIFIED SPEAKER: We'll certainly try.

MS. MOSSMAN: Thank you.

Christiaine Douglas.

[D-T-0043] MS. DOUGLAS: I am here today to express my concern about the Navy's intention to use high-intensity,

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

Wailuku, Hawaii

COMMENT NUMBER D-T-0043 (cont.)

1 mid-frequency active sonar in Hawaiian waters. There is evidence from previous use of Navy sonar that whales have been killed by sonar of 160 decibels. The Navy has the intention to expose whales to sonar thousands times louder that and more. That is a death sentence.

The Navy should not be allowed to use sonar

2 anywhere close to the Hawaiian Islands. Ironically, the next sonar practice is planned for November, coinciding with the return of the whales to the Hawaiian Islands, just in time for the mating season of the whales and the main tourist season. Some of us suspect that the reason must be that the whales provide free experimental targets, or does the Navy similarly not care?

We all know that with the increasing levels of pollution it has become more and more challenging for many species of sea creatures to survive. And recent studies speak about fact that we have already lost 80 percent of the large fish and 80 percent of the krill, which are at the bottom of the ocean animal food chain and many other fish and mammals, such as the Blue Whale, rely on as a food source.

We're being warned over and over that our food supply is shrinking. There are articles in the newspaper stating that the planet is dying. It certainly will be if we keep pushing in that direction with careless behavior.

COMMENT NUMBER D-T-0043 (cont.)

3 Why does the Navy declare itself exempt from the Marine Mammal Protection Act if it doesn't plan to harm sea mammals? And what could be the advantage of doing so?

The Navy's actions show that it does not want to study the effects of sonar and really find out the collateral damage of its war games. Is it carelessness, lack of love of life, fear of an enemy? It seems like with the

4 fear of one we have become our own enemy. The unregulated use of Navy sonar represents an attack on the future of the American people by jeopardizing tourism in Hawaii, the future of our food supply and an attack on our possibility of living healthy lives since human beings are susceptible to the destructive force of sonar as well.

The Navy likes to reason that it needs to use sonar to guarantee safety for the country. I'd like to point out that if we don't even need an enemy -- that we don't even need an enemy if we self-destruct and our actions result in our losing our food sources and ecological and economic

5 balance. Not to be concerned about the well-being of our people, animals, plants and natural environment is self-destructive and suicidal.

At this time we need to take a stand for life and cooperate to heal what meets our health and protect our environment.

Thank you.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

(Applause.)

MS. MOSSMAN: Thank you very much for holding your applause. Mahalo.

Mr. Howard Sharpe.

D-T-0044

MR. SHARPE: Aloha, everyone. I'm Howard Sharpe representing myself. I am totally against the Navy's war games in Hawaiian waters, especially the ear-piercing

1

sonar side of it. Our marine birds and mammals have bellies full of plastic. Having their brains blown and blasted by sonar is the ultimate insanity of man's inhumanity to nature. I consider it a criminal act.

In my opinion, our Navy is overprepared and

2

our greatest enemy is ourselves. I'd like to see their future efforts in cleaning up and preventing further toxic waste and finding workable solutions to the innumerable problems facing our oceans. Remember, water and air flows freely everywhere and pollution elsewhere eventually reaches here. Mahalo.

(Applause.)

MS. MOSSMAN: The next five speakers are: Thomas Neakagawa, Robert Roggpisch, Frances Pitzer, Holme Le'almohala and Julian Castelbuono.

Mr. Thomas Neakagawa.

D-T-0045

MR. NEAKAGAWA: Aloha. My name is Thomas Neakagawa and I represent myself.

COMMENT NUMBER
D-T-0045 (cont.)

Thank you for being here tonight and being concerned that our environment is being subjected to some pollution.

I was born and raised here on Maui. I am here tonight to voice my concern and objection to the use of mid-frequency sonar testing proposed by the United States Navy. Ours is an ocean planet. Hawaii is a unique, isolated environment in the middle of the ocean. I am here to raise my voice for those voices that go unnoticed, the citizens of our oceans from the majestic Blue Whale and countless species documented, and yet -- and those yet to be discovered to the microscopic single cells and the larvae of the ocean animals.

1

The ocean is full of life sounds. Man-made noise pollution from supertankers, compressed air cannons and now 165-decibel sonar cause those marine animals distress. There is a kill zone which will result in the immediate death of organisms. And like a nuclear weapon, a larger zone of injury and disability which can ultimately result in a lingering death.

2

The proposed use of sonar within the Hawaiian Island Humpback Whale National Marine Sanctuary and the Northwest Hawaiian Island Archipelago endanger or disrupt normal marine behavior, breeding and calving for the Humpback Whales and unknown effects on the endangered Hawaiian monk seals and Hawksbill turtles. Countless fishes and

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-T-0045 (cont.)

3

invertebrates will also suffer the effects of this super-boom box.

4

Please consider the serious impact of the proposed testing not only on the ocean life, but Hawaii's economy. If the whales desert the Hawaiian Islands Humpback National Marine Sanctuary waters, if the reefs are sonically clean of life, if the fishes are driven from their habitat, we lose many of those valuable tourist resources.

5

Our fish populations are on the decline. Tunas, sail fish and whale sharks also are affected by the noise, possibly disturbing migration, breeding and spawning activities.

6

Observations worldwide seem to link high power sonar with marine strandings. Those are the visible effects. What about the organisms that we do not see below the water?

Additional research on the effects of high power sonar for the marine environment is needed before we release the hounds of hell. Thank you.

(Applause.)

MS. MOSSMAN: Robert Roggpisch.

D-T-0046

MR. ROGGPISCH: Thank you for holding this meeting. I have to take my glasses off. I don't have any written testimony. What I have to say is that the Navy has no jurisdiction here. This is the Kingdom of Hawaii.

UNIDENTIFIED SPEAKER: That's right.

UNIDENTIFIED SPEAKER: Amen.

COMMENT NUMBER

D-T-0046 (cont.)

MR. ROGGPISCH: What? Oh.

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So, anyway, you have no jurisdiction here. Your jurisdiction is because you came here and stole it. And now you're killing more local fish than have been killed already.

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The Kanaka Maolis are the ones who should be talking here, not me. It's their nation. It's not these people -- Well, some people are from there, but it's not anybody other than Kanaka Maolis country. And Americans don't have no business here, and certainly the United States Navy doesn't have any business. They created this whole process trying to establish the Spanish-America War, you know. And I don't want to talk too long, but I found in 1898 that the senate rejected statehood -- not statehood, but territorial annexation. And it's never heard of, you know. How did it -- If the senate voted for annexation and the Kanaka Maolis voted not to have statehood, how did Hawaii get run over? They just run over and do it anyway.

And there's one other thing I think that every citizen -- it's the duty of every citizen to question whether an agency of their government is working within the bounds of their authority. And when German citizens said that, "We weren't doing it. We were just doing our jobs," well, that's what you're doing. And I tell you, you're committing a crime against humanity. Thank you.

(Applause.)

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

MS. MOSSMAN: Frances Pitzer.

D-T-0047

MS. PITZER: Aloha. I'm Frances Pitzer. I'm speaking on behalf of myself and all of those who cannot speak including the wildlife, the marine life, the creatures of the air and the land. We're here as guests. And I fully agree with the gentleman before me in so many regards.

So many things I planned to say have already been said, so I want to focus on the EIS, the Draft EIS that was put out. I'm confused and I'm concerned about many of

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the things that I read in there. What does, quote, "impacts minimized," end quote, mean on the EIS summary? You don't indicate the impacts for us to be able to determine whether or not them being minimized is going to be an acceptable choice.

Some marine life descends to the ocean floor upon death, so it's impossible to ascertain the effects of using sonar on marine life. If the sonar affects the abilities of marine life, any subsequent injury or death will never be correlated to the real cause, which is a loss of hearing.

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Under the Water Resources Area on this Draft Environmental Impact Statement, how can discharges and

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emissions not affect water resources? How can the use of hazardous material and waste have, quote, "no impact," end quote, when deposited on the ocean floor? What is, quote,

COMMENT NUMBER

D-T-0047 (cont.)

4

"take authorization"? It's not defined, so I don't know what that means when that's referenced there. I suppose in the longer draft impact it's defined, but it's not on that summary sheet that I could see.

5

Under Biological Resources how can debris not harm species? Quote, "Critical habitat will be avoided where possible." "Minor local life impacts to fish at a few locations, end quote. And I skipped some, there's words in between. My question is: How can all fish and all marine life and all cultural resources located under the water not be adversely affected rather than being, to use your terminology, "extremely low probability of being affected"?

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"The short-term startle effect to birds are possible." That's your quote. Do we not know long-term effects? And of course they're going to be startled.

Okay. I have 30 seconds. So in conclusion, I'm against the use of sonar and the war games everywhere,

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not just here in Hawaii. Kahoolawe still isn't restored from prior military activities and I cannot support more military activities in this area. There's still ordnance around the coast of Oahu.

9

You say the military deserves this. Well, who worries about what marine life deserves? I want to keep our country's military safe as well, but not at the expense of our marine life and environment. Hawaii is a territory of

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER D-T-0047 (cont.)

the United States and has had enough abuse to its lands, waters, people, cultural practices and sites and wildlife of the ocean, air and lands. As we say here, 'nuff already. Personally, I'd rather see these money used to help New Orleans recover and to clean up Kahoolawe. Thank you.

(Applause.)

MS. MOSSMAN: Holme Le'almohala.

D-T-0048

MR. LE'ALMOHALA: Aloha. My name is Holme Le'almohala. I represent the mothers and fathers who are concerned about the viability of a peaceful future for our sons and daughters, and myself.

Aloha, Captain Cudnohufsky. Thank you very much for being here. I appreciate it. Neil, I didn't get your last name, but thanks, Neil.

The kiosks and the data presented here reflect a degree of comprehension of the concerns of the community. And this gathering is being held in the spirit that is similar to the Hawaiian conflict resolution method called hooponopono. For that I'm very grateful. I appreciate your presence. I see that our military along with our government and public concerned offices are taking steps to improve their standards of stewardship and such displays give us cause for hope.

In the interests of nurturing these hopes, I would like to offer these entities an option for your next

COMMENT NUMBER D-T-0048 (cont.)

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step. The umbrella of justification for authorized takes, which is the startling or killing of marine animals, comes under the umbrella of national security. And I have to say that the allure of war as being something winnable is an archaic concept.

And to explain this I would like to offer a parable. Once upon a time long, long ago there were two guys that carried a couple clubs. And for the sake of reference, we'll cull them Unc and Ugg. They were having an argument. Unc wanted to go this way, Ugg wanted to go that way. Unc had a great idea. "I think I'll bash Ugg over the head." And he did and Ugg stopped arguing with him and he won the argument. And I call this the Neanderthal problem-solving method.

And nowadays that methodology hasn't really come a long way. We have wonderful minds that have created a wonderful society. We have wonderful minds like Newton, Einstein, Gandhi, Martin Luther King. And they've all given us wonderful, wonderful directions to steer our lives in the hopes of peaceful conflict resolution.

In the names of our sons and daughters and your sons and daughters, I ask, please, put this a little higher on your list of priorities for what you do with your life, because it will make a very big difference. Mahalo Nui. Aloha.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

(Applause.)

MS. MOSSMAN: After Julian Castelbuono speaks, the next five will be: Brooke Porter, Faith Rose, Ken Rose, Hugh Starr and Bruce Douglas.

Julian.

D-T-0049

MS. CASTELBUONO: Hello. I don't have a

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speech. I don't have any mind-blowing statistics of how many whales were beached. I' simply an aloha mana card reader. And so I can talk to you about what dolphins and whales represent, basically.

Dolphins represent mana. They're mammals, but they live in the water, so they need to come up for air. So mana is finding your power center through breathing. And basically aloha represents love, which is from the breath of the cosmos and Mother Earth, the creator. The whale represents the record keeper of the Goddess of all history that was before we took off with our opposable thumbs and started building on top of ourselves.

Whales and dolphins and people were once the same and whales went back into the ocean and we went on the land and developed opposable thumbs and we stayed here and built. So I do know that it creates a dangerous metaphor when we are killing the whales and the dolphins, because it essentially means that we are suffocating the belongings of Mother Earth and we're taking away the story of us doing that

COMMENT NUMBER

D-T-0049 (cont.)

by killing off the whales.

So I would ask us to consider whether we would have Mother Earth not breathe and then lie to her and say that we didn't do it in the first place and we don't know what the problem is. I think it's -- we're treading on dangerous water and I think that global warming is enough of a warning, but this is just insane. This is insanity. And that's all I have to say. Aloha.

(Applause.)

D-T-0050

MS. PORTER: Aloha. Good evening. My name is Brooke Porter and I'm representing myself and Pacific Whale Foundation tonight.

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First off, we are very concerned about the need for a take authorization and this Draft EIS recommends a take authorization based on the current frequency of strandings. This in and of itself directly admits a link of

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sonar to strandings. Previous research demonstrated Humpback Whales are often beached during sonar transmissions and it stated that the song of whales are interrupted for tens of minutes. Such summaries are vague, nondescript and completely void of necessary quantification. It seems like this Draft EIS is as well. I don't think people mentioned the vagueness of it earlier.

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In addition, the majority of the research concerning the effects of underwater noise pollution on

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0050 (cont.)

marine mammals is based on the effect demonstrated as a result of long-term exposure on humans, which can in no way be applied to marine mammals. It's very easy for a human to go get a hearing aid and become dependent on an artificial aid, but we all know that a deaf whale is a dead whale. And to my knowledge, there aren't hearing aids available for them. We believe that additional research is necessary and I think this destructive use of our oceans is not necessary for military sonar. Thank you.

(Applause.)

MS. MOSSMAN: Faith Rose.

D-T-0051

MS. ROSE: Hi, I'm Faith Rose and I represent what seems to be the prevailing consciousness in this room tonight and I'm sure many places around the world that we all recognize that -- the facts have been stated, I won't go through those, but that there is this interconnecting web of life that none of us fully understand.

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And we know that each and every time that we play with it and toy with it without understanding it, we risk something very serious, far more grave than any us of can even analyze. And that the systems on this planet are completely overtaxed. We are no longer in a place of if we do something, maybe we can avoid it. We can't avoid it. We're in the middle of it. The changes are happening. There is no way out but through whatever we've already created.

COMMENT NUMBER
D-T-0051 (cont.)

The only question that we have left to answer is how long will it take and how bad will it get and how deep will it go before we get through to the other side. And anything that we do, any risk that we take is greatly multiplied at this point. We cannot risk one more species. We cannot risk one more death that is unnecessary of any form of life, be it human or nonhuman, be it bacteria, be it something that we can see or not see or understand or even know that it exists. We can't afford to lose it and we can't afford to play any more with this ecosystem.

I ask you please not to do anything further that harms any living thing. Thank you.

(Applause.)

MS. MOSSMAN: Ken Rose.

D-T-0052

MR. ROSE: Thank you. I too will resign the science to other people. It's a matter of trust for me. I learned to trust by being trusted, by being able to depend on people. And I have been in the water swimming with whales and families of whales, baby whales swimming near me that are looking at me. I have swam and played with dolphins.

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I know that the whales swim thousands of miles to come here to the safety of our waters. It's our responsibility to maintain that safety. We can't do it if we can't trust the decision-making process, and I'm afraid that we can't. I wonder, we've been told over and over again that

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0052 (cont.)
D-T-0053 1

there was no depleted uranium in Hawaii. Think of all the people who have been downwind of depleted uranium on the shooting range in Schofield or on the Big Island. Can they trust?

Can the whales learn to trust? Can we expect the whales to continue to come here to this sanctuary to gain healthy birth, to gain new children to bring to the world and to bless us all with their presence? It's a great loss. This is what happens with mistrust. And mammals, whales have intelligence probably every bit as great as ours if not greater.

And I suggest that the -- that the military has a lot to learn about service, about caring for people before machines, people before technology. And I suggest again that we all pray that we can continue to be blessed by the whales and dolphins that spend so much time in our hearts and in the water with us. Thank you.

(Applause.)

MS. MOSSMAN: Hugh Starr.

MR. STARR: Aloha. My name is Hugh Starr. I would like to refer you to the statement of Admiral William Fallon, Vice Chief of Naval Operations, before the House Committee on Government Reform on Constraints on Military Training dated 9 May 2001. In this statement the admiral was appearing before the -- this particular House committee to

COMMENT NUMBER
D-T-0053 (cont.)
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appeal to them because of their -- the consequences of environmental pressures on naval testing.

And in this talk he alluded to the most important test ranges that the Navy has, and I found it interesting that the Hawaii Range Complex was not mentioned there. So I would like to know what the significance of the Hawaii Range Complex is in the total spectrum of Navy training, especially with underwater active sonar?

Also, in that -- in that statement he mentioned -- he used the term "core range," and I'm just wondering if the EIS could address if the Hawaii Range Complex is identified as a core range by the Navy? And if not, why not?

What is the status of the Navy's five-year science and technology objective to ensure adequate research dollars for hearing physiology? This was also alluded to in Admiral Fallon's statement before the House committee.

And then moving on, it's my understanding that the Pacific Missile Range Facility is used for subsurface, surface, air and space training. That it -- And so I would ask the question: Is it possible to consider an alternative in this environmental impact statement that looks at either reducing the underwater sonar, active sonar activities, just that activity without limiting the other activities, being the other subsurface, surface, air and

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0053 (cont.)

space activities? And if not, why not?

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Also, has the Navy considered that because of the presence of the Hawaiian Islands Humpback Whale National Marine Sanctuary and the characteristic of the sound -- the sonar traveling large distances, 160 kilometers or more, until it subsides to the point it might be tolerable for marine mammals, has the Navy considered not holding underwater active sonar testing within, say, 300 miles of the Hawaiian Islands Humpback Whale National Marine Sanctuary?

MS. MOSSMAN: Mr. Starr, your time is up. Thank you.

MR. STARR: Oh. Thank you very much.

(Applause.)

D-T-0054

MR. DOUGLAS: My name is Bruce Douglas, I represent myself and the Hawaiian Ocean Noise Coalition.

1

There's several questions to be addressed in the final environmental impact statement. One is why is 130 decibels sonar being used when it's been proven that 160 decibel active sonar kills whales? This has been shown in the Canary Islands, Bahamas, Mediterranean, by naval practices many places throughout the world. Why would such loud sounds be used when 160s are already proven.

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Why it the Navy unwilling to announce when active sonar is being actually done? This is common sense to protect the divers that may be in the water and common sense

COMMENT NUMBER
D-T-0054 (cont.)

so we can research when sonar is happening. What does that leave us with, having to measure ourselves when you guys are actually using sonar so we can test and see the research? You should tell us when these tests happen, so we will know. Why is it in secret? There is no national security, there is no war zone here, there's no need for a secret. We know that.

3

A beached whale is only the tip of the iceberg. Those are the ones that try to escape the noise. What about the ones that are dying beneath the ocean we don't even see? How are we going to research that? How can that be assessed in the final impact statement as far as how do we assess what's underwater?

4

And it's been proven that fish are vastly reduced in areas where there's noise such as air hammers or under seawater oil explorations. Fish scatter from areas of intense noise. What research is going to be done in order to follow this up? How is the Navy going to play with that?

5

There's been suggestion -- common sense suggestions to protect wildlife. One is only do active sonar in areas hundreds of miles away from any marine life populations. Common sense. No need to do it close to shore except to save money.

No sonar during whale season. Why would you do it during whale season? Why is the upcoming test planned

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0054 (cont.)

starting in November? It doesn't make sense.

Keep sonar below 145 decibels, which is the amount that was previously agreed to by the Navy with the California Coastal Commission and other sorts of things. No need to go to 160 or 230 decibels. 145 is enough and already been agreed to.

6 And, most importantly, why don't we create some video games the sailor boys can play to practice their sonar and not harm wildlife out in the ocean? Create video games so that they can play these and they can practice. It's already proven technology. There is no reason for any more testing in our waters when it's already proven. Games can be played to simulate that.

1,100 active sonar exercise in Hawaiian waters is way too many. It's not necessary. It's ridiculous. A few can be done far away from any marine wildlife population. It's common sense.

Simulated practice is enough when technology is already proven. It doesn't need to be proven any more.

Thank you very much.

MS. MOSSMAN: Thank you.

(Applause.)

MS. MOSSMAN: The next five speakers will be: Kahu Charles K. Maxwell, Sr.; Uncle Les Kuloloio, Protect Kahoolawe Ohana; David Jimenez; Anita Wintner; Manuel

COMMENT NUMBER

Kulaoio.

D-T-0055 MR. MAXWELL: Aloha kakou. My name is Kahu Charles K. Maxwell, Sr. I live in Pukalani, Maui. Born in Lahaina, raised in Kula.

The EIS is a farce. It is a farce.

(Applause.)

1 MR. MAXWELL: Tell you what, what makes America the supreme beings of the world that they can conquer this little nation of Hawaii in 1893. It took away with guns. Marines landed from the USS BOSTON and trained the guns on Queen Lili'uokalani's palace and since then they created laws against nature.

Look at Kahoolawe. I organized the first occupation of Kahoolawe and several people here was with me. Twenty-four years later they stopped the bombing. They did all kinds of EIS, the Navy did, and it's all farce. It was all for nothing. There's unexploded ordnance on that island that it cannot be inhabited anymore. They got $400 million to clean it up and they spent it all for nothing, just to clean one valley.

But let me talk about the whales. I

2 represent -- I'm a Kanaka Maoli and I represent the whales, that's who I represent. I am -- I was on the Humpback Whale Sanctuary 15 years when it first started and that's become a farce because they don't control what happens in the

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

Wailuku, Hawaii

COMMENT NUMBER
D-T-0055 (cont.)
3

sanctuary. They let the Navy come in and kill whales in the sanctuary. And they let people go with their whale watching and kill the whales, you know. So what is the sanctuary all about?

But my point is that we -- the whale, the kohola, the (Hawaiian - "pulawa") is sacred to us as native people. I carry this on my neck. Three of us -- two, three of us wrapped the remains -- stopped the Ritz Carlton Hotel being built on 2,000 remains. The last night when we buried the remains, a whale came in the bay, turned over on its side and slapped the waters. For Hawaiians that is ho'ailona, it's a sign that the spirits were finally relocated to their bones in Honokahua. So why are you killing our cultural, spiritual, sensitive things, the kohola, the nai'a, the dolphin. You guys -- I mean, who made you the policemen of the world? Not you guys, the Navy.

(Applause.)

MR. MAXWELL: And with the president, President Bush, hey, you know what? We're not liked around the world. We're hated around the world as Americans. Why? Because we're bullies. The war is illegal. Thousands of people are dying.

MS. MOSSMAN: Thank you. Your time is up.

MR. MAXWELL: Thank you.

(Applause.)

COMMENT NUMBER
D-T-0056

MS. MOSSMAN: Mr. Kuloloio.

MR. KULOLOIO: Aloha. Good evening. I'm going to need about another hour for me to talk because I hate to be a ramrod, but I've been an activist since 1962 when I was a freshman coming up from Europe. And I joined Protect Kahoolawe Ohana. And here we go again, the same old white prose. The same old EIS that was responsible to clean up what Eisenhower said clean up the mess and two miles around Kahoolawe they have not even touched one damn ordnance.

(Applause.)

MR. KULOLOIO: That comes out to Molokini. To say you got experts here. Damn you. You got the experts. Where was your experts on Kahoolawe?

I'm speaking for the Protect Kahoolawe Ohana and I'm the senior spokesman. I sat on this -- 1993, the final report of the Federal Facilities Environmental Restoration Dialogue Committee. I had to sneak away from the state of Hawaii, from Kai Hokama and Linda Lingle so that we could as Hawaiians watch for ourselves what's happening in Washington. To that committee, to people of colors, American Indians invited me as one Hawaiian to speak, to set principles regulatory framework and clean up the thousands of national priorities lease ranges that the Army, Navy and you guys, assed up. With these principles be set it down for you

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0056 (cont.)
1

19:12:12 guys to follow in 1996.
19:12:15 This is small talk. This is the one you're supposed to be following, how to clean up the ranges. Here you making another range. And our peoples now, our people -- You told me to set up a dialogue committee that consists of Polynesian society people in the Polynesian triangle. That's where it starts. Us, each Hawaiian, Hawaii and New Zealand and as Hawaii Polynesians that you folks wrap up including the Northwest Hawaiian Islands, Bikini Islands, the whole nuclear waste. So we need to put that -- us on this kind of dialogue committee. You can contact us at www.Kahoolawe on Act 212 the State just passed. The Kahoolawe Conference is of Native Hawaiians to people with the Department of Land and Natural Resources, but they have done a lousy job in protecting our resources, the State of Hawaii, including Governor Lingle.
19:13:32 MS. MOSSMAN: Mr. Kuloloio, your time is up.
19:13:33 MR. KULOLOIO: In closing, it's good to see that we stop the superferry today.
19:13:38 (Applause.)
19:13:42 MS. MOSSMAN: Mr. Kuloloio.
19:13:43 MR. KULOLOIO: And you know what, our report -- We coming right back again. I have a suggestion, beware for you guys.
19:13:48 MS. MOSSMAN: Sir, your time is up.

COMMENT NUMBER
D-T-0056 (cont.)
D-T-0057
1

19:13:51 MR. KULOLOIO: Wait a minute. D-A-D, D is you guys come in to here --
19:13:54 MS. MOSSMAN: Sir.
19:13:55 MR. KULOLOIO: You folks come in here and make a decision --
19:13:59 MS. MOSSMAN: Sir, your time is up.
19:14:02 MR. KULOLOIO: You know what, D is you folks just destroy. And I'm going to stay here, because, hey, I been with you guys on Kahoolawe. Back off, you guys. Back off. Back off.
19:14:15 (Applause.)
19:14:17 MR. KULOLOIO: All you experts go home.
19:14:19 MS. MOSSMAN: Thank you. Thank you.
19:14:21 MR. KULOLOIO: Enough of Hawaii.
19:14:22 (Applause.)
19:14:37 MS. MOSSMAN: David Jimenez.
19:14:39 MR. JIMENEZ: David Jimenez. Thank you.
19:14:42 I'm just really honored to be here with such incredible citizens. I am -- You're filling my heart.
19:14:56 I want to share -- It's been my life, learning lessons and wondering why on this incredible planet with these incredible people that we're killing each other at all in any form in any way. And I feel there's prophesy that's been told and we're at that time right now where I feel like we've been playing a game here, the human game

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-T-0057 (cont.)

called elimination. And I find that we have mastered this game. The human people have mastered the game of elimination. And the prophesy, once that comes around, we will change our ways. And I feel this is part of that process.

I would ask that we all or whoever would like to, please take a breath together right now.

I'd like to say I'm not against anybody, but being masters of elimination, I feel we're all in this game together. The universal science of we inhale and we exhale and that's kind of what goes on in many fractals of the universe. We contract, then we expand. I feel like we've come to that point in contraction in this game that we're ready to expand.

Thank you for coming, but it's the people that we come together more and that we do make a stand somehow. It's the people that are going to change us. There's no government, there's no Navy, there's nothing without the people.

And I'm honored to be part of this community. And thank you so much.

(Applause.)

MS. MOSSMAN: Anita.

D-T-0058

MS. WINTNER: Hi, I'm Anita Wintner and I'm representing myself and Pacific Whale Foundation.

COMMENT NUMBER: D-T-0058 (cont.)

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I'm opposed to sonar testing and the underwater explosives around the Hawaiian Islands and Northwest Hawaiian Islands National Monument. The initial plan is bad enough, but now the Navy and the National Marine Fishery Service has expanded their war games practice to 1,145 exercises around the Hawaiian Islands, including the United States Hawaiian Humpback National Marine Sanctuary and the Northwest Hawaiian Island National Monument.

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Recent sonar testing linked marine mammal stranding to include Canary Islands in 1985, '88, '89, '91, 2002 and 2004 with the total reported of 44 whales. In Greece in 1996, 12 beached whales. Virgin Islands in '99, four whales. Spain, three whales in 2000. Bahamas in 2000 and 2002, three whales including one Humpback Whale. And as was mentioned earlier, that was done with 150 to 160 decibels. Washington state in 2003, 11 porpoises. Alaska in 2004, six whales. Hanalei Bay in 2004, 200 Melon-Headed Whales stranded, one dead. Yokosuka, Japan, where the US naval base is in 2004, multiple strandings. North Carolina in 2005 where your base is, 34 strandings of three different species of whales.

The Navy and the National Marine Fishery Service have now admitted they realize they will be killing

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mammals. They say humans can survive or have survived 144 decibels sonar, but the Navy will be testing at 235 decibels,

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-T-0058 (cont.)

which is one billion times more energy than 145 on everything I have read, and I have done multiple research on that.

There are a lot of divers in Hawaiian waters. Two-thirds of the North Pacific Humpback Whales, which are on the endangered list, come to Hawaii to give birth in May. We only have about 1,200 monk seals left, found nowhere else in the world, and they're on the critically endangered list. We [6] have 300 endangered Hawksbill turtles, only 50 nesting females left. There are many other species of whales, dolphins and other mammals on the endangered list here in Hawaii.

[3] And the Navy admits that underwater detonations will kill fish, but says that we have plenty. The National Marine Fishery Service says the Navy are ignoring the Marine Mammal Protection Act, the Endangered Species Act, the National Environmental Policy Act, the Federal Protection For the Northwest Hawaiian Islands and many more federal agencies created to protect our waters.

MS. MOSSMAN: Your time is up. Thank you.

(Applause.)

MS. MOSSMAN: We're going to give the court reporter a five-minute break. When we get back, we have Manuel Kulaoio, Lisa Messenger, Amber King, Jasmin Asis, Nicole Carbonel.

(Pause in Proceedings: 7:20-7:34)

COMMENT NUMBER: D-T-0058 (cont.)

MS. MOSSMAN: Okay. Before we go any further, I'd like to humbly ask that you respect when the speakers are up there to hold your comments, your applause. Our court reporter, you know, she's having a little difficulty hearing above that. And we'd like to also offer the speakers some respect when they're up here. Really appreciate that.

Okay. We'd like to start with Manuel Kulaoio.

D-T-0059

MR. KULAOIO: Aloha. My name is Manuel Kulaoio. [1] Sorry, I only had white socks. I was at an Airforce meeting, walked up here from the landing craft. Probably shouldn't be doing that, but I did it anyway and I'm here.

At Makena High School two nights ago after the public's EIS testimony the score was Navy 23, Public zero. Only had four people show up. I was one of four. I'm not going to tell -- One was from the Navy League. So I hope to see the Navy League, I hope to see the Maui Economic Development Opportunity here, the mayor, because the politicians were allowed to speak first and, yet, they're the very ones that they send information to and ask for responses. And we never know what is their response until the Final EIS comes up and that's what insults my intelligence.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0059 (cont.)

But I'm going to start it off this way: Imagine Makena Bay as a Pearl Harbor. Imagine Kahoolawe as the Pacific Missile Range. Imagine the Island of Vieques six miles from Kahoolawe. Imagine 9,000 people live in the middle third of the island and the Navy bombs both sides. That's how they the treat Puerto Ricans. They did the same thing to Hawaiians. They took away Guam at the same time, Philippines, Cuba.

And by the way, Baldwin High School did not teach me that kind of stuff. Kahelelani, McKinley, Baldwin. At McKinley they doing a Hawaiian pule, from Kawaiahao Church, a Maui boy to do the prayer, you know how it starts it out? "Let's all hold hands. Meet four people that you don't know and spread the love. This is the humanity."

He walked right past me and I told him, "You sit down and listen to what whoever wants to say." So Kalani Wong, wherever you are. I think he's gone. You go Iao Church and go back to Kamehameha Schools and bring those kids over here to listen what's going on. You're just as bad.

When I went to Vieques, you know what they said? It wasn't the Navy that bombed the range. It was a marine pilot.

I said, "Wow, I never know a marine is not part of the Navy."

And they're saying the same thing today. It

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D-T-0060
1

was the marines who helped overthrow the peaceful Hawaiian nation. Shit, it was the United States Navy. Who telling you it wasn't? Look at the Akaka Bill, the public apology.

Captain, Mr. Sheehan, Ms. Mossman, you look like a person who defuse public opposition, but I like you.

So to the cops in the back, my brothers, they had three cops over there that night. Embarrassing, very embarrassing. Our people to protect, I don't know who they were to protect, but to me the threat of violent protest is an organized distraction by politicians and business leaders to divert attention from the actual violence brought down to bear on our local cultures, our environment and the economies. That's how I feel.

MS. MOSSMAN: Mr. Kulaoio, your time is up.

MR. KULAOIO: I just want to say, you guys do the navy proud for Maui. Right now I just want to thank my peers for coming.

MS. MOSSMAN: Mr. Kulaoio, your time is up, sir. Thank you.

(Applause.)

MS. MOSSMAN: Lisa Messenger.

MS. MESSENGER: Hi. My name is Lisa Messenger. I'm here -- I'm a citizen of the Kingdom of Hawaii. I travel on a Kingdom of Hawaii diplomatic passport. His Royal Hawaiian Majesty Akahi Nui is my boss. I'm his

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0060 (cont.)

legal counsel and secretary.

And United States Navy, National Marine Fisheries, State of Hawaii; where is your jurisdiction? Who owns this soil? Now, in Larsen vs. Hawaiian Kingdom the Royal Court President stated that the Kingdom of Hawaii is in existence today. The Kingdom of Hawaii is not overthrown. The Kingdom of Hawaii is not a foreign sovereignty. We are sovereign and we know it and we are recognized internationally as such.

And I hold in my hands right now a copy of the deed to Maui, Molokai and Lanai. And I will be making available, also, for your perusal the deeds to the entire Hawaiian archipelago. We claim a 12-mile territorial in accordance with the laws of the sea. Now, you're in violation of treaties that have never properly abrogated according to terms set forth therein.

Ever since the day that the United States Navy USS BOSTON turned their guns on the palace and Queen Lili'uokalani, our beloved queen, who is in my estimation one of the finest women that ever walked this earth, and invaded Hawaii in an undeclared and unlawful war. And please see "Hawaiian Nations" for the definition to that and Greg Panovich. This is piracy on the seas.

And now you perpetuate your undeclared war and you also include the whales and marine life of Hawaii in

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D-T-0060 (cont.)
D-T-0061
1

your undeclared war. You have to do this during whale season. You will not do this. You are prohibited on the king's word, His Royal Majesty Akahi Nui, Lineal Sovereign Heir, Kingdom of Hawaii, Trustee of the Kingdom of Hawaii Nation Ministry Trust, which holds the deeds of the entire Hawaiian archipelago. You can look those up at the Bureau of Conveyance. They are filed in there. And you will be receiving copies. And you will have seven days -- by order from His Royal Majesty, seven days after lawful fact of evidence of jurisdiction or you will be removed from our coast.

(Applause.)

MS. MOSSMAN: Amber King.

MS. KING: Hi. I would like to speak for my age group and the younger age groups. You guys are setting a really bad example, trying to make everybody think that it's okay. It's not. My brother and girlfriend and most of my family, they like fish and stuff like that, you know, and diving. And it's just not cool because it's bad for the people to -- And, sorry, I'm a little nervous, but --

I think that it's not only the whales we should be worried about, but the sharks, the fish, the opihis, the dolphins, everything. And you guys are just killing 'em for no reason at all because you feel like testing your little toys just like she said and it is totally

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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not cool. You guys should really stop. Thank you.

(Applause.)

MS. MOSSMAN: Jasmin.

D-T-0062

MS. ASIS: Aloha. My name is Jasmin and I am speaking on behalf of, you know, the young kids, the Hawaiians and non-Hawaiians alike. But, you know, I only found out about this maybe like two weeks and I can already tell that it's, you know, going to hurt everything in the water, you know, on land.

1

And we fish, we dive, we get our food from the water and you -- You know, I don't want to be eating mutated or rotten or dead food or anything, you know. I want healthy stuff, healthy things for the future, for, you know, everyone else living here. That's what we deserve. We deserve, you know, good things in life. And it's sad to say, but you're destroying it. And we just want good things. Thank you.

(Applause.)

MS. MOSSMAN: Nicole Carbonel.

D-T-0063

1

MS. CARBONEL: Hi. My son and I are here to represent the generalizations to come that are not here to speak out against what you guys are doing to our culture, to our lifestyle, our way of life, how we get our food, how we eat, how we swim and play in the ocean, our recreation. If we lose these; we lose us, we lose Hawaii, we lose what we

COMMENT NUMBER: D-T-0063 (cont.)

stand for, we lose our way of life. Please consider that.

And look at him. You got to the think about the ones to come because they're going to live with the consequences of your actions. They have to deal with what happens from your testing. And you guys are not going to be around to have to deal with those things. It's going to be all on them. Think about the future. Think about what you're doing to the planet. Think about what you're doing to Hawaii, our home. Our home.

(Applause.)

MS. MOSSMAN: The next five speakers will be Akahi Wahine, David Bayly, Eli Sheetz, Kristin McCleery, Helen Schonwalter and Summer Starr.

D-T-0064

Akahi Wahine.

UNIDENTIFIED SPEAKER: Her Highness regrets she couldn't make it.

MS. MOSSMAN: Okay.

David Bayly.

D-T-0065

1

MR. BAYLY: Aloha. My name is David Bayly. I love Hawaii. I have lived here for about 40 years. I think a lot of people are here because they really love animals. We're animals, that's why we love animals. Yeah?

But there's a point that I want to make that hasn't been brought up. This technology was developed to kill human beings, and it's sad that the animals are feeling

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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D-T-0065 (cont.)

this residual effects of the designed weapon of mass destruction. It's used to kill human beings in war. The side effect is what happens to the marine life.

We have been spending billions and billions of dollars searching for weapons of mass destruction in Iraq. We never found any. Look in the mirror. The weapons of mass destruction are being created by you. We're fighting a war where every bullet that's fired has depleted uranium in it. So not only do we kill the people that we're aiming at, but we kill the people that we miss and we kill all our own people that are firing the weapons. Get a clue, you guys. Figure it out. You know, what are you doing? It's insanity.

(Applause.)

MS. MOSSMAN: Eli Sheetz.

D-T-0066

MR. SHEETZ: Hi. My name is Eli Sheetz. I don't have anything prepared, but I did have a really good conversation with one of the naval officers here and I can see both sides and I can see why they're doing what they're doing.

And I have been there, as a child I was raised on video games and there's an addiction there. And I think there's probably a good portion of that that has to do with being a male and wanting to -- an outlet for that aggression and that -- the strategic tactics and all that stuff. That's a lot of what I heard, was that these are war

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D-T-0066 (cont.)

games, games that are played out to train our youth on how to fight in these wars that we create.

And, you know, these are, also -- I've heard things, good points about these are expensive tools that are developed to aid our country in fighting these wars and we have to justify the enormous expenses, so we play out these war games and we test these -- these, you know, giant toys. I've heard that we should do this with video games and reasons why we shouldn't and reasons why we should.

Basically what I -- what I'm trying to appeal to you right now from a place of understanding that I want you to hear not just my message, but all the messages here as trying to put yourselves in these people's shoes and don't hear it as an attack personally. But try to take this message back to your superiors and anybody that you feel can hear and maybe make a difference.

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I know that in my conversation you stated that had one of the reasons that -- that it was kind of arbitrary that we start this testing right when the whales come back, at least this session of testing. That those orders come from higher up on the mainland or overseas and they don't understand the whale's pattern here, but I know you do understand the whale patterns here because you live here and you know that that's an important factor. You take that message back to the Pentagon, you know.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-T-0066 (cont.)

19:50:36 And there's a lot of facts that were stated
19:50:39 maybe accurately, maybe somewhat not accurately, but the --
19:50:46 the statistics can be argued either way.
19:50:50 Thank you.
19:50:52 But the message here is that there's a clear **[3]**
19:50:55 and present danger of these whales being harmed by the sonar.
19:51:00 If there wasn't, you wouldn't have had to get an exemption **[4]**
19:51:03 from federal laws that protect them. You wouldn't have had
19:51:06 to get that exemption from the Pentagon. You guys know that
19:51:09 this is dangerous for the marine life in this area. So if
19:51:13 you know this, you know, you should conduct whatever -- you
19:51:18 can conduct that doesn't break laws, not get an exemption for
19:51:21 the law that exists.
19:51:21 MS. MOSSMAN: Thank you, Mr. Sheetz.
19:51:23 (Applause.)
19:51:26 MS. MOSSMAN: Kristin McCleery.
19:51:34 MS. McCLEERY: Good evening. I just wanted **[D-T-0067]**
19:51:46 to state that I strongly oppose the Navy's decision to
19:51:50 continue the use of sonar in Hawaii's waters. The 1,145
19:51:56 exercises will cover a quarter million square miles around
19:51:59 our shorelines. This will potentially affect 7,000 species,
19:52:04 a quarter of which are endemic to Hawaii. The national **[1]**
19:52:08 monument and the Humpback Whale Sanctuary should be protected
19:52:13 areas.
19:52:13 In March of 2000 in the Bahamas 17 whales

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19:52:15 stranded themselves and at least seven of those died. In the **[2]**
19:52:19 Bahamas the sonar used was about 150 to 160 decibels, so we
19:52:25 know that whales die at that level. If this can kill whales,
19:52:30 how can you justify using anything louder? The safe level
19:52:34 that you claim is 195 decibels. That's 1,000 times louder
19:52:38 than what did kill them in Bahamas. 215 decibels is clearly
19:52:43 going to injure and kill many more marine mammals and fish.
19:52:47 That's 1 million times louder than the Bahamas.
19:52:52 The Navy claims that turtles and fish aren't **[3, 4]**
19:52:53 being effected because they cannot hear these frequencies,
19:52:56 however, it is the intense sound waves that cause the damage.
19:53:00 They cause hemorrhaging around the brain and other organs and
19:53:04 they rupture your cell membranes. And this will also affect **[5]**
19:53:07 scuba divers, which is kind of scary. So we also need to
19:53:12 have much better mitigation measures during this project if
19:53:16 it's going to happen.
19:53:18 I believe that this action is absolutely
19:53:20 unnecessary. Thank you.
19:53:22 (Applause.)
19:53:26 MS. MOSSMAN: Helen Schonwalter.
19:53:34 MS. SCHONWALTER: Aloha. My name is Helen **[D-T-0068]**
19:53:37 Ann Schonwalter. I'm sorry, I didn't bring my clear glasses.
19:53:42 I have been following the issue of low, mid
19:53:43 and high frequency sonar since 1985, perhaps, with the
19:53:49 National Resource Defense Council and other environmental

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER D-T-0068 (cont.)

groups. I have also been waiting very patiently for our government to recognize the need to move from refuge status for the Northwest Hawaiian Islands to sanctuary status to monument status. As you know, that would be the strictest measures to protect an area.

I breathed a sigh of relief, but with some cynicism when President Bush contrary to his usual Black Fridays and arbitrary environmental slashing created. Papahanaumokuakea, the Hawaiian name for these islands. I thought, "Oh, Well, maybe we can rest assured for a moment," and then we had to deal with Wespac. Wespac wants to come in and continue to fish in the monument, so we're fighting that battle as well.

I'm tired. I'm really tired. I'll take off my glasses so you can see that. I've been fighting this for 22 years. And I'm in the position now where I want to kikaha, which means out to lunch in the Hawaiian language. And I'm a haole, I'm not Hawaiian, but I'm as angry as Leslie Kuloloio, who was a presenter here. He's our kupuna.

The Hawaiian Environmental Alliance has this to say: The Navy's proposal includes live fire bombing and [1, 5] missile interception over the Northwest Hawaiian Islands which would significantly increase the use of high intensity active sonar in the monument and the Humpback Whale Sanctuary and increased bombing exercises at ranges contaminated with

COMMENT NUMBER D-T-0068 (cont.)

[2] depleted uranium. We're also fighting the transportation of Striker missiles on our superferry and we're sick of it.

[3] Here's some more information from Kahea, whom I trust. "Contamination from missile debris, as well as damage from large wave knocking around large shrapnel pieces on the reefs are so far outside accepted practices in the Northwest Hawaiian Islands that they should be prohibited."

I am for no sonar and no more bombs, period. I also -- Yes, no more, absolutely none. It's all unacceptable and intolerable. I'd also like to say as a member of Kanaka Malama Kai, which means the local folks protecting our ocean, I've dove several times, many, many times at Molokini Crater. The fish not only hear bombs, they hear the motors of all the boats coming. I've been diving there since there were very few cruise ships and recreational vehicles. There were [4] multitudes of fishes. Now that we have so many tourist vessels out there, the fish take off. They only take off temporarily. They come back after all the boats leave. So the fish do, indeed, here. So this bogus claim --

I want to say just one last thing.

This bogus claim that --

MS. MOSSMAN: Ms. Schonwalter, if you'd like to turn it, you can.

MS. SCHONWALTER: I'll turn it in. I've highlighted it.

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Wailuku, Hawaii

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D-T-0069 1

MS. MOSSMAN: Thank you very much.

(Applause.)

MS. MOSSMAN: Summer Starr.

MS. STARR: Aloha. Okay. I grew up here. I'm speaking on behalf of myself, summer Starr. I'm a grad student of UH Manoa. My degree has been protecting Hawaii's environment and culture since 1999, so, as you can imagine, it's kind of personal attack on my life's work. Why am I here today? I'm here today to speak on behalf of the whales, yes, but more so what this implies.

As the US military, the Navy, as an imperial force here in Hawaii, I believe it's our responsibility, everybody here, to stop further action from happening. This has been happening since before Lili'uokalani was taken over. Yeah? As far as defending democracy, which would be the natural intention for killing innocent species and endangering marine life -- Correct? It's for defending democracy. It's my belief from the propaganda, which is my opinion, if you look at this room, I don't know what the democratic vote would be, but it looks pretty anti-Navy sonar testing.

(Applause.)

MS. STARR: Thank you. Thank you. I like the feedback. Thank you.

I grew up in a democracy, sort of. I believe

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D-T-0070 1

it's 2007, not 1984. And I believe that as a tax-paid organization, a governmental organization, it is your responsibility to obey these people, to obey us. Yeah?

(Applause.)

MS. STARR: Because it's my paycheck that's paying to blow the world's brains out. And I'm really not okay with that and I want to work under the table, so I'd really appreciate it if you listen all of us here today and you thought about. Especially here in Hawaii, it's such a sensitive issue. To come in here with an imperialist mind set to go against what the majority of the population knows is right, it's -- you know, it's putting salt in a fresh wound, you know. It's not -- This isn't the place to do it, you know. Thank you.

(Applause.)

MS. MOSSMAN: The next five speakers will be: Keoki Ramond, Mary Broode, Christine Nonnemacher, Pauahi Hoohana and Samuel Dolphin.

MR. RAMOND: Hi. My name is Keoki Ramond. I've spent about 85 percent of my 61 years on this planet in Puunene. A short sojourn in California for education. I come here tonight to speak in advocacy of the whales. For the whales, not about them. I've heard some incredibly articulate information presented tonight and I'm just talking about communication.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-T-0070 (cont.)

I'll start by kicking the dog one more time. I certainly don't appreciate the position you guys are in here tonight. To some people it might appear to be grant funded, defense budgeted, hourly charging consultants, shape-shifting apologists for a whale-killing military industrial complex run amok with power and arrogance. I hope I didn't miss anything.

(Applause.)

MR. RAMOND: Okay. But that is only one facet that we see here this evening. Your designated mission is also to gather information and take it back to your superiors. Plenty of them, I'm sure.

There has been some beautifully stated, as I said, before articulately presented and very telling testimony here tonight. And if you guys ain't heard it before, you ain't doing your job. But if you could truly hear what you were being gifted with this evening and if you can convey this to your bosses, who don't want to hear it, and if you can do this with integrity and conviction -- big question marks. Plenty of rats leaving the sinking ship in Washington these days -- then and only then will you earn your publicly funded paychecks. Until such time, however, great shame on you for presenting this shabby and deceitful excuse for an EIS to the people of Hawaii. Thank you.

(Applause.)

COMMENT NUMBER

MS. MOSSMAN: Mary Broode.

D-T-0071

MS. BROODE: Aloha. My name is Mary Broode. I speak for myself and mermaids. I've lived in Hawaii over 30 years. I swim in the ocean all the time. I'm fortunate to have been able to swim with whales and dolphins. I'm here tonight because I don't believe you. I don't trust your agenda or your words. Why don't I trust you? Well, your commander in chief lied to us about the reasons for going to Iraq, sent us to war and thousands of Iraqis and Americans have died as a result. Let's see. The vice president got no bid contracts for his pal, Halliburton, in Iraq and Louisiana and millions of those dollars are unaccounted for. Let's see. The attorney general resigned today after lying and telling Congress 64 times in one hearing, "I don't recall."

If I don't trust the leaders of this country and the commander of the military, why should I trust you?

1

This war on terror has been an excuse to take away our rights and freedoms. It doesn't surprise me now that it is your excuse to use this technology that will definitely, by your own admission, kill fish, whales and dolphins. It's time the people said no to these experiments of our environment.

The media and the government want us to be so afraid, they want the public to agree to institute every stupid idea that comes across the board in the name of national security. Our ports are not secure, our borders are

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D-T-0071 (cont.)

definitely not secure, and it doesn't make any sense at all kill fellow creatures in the oceans in the name of security. It's time to speak for other mammals on this plant that can't speak for themselves. It's time to just say no to military exercises in Hawaiian waters.

My mother reminded me today that all it takes for evil to win is for good people not to show up. There are a lot of good people tonight to reflect to you that your agenda is wrong. Abandon these exercises. Come to your senses. Listen to your conscience. Which one of you would volunteer to be in the water when these high levels of sonar are deployed? No volunteers? I'm not surprised.

Where -- When we were advised to do on to others as you want others to do unto you, that was really good advice. Have you heard of live and let live? This applies to creatures, not just fellow humans. The military is way out of line here.

I'm in black tonight because I'm in mourning for my country. I'm in mourning for the natural world which is being killed every day by narrow national interests and personal profit motives.

MS. MOSSMAN: Ms. Broode, your time is up. Thank you.

(Applause.)

MS. MOSSMAN: Christine.

COMMENT NUMBER

MS. NONNEMACHER: Thank you, Mary, that was very well said.

D-T-0072

I'm Christine Nonnemacher. This is my seventh year dealing with these $9 billion weapons. If you guys haven't read that, this is why they continue to do it and continue to lie to us. $9 billion they get for every one of those ships. So what are they doing? They're in the sales business.

We know of your lies. We have the facts. That you continue to deny the truth is despicable. Your actions are reprehensible. And no one -- There will come a time when your weapons will be useless. They are kind of now. We all want to go to a world of peace.

We, the American people, will not tolerate destruction of our marine life, our global resources, nor the blatant lies of our government nor the individuals telling these lies. So remember that. We, the people of Hawaii, will not tolerate the activities of the Navy in our sanctuary waters when sonar is involved. Stay out of our sanctuary waters with your weapons. 1

Thank God we had the energy to speak and all the people willing to show up here to make sure that you will not conduct these exercises in our waters, especially when our sacred whale population is here. Train without sound or train outside our waters. Your killing machines are 2

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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D-T-0072 (cont.)

20:07:34 unacceptable. Your attitude about it is unacceptable.

20:07:41 Winston Churchill stated, "The price of
20:07:45 greatness is responsibility." I want you to take that home,
20:07:51 you people as individuals. The Navy -- You make up the Navy.
20:07:56 We're saying the Navy, but it's you. I want you to
20:08:00 personalize it. "The price of greatness is responsibility."
20:08:06 What you're doing without responsibility is destruction. You
20:08:14 can talk all you want about, you know, all these farce facts
20:08:19 that you think we are so stupid that we're going to suck in
20:08:22 and say, Oh, sure, come on into our waters, do your tests.
20:08:26 We know they're not tests. We know you're a killing machine.
20:08:33 "The price of greatness is responsibility."

20:08:37 The Navy's actions prove that not only are
20:08:41 you not the stewards of the seas, but lame brain pawns of
20:08:48 neo-con warmongers and weapons manufacturers, criminals at
20:08:52 best, unwilling, at worst, to do the right thing.

20:08:55 Thank you.

20:08:56 (Applause.)

20:09:02 MS. MOSSMAN: Pauahi Hoohana.

D-T-0073

20:09:09 MS. HOOHANA: (Statement in Hawaiian.)

20:09:25 My husband has been a taro farmer in Waipi'o
20:09:29 and his ohana has been a taro farmer -- has farmed taro from
20:09:32 time immemorial. Yeah? You guys are symbols. You guys are
20:09:38 symbols of the continued oppression, the continued
20:09:42 degradation, the continued colonization of our people. Not

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D-T-0073 (cont.)

20:09:47 only degrading our people by being here, you're making us a
20:09:51 target of the entire world just because you're here.

20:09:55 (Applause.)

20:09:58 MS. HOOHANA: If you guys -- You know, all
20:10:01 the propaganda out there saying, Oh, if it wasn't for America
20:10:03 colonizing us, it would have been somebody else. No. It was
20:10:07 already done by Blount in his -- in Blount's -- After the
20:10:12 overthrow in 1893 that what the American military did was an
20:10:16 act of war on a peaceful loving people. Yeah? You guys came
20:10:22 and oppressed. You took our nation. You degrade our aina.
20:10:27 You degrade our oceans. Yeah? Because of what? So that you
20:10:31 guys can go and bomb people in the desert? You see deserts
20:10:35 in Hawaii? I don't see no deserts in Hawaii. Go train 1
20:10:40 someplace. Go pollute the world with your depleted uranium.
20:10:44 All your magazines, all your weapons, all -- everything is
20:10:47 polluted with depleted uranium. You're doing -- You're
20:10:50 desecrating our aina, our aina, our heart, because no -- it
20:10:53 has mana. It has -- We are connected to that time
20:10:59 immemorial. (Statement in Hawaiian.) You guys are from
20:11:07 someplace else. Why don't you guys go back and pollute your
20:11:10 aina? Don't come and destroy us.

20:11:14 (Applause.)

20:11:16 MS. HOOHANA: Yeah? You guys are destroying
20:11:19 us. Yeah? What about my husband when he goes fishing in the 2
20:11:23 ocean to put food on our table? Huh? When you guys making

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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your stupid testing, what's going to happen to him if he's like being in the water getting ahi for us, getting papio and ulua? Yeah? What's going to happen to him if he's subjected to your sonar? Am I going to have cry over my husband because of your stupidity, because of your colonization, because of your continued oppression of our resources which are limited because we're on an island? Huh? Think about that.

We're sick and tired of your continued oppression and colonization as Kanaka Maoli. (Statement in Hawaiian.) Hell, no.

(Applause.)

MS. MOSSMAN: Samuel Peace Eagle Dolphin.

D-T-0074

1

MR. DOLPHIN: Aloha, everyone. Living this island for ten years, I already saw a big change. I'm here representing me, my wife, my family, the dolphins, the whales, the Hawaiian culture and Native American culture. These people and these animals, they are under pressure from people like you from the beginning of history. It's time to change. This is not working. It's not going anywhere. It's damaging the world. It's damaging the people. It's damaging everything. The planet is your model. You kill the planet, you kill yourself.

You have a son, you have a daughter, do you have a family? They are going to pay. What are you going to

COMMENT NUMBER: D-T-0074 (cont.)

do, all of you? Anybody that do these things. The planet is going to be gone if you don't start taking care. Your job is supposed to be take care of the people. And you know what, you're supposed to take care of the land, take care of the planet. You kill the planet, you kill everybody and everything.

I'm against the sonar testing and any, any weapon that you guys use I'm against. The world doesn't go in this way. You disrespecting everything: The law of nature, the love of humanity, the love of family. Respect, remember, respect. You disrespect, you lose. We have lost land in the world because there is no respect, man. You understand?

The military doesn't do any good. We get attacked because we have the military. We should have an army of peace, not an army of war. We should have a weapon that helps people and nature, not destroy them. Those are your good weapon. Do a friend instead of an enemy. This is what you people should do and the world would change. You want to do it because I'm sure when you were little, you told, I'm going to be somebody one day. So you guys have opportunity right now. What you can do is change the world in a better way. Stop using weapon and use love, compassion. That's what you people need to use. Thank you.

(Applause.)

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COMMENT NUMBER
D-T-0064

MS. MOSSMAN: We have one more speaker. Akahi Wahine.

MS. WAHINE: Aloha to all my brothers and sisters here to help support us in going against this military forces that just hits our waters. And it's sad to see these things happening in our islands repetitiously by the military. For one, Hawaii is breath of our living water, is our ocean and our land, which you folks are totally disrespecting. But you know what? It takes our uhane, our spirit, that if we can't deal with you folks in the physical, our spirit of ancestors will deal with you folks. If not with you folks in the present time now, it will be with your ohana, meaning your family, so there's no way out. If you know how to forgive and stop what you folks are doing -- We are not the enemies. You guys are in the wrong nation.

As long as the Kanaka Maoli will live, our nation will live. Hawaii will live as long as our people live. And we are the true people, we are the aboriginals of our land. This is where our substance comes from, our daily substance. But because America, America is here in our land to suppress and oppress of our people in the past and present for 114 years, it's going to have to end. It's going to have end very now. Like N-O-W now. You folks have to get out of our waters, get off of our lands and leave our people alone. We have been suppressed and oppressed enough. It's time for

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you to folks to pack up and move out.

(Applause.)

MS. WAHINE: It's our land. We are Hawaii. We'll always be Hawaii. As long as our akua permits us to live this land, we'll live it forever. And it ends and it ends now. This is enough of you folks. You folks belong out in another nation that -- where America is in Iraq. You folks are overthrowing another nation and what's happening to the Americans there? Innocent lives are being taken repetitiously in Iraq. That's where you folks belong, out in a nation that's against you folks.

Japan was here and bombed Hawaii, but they didn't come here to bomb the Hawaiians, the Kanaka Maoli. They came here because the Americans were here and they came to send a message to America. So it's time for you folks to read between the lines, America. Military, read between the lines. Take you folks' blinders off and it's time for you folks to see the truth.

1 Congress has already signed Public Law 103.150. Supposed to be public law to protect the people, but you folks don't seem to understand what public law means. You folks have admitted the fact you folks illegally overthrew Hawaii. Can't you folks understand you folks don't belong here. You folks illegally is here. You folks have done enough damage to our land. Pack up and get out. No

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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20:18:29 more.

20:18:29 (Applause.)

20:18:33 MS. MOSSMAN: We'll take a recess. If
20:18:45 there's anybody out there who hasn't up to speak that may
20:18:48 want to do so, we'll go ahead and resume. We'll be here
20:18:52 until 9:00 p.m. Thank you.

(The proceedings recessed at 8:19 p.m.)

(The proceedings adjourned at 9:02 p.m.)

C E R T I F I C A T E

STATE OF HAWAII)
) SS.
CITY AND COUNTY OF MAUI)

I, Sandra J. Gran, Certified Shorthand Reporter for the State of Hawaii, hereby certify that the proceedings were taken down by me in machine shorthand and was thereafter reduced to typewritten form under my supervision; that the foregoing represents to the best of my ability, a true and correct transcript of the proceedings had in the foregoing matter.

I further certify that I am not attorney for any of the parties hereto, nor in any way concerned with the cause.

DATED this 12th day of September, 2007, in Maui, Hawaii.

Sandra J. Gran

SANDRA J. GRAN
Notary Public
State of Hawaii

Sandra J. Gran
Hawaii CSR 424
Notary Public for Hawaii
My Commission Expires: 5/14/08

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HAWAII RANGE COMPLEX

DRAFT ENVIRONMENTAL IMPACT STATEMENT/

OVERSEAS ENVIRONMENTAL IMPACT

STATEMENT (EIS/OEIS)

AUGUST 29, 2007

Waiakea High School

155 W Kawili St, Hilo, Hawaii

BEFORE: SANDRA J. GRAN, CSR NO. 424
Registered Professional Reporter

COMMENT NUMBER

Speaker List:

Vida Mossman
Captain Aaron Cudnohufsky
Neil Sheehan
Cory Harden
Larry Sinkin
Lynn Nakkum
Reynold Kamkawiwaole
Kalei'ileihi Muller
Michael T. Hyson
Duane Erway
Jim Albertini
Lee Tepley
Dwight Vicente
Hans K. Mortensen
Frank Vesperes
Moanikeala Akaka - Aloha Aina
Jon Olson
Marjorie Erway
Manuel Kuloloio
Cynthia Piano
Shelley Stephens
Star Newland
Mark Van Doren
Galen Kelly
L. V. Kelly
Paul Normann
Judy Walker
Bunny Smith
Koert

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

P R O C E E D I N G S:

MS. MOSSMAN: Aloha and good evening, everyone. Thank you very much for coming tonight. Before we get started, I would like to invite Kahu Wendell Davis, Chaplain, Kamehameha Schools, Ka'ao Campus, to offer a pule.

CHAPLAIN DAVIS: Aloha makaiko.

AUDIENCE: Aloha.

CHAPLAIN DAVIS: Let us begin in the spirit of pule as we learn not only from our kupuna, but also learn that all things should start together in a spiritual effort of prayer. Let's pray together. Epule Akau, let's pray.

(Statement in Hawaiian.)

We thank you, oh, God of Love and Holy God, and we are humbled to be here as ohana of this community and we ask your blessings as we conduct our halawai, our meeting. We realize that all things that are righteous and puwu, wisdom, na'ao, mana, strengths come from above. So we ask for your kokua. We pule and ask for your presence to be here.

Help us to conduct our meeting together in the way of malukea and the way of puna as we hear each other's manaloha as we gather together and help us to wili and bring together, weave together our thoughts and our energies for the betterment of each other.

We pray that you will be with us and we thank

you for those who have journeyed near and far to come to this place of Waiakea High School. Bless this place, bless us, help us to also remember those before us of our nakupuna. Help us to malama each other, malama the aina, aina of the land and of the sea. Help us to be makaaina, good stewards, both of us, all of us here, to be one in ohana, for this is your command to us, to be lokahi.

So Ke Akua, aloha, we ask your blessings, oh, Lord upon us tonight. We come together in this spirit of prayer.

(Statement in Hawaiian.)

Amen.

AUDIENCE: Amen.

MS. MOSSMAN: Mahalo, Kahu.

This is the public hearing on the Draft Environmental Impact Statement for the Hawaii Range Complex. I'm Vida Mossman and I will be the moderator for tonight's meeting.

This hearing is being held in accordance with the provisions of the National Environmental Policy Act and implementing regulations. The act requires federal agencies to analyze the potential environmental impacts of certain proposed actions and alternatives, and to consider the findings of those analyses in deciding how to proceed.

The purpose of tonight's hearing is to

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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receive your comments and suggestions on the Draft EIS. Those of you who have not had an opportunity to review the Draft EIS may want to read the summary of the major findings in the handout available at the registration table. Those findings will also be summarized briefly by one of our panel members in his presentation.

Let's look at the agenda for tonight. Hopefully you all had the opportunity to talk to the many knowledgeable experts who were staffing the exhibits during the past hour. After I finish this introduction, Captain Cudnohofsky will give a brief introduction to the Navy's activities in the Hawaii Range Complex. Captain Cudnohofsky is both the commanding officer of the Pacific Missile Range Facility and the officer in charge of the Hawaii Range Complex.

Next, Mr. Neil Sheehan will brief you on the environmental impact analysis process and summarize the results reported in the Draft EIS. Mr. Sheehan is the EIS team leader for the Navy.

The item -- The last item on the agenda, however, is the most important. The comment period is your opportunity to provide information and make statements for the record. This input ensures that the decision makers can benefit from your knowledge of the local area and any environmental effects you think may result from the proposed

action or alternatives.

Keep in mind that the EIS is intended to ensure that future decision makers will be fully informed about the environmental impacts associated with the various alternatives before they decide on a course of action. Consequently, comments for tonight's meeting on issues unrelated to this EIS are beyond the scope of this hearing and cannot be addressed.

To comment verbally tonight, please fill out a verbal comment card available at the registration table and turn it in. I will then start calling on speakers in the following order: I will recognize elected officials first, then I will call on members of the public in the order in which the cards were turned in.

Each person will have three minutes to speak, including public officials, organizational spokespersons, and private individuals. We want to make sure that all who wish to speak have a fair chance to be heard. Although we will not videotape this hearing, and some other organizations may choose to do that, we have a stenographer here who will be making a verbatim record of everything that is said tonight. This record will be become a part of the Final EIS.

If you don't feel comfortable standing up here tonight and making a statement, you have until September 17th of this year to submit a written statement for

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

consideration in the final EIS. Keep in mind that written comments are given the same consideration as verbal comments offered here tonight.

It is now my pleasure to introduce Captain Cudnohufsky.

CAPTAIN CUDNOHOFSKY: Thank you, Vida.

Aloha and good evening to you all. I'm Captain Aaron Cudnohufsky, commanding officer of Pacific Missile Range Facility and the Hawaii Range Complex Coordinator.

Welcome to tonight's hearing on our Draft Environment Alt Impact Statement on the Hawaii Range Complex. In just a few minutes Mr. Neil Sheehan will get up and give a brief presentation on the draft document. I have just a couple things to say, but I'll keep my comments short so we can get to your comments, which really is why we're here tonight.

First I would like to thank Kahu Wendell Davis. Thank you for that wonderful prayer that opened this evening's event. Mahalo, Wendell. Thank you for the blessings on this evening's events.

As many of you know, Hawaii Range Complex is a collection of significant testing and training capabilities throughout the state. The new technology that is tested here, along with the vital training that is conducted, is of

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incredible importance and value to our nation. Our sailors, marines, soldiers, airmen and Coasties depend on the training to hone their skills before we send them into harm's way. They also deserve the best technology our country can provide them. We owe them this much: The opportunity to train and be equipped so we can help keep them as safe as possible. The Hawaii Range Complex contributes in both ways to do this. In testing and training, we have the best facilities available.

At the Pacific Missile Range Facility we employ nearly 800 civilians. These are predominantly Kauai people, from families that have provided generations of dedicated and capable people to our work force. It is from this talented pool that we entrust our most important work: From the management of our Missile Defense Agency programs, to qualifying our nation's newly selected submarine commanders, you'll find people born and raised on Kauai and Hawaii involved.

We are the largest high tech employer on Kauai, but what we do is not just about technology and employment. We recognize our responsibilities as stewards of a very special place. We are very proud of our accomplishments and hopefully you had a chance to visit our poster station on environmental stewardship and talk to our folks about that.

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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We take a formal approach to our environmental management, but our success can also be attributed to the input we receive from the community. And as I have stated before, Kauai families work here and they really do care about their environment.

Speaking of input from the community, that's why we're here tonight, so I'll wrap up my part of this. I can't stress enough how important your involvement is in tonight's effort. You have taken time from your busy lives and jobs to participate in this democratic process and we appreciate that. Let's make this time to share not only our views, but our respect for one another. Mahalo.

(Applause.)

MR. SHEEHAN: Good evening, everyone. My name is Neil Sheehan and I'm the Project Manager for the Hawaii Range Complex Environmental Impact Statement. I am here to discuss the findings contained in the Draft Hawaii Range Complex Environmental Impact Statement or EIS and the Draft Overseas Environmental Impact Statement or OEIS.

This Draft EIS/OEIS was prepared by the US Navy to comply with both the National Environmental Policy Act and under the President's Executive Order 12114 which requires environmental analyses for activities that occur outside of 12 miles from land. The environmental study has been ongoing for several years.

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In order to receive the public's input, the Navy conducted scoping meetings on Oahu, Hawaii, Kauai and Maui in September of this -- of last year; now the Navy is receiving input from the public at this Draft EIS stage of the process. The current schedule shows that the Navy could be signing a record of decision in May of 2008 and it's critical to the Navy decision makers to receive comments from the public.

In order to help facilitate receipt of comments, the Navy will be receiving comments this evening. The Navy will also accept comments via fax, regular mail, e-mail and through our website. As stated earlier, the deadline for receipt of comments is September 17th.

This Draft EIS/OEIS studies Navy training activities within the Hawaii Range Complex as shown here. It also analyzes research, development, test and evaluation done by other federal agencies, to include the Missile Defense Agency. The Hawaii Range Complex consists of surface, subsurface and special use airspace in and around the main Hawaiian Islands and is an area in which the Navy has been conducting training for many decades.

It also includes what's referred to as the Temporary Operating Area or the TOA, which is a large area north and west of Kauai. The TOA is used for missile testing and evaluation for short periods of time.

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There's one thing that the Draft EIS/OEIS does not do is request the use of any new air, land or sea space. It represents current and anticipated future usage within the existing footprint. The Hawaii Range Complex is important because it is the largest and most used Navy Range Complexes in the Pacific region. It provides vast open spaces for large exercises like the biennial Rim-of-the-Pacific Exercise or RIMPAC. It also provides enough air and sea space to conduct missile testing. Its central location allows for other nations' military services from North and South America, Asia and Australia to meet for training exercises.

It is critical for those units stationed in Hawaii to train locally without having to travel great distances in order to remain proficient with their training. The complex provides irreplaceable capacity for the Navy to conduct essential training and testing, and this training is absolutely vital for the safety of our nation's sailors and marines and ultimately for the well-being of our country.

The Navy has not been doing this alone. The Navy has been working with many partners throughout this draft process. We have sought assistance from National Marine Fisheries Service and have worked closely with their experts in trying to quantify potential effects on marine life that may be associated with Navy training activities.

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Additionally, the Missile Defense Agency, the Army and the US Department of Energy have been partners in our efforts. Finally, we've been coordinating with experts from various state and federal agencies to ensure that impacts on the environment are properly identified.

The EIS/OEIS proposes to conduct current and emerging training and defense-related testing and evaluation of new technologies within the Hawaii Range Complex and to upgrade and modernize the existing range. The action is needed to ensure that our sailors and marines are trained and that they remain at a high state of readiness and that advanced technologies are able to be tested and evaluated and ultimately available to the military. The majority of the this training proposed and examined in this EIS/OEIS occurs out in the open ocean.

The document analyzes three alternatives: The no action and two action alternatives. The no action includes those training activities that currently occur in Hawaii to include a RIMPAC Exercise and up to six Undersea Warfare Exercises annually, and it captures the typical test and evaluation activities like missile launches from the Pacific Missile Range Facility.

Alternative One includes the activities in the no action alternative and additionally, it studies: Potential impacts on the environment that might be caused by

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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increased Navy training in Hawaii; enhancements or improvements to existing training facilities; upgrades for missile launches; and impacts on the environment that two aircraft carriers training together during a RIMPAC Exercise would have.

Alternative Two is the preferred alternative and includes all those actions in the no action alternative, all the activities that are in alternative one as well, and studies a three-carrier exercise, a slight further increase in training, and the support required for some future high technology initiatives.

The draft EIS/OEIS evaluated thirteen separate environmental resource areas, such as biological resources, cultural resources, and health and safety, to determine the potential effects of ongoing and proposed activities. Additionally, the affected resource areas were analyzed at six different locations within Hawaii: On Oahu, Maui, Hawaii, the Northwest Hawaiian Islands, the open ocean and Kauai.

In this DEIS, the analysis to date does not identify significant adverse impacts identified for any resource area and any geographic location within the Hawaii Range Complex that could not be mitigated. However, this document is at the draft stage and the Navy welcomes any

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comments on its draft findings or its method of analysis.

The Navy does not expect to cause to marine mammals but it recognizes the potential impacts on marine caused by its use of sonar is controversial. Based upon input from the National Marine Fisheries Service and nongovernmental organizations, the Navy has incorporated the best available science to assess the potential impacts to marine mammals caused by mid-frequency active sonar. This methodology is called the dose function and it has been used by the Environmental Protection Agency in other environmental contexts, and now is being used for the first time to assess mid-frequency active sonar's impacts on marine mammals.

However, what this method cannot do is include in its calculations all of the procedures the Navy has in place to protect mammals. These procedures include: Personnel training; exclusion zones for detonations; power down and power off procedures for the sonar when the mammals are a certain distance from the sound source; and passive detection of mammals.

The Navy is also working with the National Marine Fishery Service to develop a monitoring plan that will assist our agencies identifying possible effects on marine mammals in the main Hawaiian Islands to better assist the Navy in future analyses.

Finally, the schedule here shows four public

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hearings on the Draft EIS, and we're currently conducting the last one here tonight in Hilo. As I stated earlier, the schedule anticipates a potential final decision being made in May of 2008. The Navy welcomes your verbal comments now and your written comments tonight or sent in via fax, mail, e-mail or on our website by September 17th.

Mahalo.

(Applause.)

MS. MOSSMAN: We are ready to begin listening to your comments. To ensure that we get an accurate record of what is said, please help me respect the following ground rules: First, speak clearly and slowly into the microphone, starting with your name and any organization that you represent.

Second, each person will have three minutes to speak. This time limit includes public officials, organizational spokespersons, and private individuals.

Third, if you have a written statement, you may turn it in at the registration table and/or you may read it out loud within the time limit.

Fourth, please honor any requests that I may make for you to stop speaking if you reach the three-minute time limit. To aid you in knowing when your time is almost up, my assistant will hold up a card when you have 30 seconds left. This should allow you to find a comfortable place to

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wrap up your comments.

Finally, please remember that no decision is being made tonight. The main purpose for the government representatives being here tonight is to learn of your concerns and suggestions firsthand.

Our first five speakers, in order, will be: Cory Harden, Larry Sinkin, Lynn Nakkum, Reynold Kamkawiwaole, and Kalei'ileihi Muller.

Cory.

D-T-0075

MS. HARDEN: Hello. I'm Cory Harden with Sierra Club Mokuula Group making comments for Sierra Club. I appreciate the Navy folks taking time to come and give us information. Having said that, I have many concerns about their past, present and proposed actions in the Hawaiian Islands.

1

First on sonar, the Navy should not receive the blanket permit it is seeking. Sonar has been linked to whales dying from the bends after boiling to the surface in panic. Earth Justice says intense sonar sounds can rupture marine mammals' hearing organs and result in strandings and death. Sonar can interfere with marine mammals' ability to navigate, hunt, and take care of their offspring and avoid predators.

Earth Justice in Honolulu just filed a court motion to stop the Navy from using high-powered sonar in an

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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exercise this November. Federal judges have shut down sonar or mandated increased precautions several times, including 2006 in Hawaii and this month in California. In the California case, the Navy itself predicted permanent injury from sonar to almost 500 Cuvier's Beaked Whales when only about 1,000 may be left off the US West Coast.

"Taking precautions to protect marine life during sonar use would not reduce Navy ability to respond to actual threats," says the National Resources Defense Council. When I sought expert opinions on sonar I was told, "This is a delicate issue because over half of the marine mammal research in the US is funded by the Navy." In 2002, scientists funded by the Navy made negative comments on an EIS. An Office of Naval Research official phoned and chastised them, then e-mailed a copy. "I think they had some inkling they might be about to talk our money and make themselves look good to the enviro's, too."

2

Second concern: Navy actions added to other military actions in Hawaii will cause large cumulative impacts. Depleted uranium was found at Schofield and Waikoloa, it's suspected in Lahua Valley. The Navy itself has definitely fired depleted uranium into the hills above Aiaia in 1994. It was never found.

Future plans for the Striker will cause severe soil erosion and dust, increased wild fires, impact

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3

sensitive species, spread nonnative species, bring noise from helicopters and explosions, destroy archeological and Native Hawaiian cultural resources, and restrict Native Hawaiian access to traditional sites.

Past and current military actions have left almost 800 contaminated military sites in Hawaii. One site is Pearl Harbor Naval Complex, which itself contains about 750 contaminated sites. Almost 5 million gallons of low-level radioactive waste were discharged into Pearl Harbor in the 1960s and '70s. More than 8,000 tons of chemical munitions were dumped off Oahu about 1940 to 1970. It seems there's little money for cleanup of past hazards, but plenty of money to fund a shift in forces to coastal and Pacific areas that will bring even more hazards.

MS. MOSSMAN: Cory, your time is up. Thank you very much, Cory.

4

MS. HARDEN: Third concern, the greatest chemicals will fall on the Northwest Hawaiian Islands from missile flights and intercepts.

UNIDENTIFIED SPEAKER: I would like to give her my three minutes.

MS. MOSSMAN: Sorry, Cory, your time is up. Cory.

MS. HARDEN: Also, high-ranking officials in the Fish and Wildlife Service --

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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D-T-0075 (cont.)

MS. MOSSMAN: Cory, your time is up right now. Ms. Harden, please.

MS. HARDEN: Thank you.

MS. MOSSMAN: Thank you.

(Applause.)

MS. MOSSMAN: I would appreciate it if you would just glance this way once in a while so you know when you've got 30 seconds left. Mahalo.

D-T-0076

MR. SINKIN: Hello. My name is Larry Sinkin. I'm appearing tonight as Alii Manao Nui for Alii Nui Edmund Keali'i Silva of the Kingdom of Hawaii.

1

Here tonight the United States Navy represents the United States government in our eyes. We understand that the underlying agenda of the United States government is to use Hawaii as the forward base for your planned war with China. The potential environmental impact of putting Hawaii in this position will never be the subject of an EIS.

The real question that should be of concern to you tonight should be how the Navy's behavior reflects on the reputation of your government. As a general matter, the Navy behavior I have observed personally since 1998 in these islands can best be characterized as arrogant, lawless and disrespectful. I have submitted written comments detailing many examples of these three characteristics. I will touch

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D-T-0076 (cont.)

on only a few.

An example of arrogance is intimidating the United States Congress into changing the laws that prevent you from doing exactly what you want to do, regardless of whether or not those laws are the product of common sense and intelligent debate. An example of lawlessness is having to constantly be sued to gain your compliance with environmental laws. I myself have done that on many occasions. An example of disrespectfulness is ignoring the evidence gathered by people on this island that showed the humpback whales fled from your test area almost as soon as you turned on the low-frequency sonar in 1998. You have never acknowledged that evidence.

2

Your past attitudes and actions make abundantly clear why nothing short of complete independence will ensure these islands are truly cherished and protected. I'm not here to comment on your Draft EIS. I know that the entire EIS process is simply an exercise for you. You conduct this exercise solely to escape from legal oversight. You will do what you will do because you have made yourselves who you are.

3

We offer a place known for ho'oponopono. One meaning of that healing process is acknowledging when you do something wrong. From that acknowledgment comes a healing process that brings you back into alignment with the natural

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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D-T-0076 (cont.)

world and makes you an agent of peace within the human family. When you are finally ready to put down your weapons and start your healing process, we will be here to help you. In the meantime, we will not waste your time and ours by continuing to participate in predetermined processes like this one. [4]

Thank you.

(Applause.)

MS. MOSSMAN: Lynn.

[D-T-0077]

MS. NAKKUM: My name is Lynn Nakkum and I'm here tonight to represent the whales. I'm concerned and dismayed that the US Navy insists upon this plan to do their sonar exercises in the Hawaiian Range Complex of the Hawaiian Islands. I have now read the environmental impact analysis in your report, those few pages, and I think it is a very bad idea.

The whales are not a category. No. They're just lumped under Biological Resources along with seaweed, crabs, plankton and other exciting species which I'm sure won't be very bothered by the sonar. But sonar kills whales. We know that. Back in 1998 there was a baby whale that coincidentally died when you were doing your sonar testing here. [1]

Every official that I spoke to before this meeting started said, "What baby whale? Hmmm. Never heard

COMMENT NUMBER
D-T-0077 (cont.)

of that." But you have heard of the 11 whales in the Bahamas and you have an answer for it now, but when I read that report in the newspaper in 2000, the Navy's immediate statement was, Coincidence. Had nothing to do with what we were doing. I understand that the admission has been made since then that they did have something to do with it, but that situation, I was told tonight by five different people who grouped around me, that there's nothing to worry about. Those conditions will never occur again. That was a narrow space between islands, it was very deep and those were beaked whales, which we don't have, and, therefore, no parallels at all.

Well, I'm here to say that the whales have probably been coming here for 50 to 100 thousand years or more, that they were here first and I think that they have a right to be here. I've been told that what the Navy is doing is according to law, that they have to practice an exercise. Well, there is a higher law and that affects the whales and us and our relationship to them.

Sonar is like terrorism to whales. It doesn't just kill them by hurting their eardrums and making them unable to stabilize underwater. As was mentioned by Cory Harden, it can just cause them to go to the surface and die because they die of bends. They get bends like we would if we shot to the surface in a hurry because we didn't know [2]

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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what the heck was going on. Can you imagine coming across 2,000 miles of ocean with nothing but the sound of other whales to listen to, because that's really all there is out there, and all of a sudden you hear an excruciating sound that pierces your body through your eardrums? Well, wouldn't you be a little scared? You know, they can't read these reports. They don't know that this is good for them.

The Navy's attitude can be expressed succinctly by just that simple reference, calling whales just biological resources. Whales don't just exist as a resource to humans. I think it's the height of conceit to think so.

MS. MOSSMAN: Thank you, Lynn. Your time is up.

MS. NAKKUM: Okay.

MS. MOSSMAN: Thank you very much.

(Applause.)

MS. MOSSMAN: Mr. Kamkawiwaole.

MR. KAMKAWIWAOLE: First time I've got something to speak in one direction. Should be faced to the people. Can I face it that way?

MS. MOSSMAN: Yeah. What I'll do -- You know, I guess it's pretty hard to see the 30 seconds. What we'll do is I'll say real quietly you've got 30 seconds.

MR. KAMKAWIWAOLE: Aloha.

AUDIENCE: Aloha.

COMMENT NUMBER: D-T-0078

1

MR. KAMKAWIWAOLE: My name is Reynold Kamkawiwaole Kamehameha Ikahi, which means, basically, I am a person that has no fear in my face. I am 60-percent Hawaiian and I also have Caucasian blood, so I can speak of both sides. I am here together with Kalei'ileihi and we are the twin flanks of God. We represent God in a different fashion, in a different way as we come up here to explain to you why you should not even think about this.

All of you here are about to experience and receive an amazing message that was sent today by our family of the ocean family and of the Hawaiian seal monks. I am here in desperate request to the Navy to stop what you are doing because each and every time you do it, it is affecting each and every one of us.

One thing you should know, as a Hawaiian, what affects the aina, what affects the ocean, affects us. We have been stopping people to say to them listen, and don't listen only with your ears, listen with your eyes. Because we are talking about peace and peace is only the way of God. And if we are to represent those that are here today as Hawaiians and those that come here to support the Hawaiians and their belief and what they believe in their attachment to the relationship to each and every segment of the ocean. Every segment, that includes everything that's in the ocean. That is part of our land. That is part of who we are. We

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-T-0078 (cont.)

are (Hawaiian - demertis). We come from (Hawaiian - mo'o). And there's a lot of Hawaiians here that needs to know that because you represent (Hawaiian - mo'o) and you are the masters here and we tell the people here what we're going to do and we tell them what is their responsibility.

Number one, you do not hana ino any part of the places outside here, up there, whatever they may be. You don't drop your rubbish in there. You do not change anything. They will respond, the ocean family will respond. Your evidence, the Navy, will be pictures that you will receive. I promise you that.

MS. MOSSMAN: Thank you, Mr. Kamkawiwaole.

MR. KAMKAWIWAOLE: And let me introduce to you now Kalei'ileihi Muller.

MS. MOSSMAN: Thank you. Your 30 -- your three minutes are up.

MR. KAMKAWIWAOLE: My wife. Okay.

MS. MOSSMAN: Thank you very much.

(Applause.)

D-T-0079

MS. MULLER: Aloha. This morning I received a channel message from our ocean family and I would like to share that with you. I want to know they come and offer this to you in love.

(Statement in Hawaiian.)

Ue uwe, ue uwe, ue uwe. At this time I'm

COMMENT NUMBER: D-T-0079 (cont.)

seeing the whales and hearing their cries. Ue uwe, ue uwe, ue uwe. Lamenting cries. This is their message from the ocean family. We beseech you, listen, you know not what you do. You know not what you do. It is only the arrogance of man's egos that will not allow him to listen. Listen, we are communicating to each and every one of you. We are family. What you do to us you do to yourselves. We beseech you, listen.

Even now we communicate to you in the millions. We are your ocean family. We are the whales. We are the dolphins. We are the turtles. We are the monk seals. We are all family. There will be untold damage to ocean life, all ocean life, for we are a chain, a web all connected to you.

1

We beseech you, listen to our cries. You are hurting us and yourselves. The planet cannot sustain this kind of damage. If only you knew how precious we are, how invaluable we are to you and your children's children.

Ue uwe, ue uwe, ue uwe. You are hurting us

2

and yourselves. Please, we beseech, stop your war games and listen. We are speaking to you and to yourselves. There are scientists who are enlightened and can verify this transmission.

Ue uwe, ue uwe, ue uwe. You do not know enough about what you are doing. You do not know about the

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-T-0079 (cont.)

harm that you are doing.

Ue uwe, ue uwe, ue uwe. We beseech you, listen. Are you having headaches? Are you feeling nauseous? Are you feeling -- having sleepiness?

MS. MOSSMAN: Thirty seconds.

MS. MULLER: Are your nerves touching you for no reason? Are you hearing a faint drumming in your ears? Are yours eyes becoming blurry? Listen with your eyes, we beseech you. We are your ocean family. We are one with you. Ue uwe, ue uwe, ue uwe.

(Applause.)

MS. MOSSMAN: Our next five speakers are: Michael T. Hyson, Duane Erway, Ashley Heard, Jim Albertini, and Lee Tepley.

Excuse me. Are you Michael Hyson?

D-T-0080

MR. HYSON: Oh, yes. Thank you. Yes. I'm Michael Hyson, Research Director, Cetaceaous Institute, Puna, Hawaii. I'm glad to be here to speak on behalf of the cetaceans.

One of our outreach projects is called the Cetacean Commonwealth, an effort to achieve the rights and recognition that the cetacean, who are self-aware, superintelligent beings, deserve. They've had brains larger than ours for the last 30 million. They have a symbolic language with at least a trillion symbols. They know what

COMMENT NUMBER: D-T-0080 (cont.)

they're doing. They heal children of autism. They heal people of depression. They've been our companions and shown us how to live and shown us civilized behavior for millions of years. They may have had something to do with why civilizations arose on many rivers. And we're now learning through the process of human underwater birth and other processes how much they can enhance our life.

This is a new way of looking at our whole evolution as aquatic beings. Look at your noses. They're aquatic adaptations, along with your tears, the lack of hair, the subcutaneous fat, the position of the breasts and on and on. We are aquatic creatures and we co-evolved with the cetacea. We call it the delphic tradition brought forward, typified by the Greeks where they fished together, which is still going on here, in Australia, in the Amazon in the Martania. And they helped our development. We are co-evolved together and that respect should be shown to them.

And they are much beyond biological resources. They are the progenitors of our civilization as a whole, you know. They are the memory that allows us to redevelop civilization between catastrophes, asteroid strikes, ice ages and so on. And they are attributed to founding civilization by at least seven major cultures including China, India, Babylon, Greece, the Dogon in Africa and so on. And this is all becoming clearer and clearer.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-T-0080 (cont.)

And this was all well laid out by John Lily, who I note that the current Navy marine mammal researcher has yet to hear of. And so I commend him to the work of John Lily, who showed the quality of their brains and cognition at least 60 years ago now. And Wayne Batteau, who had them up to 50 words in Hawaiian, where they've done better than any other creature on language. And since they have own language and they have full cognizance, we should treat them like that.

MS. MOSSMAN: Thirty seconds.

MR. HYSON: So instead of treating them as biological resources, we must treat them as the sentient beings they are at the level of the State Department, at least, and the UN, through treaty like we would with any other real people who are sentient and so on. And it is the UN Year of the Dolphin, so it seems appropriate for the Navy to begin treating the cetacea as the sentient beings they are instead of biological resources in an environmental impact statement, blah, blah, blah. **1**

MS. MOSSMAN: Thank you, Mr. Hyson, your time is up.

MR. HYSON: And one other -- Just to mention, we're working on an interspecies birth cohort so we can raise humans and dolphins together.

MS. MOSSMAN: Mr. Hyson, thank you very much.

COMMENT NUMBER

D-T-0080 (cont.)

Thank you.

MR. HYSON: And improve our communication. Thank you.

MS. MOSSMAN: Thank you, Mr. Hyson.

(Applause.)

MS. MOSSMAN: Duane.

D-T-0081

MR. ERWAY: Aloha. My name is Duane Erway. I'm leaving copies of a longer, very detailed description of what is wrong with the Navy's use of sonar with you. And for my oral testimony, I will make my statement less scientific. **1**

There is a high likelihood that the beaked whales here, which we have several species including the Cuvier Beaked Whale, and the monk seals will be negatively impacted and harassed by the Navy's mid-frequency sonar. Scuba divers have the same problems. Two percent of the Navy's scuba divers tested in a very severe aversion with a fairly modest signal level of about 148 dB and the sonar puts out 235 dB.

On March 15th, 2000, 17 whales of four species including the Cuvier Beaked Whales stranded themselves in the Bahamas right after the Navy conducted a sonar during an anti-submarine warfare exercise using the mid-frequency sonar. The National Marine Fishery Service and the Navy have considered the strandings to be highly likely linked to the sonar test. High decibel sonar tests in other

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER D-T-0081 (cont.)

parts of the world also coincided with stranded whales, but the Bahamas test was the first clear cite of internal damage linked to the test. And the stranded whales may only have been the tip of the iceberg. Subsequently Earth Watch teams sighted no Cuvier Beaked Whales in the Bahamas. There is a corroborating website in my written testimony.

The workshop -- a very important workshop organized by Dr. Roger Gentry of National Marine Science Foundation on May 19, 2002, examined the theoretical reasons for why the whales beached.

MS. MOSSMAN: Thirty seconds.

MR. ERWAY: Dr. Potter showed that the likely culprit was sound activation of bubbles in the animal's blood. A troubling conclusion in the theoretical work showed that the sound level for which this occurs is very, very low. It takes only a small received signal level that can induce bends in the saturated blood of the whales.

MS. MOSSMAN: Thank you, Mr. Erway. Thank you. Your time is up.

MR. ERWAY: Okay.

(Applause.)

MS. MOSSMAN: Ashley Heard is not here, so we'll go to Mr. Jim Albertini.

D-T-0083

MR. ALBERTINI: Thank you. Aloha. Good evening. I'll be submitting written testimony, but tonight I

COMMENT NUMBER D-T-0083 (cont.)

1

would just like to address a few points that I think this environmental impact statement needs to address the Navy's cumulative environmental impact in Hawaii. And we need to first realize that the Navy got Pearl Harbor as part of a deal under the Bayonet Constitution of 1887 of the Hawaii sugar planters. It was a deal that gave exclusive control to the Navy in exchange for the Navy's backing in a few years of the overthrow of Hawaii in 1893 when the Navy ship the BOSTON landed marines to assist the sugar planters in the overthrow.

Since that time it's been one horror upon another horror. All of our mothers have told us that you don't even consider making a new mess 'til you've cleaned up your old mess. Well, the Navy has a lot of cleaning up to do. Pearl Harbor was Hawaii's Mother Pearl. The Navy raped, plundered and trampled our Mother Pearl. Today there are 750 toxic sites in Pearl Harbor alone instead of the hundreds of fish ponds that once were the home to Pearl Harbor.

The "Honolulu Star-Bulletin" of April 4th, 1979, an article written by Staff Writer Nadine Scott entitled "Nuclear Waste" quotes that in the years 1964 to '73 the Navy dumped nearly 5 million gallons of radioactive liquid waste into Pearl Harbor and over 2,000 55-gallon steel drums of radioactive solid waste from the repair and overhaul of reactors at Pearl Harbor. Dumped those steel drums on the ocean floor off of Oahu's southern shores.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0083 (cont.)

In 1969 the American -- the aircraft carrier THE ENTERPRISE had an $80-million accident of bombs exploding on it, taken into Pearl Harbor for emergency repairs. It was the year of the largest oyster kill in Pearl Harbor's history.

Nuclear accidents by the Navy are considered classified, that the people of Hawaii have no right to know and nothing to say about such accidents. All of these things need to be addressed and investigated further as part of the cumulative impact in the environmental impact statement.

In addition, the connection of electromagnetic radiation and tenants in Wai'anae and (Koolea) Valley, to the Down's syndrome increased numbers in Wai'anae.

MS. MOSSMAN: Thirty seconds.

MR. ALBERTINI: No live fire by the Navy or inert fire should be taking place at Waikoloa Training Area that's now documented to contain depleted uranium. Any inert fire can further disperse the radioactivity that's there. No inert fire. Clean up the ordinance dumped off the South Kohala Coast and right out here in Hilo Bay.

I think you know in the long and short of it all we're all in the same boat as the (Ahini Marusch) that was cut in half by the US Navy's hotrod submarine commanders.

MS. MOSSMAN: Thank you, Mr. Albertini, your

COMMENT NUMBER
D-T-0083 (cont.)
D-T-0084

time is up.

MR. ALBERTINI: It's time to take back Pearl for the people. Aloha.

MS. MOSSMAN: Thank you.

(Applause.)

MS. MOSSMAN: Lee Tepley.

Mr. TEPLEY: By way of introduction, I might say I have a PhD in physics and about five years ago I spent a lot of time investigating possible effects of mid-frequency sonar on marine mammals.

And the gentleman in the brown shirt that made these introductory remarks commented that he does not expect -- the Navy does not expect to cause any damage to marine mammals. And that is a statement that I think is totally out of touch with reality. A great deal of damage to marine mammals has already been demonstrated in the Bahamas as mentioned by Duane Erway, and also the Canary Islands for strandings that took place after sonar tests and probably in many other locations. So there will be damage to marine mammals. It's just a question of how many. And the idea of saying none is kind of ridiculous.

Now, I presented a paper about five years ago to the workshop put on by the National Marine Fisheries and that's when I became acquainted with this paper by Dr. John Potter that Duane Erway has already mentioned. Dr. Potter

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0084 (cont.)

based on earlier work, including some by Navy scientists, made a very good presentation showing that mid-frequency sonar has the potential to kill whales even at very, very low levels. And this is due to a rather complex, indirect mechanism having to do with something called bubble activation. It's kind of like the bubbles are sort of there inside the animals waiting to start and the sonar can just get the bubbles goings. And this has occurred when the whales are down deep and then they will come up too fast and get the bends. And this is probably the main reason for the Bahama strandings and other strandings. — 1

And I have also been working recently on some work trying to make the Hawaii superferry act responsibly and I have gotten this rather interesting correlation that cruise ships are -- in the Hawaiian waters are not known to hit whales and this -- and so why not? And just recently I've really become fully appreciative of the fact that they're probably hitting a lot of whales and it's not being reported. And this is the kind of thing that -- in the strandings in the Canary Islands and other places are not likely to be reported, either. So one of the things that happens comparing Hawaii to the Canary Islands --

MS. MOSSMAN: Thirty seconds.

MR. TEPLEY: Whales are probably being killed in both places and it's just not being reported. And so why — 2

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D-T-0084 (cont.)

not? I don't think the cruise ship people are going to report when they hit the whales in Hawaii and I don't think the Navy is going to report when they kill beaked whales when it's found floating around. So this is the kind of real world that we live in and it's kind of -- I know that's kind of the way it is.

MS. MOSSMAN: Sir. Sir.

MR. TEPLEY: It's not a question of how many whales are being -- whether they're being killed or not -- — 3

MS. MOSSMAN: Mr. Tepley.

MR. TEPLEY: -- it's how many dead whales are acceptable. Thank you.

MS. MOSSMAN: Thank you.

(Applause.)

MS. MOSSMAN: The next five speakers will be: Dwight Vicente, Hans K. Mortensen, Frank Vesperes, Moanikeala Akaka, and Jon Olson.

MR. VICENTE: Good evening. My name is Dwight Vicente. — D-T-0085

ES 1.2 Background, line 21 to 33, they fail to tell you the true history of the Navy, United States Navy, their activities and their constitutional authority, which is not for conquest. It was only designed to prosecute piracy on the high seas by treaty. The history here in Hawaii was to replenish supplies, recover wrecked ships and take shelter

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0085 (cont.)

from storm in the prior treaties with the United States and the Kingdom.

After 1887 they acquired Pearl River, which is known as Pearl Harbor. Under Article 1, Section 8, Clause 17 there is no authority for the United States even by treaty to have a harbor in a foreign country. It's not authorized. Now you look at the -- after January 13th -- or January 17th, 1893, the Navy, which illegally had land forces attached to the -- on the Navy ship, which is illegal under the US Constitution Article 1, Section 8, Clause 12 and 13. They're separated for a reason.

They participated with illegal activities, overthrowing the monarchy. And this is because of what the queen had done on January 13, 1893. She signed a lottery into law to abolish taxes and get rid of the foreign voters, which was American citizens, and that's why the Navy participated in the illegal overthrow. And then they took over from there. And all of this history has been for conquest, which is in violation of United States Constitution and international law.

So there is no federal property here. For the people that say there's Pearl Harbor, there is no federal property. They should look at the US Constitution and look at the history. So the US Navy right now is trespassing. 1

The Kingdom's treaties end in 1898 so the US Navy should go

COMMENT NUMBER
D-T-0085 (cont.)

home until we have a treaty with them again. I'll close at that. Thank you.

MS. MOSSMAN: Thank you, sir.

(Applause.)

MS. MOSSMAN: Hans.

MR. MORTENSEN: Ladies and gentlemen, aloha.

AUDIENCE: Aloha.

D-T-0086

MR. MORTENSEN: My name is Hans Mortensen. I am representing this evening the community of Keaukaha on Hawaiian Homelands, which is located directly north of the Hilo International Airport Runway 826 down toward the beach area, so I would like to share some of our thoughts and concerns.

I would like to submit my comments and concerns in regard to the Department of Navy's Draft EIS/OEIS to evaluate some environmental effects on our community of Keaukaha, concern about environmental impact generated from increased military presence on the surrounding communities of the Hilo International Airport, including the Department of Hawaiian Homelands community of Keaukaha. We understand that on the island of Hawaii impact areas will be the Pohakuloa Training Area and the Bradshaw Army Airfield. We believe that the Hilo Airport will be impacted, also. 1

We believe that the current negative effects from the noise and air pollution at the Hilo Airport will be

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER D-T-0086 (cont.)

intensified. We are concerned that increased military presence at the Hilo Airport will increase the adverse effects of the airport on our community. [2] Some of the concerns that we have are noise generated by aircraft, ground equipment that service the aircraft, and equipment that are transported by the aircraft.

Some of the examples of the aircrafts are the heavy transport jets, aircraft refuelers, fighter jets and helicopters. [4] Some of the examples of negative impacts include, but are not limited to noise pollution, air quality, and concerns of aircraft crashes and accidents impacting our community. [2] Possible increase of heavy transporter jets, aircraft refueler jets, fighter jets, and helicopters can produce an increase in toxins that are released into air that will decrease air quality and increase airport noise pollutants. [4]

So speaking behalf of our children, kupuna, our young adults, young women, young men; we feel that we will be impacted being that training is going to happen up at Pohakuloa and the airports, the harbors is a means of getting up there. So we appreciate your consideration in looking into the environmental impact and work with other programs that we are currently dealing with and make things right for the human people and the Native Hawaiians in Keaukaha. Thank you.

COMMENT NUMBER

MS. MOSSMAN: Thank you.

(Applause.)

MS. MOSSMAN: Frank Vesperes.

MR. VESPERES: Aloha. D-T-0087

AUDIENCE: Aloha.

MR. VESPERES: I'm also a member of a noise abatement at Keaukaha Hawaiian Homes land. I'm a resident down there.

And first thing is I didn't see anything mentioned about Keaukaha, the runway that affects our living area. [1] It's not mentioned about airport runway touch and go by military aircrafts. Residents along the fence lines are not protected from health hazards caused by constant start and go by the Navy and sometimes other aircrafts. Touch and goes interferes with residents trying to be normal, live a normal lifestyle. It interferes with children trying to do their regular homework and also workers who have to rest early to get up in earlier morning hours and drive freight and transport drivers. They don't all go to bed at 10:00. They go to bed at 6:00 and 7:00 in the evening and wake up at 2:00 and 3:00 in the morning. This happened to me while I was an active driver while I was working. That's the reason why I had to retire early. I didn't want to get suspended from, you know, related things that happened at night happen on my job.

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0087 (cont.)

19:15:44 So it's also an eyesore watching the Navy circle our Hawaiian Homes land all day, constantly. And deaths and ratio of human illness were pretty high among those living close to the airport when the military was doing constant flying day and nights. Touch-and-go flights still have impact on those living close to the airport runway and other locations. **2**

19:16:11 In the past we used to have meetings with officials from the DOT and also the military. It seemed to get us nowhere. Now at least we have lawyers who would listen to us and have plans that would lead us in a sound direction, yeah. So these are my comments. Thank you.

19:16:32 (Applause.)

19:16:35 MS. MOSSMAN: Moanikeala Akaka.

D-T-0088 (cont.)

19:16:44 MS. AKAKA: (Hawaiian.) My name is Moanikeala Akaka. I'm a former trustee for the Office of Hawaiian Affairs between 1984 and 1996.

19:17:06 Myself and a handful of -- a handful of us started the Native People's Movement For Justice almost 40 years ago in these islands. And, you know, there are those of us that are sick and tired of being abused by the colonialization and the militarization of these islands. Twenty-five percent of Oahu is controlled by the military. **1** There are over 50 sites on this island that have been since the Second World War that still have munitions on it that

COMMENT NUMBER
D-T-0088 (cont.)

19:17:53 have been left over.

19:17:55 Over in Waikoloa we have a situation where $10 million a year is being allocated to clear -- clean up the munitions that you have left over since the Second World War. $10 million a year and it will take 60 years at $10 million a year to remove the military rubbish that is even **2** found floating over at -- next to the Spencer -- next to the Mauna Kea Beach Hotel. It's been found in the ocean, munitions that have been dislodged from the -- from underneath the sand. Over at Wie -- I believe it is Waimea School munitions have been found by the school kids in the school yard that has been left over from the Second World War.

19:18:49 You know, you have -- The military as well as the US Navy has used us as a rubbish dump for your munitions, for your war games while we, like the people of Keaukaha have just testified, the local people who are impacted, the areas that are right next to the airport you disregard. And, you know, as we all know you're going through this series of hearings for show. Let's be honest about it.

19:19:30 You say in your EIS that the Navy admits that an increased tempo and frequency of training operations could **3** increase the potential for impact on cultural resources in sensitive areas. In the event of unexpected cultural resource areas such as human remains are identified during

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0088 (cont.)

live fire exercises, training in the area would immediately halt and the Schofield Barracks Cultural Resources Manager would be contacted. Let's be honest about this.

MS. MOSSMAN: Ms. Akaka, your time is up.

MS. AKAKA: We have had cultural resource monitors from Schofield come before us and tell us that there are over 100 --

MS. MOSSMAN: Ms. Akaka, your time is up.

MS. AKAKA: -- cultural sites have not even been pointed out by the military.

MS. MOSSMAN: We're going to take a five-minute recess. Thank you.

(Pause in Proceedings: 7:20-7:24)

MS. MOSSMAN: Our next speaker will be Mr. Jon Olson.

D-T-0089

MR. OLSON: Aloha. My name is Jon Olson. I have comment on what is missing from this. You have a statement back there that this is -- the sonar component is

1

the only way to complete the mission, but in your EIS you do not address the multi-billion-dollar, fixed, ocean-floor monitoring system that we have all paid for and why that is not sufficient to accomplish the mission.

2

On page 55 under the description of the sonar impacts you give a stated possible limit of 235 dB. Having been trained as a salvage diver, I can tell you that for a

COMMENT NUMBER
D-T-0089 (cont.)

human being that is a lethal level, as stated in even the Navy manuals. And you can exceed that if an undescribed object needs to be further evaluated with this sonar system.

3

In the public literature there is also the supersonic torpedo, which you have not addressed its impacts for testing although it's out there and we know that it's being worked on, so it can be assumed that it's going to be tested in this area, also.

It's interesting that our physicist here came across the idea of the sonar capable of pulling the bubbles out of the water, which could then be used as a defensive weapon against the supersonic torpedo. The impact against the bubble that is being created to run it would collapse and cause the vehicle to be destroyed, potentially.

Let's see. There was another issue here,

4

too. Well, getting on to your impacts around the marine sanctuary that the people of Hawaii worked quite diligently to get passed through Congress to give that area the nation's highest possible level of protection. And while the military was successful in getting itself exempted from that high protective standard, I can only assure you that we will continue to work with our legislatures to see that that is reversed because you basically say there's no impact at all up there. Ships collide. Aircraft crash. Missiles go awry. Air quality issues extend for hundreds, if not thousands of

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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D-T-0089 (cont.)

miles downwind, which your systems will operate up in the windward area.

Thank you.

MS. MOSSMAN: Thank you, sir.

(Applause.)

MS. MOSSMAN: The next speakers will be: Marjorie Erway, Manuel Kuloleio, Cynthia Piano, and Shelley Stephens or Stevens.

MS. STEPHENS: Stephens.

MS. MOSSMAN: Stephens.

Marjorie Erway.

D-T-0090

MS. ERWAY: Aloha.

AUDIENCE: Aloha.

MS. ERWAY: My name is Marjorie Erway and I represent only myself.

I am most concerned tonight with the protection of the marine mammal monument -- marine national monument. Both President Clinton and President Bush have declared the Northwestern Hawaiian Islands as a safe sanctuary for all marine life including the islands, the aina, coral, fish, marine mammals and all that is in the ocean. Safe from fishing, safe from harm, that was their intention as this particular area of the world is one of the

1

only remaining pristine sea life areas. So it stands to reason that the military should not be using it for

D-T-0090 (cont.)

practicing maneuvers either bombing or even using depleted uranium or using underwater sonar noise.

2

I live in Kona and have recently heard a talk by Dr. Robin Barry about the many species of whales that live in the Hawaiian Islands, including several beaked whale species. So guess the Navy needs to study the species of whales here more completely, because they are here.

3

I respectfully ask you to immediately stop all consideration of doing anything in the Northwest Hawaiian Islands and to protect this area completely. No desecration, please. Thank you.

(Applause.)

MS. MOSSMAN: Manuel Kuloloio, please.

D-T-0091

MR. KULOLOIO: My name is Manuel W.M.D. Kuloloio, from the island of Kauai. The W stands for Wayne, the M stands for Makahiapo, and the D stands for DeCosta. Yeah, that's my Uncle Francis Kuko DeCosta that works at the missile range that used to be a range safety officer.

Mr. Albertini, it's very good to see you. I once spent an evening at your home where you fed me dinner and allowed me to sleep on your beautiful bed under the auspices of Aunty Marion Kelly, a noted Hawaiian land tenure expert, and Ms. Mae Von Lom, an international lawyer. We were staying so that we could participate in the protests for the Makele O Puna. And so it is with great heart that I come

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0091 (cont.)

here this evening to acknowledge you and to thank you and to blame you for what you did on the Island of Kauai and on encouraging them to do that. You did your part on the island of Maui: (Aruela) Makena, Isaac Hall, my dad and Dana. That's our money fighting the superferry.

(Applause.)

1 MR. KULOLOIO: So that money came as a result of our court case against (Mandio Kauchi), the State Land Foundation and the Arts Comprador stealing lands from Ulupalakua Ranch with the help of Governor George Ariyoshi and Seibu and Land and Power, who then went to work for Seibu.

Mr. Vaclav Havel, a poet, playwright was once jailed for his humanitarian rights causes in what was then called Czechoslovakia. Little did he know that he would become the president of the Czech Republic. He once mentioned that it is more easy to be in opposition to something, but as president with the ability to effectuate and lead change, he found it difficult. He had to compromise. He had to make tradeoffs. And I compared him to Uncle Emmett Aluli. At the request of Dr. Emmett Aluli, several months before the month of September, the year 2001, I was sent on a delegation to the Island of Vieques. Snuck on to the island, I was part of an international delegation of lawyers to learn from --

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D-T-0091 (cont.)

Three minutes almost pau?

MS. MOSSMAN: Yes.

MR. KULOLOIO: To assist the people and to return of that island. And I'm proud to say that not only did we stop the bombing, but we kicked them off of Vieques. Roosevelt rose. And I'm sad to say they ain't got that much money, but the way that they welcomed me was two battle ships came across the bioluminescent bays and they shot ten rounds like boom, boom, boom, boom. I felt just like they say, Manuel Kuloloio of Maui, in trying to clean up Kahoolawe --

MS. MOSSMAN: Manuel, thank you very much.

MR. KULOLOIO: In the human world --

MS. MOSSMAN: Mr. Kuloloio.

MR. KULOLOIO: Welcome to Vieques.

MS. MOSSMAN: Thank you.

MR. KULOLOIO: I promise I never do that, but to you, Becky Harmond, you tried to help me out.

MS. MOSSMAN: Mr. Kuloloio, thank you. Your time is up.

MR. KULOLOIO: -- national laboratory to bring best technologies to Kahoolawe.

MS. MOSSMAN: Mr. Kuloloio.

MR. KULOLOIO: I requested an official investigation into the procurement --

MS. MOSSMAN: Sir, your time is up. Thank

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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you.

MR. KULOLOIO: Thank you.

(Applause.)

MS. MOSSMAN: Cynthia Piano.

D-T-0092

MS. PIANO: My name is Cynthia Piano. I'm here to represent myself. I am here to find common ground. My words are powerful. I have several basic beliefs that I think we all feel. Any of you who would like to discuss this with me after, I am open.

1

First of all, I believe that each of us is gathered here tonight to do the very best we know how to live our lives and protect our way of life. We are all powerful creators with powerful tools. We are all thankful and desire peace and beauty for ourselves, for our families, and for all on the planet. We are all related. We must all care for each other. It is time now for all of us to take the leadership on this planet to a new way of life, to live in true safety and peace. Mahalo kea kuau.

(Applause.)

MS. MOSSMAN: Shelley Stephens.

D-T-0092

MS. STEPHENS: Aloha. My name is Shelley Stephens. I'm the daughter of First Mates Stephens, Alexander Mark Stephens. As a trial base to go aboard destroyers and submarines I was supposed to be in training for one of the very first Navy Seals women cadets, you might

COMMENT NUMBER
D-T-0093 (cont.)

say, but I came to be kicked off the destroyer because the captain was bombing and I said, "You're hurting the fish and stop." And I was about ten years old and I actually attacked the captain and punched him in his face. And they dragged me off of him and sent me down to the galley and made me peel potatoes. And then after that they put me on a submarine.

And since then I've worked with Cajuns on shrimp boats and came to love the ocean and learned all kinds of things about that. But I came here to Hawaii and the Hawaiians told me about the Kumulipo, that in the Kumulipo there's actually a direct relation between the creatures of the land and the creatures of the sea.

1

I also want to mention that there is cumulative effects of everything the Navy and military does here in the Hawaiian Islands. And I'm especially concerned about the cumulative effect of heavy metals because I would like to see more specific cites on all these bombs, missiles, everything that you intend or think you're going to use in any other RIMPAC or other training.

And especially everyone has heard about Pohakuloa and the DU up there. And we have a copy of the lease, the original lease, and it appears you're in severe violation of the lease. At the time that DU was used, it specified specifically in the lease that it was atomic simulators only. And also that the military is not going to

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0093 (cont.)

clean up Pohakuloa past the fair market value of the land.

So right now -- I was speaking with Department of Land and Natural Resources, who gave you the lease, they are the trustee for the Kingdom of Hawaii, which the land and all the resources are to be returned in 2008. So I'm just wondering exactly who are you making the agreement with to do this area of training anywhere within the Hawaiian Islands, especially the Northwestern Hawaiian Islands. **2**

Also, Kahoolawe has a cracked water lens and it needs to be addressed by the Army Corps of Engineers to repair that cracked water lens. It is not holding water right now because you bombed it with enough TNT to equal an atomic bomb. **3**

Also, the issue of cultural sites. There's underwater heiaus, petroglyphs. I also want to mention Harp we don't want to be used in crowd control here. Also, the snap generators which are buried military secret dump sites and. **4** Also to please do not use any ocean mining for strategic metal. We are aware of the ocean mining proxy and the dumping within the Hawaiian Islands within our cement and soil amendments. We're very concerned that you are participating in illegal activities with China and other ocean-mining proxies through the International Seabed Authority. **1**

COMMENT NUMBER
D-T-0092 (cont.)

MS. MOSSMAN: Thank you.

MS. STEPHENS: You can contact me at PO Box 866, Pahoa, Hawaii 96778.

MS. MOSSMAN: Thank you very much.

MS. STEPHENS: That's Shelley Stevens. Mahalo.

MS. MOSSMAN: Thank you very much.

(Applause.)

MS. MOSSMAN: The next speakers will be Star Newland, Mark Van Doren, Galen Kelly, L.V. Kelly, Paul Normann, Judy Walker, and Bunny Smith.

D-T-0094

MS NEWLAND: Aloha. Thank you. Thank you all for joining us. I want to welcome you for being here and wanting to maintain the common ground that we established last year with Captain Mark Dolora on the occasion of the scoping meeting as well as Public Access Officer Tom Clemens, who is continuing to maintain rapport with us.

I'm here on behalf of the Sirius Institute and on behalf of the Cetacean Commonwealth. And we're here today to ask this: What are we going to do to assure the wellbeing of cetacea, of all their kind? **1**

As I read these very technical pages and terms and conditions, the thought comes: What if these were your children we were doing this to or some of your many thousands of requested incidental takes include your mother

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0094 (cont.)
2

or uncle or dad or sister or great, great, great grandmother or great, great, great grandfather? Could you harvest those you love so dearly in the name of anything?

Or that these takes are going to be taking place during the most critical time of any mammal mother's life, her gestation and birthing times, and in her own Humpback Whale Sanctuary. All these takes are important to the life of the pod, to the continuity of cultural information and practices nearly as ancient as the oceans, their home, as well as the continuation of these people of the seas.

Could you keep scientifically saying it is all for science so we know this? I think zero would be your heartfelt answer. And that is what we are looking to breach here: Hearts. Opening them to our common humanity and making choices for a different future together.

Could you continue to say, We need to protect ourselves against our enemies, when we could be working together to find ways to be together? We could make aloha a way of life for the world.

Perhaps we can all take a stand today that we would prefer by far to live in a more harmonious world where the need for bigger and badder means of taking life, our own and the earth's, are gone, where we can live and enjoy life in all its complexity and wonder, here to help care for earth

COMMENT NUMBER
D-T-0094 (cont.)

and each other.

Does it matter how damaging the sonar is? As important as it is necessary, or so we think, what is really damaging is the thought that it is necessary and keeps co-creating a world where this warfare mentality is acted out daily. Look around at the vast natural resources that are being bled of our lives daily to maintain this thinking and reality.

MS. MOSSMAN: Ms. Newland.

MS. NEWLAND: Everyone alive today would have enough to live a productive, helpful, supportive life where our resources could be applied to the art of harmony. Learning from the most ancient of conscious, largest brained life forms, we hope to learn how to live together, how to restore our home and how to reach to the stars together when we are ready to go ajourneying. One component of this is the establishment of the interspecies birth cohort project, a community outreach of the Cetaceaous Commonwealth, the Sirius Institute, as well as the --

MS. MOSSMAN: Ms. Newland, thank you. Your time is up. You can always turn it in. You can turn in your written comment if you prefer.

MS. NEWLAND: Thank you very much.

MS. MOSSMAN: Thank you.

(Applause.)

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-T-0095

MS. MOSSMAN: Mark Van Doren.

MR. VAN DOREN: Good evening. My name is Mark Van Doren. I would like to thank the Navy for hosting this event. And welcome to Big Island. The US military has done some wonderful things and some not so wonderful things, but it is nice to be able to voice dissent and I thank you for being able to speak.

1

Two things: When you look at the map of the HRC, you see the Marine National Monument fully encompassed by the military activity zone. Well, accidents happen, missile fail and what happens if a missile half full of fuel drops into the monument? Any number of accidents could happen. Couldn't we just shift the HRC over a little bit? You know, it's endangered.

Secondly, real quick, I don't see any mention of nuclear submarines in this report, but I assume they are a part of these exercises and they have a huge negative potential on the environment. In the 1970s a Russian nuclear sub sank some 400 miles off of Maui, where it left debris that the Glomar Explorer picked up and dropped it.

A wise woman spoke earlier of the arrogance of man, and that is so true. The possibility of nuclear war is just madness. And we need to rid the Hawaiian waters of nuclear weapons and then eliminate them entirely.

There is a reason people risk their lives to

COMMENT NUMBER

D-T-0095 (cont.)

come to the US shores. We're a great country. We really are. We have a brief moment in history as the world's lone superpower. Let's act great. Let's take the lead and lay down nuclear weapons. Thank you.

MS. MOSSMAN: Thank you.

(Applause.)

MS. MOSSMAN: Galen Kelly.

MS. KELLY: Aloha.

AUDIENCE: Aloha.

D-T-0096

MS. KELLY: I'm Galen Kelly and a proud member of Malu Aina, a nonviolent peace and justice center, and a proud citizen of the great nation of Hawaii.

And I have a little pin on my lapel here that goes back almost 40 years and it says "Save the Whales." So I've been on board for the whales for a long time, but I -- tonight I just wanted to say it's difficult for an anti-war activist to come to a military gathering, but it's necessary because we are so polarized in our ideas of how life should be lived. But Kupuna Wendell's prayer tonight kind of gave me the courage. And, also, hearing the other testimonies, I'm so proud of a citizenry that is waking up and asserting itself.

Captain, you mentioned that you were very proud of your accomplishments and I honor you as part of the human family, but I cannot honor your path. Because if I

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0096 (cont.)

Galen Kelly 57

expand the greater picture to who is giving you the orders to do what, it always leads back to war and the taking of life. Right now we have a flotilla of many, many ships sitting in the Persian Gulf ready to take another country out, millions of lives.

When I bring this up, a lot of times the feedback that comes, Well, we need a strong defense to keep us safe from the terrorists. And I think anyone that's been researching any of the events of today will know that many times it is we who instigate wars of aggression and steel resources, kill people and expand empire. And a lot of times it is to hold up the aristocracy with very little regard for the small person.

And when I look at you and I see the uniform, it used to be that the uniform meant something when my dad -- when I was growing up, but now I look at it and I see pain. And I think about the people that spoke over tonight, it's because they have pain about what is being done to them and they need 30 more seconds to try and tell you how they feel. And so the format is a little bit restrictive. But I would invite you to think about maybe taking off that uniform and laying down those stripes and really thinking about what you are serving and turning it around. And maybe some of the words you heard here tonight will come home with you and touch your heart and conscience. Because we are not naive.

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D-T-0096 (cont.)

L.V. Kelly 58

We are informed. We are awake. We know what we need to survive. And we're spiraling down and something has to really change.

MS. MOSSMAN: Thank you, Ms. Kelly.

MS. KELLY: Thank you very much.

(Applause.)

MS. MOSSMAN: L.V. Kelly.

D-T-0097

MR. KELLY: You may have noticed a relationship between the name before and the name coming up now. I'm Larry Kelly. And I'm here as a citizen and have practical questions, so -- and I also support the Mahulena Organization. I think they do great work. Thank you, Jim, for being on this planet. You're appreciated.

(Applause.)

MR. KELLY: But being practical, I guess that's what a Capricorn is, I have two questions for the -- and I'm asking them to be addressed. And one of them is:

1 How do you intend to count and monitor marine fatalities during the exercises? And who's taking the census when the fish come floating up and the other animals that are obviously wounded or have been destroyed? And what do you intend to do with that information? Will it be made public?

2 And then my second question is: How is monitoring by the citizens of the state of Hawaii being implemented so that they can report to the public in unbiased

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Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER: D-T-0097 (cont.)

19:50:06 ways as a citizen would report to other citizens as how the
19:50:13 exercises affected our wonderful state here?
19:50:17 So thank you very much. Aloha.
19:50:19 (Applause.)
19:50:24 MS. MOSSMAN: Paul Norman.

D-T-0098

19:50:29 MR. NORMAN: I'm a Nima Butu, so I'm here
19:50:36 first and foremost as a religious person, as a Buddhist. And
19:50:40 as a Buddhist, of course, warfare in all its forms is both
19:50:44 offensive and basically the greatest sin, to use a Christian
19:50:54 term. But that's not very helpful in this very practical
19:50:59 thing.

1

19:51:00 So I have two questions. Thank you for that
19:51:03 first question about how we're going to have a count of the
19:51:08 marine fatalities. And what I want to know is how the Navy
19:51:12 or the military in general are taking a census of the status
19:51:17 of this very, very large range complex before the training
19:51:25 exercises begin, before the military exercises are planned to
19:51:32 commence so that we have something before to compare it to,
19:51:35 so we have something to compare the fatalities to.
19:51:39 And then the other question, practical

2

19:51:41 question I have is: Given the vast complexity of the marine
19:51:48 environment and the fact that we really have very sparse
19:51:56 scientific understanding of the environmental complexity that
19:52:04 we don't really -- we don't even know all the species, all
19:52:07 the different environments, how they interact. How do we

COMMENT NUMBER: D-T-0098 (cont.)

19:52:13 know, really, what the impacts of the military operations
19:52:16 are? And in particular you're using live ammunition. Your
19:52:23 weapons are being used that explode, that destroy life, that
19:52:28 destroy ecosystems and so forth. And these are very real
19:52:33 impacts.
19:52:33 So I would like to see how the Navy is
19:52:36 addressing that. And it's not the '50s where -- and a lot of
19:52:42 the response in the report is a '50's response, the solution
19:52:46 to pollution is dilution. It's not the '50s anymore. The
19:52:50 planet, as we all know, is in a very, very tenuous situation.
19:52:54 We need to be very serious about taking care, minimizing
19:52:59 harm, supporting a healthy environment. And I am very, very
19:53:03 much concerned about -- thank you -- very, very much
19:53:06 concerned about how the Navy is seriously addressing the fact
19:53:11 that we need a healthy planet, we need a healthy ocean as a
19:53:17 species to continue. Thank you.
19:53:18 (Applause.)
19:53:27 MS. MOSSMAN: Judy Walker.

D-T-0099

1

19:53:32 MS. WALKER: Aloha. My name is Judy Walker
19:53:37 and I live in downtown Hilo right in the flight path of the
19:53:42 airport, so I think we've got quite enough military already.
19:53:45 I see them every day.
19:53:47 And the last name wasn't included for us, but
19:53:50 this is another husband and wife team. And this is the last
19:53:54 time I discuss things with my husband on the way to the

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0099 (cont.)

hearing because he said everything I was going to say. But just to emphasize what he was saying, I mean, I'm still -- I'm afraid I have nothing prepared to say because I'm still trying to work my way through this 1,700-page report. And it's structured in such a way that you can't even take a section and say this is what is going to happen to Hawaii or Oahu or the Northwestern Hawaiian Islands or specifically to marine mammals. It's structured in a way that you need to read the whole document to have any idea of what the supposed effects and mitigation measures will be. And I find that very frustrating. **2**

And from what I have read, I am very disturbed, first of all, by the exemptions from any kind of environmental law. I find that so offensive. And people have brought this up before, but we have a National Marine Monument, you know, we have a whale sanctuary and that means nothing once the military steps in and that is so offensive. What is the purpose of law if it's not going to protect. **3**

I'd also like to say that the science is just -- I'm using the word very loosely, because it looks to me like the environmental assessment is by inference rather than by any direct observation. We haven't seen piles of dolphins and beaked whales floating up to the surface on the beaches so we must not be hurting them. I think we absolutely need to do a real assessment of what's going on, **4**

COMMENT NUMBER
D-T-0099 (cont.)

what we're doing to these marine ecosystems.

I will be submitting detailed written comments, but I would like to point out specifically sea turtles, you know. We have six species of sea turtles that come through here. They are all threatened with extinction. The Pacific Leatherback is critically endangered and there was very little said about them in this EIS at all. In fact, they were evaluated using marine mammal data and turtles aren't mammals. **5**

And for another practical question I would like to ask: What is a survey of a marine mammal area? Does that mean one person stands there with binoculars and turns 360 degrees? You know, are they actually going to pass through and look and try to see if there are animals there? And even if they do, marine mammals and sea turtles spend most of their life submerged. **6**

MS. MOSSMAN: Thank you. Your time is up. Thank you.

MS. WALKER: Thank you.

(Applause.)

MS. MOSSMAN: Bunny Smith.

MS. SMITH: Aloha. Good evening. I'm Bunny Smith. I live in Kaokaha and I'm a Malu Aina. I first found out about this meeting on Monday when I received the newspaper and saw this outline about this meeting. Now, what **D-T-0100**

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-T-0100 (cont.)

1

happened was because I guess the document is 1,700 pages, what I got was this little outline of what was happening to -- in the areas of Pohakuloa, Bradshaw Army Airfield, Kawaihae pier.

And as I read through it, I was absolutely stunned and I started to laugh because it was so simpleminded. The rationale that was given here is to how the Navy was going to deal with the problems in airspace, biological resources, cultural resources, health and safety, noise and so forth was absolutely simpleminded. There were three ways of approaching these issues that I note that it sort of comes down to, quote, "minimize through existing regulations." We all know how very carefully the military follows their regulations.

A few people in apu graves know how the military follows their regulations. We have cases in the court in Tahiti because of the way the military follows their regulations. And we certainly know it on these islands. That was -- Those were those things. The idea of minimizing things was used -- was the word thrown out here as a pacifier, I think, for a public that might get a little uncomfortable with some of these issues.

2

The second thing is we're told that noise from the increased activity, for example, at Bradshaw and Kawaihae will have no impact. How can that be? No impact?

COMMENT NUMBER

D-T-0100 (cont.)

But it says it right here and supposedly this must have passed muster. And that at Pohakuloa the noise impacts will be minimized, that favorite word again.

3

Now, the third thing I noticed is that as far as wildlife is concerned -- This is a quote from this little sidebar. "The intensity and duration of startle responses from noise to wildlife," birds, I guess, "would decrease with the number and frequency of exposures." So somebody has decided that for the birds, how they're going to respond. No question about how this is going to affect their nesting, their mating, whatever they're doing, but it's been decided that they'll get used to the startle and that's fine.

Somebody previously said that this whole thing reflects a sense of being out of touch with reality, and I think that's true. I think it's also -- it's foolishness and it's arrogance. And I think that what we need to do is to put an end to this nonsense. Thank you.

(Applause.)

MS. MOSSMAN: Before our next speaker comes up, when he's done, we're going to take a ten-minute break to give a stenographer a break.

Okay. Mr. Koert.

MR. KOERT: Aloha.

AUDIENCE: Aloha.

D-T-0101

MR. KOERT: My name is Koert. I am a Mormon

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-T-0101 (cont.)
1

childs, and I am in the world to live my life and my love. We are all one. I feel in my whole being that the earth and all its visitors are suffering. To fill your heart now -- Also you, Captain, and you and you, everybody, when you feel the love in your hearts, how can you hurt somebody else then? There is only one way to heal each other. I am you and you are me. I am a whale and the whale is me. I am you, captain, and you are me.

My father was a soldier. My grandfather was a soldier. And I forgive everybody who made errors in this life. We all make errors and I forgive everybody. We can only live our truth and our love. And when you do this, you will not attack anybody else. Aloha.

(Applause.)

MS. MOSSMAN: We'll take a ten-minute break. Thank you.

(Pause in Proceedings: 8:02-8:12)

MS. MOSSMAN: We have no more speakers that have signed up, so we will take a recess until we do. We'll be here until 9:00. Thank you.

(Pause in Proceedings: 8:12-9:00)

MS. MOSSMAN: The public hearing is officially over.

(The proceedings were adjourned at 9:00 p.m.)

C E R T I F I C A T E

STATE OF HAWAII)
) SS.
CITY AND COUNTY OF MAUI)

I, Sandra J. Gran, Certified Shorthand Reporter for the State of Hawaii, hereby certify that the proceedings were taken down by me in machine shorthand and was thereafter reduced to typewritten form under my supervision; that the foregoing represents to the best of my ability, a true and correct transcript of the proceedings had in the foregoing matter.

I further certify that I am not attorney for any of the parties hereto, nor in any way concerned with the cause.

DATED this 12th day of September, 2007, in Maui, Hawaii.

Sandra J. Gran
Hawaii CSR 424
Notary Public for Hawaii
My Commission Expires: 5/14/08

SANDRA J. GRAN
Notary Public
State of Hawaii

COMMENT NUMBER

Exhibit 13.4.3-1. Copy of Public Hearing Documents - Draft EIS/OEIS (Continued)

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Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS

Commenter	Comment #	Resource	EIS Section	Response Text
Stewart Burley	D-T-0018-1	Socioeconomics	3.3.2.1.10	PMRF is a major contributor to the economy of Kauai County, particularly on the western side of the island. The installation employs nearly 1,000 military, civilian, and contract personnel and has a $130 million impact annually on the local economy (see Section 3.3.2.1.10).
Tony Ricci	D-T-0019-1	Program		Thank you for your comment.
Rich Hoeffner	D-T-0020-1	Policy/NEPA Process	13	The proponent agency (Lead Agency/Sponsor) is responsible for performing the environmental analysis of its actions, which for this document is the U. S. Navy. Section 1501.5 of the National Environmental Policy Act (NEPA) states that a lead agency shall supervise the preparation of an environmental impact statement. The Navy does review and consider all comments submitted during the scoping process and the public comment period. Scoping transcripts/records of scoping comments are not a part of the EIS/OEIS but are included in the Administrative Record. Chapter 13.0 includes a copy of each comment received on the Draft EIS/OEIS and a response for each comment. Although all comments are reviewed and incorporated where appropriate, some comments may be outside the scope of the document and therefore were not addressed.
	D-T-0020-2	Cumulative Impacts		Your concern regarding the Superferry is noted but is outside the scope of this EIS/OEIS.
	D-T-0020-3	Cumulative Impacts		Detailed analysis for the permanent stationing of the 2/25th Stryker Brigade Combat Team is beyond the scope of this EIS/OEIS but can be found at the following website: http://www.sbct-seis.org/. However, cumulative impacts from Army activity are considered in Chapter 5.0 of this EIS/OEIS.
	D-T-0020-4	Policy/NEPA Process		Thank you for your comment.
Diana La Bedz	D-T-0021-2	Biological Resources - Marine		Thank you for your comment.
	D-T-0021-3	Biological Resources - Marine		Your comments regarding the Pacific Coast gyre in the middle of the Pacific Ocean are noted but are outside the scope of this EIS/OEIS.
	D-T-0021-4	Policy/NEPA Process		Thank you for your comment.
	D-T-0021-5	Alternatives	4.1.2.4, 4.1.2.4.11, 4.1.2.2	See response to comment D-E-0062-2. Section 4.1.2.2 includes potential impacts on fish from the No-action, Alternative 1, Alternative 2 and Alternative 3.
Aukai Gonsalves	D-T-0022-1	Policy/NEPA Process		Thank you for your comment.
Bruce Pleas	D-T-0023-1	Land Use	4.3.2.1.8	The following wording was removed: “and do not provide a unique recreational coastal opportunity that is not being provided elsewhere on the island.”

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Bruce Pleas	D-T-0023-3	Land Use	Appendix I	Appendix I describes the circumstances by which the lands now known as PMRF came into Federal ownership. This section is not intended to represent the full or complete recitation of law(s) relating to the lands now known as PMRF.
Juan Wilson	D-T-0024-1	Cumulative Impacts		Your comments regarding the Hawaii Superferry and the stationing of the Stryker Brigade Combat Team in Hawaii are noted but are outside the scope of this EIS/OEIS.
	D-T-0024-2	Hazardous Materials and Waste		Your comment is noted; however, GML 4 experiments are not part of the proposed activities in the EIS/OEIS.
	D-T-0024-3	Cumulative Impacts		Your comments regarding the Hawaii Superferry and the stationing of the Stryker Brigade Combat Team in Hawaii are noted but are outside the scope of this EIS/OEIS.
James Trujillo	D-T-0025-1	Policy/NEPA Process		This EIS/OEIS was written by the Navy to comply with both NEPA and the President's Executive Order 12114 which requires environmental analysis for activities that occur outside of 12 miles from land. The Navy has been working with many partners in drafting this EIS/OEIS. The Navy has sought assistance from the National Marine Fisheries Services and has worked closely with their marine mammal and regulatory experts in trying to develop a method to quantify potential impacts on marine life caused by Navy activities. Additionally, the Missile Defense Agency and the U.S. Department of Energy have been partners in this EIS/OEIS. Finally, the Navy has coordinated with experts from various Hawaii State and other Federal agencies to ensure that impacts on the environment have been identified and are minimized to the maximum extent practicable.
Puanani Rogers	D-T-0026-1	Policy/NEPA Process		For 25 years, the Navy in Hawaii has been successfully implementing its Installation Restoration Program to guide the process of cleaning up contaminated sites on its bases and other areas. Cleanup is conducted in a way that protects surrounding residences, sensitive habitat, and cultural, historical, and archaeological resources. As a result, formerly contaminated sites have been returned to productive use, drinking water quality and safety has been maintained, endangered species habitat has been protected and Hawaii's rich cultural heritage has been preserved.
Elaine Dunbar	D-T-0027-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2.
	D-T-0027-2	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.
	D-T-0027-3	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Elaine Dunbar	D-T-0027-4	Health and Safety		No impacts from electromagnetic radiation (EMR) generation to wildlife are anticipated. Electromagnetic radiation emitted during electromagnetic transmitting and receiving equipment testing is not a health and safety issue. Review of recent FAA/NTSB records of helicopter incidents determined that EMR was not the cause.
	D-T-0027-5	Program		Environmental analysis does not require an exact count of materials to be used during training. Analysis is based on the type of events and activities required for training. Each training event and RDT&E activity has been evaluated for each location for effects on the environment.
	D-T-0027-6	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination.
Michael Fox	D-T-0028-1	Policy/NEPA Process		Thank you for your comment.
Wendy Raebeck --Ride the Rainbow	D-T-0029-1	Policy/NEPA Process		The DoD is a leader in environmental stewardship. As described in Chapter 4.0, the Navy in Hawaii takes seriously its commitment to environmental stewardship. The Navy has an impressive track record of demonstrating its dedication to maintaining the islands' natural environment and, in many cases, improving conditions. For 25 years, the Navy in Hawaii has been successfully implementing its Installation restoration program to guide the process of cleaning up contaminated sites on its bases and other areas. Cleanup is conducted in a way that protects surrounding residences, sensitive habitat, and cultural, historical and archaeological resources. As a result, formerly contaminated sites have been returned to productive use, drinking water quality and safety has been maintained, endangered species habitat has been protected, and Hawaii's rich cultural heritage has been preserved.
George W. Saunders, Jr.	D-T-0030-1	Policy/NEPA Process		Thank you for your comment.
Carl Berg	D-T-0031-1	Biological Resources - Marine		Kaula has been used as a target location by U.S. and Allied forces since 1952. At one time the entire island was used for training in air-to-surface and surface-to-surface weapons delivery. Today only the southeastern tip, approximately 8 percent, of the island is used for training.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Carl Berg	D-T-0031-2	Health and Safety	4.2.1.1.1.1, 3.3.2.1.7, 4.3.2.1.7	Section 4.2.1.1.1.1 details the size and likelihood of missile debris impacting threatened, endangered, or other marine species. Sections 3.3.2.1.7 and 4.3.2.1.7 and Appendix K include details of range safety, ground safety, missile flights, ocean and ground clearance areas, fire and crash safety, and transportation safety. PMRF takes every reasonable precaution during the planning and execution of training activities to prevent injury to human life and property.
	D-T-0031-3	Air Quality	4.3.2.1.6.1	Navy does not anticipate the type of described degradation due to on-pad fires. The language has been modified in Section 4.3.2.1.6.1 based on this comment.
	D-T-0031-4	Alternatives		Thank you for your comment.
Jeff Connolly	D-T-0032-1	Policy/NEPA Process		Thank you for your comment.
	D-T-0032-2	Alternatives		Thank you for your comment.
	D-T-0032-3	Biological Resources - Marine		Thank you for your comment.
	D-T-0032-4	Program		Thank you for your comment.
Mahelani Sylvia	D-T-0033-1	Policy/NEPA Process		Thank you for your comment.
Ken Taylor	D-T-0034-1	Alternatives		Thank you for your comment.
	D-T-0034-2	Biological Resources - Marine	5.2.1.3	Section 5.2.1.3 has been added to discuss anthropogenic sources of ambient noise that are most likely to have contributed to increases in ambient noise. These include vessel noise from commercial shipping and general vessel traffic, oceanographic research, and naval and other use of sonar.
Louis Parraga, Jr.	D-T-0035-1	Policy/NEPA Process		Thank you for your comment.
Marti Townsend --KAHEA, the Hawaiian Environmental Alliance	D-T-0036-1	Policy/NEPA Process	13	The Navy does review and consider all comments submitted during the scoping process and the public comment period. Scoping transcripts/records of scoping comments are not a part of the EIS/OEIS but are included in the Administrative Record. Chapter 13.0 includes a copy of each comment received on the Draft EIS/OEIS and a response for each comment. Although all comments are reviewed and incorporated where appropriate, some comments may be outside the scope of the document and therefore were not addressed.
	D-T-0036-2	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
	D-T-0036-3	Policy/NEPA Process		Thank you for your comment.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Bob McDermott --Navy League	D-T-0037-1	Socioeconomics		Thank you for your comment.
	D-T-0037-2	Biological Resources - Marine		Thank you for your comment.
	D-T-0037-3	Mitigation Measures		Thank you for your comment.
	D-T-0037-4	Cumulative Impacts	5.2.1	Text has been added to the cumulative impacts section (Section 5.2.1) of the EIS/OEIS that describes other open ocean activities with potential marine species impacts.
Manuel Kuloloio	D-T-0038-1	Policy/NEPA Process	13	The public comment and response section of the EIS/OEIS contains a matrix of the total number of people in attendance for the four public meetings held and the number of individuals who provided comments overall. All consultation comments/responses are in the EIS/OEIS as well.
	D-T-0038-2	Biological Resources - Marine		Training will include the continued use of the southeast end of Kaula for bombing and Air-to-Ground GUNEX training under agreement with the State of Hawaii.
	D-T-0038-3	Policy/NEPA Process		The Navy recognizes that past practices conducted decades ago resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceed with the available funds. The island of Kahoolawe is one site that received priority funding in excess of $400 million and its own special legislation which resulted in a 10-year cleanup conducted in consultation with the State of Hawaii.
Kyle Kajihiro --AFSC	D-T-0039-1	Policy/NEPA Process		Scoping transcripts are generally not included in the EIS/OEIS. The Scoping transcripts/scoping comments are available in the Administrative Record.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kyle Kajihiro --AFSC	D-T-0039-2	Alternatives		Current training, or the No-action Alternative, is evaluated for potential impacts just like Alternative 1, 2 and 3. To decrease military training from current levels would not meet the purpose and need of the Proposed Action and would not support the Navy's ability to meet Federal statutory requirements. In addition, a reduction in training could jeopardize the ability of specialty forces, transient units and Strike Groups using the HRC for training purposes to be ready and qualified for deployment. The Navy has broadly defined its objectives and offers appropriate alternatives to achieve them. To implement its Congressional mandates, the Navy needs to support and to conduct current and emerging training and RDT&E events in the HRC and upgrade or modernize range complex capabilities to enhance and sustain Navy training and testing. These objectives are required to provide combat capable forces ready to deploy worldwide in accordance with U.S.C. Title 10, Section 5062. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this EIS/OEIS are both reasonable and necessary. Council on Environmental Quality (CEQ) regulations allow the status quo to properly be the No-action Alternative. The No-action Alternative may be thought of in terms of continuing with the present course of action until that action is changed. In requiring consideration of a no-action alternative, the CEQ intended that agencies compare the potential impacts of the proposed major Federal action to the known impacts of maintaining the status quo. The Navy has done just that in the EIS/OEIS.
	D-T-0039-3	Policy/NEPA Process		Thank you for your comment.
	D-T-0039-4	Alternatives		See response to comment D-T-0039-2.
	D-T-0039-5	Cumulative Impacts	5	The cumulative impact analysis presented in Section 5 provides the adequate level of analysis to determine the potential for cumulative impacts as a result of implementation of the Proposed Action. As a result of the analysis, it was determined that no significant cumulative impacts would occur within the 13 resource areas.
	D-T-0039-6	Health and Safety		Analysis of actions that are not reasonably foreseeable are not required under NEPA.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kyle Kajihiro --AFSC	D-T-0039-7	Socioeconomics	3.3.2.1.10	Military housing allowances and supplements are based on surveys of local housing renters and based on local economy averages. Military members not provided on-base housing are faced with the same challenges to obtain affordable housing as the general public. PMRF is a major contributor to the economy of Kauai County, particularly on the western side of the island. The installation employs nearly 1,000 military, civilian, and contract personnel and has a $130 million impact annually on the local economy (see Section 3.3.2.1.10).
	D-T-0039-8	Socioeconomics		See response to comment D-E-0451-17.
	D-T-0039-9	Program		Your comments regarding budget issues are noted but are beyond the scope of this EIS/OEIS.
	D-T-0039-10	Program	2.2.4.4, 4.1.1., 4.1.1.3.2, 4.1.5, 4.3.2.1.2	The Directed Energy program has not been developed in full. However, it is described in Sections 2.2.4.5 and 4.1.1.3.2. Potential locations are shown on Figure 2.2.4.5-1. Directed energy analysis is also provided in Sections 4.1.1 Airspace open ocean; Section 4.1.5, Health and Safety open ocean; and Section 4.3.2.1.2, Airspace at PMRF. The effect of this center on the hazardous materials associated with operating lasers, health and safety, and utilities demand on PMRF/Main Base would require a separate environmental documentation process.
Jeff Pantukhoff --The Whaleman Foundation	D-T-0040-1	Biological Resources - Marine	4.1.2	The modeling predicting possible exposures at various threshold levels was developed in cooperation with NMFS and is presented in Section 4.1.2. This section provides details on the various possible effects and the method NMFS has approved for analyzing those possible effects.
	D-T-0040-2	Biological Resources - Marine	4.1.2	Marine mammals (we believe your reference is to studies on beluga specifically) are context specific for animals that are hunted and must contend with shifting ice, which does not have relevance in the Hawaii context. In addition, "the 110 to 120 dB", discussed is a received level (at the whales) as opposed to a source level (1 meter from the sonar), which is inside the sonar dome (inside the bow of the ship). Thresholds developed in cooperation with NMFS are presented in Section 4.1.2, which provides details on the various possible effects and the method NMFS has approved for analyzing those possible effects.
	D-T-0040-3	Biological Resources - Marine	4.1.2	See Section 4.1.2 and Southall et al., (2007) regarding research on marine mammal hearing/thresholds and in particular work done at SPAWAR exposures to 195 dB.
	D-T-0040-4	Biological Resources - Marine	4.1.2.4.11	Section 4.1.2.4.11 includes specific stranding events that have been linked to potential sonar operations are discussed. Of note, these events represent a small overall number of animals over an 11-year period (approximately 40 animals), and not all worldwide strandings can be linked to naval activity.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Jeff Pantukhoff --The Whaleman Foundation	D-T-0040-5	Biological Resources - Marine	4.1.2.4.11.2	As discussed in Section 4.1.2.4.11, the Navy believes that evidence not considered previously involving the Hanalei stranding of July 2004 indicates that the full moon could have been a contributing factor in terms of bringing the animals closer to the shore. A few strandings of beaked whales have occurred elsewhere (locations far from Hawaii) that seem to be related to mid-frequency active (MFA) sonar in combination with specific ocean conditions. Strandings of beaked whales associated with sonar have not happened in Hawaii to anyone's knowledge. Regarding the Bahamas stranding, see the discussion of stranding event in Section 4.1.2.4.11.2.
	D-T-0040-6	Biological Resources - Marine		Thank you for your comment.
Mike Moran	D-T-0041-1	Biological Resources - Marine		Thank you for your comment.
	D-T-0041-2	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
	D-T-0041-3	Health and Safety	4.1.5.1.1	Human exposure to underwater noise is addressed in Section 4.1.5.1.1. The Navy issues Notices to Mariners (NOTMARs) to alert commercial and recreational users, such as dive services, about upcoming at-sea training activities so that they may divert to open areas. During training exercises, Navy assets monitor the area to ensure that the public is not exposed to a health or safety risk. If non-participants are detected in the vicinity of an exercise, then it is delayed or postponed until those individuals have moved a safe distance away. With these measures in place, the Navy has an exemplary record of public safety. To date, no member of the public has been exposed to unhealthful levels of underwater noise.
Stephany Cecil	D-T-0042-1	Biological Resources - Marine	4.1.2.4.11	Section 4.1.2.4.11 includes specific stranding events that have been linked to potential sonar operations are discussed. Of note, these events represent a small overall number of animals over an 11-year period (approximately 40 animals), and not all worldwide strandings can be linked to naval activity.
	D-T-0042-2	Biological Resources - Marine	4.1.2.4.11	Section 4.1.2.4.11 includes specific stranding events that have been linked to potential sonar operations are discussed. Of note, these events represent a small overall number of animals over an 11-year period (approximately 40 animals), and not all worldwide strandings can be linked to naval activity. The Navy believes that evidence not considered previously involving the Hanalei stranding of July 2004 indicates that the full moon could have been a contributing factor in terms of bringing the animals closer to the shore.
	D-T-0042-3	Biological Resources - Marine		Thank you for your comment.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Stephany Cecil	D-T-0042-4	Biological Resources - Marine	1.1, 1.2, 1.3	The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. Requirements to have trainees and prepared Naval forces is not a discretionary matter.
	D-T-0042-5	Biological Resources - Marine		Thank you for your comment.
	D-T-0042-6	Biological Resources - Marine		Thank you for your comment.
Christiane Douglas	D-T-0043-1	Biological Resources - Marine		Thank you for your comment.
	D-T-0043-2	Biological Resources - Marine		Thank you for your comment.
	D-T-0043-3	Biological Resources - Marine		Thank you for your comment.
	D-T-0043-4	Biological Resources - Marine		Navy training in the use of sonar is regulated by NMFS for its effects on marine species.
	D-T-0043-5	Policy/NEPA Process		Thank you for your comment.
Howard Sharpe	D-T-0044-1	Biological Resources - Marine		Thank you for your comment.
	D-T-0044-2	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination.
Thomas Nakagawa	D-T-0045-1	Biological Resources - Marine		Thank you for your comment.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Thomas Nakagawa	D-T-0045-2	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	Sections 3.7 and 4.7 of the EIS/OEIS and a Coastal Consistency Determination in accordance with the CZMA review the activities proposed to be conducted internal or external to the Humpback Whale National Marine Sanctuary, and find them to be within the range of activities previously reviewed and allowed by the Sanctuary as indicated in 15 CFR Part 922, Subpart Q. None of the activities have been modified such that they would be likely to destroy, cause the loss of, or injure any Sanctuary resource in a manner significantly greater than what had been previously reviewed by NOAA at the time of the Sanctuary's creation. Under the Sanctuary regulations, military activities are allowed within the sanctuary and not subject to vessel/aircraft approach distances, discharge of materials prohibitions within the sanctuary and consultation requirements if they are "classes of military activities, internal and external to the Sanctuary, conducted prior to 1997 (provided in Exhibit C-1 of the Draft EIS/OEIS). Proposed military activity after 1997 is also allowable but subject to prohibited activities provision under the reg. (i.e., vessel/aircraft approach to humpback whale provisions, discharge of materials, etc.). Sections 3.2 and 4.2 of the EIS/OEIS reviewed the NWHI Marine Monument. Presidential Proclamation 8031 (71 FR 36443, June 26, 2006), which established the Monument under the authority of the Antiquities Act (16 U.S.C. 431), made the prohibitions required in the Proclamation, such as the prohibition on entry into the Monument, inapplicable to activities and exercises of the Armed Forces. Navy acknowledges, as stated in the Proclamation, that it is their obligation to ensure that all "activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities." Consideration has also been given to Executive Order 13089 of June 11, 1998, "Coral Reef Protection," and consistent with the policies stated in that Order, to the extent permitted by law, the Navy will ensure that the Proposed Actions will not degrade the conditions of U.S. coral reef ecosystems.
	D-T-0045-3	Biological Resources - Marine		Thank you for your comment.
	D-T-0045-4	Socioeconomics		The Navy takes its environmental stewardship role seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment. The requirement to have a trained and prepared naval force is not a discretionary matter.
	D-T-0045-5	Biological Resources - Marine	5	The Navy does not believe any of the activities analyzed in this EIS/OEIS will impact Essential Fish Habitat in Hawaiian Waters.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Thomas Nakagawa	D-T-0045-6	Alternatives	4.1.2.4, 4.1.2.4.11	Section 4.1.2.4 of the EIS/OEIS explains the potential effects on marine mammals from Navy mid-frequency active (MFA) sonar in the HRC. MFA sonar use in Hawaii is not new and has occurred using the same basic sonar equipment and output for over 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Though the Navy works to minimize impacts on marine mammals to the greatest extent practicable, they are not mandated by any statute to alleviate all risk to marine mammals. Over the past 30 years, the numbers of marine mammals around Hawaii appear to be increasing and there are no indications that sonar has affected marine mammals
Robert Roggasch --WWW Freehawaii	D-T-0046-1	Program		Thank you for your comment.
	D-T-0046-2	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.
Frances Pitzer	D-T-0047-1	Miscellaneous	4,5	Detailed discussion of "potential impacts" and how they would be minimized is discussed in Chapters 4.0 and 5.0. The tables in the Executive Summary have been revised to better summarize "potential impacts" and also note that Chapters 4.0 and 5.0 discuss in detail the factors that influenced the analysis.
	D-T-0047-2	Water Resources		Any amount of any substance emitted does, of course, have a physical effect. However, if the substance is benign or inert; is present at an undetectable concentration; has physical, chemical, or biological effects within an insignificantly small area; or otherwise has no discernable biological, chemical, or physical effects, then it is deemed not to affect water quality (a defined subset of water quality parameters and their concentrations) or limit the availability or use of water resources. The emissions and discharges associated with the Navy's Proposed Action have been examined, and determined to generally fall within one of these categories.
	D-T-0047-3	Hazardous Materials and Waste	4.0, 5.0	The EIS/OEIS evaluates the expenditure and environmental fate of a variety of training materials. Both qualitative and quantitative assessments of these expenditures conclude that their effects on water quality and bottom sediments, and on the biota that inhabit these environments, would be negligible. There would be no effect on water quality because the expended material would not result in a detectable change in those physical and chemical parameters designated as indicators of water quality in a representative sample of ocean water.
	D-T-0047-4	Biological Resources - Marine		A take authorization is the number and species of marine mammal injuries (or Level A harassment) that could occur in the unlikely event that animals respond in the manner that leads to a stranding. Those numbers are authorized by NMFS.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Frances Pitzer	D-T-0047-5	Cultural Resources	3.2.2.2	Section 3.2.2.2 has been updated to reflect the most current archaeological information for Nihoa and Necker (Mokumanamana), the southeastern most portion of the Papahanaumokuakea Marine National Monument, where missile intercepts and associated falling debris could occur. As noted in Section 4.2.2.1, future missions will include consideration of missile flight trajectory alterations, if feasible, to minimize the potential for debris within these areas.
	D-T-0047-7	Biological Resources - Terrestrial	4.3.2.1.3.3	No long-term adverse effects on birds from HRC activities are anticipated. As first stated in Section 4.3.2.1.3.3, the intensity and duration of wildlife startle responses decrease with the number and frequency of exposures.
	D-T-0047-8	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination.
	D-T-0047-9	Program		Thank you for your comment.
Home Le'amohala -- Earthling	D-T-0048-1	Program		Thank you for your comment.
Juliann Castelhuono	D-T-0049-1	Miscellaneous		Thank you for your comment.
Brooke Porter --Pacific Whale Foundation	D-T-0050-1	Biological Resources - Marine		Thank you for your comment.
	D-T-0050-2	Biological Resources - Marine		Thank you for your comment.
	D-T-0050-3	Biological Resources - Marine		Thank you for your comment.
Faith Rose	D-T-0051-1	Miscellaneous		Thank you for your comment.
Ken Rose	D-T-0052-1	Policy/NEPA Process		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Hugh Starr	D-T-0053-1	Alternatives	1.0, 2.0	As discussed in Chapters 1.0 and 2.0, the HRC provides the geography, infrastructure, space, and location necessary to accomplish complex military training and RDT&E activities. The large area available to deploy forces within the HRC allows training to occur using a geographic scope that replicates possible real world events. In addition, the HRC has the infrastructure to support a large number of forces, has extensive existing range assets, and accommodates Navy training and testing responsibilities both geographically and strategically, in a location under U.S. control. The Navy's physical presence and training capabilities are critical in providing stability to the Pacific Region.
	D-T-0053-2	Biological Resources - Marine		ADM Fallon's statement must be considered in the full context of the discussion and subject matter and must be couched in the times in which the speech was made. The focus was not on overall Navy policy or on the importance of specific Navy range complexes. The primary focus of the Fallon speech was on Vieques as an example of a number of encroachment issues, especially with regard to restrictions resulting from military ranges being defacto sanctuaries for threatened and endangered species. The HRC contains one of two underwater tracking ranges in the Pacific, and the Hawaii Range Complex is critical to Navy training and RDT&E for DoD.
	D-T-0053-3	Alternatives	2.2.4, 2.2.5	In the Supplement to the Draft EIS and as incorporated into the EIS/OEIS, an additional alternative (Alternative 3) has been analyzed. Sonar hours for Alternative 3 and effects associated with ASW training would be identical to that presented under the No-action Alternative. Table 2.2.5-1 lists MFA/HFA sonar usage analyzed for the No-action Alternative and Alternative 3. Sonar usage is based on SPORTS data and operator input. Alternative 3 is the preferred alternative because it allows the Navy to meet its future non-ASW training and RDT&E mission objectives and avoid increases in potential effects to marine mammals above historic levels of ASW training in the HRC.
	D-T-0053-4	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
Bruce Douglas	D-T-0054-1	Biological Resources - Marine	4.1.2.4.2, 4.1.5.1.1	See response to comment D-E-0086-1.
	D-T-0054-2	Mitigation Measures	4.1.5.1.1	The divers will not be located where the active sonar is used. As stated in Section 4.1.5.1.1, research was conducted for mid-frequency active (MFA) sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonar. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Bruce Douglas	D-T-0054-3	Biological Resources - Marine		Thank you for your comment.
	D-T-0054-4	Biological Resources - Marine	4.1.2.2	The EIS/OEIS includes new findings by Popper et al.(2007) who exposed rainbow trout, a fish sensitive to low frequencies, to high-intensity low-frequency sonar (215 dB re 1 µPa2 170-320 Hz) with receive level for two experimental groups estimated at 193 dB for 324 or 648 seconds. Fish exhibited a slight behavioral reaction, and one group exhibited a 20-dB auditory threshold shift at one frequency. No direct mortality, morphological changes, or physical trauma was noted as a result of these exposures. While low-frequency sonar is not included in the Proposed Action, these results of low-frequency sonar effects on low-frequency sensitive rainbow trout are encouraging in that similar results may be found with mid-frequency active sonar use when applied to mid-frequency sensitive fish.
	D-T-0054-5	Biological Resources - Marine	4.1.2.4.2, 4.1.5.1.1	See response to comment D-E-0086-1.
	D-T-0054-6	Program	2.2.1.3	As noted in Section 2.2.1.3, computer simulators and other types of simulation training tools are already used extensively in the Navy's training program. Computer technologies provide excellent tools for implementing a successful, integrated training program while reducing the risk and expense typically associated with training at sea. Although it is an essential component of training, computer simulation cannot substitute for the high-stress environment (such as personnel experience under combat conditions) that would be encountered during an actual non-training situation. Conducting all naval training by simulation is deemed inadequate and fails to meet the purpose and need of the Proposed Action. Therefore, this alternative was not carried forward for analysis.
Kahu Charles Maxwell	D-T-0055-1	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.
	D-T-0055-2	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
	D-T-0055-3	Cultural Resources		Thank you for your comment.
Leslie Kuloloio --Protect Kaho'olawu Ohara	D-T-0056-1	Program		Navy practices conducted decades ago resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceed with the available funds.
David Jimenez	D-T-0057-1	Miscellaneous		Thank you for your comment.
Anita Wintner --Snorkel Bob Foundation	D-T-0058-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1. The area has been historically used by the Navy for training and RDT&E operations, including sonar.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Anita Wintner --Snorkel Bob Foundation	D-T-0058-2	Health and Safety	4.1.5.1.1	Human exposure to underwater noise is addressed in Section 4.1.5.1.1. Research was conducted for mid-frequency active (MFA) sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonar. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours. The Navy issues Notices to Mariners (NOTMARs) to alert commercial and recreational users, such as dive services, about upcoming at-sea training activities so that they may divert to open areas. To date, no member of the public has been exposed to unhealthful levels of underwater noise.
	D-T-0058-3	Biological Resources - Marine	4.1.2.2	The Navy recognizes that individual fish may be injured or killed as the result of several of the operations; however, these incidents are localized, and would not have a population impact on any individual species. The Navy has completed and Essential Fish Habitat and Coral Reef Assessment for the EIS/OEIS and concludes that Proposes Actions would not affect managed species (i.e., Essential Fish Habitat).
	D-T-0058-6	Biological Resources - Marine	3.1.2.3.2	The species description in Section 3.1.2.3.2 has been revised to include: "Since 1991, 81 nesting female hawksbills have been tagged on the Big Island at various locations, 22 tagged in the last 3 years. These do not include nesting females from Maui or Molokai which would add a small number to the total. While this appears to be an encouraging trend, Seitz and Kagimoto (2007) report that there are insufficient data to confirm an increasing population as yet.
	D-T-0058-9	Alternatives	4.1.2.4.11.2	Section 4.1.2.4.11.2 includes a discussion of specific stranding events that have been linked to potential sonar operations. Of note, these events represent a small overall number of animals over an 11 year period (approximately 40 animals) and not all worldwide strandings can be linked to naval activity.
Manuel Kuloloio	D-T-0059-1	Miscellaneous		Thank you for your comment.
Lisa Messenger	D-T-0060-1	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Amber King	D-T-0061-1	Program		The Navy does take its environmental stewardship role seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment. The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter, but a legal requirement under U.S. Code Title 10.
Jasmin Asis	D-T-0062-1	Biological Resources - Marine		Thank you for your comment.
Nicole Carbonel	D-T-0063-1	Land Use		All recreational services available to military personnel and civilians will remain at current status during non-hazardous training operations. Additionally, temporary clearance procedures for safety purposes have been employed regularly over time without significant impact on recreation.
Akahi Wahine --Trustee, Kingdom of Hawaii Nation Ministry Trust	D-T-0064-1	Land Use		Thank you for your comment.
David Bayly	D-T-0065-1	Miscellaneous		Thank you for your comment.
Eli Sheetz	D-T-0066-1	Alternatives		Thank you for your comment.
	D-T-0066-3	Biological Resources - Marine		Thank you for your comment.
	D-T-0066-4	Biological Resources - Marine		A take authorization is the number and species of marine mammal injuries (or Level A harassment) that could occur in the unlikely event that animals respond in the manner that leads to a stranding. Those numbers are authorized by NMFS.
Kristin McCleery	D-T-0067-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary language).
	D-T-0067-2	Biological Resources - Marine	4.1.2.4.11.2	Regarding the Bahamas stranding, see the discussion of stranding events in Section 4.1.2.4.11.2.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kristin McCleery	D-T-0067-3	Biological Resources - Marine	4.1.2.2	To summarize Section 4.1.2.2, based on the limited studies, there is some evidence that there could be minor impacts on fish (i.e., behavioral response or avoidance) from mid-frequency active (MFA) sonar, while in other studies, using hearing specialist species and intense exposure there has been severe impacts (i.e., death) to fish from MFA sonar. Also, exposure to a high intensity sound has been shown for some species to potentially damage the ears of fish, if left in close proximity (which generally they would avoid). However, most marine fishes are hearing generalists, with a hearing range generally below the mid-frequency bandwidth. Therefore, given a worst-case scenario (e.g., a hearing specialist fish in close proximity to the source and unable to relocate), there is the possibility of fish mortality. However, the loss of individuals in close proximity to the source would not result in population impacts on the species. Also, it is assumed that fish that could detect MFA sonar would vacate the area, as a behavioral response, which would be deemed a temporary, not a permanent, adverse impact. To summarize Section 4.1.2.3, the intensity of sound and how turtles sense it is dependent on them being able to "hear" at that frequency. Turtles do not hear mid-frequency sounds, so the intensity is irrelevant.
	D-T-0067-4	Biological Resources - Marine	4.1.2.3	See response to comment D-T-0067-3.
	D-T-0067-5	Health and Safety	4.1.5.1.1	Human exposure to underwater noise is addressed in Section 4.1.5.1.1. Research was conducted for mid-frequency active (MFA) sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonar. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours. The Navy issues Notices to Mariners (NOTMARs) to alert commercial and recreational users, such as dive services, about upcoming at-sea training activities so that they may divert to open areas. To date, no member of the public has been exposed to unhealthful levels of underwater noise.
Helen Schonwatter	D-T-0068-1	Biological Resources - Marine	3.2, 4.2	See response to comment D-W-0091-7. In addition, The Proposed Action includes no plan to use depleted uranium for training.
	D-T-0068-2	Transportation		Thank you for your comment.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Helen Schonwatter	D-T-0068-3	Biological Resources - Marine	1.2, 3.2, 3.7, 4.1.2.1, 4.2, 4.7	impacts on wildlife from an increase in frequency and tempo of operations would be similar to those described for the No-action Alternative since the additional training operations would be performed throughout the HRC and not confined to one particular area. It is therefore unlikely that an individual listed species or other wildlife offshore would be repeatedly exposed large shrapnel as a result of increased training operations.
	D-T-0068-4	Biological Resources - Marine	3.1.2.2.3, 4.1.2.2	Some fish can hear (see Section 3.1.2.2.3 - Fish Acoustics). The primary issue is what they are hearing. There have been studies documenting the impacts of sound (intensity and frequency) on fish, and some of the results are summarized in Section 3.1.2.2.3 and 4.1.2.2.
	D-T-0068-5	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	Information about DU and any potential effects on personnel and the environment can be found in Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
Summer Starr	D-T-0069-1	Miscellaneous		Thank you for your comment.
Kboki Raymond	D-T-0070-1	Miscellaneous		Thank you for your comment.
Mary Groode	D-T-0071-1	Biological Resources - Marine		Your comments regarding the war on terror are noted but are outside the scope of this EIS/OEIS.
Christine Nonnenmacher	D-T-0072-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
	D-T-0072-2	Program		Thank you for your comment.
Pauahi Hookano	D-T-0073-1	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	Information about DU and any potential effects on personnel and the environment can be found in Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
	D-T-0073-2	Health and Safety	4.1.5.1.1	Human exposure to underwater noise is addressed in Section 4.1.5.1.1. The Navy issues Notices to Mariners (NOTMARs) to alert commercial and recreational users, such as dive services, about upcoming at-sea training activities so that they may divert to open areas. During training exercises, Navy assets monitor the area to ensure that the public is not exposed to a health or safety risk. If non-participants are detected in the vicinity of an exercise, then it is delayed or postponed until those individuals have moved a safe distance away. With these measures in place, the Navy has an exemplary record of public safety. To date, no member of the public has been exposed to unhealthful levels of underwater noise.
Samuel Dolphin	D-T-0074-1	Miscellaneous		Thank you for your comment.
Cory Harden --Sierra Club, Mokuloa Group	D-T-0075-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Cory Harden --Sierra Club, Mokuloa Group	D-T-0075-2	Cumulative Impacts	5	Cumulative impacts are addressed in Chapter 5.0 of this EIS/OEIS.
	D-T-0075-3	Cumulative Impacts		Your comments regarding the Stryker Brigade Combat Team are noted but are outside the scope of this EIS/OEIS.
	D-T-0075-4	Health and Safety	4.2	The effects on the Northwestern Hawaiian Islands of missile debris are addressed in Section 4.2 of the EIS/OEIS.
Lanny Sinkin --Kingdom of Hawai'i	D-T-0076-1	Policy/NEPA Process		Thank you for your comment.
	D-T-0076-2	Alternatives		The 1998 observations referenced were in regard to use of low-frequency active (LFA) sonar. The use of LFA in the HRC is not part of the Proposed Action of this EIS/OEIS. In addition, your comment's characterization of the results of the tests is in error.
	D-T-0076-3	Policy/NEPA Process		This EIS/OEIS was prepared by the Department of the Navy in compliance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ), the Department of the Navy Procedures for implementing NEPA, and Executive Order 12114, which are all legal requirements. Additionally, NEPA is our basic national charter for protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy. Section 102(2) contains "action-forcing" provisions to make sure that Federal agencies act according to the letter and spirit of the Act. Their purpose is to tell Federal agencies what they must do to comply with the procedures and achieve the goals of the Act. The President, the Federal agencies, and the courts share responsibility for enforcing the Act so as to achieve the substantive requirements of Section 101.
	D-T-0076-4	Policy/NEPA Process		Thank you for your comment.
Lynn Nakkim	D-T-0077-1	Alternatives		The 1998 observations referenced were in regard to use of low-frequency active sonar. The use of low-frequency active sonar in the HRC is not part of the Proposed Action of this EIS/OEIS. In addition, your comment's characterization of the results of the tests is in error.
	D-T-0077-2	Alternatives		Thank you for your comment.
Reynolds Kamakawiwoole -- Twin Flame for God	D-T-0078-1	Miscellaneous		Thank you for your comment.
Kalei'ileihi Muller	D-T-0079-1	Policy/NEPA Process		Thank you for your comment.
	D-T-0079-2	Policy/NEPA Process		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Michael T. Hyson --Sirius Institute	D-T-0080-1	Biological Resources - Marine		Thank you for your comment.
Duane Erway	D-T-0081-1	Alternatives		Thank you for your comment.
Jim Albertini --Malu Anina Center For Non-Violent Education and Action	D-T-0083-1	Cumulative Impacts	5	Chapter 5.0 of the EIS/OEIS includes cumulative impacts associated with past, present, and reasonable foreseeable actions in the region of influence of the HRC.
Lee Tepley	D-T-0084-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
	D-T-0084-2	Alternatives		Thank you for your comment.
	D-T-0084-3	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
Dwight Vicente	D-T-0085-1	Policy/NEPA Process		Thank you for your comment.
Hans Mortensen --Keaukaha Community Association	D-T-0086-1	Airspace	3.6.2.1	Section 3.6.2.1 has been revised to state that there are no proposed activities in this EIS/OEIS that include Navy training at the Hilo International Airport. The State of Hawaii Department of Transportation, Airports Division operates and maintains the airport in conformity with environmental rules. Navy P-3 aircraft from Marine Corps Base Hawaii do currently perform infrequent practice approach and landing proficiency flights at Hilo International Airport and other airfields (e.g., Kona, Lihue, Kahului). The Navy P-3 has a limited flying schedule based on its home airfield, and operations only occur between 0730 and 2300 Monday through Thursday, 0730-2100 on Friday, and 0730-1600 on Saturday. There are no Sunday flights. Military aircraft activities make up a small percentage of the total aircraft activities at the Hilo International Airport. Based on FAA statistics for calendar year 2003, there were 99,415 total aircraft operations at the Hilo International Airport. Of these, only 11 percent were military aircraft; the remaining 89 percent were commercial. Preliminary statistics for the 12-month period ending 30 March 2007 indicates 9% of the flights were military.
	D-T-0086-2	Noise	3.6.2.1	See response to comment D-T-0086-1.
	D-T-0086-4	Air Quality	3.6.2.1	See response to comment D-T-0086-1.
Frank Vesperes	D-T-0087-1	Airspace	3.6.2.1	'See response to comment D-T-0086-1.
	D-T-0087-2	Airspace	3.6.2.1	See response to comment D-T-0086-1.
Moanikeala Akaka	D-T-0088-1	Program		Thank you for your comment.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Moanikeala Akaka	D-T-0088-2	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to issues associated with historical contamination.
	D-T-0088-3	Cultural Resources		If cultural resources are unexpectedly encountered during training operations at any of the affected locations described in the EIS/OEIS, the appropriate Cultural Resources Manager (e.g., Schofield Barracks) will be contacted.
Jon Olson	D-T-0089-1	Program		Your comment regarding the ocean-floor monitoring system is noted but is not part of the Proposed Action and is outside the scope of this EIS/OEIS.
	D-T-0089-2	Alternatives	4.1.2.4.5, 6.0	See response to comment D-E-0086-1.
	D-T-0089-3	Program		Your comment regarding the supersonic torpedo is noted but is not part of the Proposed Action and is outside the scope of this EIS/OEIS.
	D-T-0089-4	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
Marjorie Erway	D-T-0090-1	Biological Resources - Marine	4.1.7.1.1	The HRC EIS/OEIS Proposed Action includes the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. More details on the analysis of potential impacts from these DU projectiles can be found in Section 4.1.7.1.1. This is the only use of DU in the HRC EIS/OEIS Proposed Action. Guidance provided to users of Pohakuloa Training Area will be followed.
	D-T-0090-2	Biological Resources - Marine	6.4.11.1, 6.4.12	The Navy would like to see more research. See Section 6.4.11.1 and 6.4.12 for information regarding future Navy research.
	D-T-0090-3	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
Manuel Kuloloio	D-T-0091-1	Miscellaneous		Thank you for your comment.
Cynthia Piano	D-T-0092-1	Miscellaneous		Thank you for your comment.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Shelley Stephens --Cultural Resource Mgt.	D-T-0093-1	Cumulative Impacts	4.1.7.1.1	The Navy recognizes that past practices conducted decades ago resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceed with the available funds. The HRC EIS/OEIS Proposed Action includes the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy’s use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. More details on the analysis of potential impacts from these DU projectiles can be found in Section 4.1.7.1.1. This is the only use of DU in the HRC EIS/OEIS Proposed Action.
	D-T-0093-2	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.
	D-T-0093-3	Program		Your comment regarding Kahoolawe's water lens is noted but is outside the scope of this EIS/OEIS.
	D-T-0093-4	Cultural Resources		The cultural resources described in applicable Open Ocean and offshore sections of the EIS/OEIS do not encompass any known underwater petroglyphs. A shark heiau (Hal-oKapuni), where human remains were offered to sharks, is said to be located offshore of Kawaihae Pier. Its precise location is unknown since it has been buried for decades.
	D-T-0093-5	Program		Your comment regarding activities with China and other ocean-mining proxies through the International Seabed Authority is noted but is outside the scope of this EIS/OEIS.
Star Newland --Cetacean Commonwealth and Sirius Institute	D-T-0094-1	Biological Resources - Marine	4.1.2.4	Section 4.1.2.4 includes analysis of impacts on marine mammals.
	D-T-0094-2	Biological Resources - Marine		A take authorization is the number and species of marine mammal injuries (or Level A harassment) that could occur in the unlikely event that animals respond in the manner that leads to a stranding. Those numbers are authorized by NMFS.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Mark Van Doren	D-T-0095-1	Hazardous Materials and Waste	1.2, 3.2, 4.1.7.1.1, 4.2, 4.3.1.1.1	See response to comment D-W-0091-7. In addition, Sections 4.1.7.1.1 HRC Training Operations and 4.3.1.1.1 Biological Resources - PMRF Offshore (BARSTUR, BSURE, SWTR, Kingfisher) address training debris and the potential for leaching of toxic materials. As noted in the EIS, for missiles falling into the ocean, the principal source of potential impacts on water and sediment quality will be the unburned solid propellant residue and batteries. The remaining solid propellant fragments will sink to the ocean floor and change in the presence of seawater. Chemical leaching will occur throughout the settling period through the water column, and any leaching after the particles reached the bottom will be dispersed by currents. Therefore, localized and temporary impacts on benthic resources may occur, but no long-term impact is anticipated. The analysis concludes that the amounts and concentrations of debris will have no noticeable effect on ocean water quality and will affect an insignificant portion of the ocean bottom sediments. The use of nuclear weapons and relocating the HRC is outside the scope of the HRC EIS/OEIS.
Galen Kelly	D-T-0096-1	Miscellaneous		Thank you for your comment.
L. V. Kelley	D-T-0097-1	Biological Resources - Marine		Given that there have been no known injured marine mammals as a result of Navy training over decades of operation, it is very unlikely that there will be any injuries or fatalities to marine mammals in the future. However, the Navy will continue to coordinate with the Pacific Islands Office of the NMFS in regard to investigation of all marine mammal strandings. NMFS publishes a newsletter regarding all strandings in the Hawaiian Islands and it is likely that they will continue to inform the public in this regard.
	D-T-0097-2	Mitigation Measures	6	As described in Chapter 6.0, using non-Navy personnel onboard Navy vessels to provide surveillance of ASW or other exercise events would adversely impact military readiness activities, including personnel safety, and the practicality of implementation, and impact on the effectiveness of the military readiness activity. Security clearance issues would have to be overcome to allow non-Navy observers onboard exercise participants. Use of non-Navy observers is not necessary given that Navy lookouts are extensively trained in spotting items at or near the water surface.
Paul Norman	D-T-0098-1	Biological Resources - Marine	3.1.2	Analysis is based on NMFS stock assessments, as presented in Section 3.1.2, Affected Environment.
	D-T-0098-2	Biological Resources - Marine	4.1.2.2	Using the best available information, the Navy and NMFS as a cooperating agency are consulting with regard to biological resources to ensure that operations would not affect sensitive habitat and species.
Judy Walker	D-T-0099-1	Airspace	3.6.2.1	See response to comment D-T-0086-1.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Judy Walker	D-T-0099-2	Miscellaneous	3.1, 4.1	To assist the reader, Sections 3.1 and 4.1 of Chapters 3.0 and 4.0 present the affected open ocean environment and associated impact analysis relative to EO 12114. The remaining sections of Chapter 3.0 and 4.0 present the affected environment and impact analysis relative to NEPA for offshore and onshore areas. Chapters 3 and 4 are further arranged according to islands from west to east: Northwestern Hawaiian Islands, Kauai, Oahu, Maui, and Hawaii. For organizational purposes in this document, discussions about Niihau and Kaula are included under the Kauai heading, because although they are separate islands, they are part of Kauai County. In addition, discussions about Molokai are included under the Maui heading, because although it is a separate island, it is part of Maui County.
	D-T-0099-3	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
	D-T-0099-4	Policy/NEPA Process	11	The Navy sought input from the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) in the preparation of the assessment in the EIS/OEIS. Chapter 11.0 lists all Federal, state, and local agencies and individuals contacted during the preparation of the EIS/OEIS. This input was sought in order to provide, to the extent possible/practicable, a “real assessment.”
	D-T-0099-5	Biological Resources - Marine	4.1.2.3	Section 4.1.2.3, Sea Turtles (Biological Resources - Open Ocean), has been updated. This section includes analysis for sea turtles regarding the proposed training and RDT&E activities in the HRC.
	D-T-0099-6	Biological Resources - Marine	6.0	Chapter 6.0, Mitigation Measures, has been updated to reflect the Navy’s current mitigation measures and their use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.
Bunny Smith	D-T-0100-1	Program		The Navy does take its environmental stewardship role seriously, providing funds, efforts and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment. The requirement to have a trained and prepared naval force is not a discretionary matter, but a legal requirement under U.S. Code Title 10.

Table 13.4.3-2. Responses to Public Hearing Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Bunny Smith	D-T-0100-2	Noise		The increased activities proposed at Bradshaw Army Airfield could result in minor additional use of rotary wing aircraft within in the currently defined areas for reconnaissance and survey inserts. These additional training events would produce noise levels similar to the current levels at Bradshaw Army Airfield. Current training at Kawaihae Pier include Expeditionary Assault and Special Warfare Operations. The training proposed for Alternatives 1, 2, and 3 at Kawaihae Pier would be the same and would produced noise levels similar to those currently produced during Navy training events. The proposed training would be considered individual events and would not occur simultaneously. See response to comment D-W-0097-30 regarding noise levels at Pohakuloa Training Area.
	D-T-0100-3	Biological Resources - Marine		The effects of noise on wildlife vary from serious to no effect in different species and situations. Behavioral responses to noise also vary from startling to retreat from favorable habitat. Animals can also be very sensitive to sounds in some situations and very insensitive to the same sounds in other situations. (Larkin, 1996) Noise from launches and other operations may startle nearby wildlife and cause flushing behavior in birds, but this startle reaction would be of short duration. The increased presence of personnel, vehicles, helicopters, and landing craft immediately before a launch would tend to cause birds and other mobile species of wildlife to temporarily leave the area that would be subject to the highest level of launch noise. Impacts on wildlife from an increase in frequency and tempo of training would be similar to those described for the No-action Alternative since the additional training would be performed throughout the HRC and not confined to one particular area. It is therefore unlikely that an individual listed species or other wildlife offshore would be repeatedly exposed to noise, debris, EMR, or emissions as a result of increased training.
Kurt De Keukeleere	D-T-0101-1	Miscellaneous		Thank you for your comment.

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13.4.4 WEBMAIL PUBLIC COMMENTS

One hundred three people commented via the public HRC EIS/OEIS website.

Table 13.4.4-1 presents individuals who commented using the website, with their respective commenter identification number. This number can be used to find the written document that was submitted and to locate the corresponding table on which responses to each comment are provided.

Exhibit 13.4.4-1 presents reproductions of the webmails that were received commenting on the Draft EIS/OEIS. Webmails are identified by commenter ID number, and each statement or question that was categorized as addressing a separate environmental issue is designated with a sequential comment number.

Table 13.4.4-2 presents the responses to webmail comments on the Draft EIS/OEIS. Responses to specific comments can be found by locating the corresponding commenter ID number and sequential comment number identifiers.

Table 13.4.4-1. Commenters on the HRC Draft EIS/OEIS (Webmail)

Commenter	Comment ID	Commenter	Comment ID
Reuben Balmores	D-N-0072	Kauwila Duell	D-N-0095
Carlyn Battilla	D-N-0052	Evelyn Dymkowski	D-N-0084
Marguerite Beavers	D-N-0035	Roscoe Flora	D-N-0068
Marguerite Beavers	D-N-0094	Ronald Fujiyoshi	D-N-0060
Bonnie Beck	D-N-0011	Tova Fuller	D-N-0077
Elyse Bekins	D-N-0102	Errol Gard	D-N-0045
Gaye Berger	D-N-0019	Karen Giles	D-N-0073
Linda Bonura	D-N-0030	Ernest Goitein	D-N-0020
Lee Bowden	D-N-0044	Paul Grossman	D-N-0028
Megan Bowman	D-N-0105	Samadhi Haapala	D-N-0064
Nancy Bracewell	D-N-0006	Brett Hartl	D-N-0004
Nancy Bracewell	D-N-0007	Don Hirth	D-N-0031
Phyllis Brown	D-N-0009	Russell Hoffman	D-N-0071
Phyllis Brown	D-N-0037	Daniel Hoffman	D-N-0079
Carla Buscaglia	D-N-0047	Jennifer Jastrab	D-N-0106
Dennis Chaquette	D-N-0089	Margo Johnson	D-N-0061
Therese Coniglio	D-N-0049	Stephen Jones	D-N-0051
John Cragg	D-N-0104	Elle Jordan	D-N-0040
Emily Dale	D-N-0039	Sharon Kaczorowski	D-N-0069
Adam Davis	D-N-0046	David Kane	D-N-0027
Betty Dean	D-N-0054	Terrilee Kekoolani	D-N-0087
Peter Dearman	D-N-0074	Seth Kowitz	D-N-0080
Laurel Douglass	D-N-0022	Lindafaye Kroll	D-N-0070

Table 13.4.4-1. Commenters on the HRC Draft EIS/OEIS (Webmail) (Continued)

Commenter	Comment ID	Commenter	Comment ID
Miriam Kurland	D-N-0083	Elizabeth Robbins	D-N-0101
Mark Lacas	D-N-0067	Puanani Rogers	D-N-0005
James LaGarde	D-N-0078	Gayle Roller	D-N-0029
Joy Layman	D-N-0097	Frederick Ruch	D-N-0016
Patricia Lemon	D-N-0107	Pat Rydz	D-N-0076
Nancy Levis	D-N-0001	Joseph Sanchez	D-N-0017
Bill Lewis	D-N-0018	Beth Saxon	D-N-0081
Lisa Long	D-N-0036	Christoper Schwartz	D-N-0053
Kristi Lyons	D-N-0002	Sherry Sctt	D-N-0092
Natalie MacIntyre	D-N-0099	Rev. Mark Seydel	D-N-0012
Kayla Makortoff	D-N-0021	Sherry Sharp	D-N-0042
Shyrl Matias	D-N-0066	Renee Siegel	D-N-0090
Michael McAvoy	D-N-0059	Serge Simard	D-N-0025
Kathy McElwain	D-N-0108	George Simich	D-N-0023
Pono McNeil	D-N-0082	Darla Sparks	D-N-0085
Jean Merrigan	D-N-0008	Lionel Standish	D-N-0050
Harriet Mitteldorf	D-N-0034	Audrey Stanzler	D-N-0057
Robert Miyake-Stoner	D-N-0024	Lynn Surgalla	D-N-0013
Shannon Monkowski	D-N-0063	Roxie Sylva	D-N-0093
Patti Montgomery	D-N-0065	Angela TafarI	D-N-0041
Barbara Moore	D-N-0103	Nancy Tally	D-N-0038
Bonnie Morgan	D-N-0062	Simon Teolis	D-N-0026
Patricia Nelson	D-N-0058	Christal Walker	D-N-0096
Lela Nickel	D-N-0048	Gemma Walsh	D-N-0010
PI Norton	D-N-0032	Margaret Watson	D-N-0091
Kem Patrick	D-N-0043	Anna Webb	D-N-0055
Janet Rapoport	D-N-0088	Joe Whetstone	D-N-0075
Albert Ritchey, Jr.	D-N-0098	Janus Wilhlem	D-N-0033
Sharon Ritchie	D-N-0056		

COMMENT NUMBER
D-N-0001

First Name: nancy
Last_Name: levis
Organization:
City: Koloa
State: Hi
Date Submitted: 9/1/2007
Comment:
I am opposed to the sonar testing. It is not worth the risk to our marine life. The environment is already under enough stress. Would you swim in the water during these tests? If the answer in NO then don't do it...and tell others. We need intelligent leadership...we have enough sheep.... 1

COMMENT NUMBER
D-N-0002

First Name: Kristi
Last_Name: Lyons
Organization:
City: Olympia
State: WA
Date Submitted: 9/1/2007
Comment:
I am very much against the sonar testing in the Hawaii waters or any waters of that matter. The marine animals are already under enough stress due to activities the waters all over the world. It does not make sense to be disrupting marine life and possibly create havoc under waters especially at a time like this where there is already too much pollution. We don't need mass destructive weapons and invasive corruptive technology in order to live in peace. This isn't a cold war and it's completely unnecessary to be using this kind of equipment at this time. 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS

COMMENT NUMBER
D-N-0004

First Name: Brett
Last_Name: Hartl
Organization:
City: Solana Beach
State: CA
Date Submitted: 9/2/2007
Comment:

I am against Alternative 1 and I am against Alternative 2. 1
I support the Navy maintaining the No-Action Alternative.
In the EIS, the Navy contends that the Hawaiian Monk Seal critical habitat extends to the 20 fathom line. It is pathetic and ridiculous that the Navy uses a NMFS document from 1988 to support this claim. Anyone who has seen a documentary from the the past 10 years know that Hawaiian Monk Seals regularly forage at depths up to 200 fathoms. The Navy is willing to disregard all relevant scientific information to support its claims. 2

The Navy acknoweledges in its EIS that Pacific Right Whales rarely enter Hawaiian waters, yet they make no other mention of any actions pertaining to what would be done if a right whale were to be in the area. The Pacific Northern Right Whale is the most endangered marine mammal on earth. Again, the Navy fails to include precautionary plans to help preserve this critically endangered species.

Finally, just a few days ago, an article was published about the recent discovery of many new sounds that Humpback Whales make while foraging at night. These acoustic sounds occur at different frequencies than were previously known that Humpback Whales could emit. Again, the Navy fails to produce a precautionary plan to protect marine mammals from the extremely damaging effects of sonar. 3

COMMENT NUMBER
D-N-0004 (cont.)

It is sad that the Navy continues to justify its' unnecessary war games as vital to our national security during war time. I am pretty sure that Afghanistan is a landlocked country, and that the conflict in Iraq is primarily a land based conflict. 1
If perhaps the Navy could more clearly articulate the actual threat the United States faces from any other nation's Navy, its statements would have more credibility. As it is, there is no credible reason for approving Alternative One or Alternative Two. 4

Sincerely,

Brett Hartl

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0005

First Name: Puanani
Last_Name: Rogers
Organization: Ho`okipa Network
City: Kapaa
State: HI
Date Submitted: 9/12/2007
Comment:
AUGUST 21, 2007
LIHUE, KAUAI

TESTIMONY GIVEN RE: HAWAII RANGE COMPLEX DEIS/OEIS

TO: Commander Kutkowski, and affiliates of the Hawaii Range Complex EIS/0EIS.

E welina kakou....greetings to everyone see and unseen.

For the record, my name is Puanani Rogers and I was born, raised and still live in the Ahupua`a o Kealia, Mokupuni o Kaua`i. I live with my children and grandchildren and have been raised by my parents and grandparents who taught me that we need to always be aware of the importance of raising our children to take the responsibility or kuleana of caring for our ohana and ka `aina, i.e. lands and rich resources of our island, and to live in harmony with nature. I speak for my ancestors who have passed down this knowledge to us as well as for my descendants and future generations who will inherit this responsibility. It is a responsibility that I must obey. It is Ke Akua's will that I do so.

COMMENT NUMBER
D-N-0005 (cont.)

1 I speak in strong opposition of any growth or enhancement of any military activities on our precious and sacred lands of Hawaii. My opposition is based on the past history of the US military presence here. It has not been good neighborly, as you imply...instead you have caused more destruction to our lands and resources than any other entity in Hawaii, including taking the lives of our men and women in your wars. The military already occupies over 245,000 acres of Hawaiian lands; that is more than we want to give up so

2 you can't ask for more. Just today we read in the newspapers that Depeleted Uranium has been found on our lands. The surrounding waters of Oahu and Kaho`olawe is filled with military ordnances that are poisoning our waters and marine life. I oppose your use of underwater sonar in our waters that pose a danger to whales and dolphins. The military has admitted that there are 828 contaminated sites on our lands. These sites incluce chemical and biological weapons testing ares, jungle warfare training, bombing, rocket and live fire ranges. PMRF is on this island and that makes us a threat as a target for enemy weapons. This must stop. MILITARY MUST CLEAN UP! NOT BUILD UP!

Does this EIS/OEIS mention any of these facts. What a

1 joke! As far as I'm concerned this document should be called a DRAFT EXEMPTIONS IMPACT STATEMENT.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0005 (cont.)

It is filled with military "exemptions" and empty of any protections and concerns of our lands and precious resources, nor does it have any clues bout how we, as natives of this land, care and feel about the lands culturally and spiritually. You people are culturally and spiritually void!!

3 War games and weapons of mass destruction is for killing people. People who foster wars are criminals. Thou shalt not kill...that is Ke Akua's law...a universal law that is above any government laws!

We need to malama ka `aina, if you destroy our lands and waters, we will have no future for our unborn generations. Please stop the destruction now and de-occupy our lands after you clean up all the damage done.

Aloha and mahalo for this opportunity to comment.

Puanani Rogers
Ahupua`a o Kealia, Kaua`i
Kingdom of Hawaii

COMMENT NUMBER
D-N-0006

First Name: Nancy
Last_Name: Bracewell
Organization:
City: Birmingham
State: AL
Date Submitted: 9/12/2007
Comment:

The U.S. Navy is charged to protect and defend.
This action does NOT protect and defend, but attacks and damages the people, the environment, the marine life, and all life. 1
The effects of any radioactive weapons used will last -- as far as we are concerned -- FOREVER. 2
This is madness. Of WHOM are we AFRAID?
WHO is prepared to attack the great big strong USA?
This is ridiculous and a waste of lives and money, not to mention the waste already mentioned! 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0007

First Name: Nancy
Last_Name: Bracewell
Organization:
City: Birmingham
State: AL
Date Submitted: 9/12/2007
Comment:

This "training" in Hawaii is beyond ridiculous: It is damaging, an insult to the Island State, detrimental to all life in the area -- both animal and man!
There is no excuse for training exercises for an enemy that does not exist. There is no navy on earth that could possibly attack the great big strong USA. The generations of over-spending in a WAR budget have made that a definite fact. No, NOT the Defense budget, a WAR budget!
The people are NOT fooled. This is an outrageous waste of manpower, resources, citizens, and all life! The radiation in weapons alone is damaging to the ones using the weapons as well as all others.
The job of the Navy is to protect and defend. These are not defensive weapons and there is NO need for this exercise. 1

COMMENT NUMBER
D-N-0008

First Name: Jean
Last_Name: Merrigan
Organization: WILPF
City: Santa Cruz
State: CA
Date Submitted: 9/12/2007
Comment:

I do not support military expansion in the Hawaii Range Complex and reject Alternatives 1 and 2. It seems crazy to me that the US Navy wants to mess up paradise with its war games. Why don't you just get your snorkels out, jump in the warm water, and enjoy the beautiful marine life, instead of destroying it??? 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0009

First Name: Phyllis
Last_Name: Brown
Organization: none
City: Petaluma
State: CA
Date Submitted: 9/13/2007
Comment:

Please do NOT allow the government to carry throught on their war games against the waters off Hawaii! This would endanger all the fish, qwhales & dolphins! Sonar has already played havoc with the whales. Do all within your power to STOP this!! The Hawaiain people depend on the sea liofe to make their living. Inroads of mainload civilization has already destroyed much of their native culture and spiritual philosophy to the point most of them are deopendant on us now to earn a living. 1

COMMENT NUMBER
D-N-0010

First Name: Gemma
Last_Name: Walsh
Organization:
City: London
State:
Date Submitted: 9/13/2007
Comment:

As an Australian livinging in the UK I have no personal ties with Hawaii or its people. But I am still disgusted at the proposal to test and develop weapons on such a sensitive eco system. Surely even America can see that the weapons will be useless if there is no world left within which to use them. 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0011

First Name: Bonnie
Last_Name: Beck
Organization: The People of Earth
City: Perkasie
State: PA
Date Submitted: 9/13/2007
Comment:

1 The Navy is to proctect the EARTH , PEOPLE , And ANIMALS . Why are they DESTROYING the PEOPLE , SEA ,FISH ,and the EARTH ???? STOP , STOP , STOP BEFORE the whole Planet is DESTROYED . PLEASE STOP

COMMENT NUMBER
D-N-0012

First Name: Rev. Mark
Last_Name: Seydel
Organization:
City: Warrington
State: PA
Date Submitted: 9/13/2007
Comment:

1 Very interesting article considering there are many thing going on today to increase and perfect our military. War games and exercises have become quite commonplace. There were "war games/exercises" on 9/11 that involved plains crashing into buildings. At the exact same time the bombings happened in London there were "war games/exercises" going on involving the scenario that actually took place. In October (15th-20th) there are going to be "war games/exercises " involving the implementation of martial law. Do people still think this is coincidence?

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0013

First Name: Lynn
Last_Name: Surgalla
Organization: ny911truth
City: Monmouth Beach
State: NJ
Date Submitted: 9/13/2007
Comment:
The filthy, depraved, TREASONOUS WAR-CRIMINALS who perpetrate CRIMES AGAINST HUMANITY and AGAINST ALL LIFE-ON-EARTH (for whatever selfish,personal motives) WILL EVENTUALLY DIE. THEY WILL THEN REINCARNATE IN HELL --> PROBABLY AS MUTATED, SUFFERING DEPLETED-URANIUM-BABIES (OF SOME SPECIES)FOR AS LONG AS EARTH WILL BE RADIOACTIVE (4.5 BILLION YEARS!!!). The REST OF US will return into the LIGHT, undefiled. 1

COMMENT NUMBER
D-N-0016

First Name: Frederick
Last_Name: Ruch
Organization:
City: North Olmsted
State: OH
Date Submitted: 9/13/2007
Comment:
Stop this this excessive, fear-based activity now! 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0017

First Name: Joseph
Last_Name: Sanchez
Organization:
City:
State:
Date Submitted: 9/13/2007
Comment:
I do not support any military expansion in the Hawaii Range Complex and reject both Alternatives 1 and 2, and insist instead that our government protects and defends Hawaii (its land, its ocean, its wildlife, and its people) from further harm and degradation. 1

COMMENT NUMBER
D-N-0018

First Name: bill
Last_Name: lewis
Organization:
City: Sandpoint
State: ID
Date Submitted: 9/13/2007
Comment:
All military training exercises within the environmental zone of the Hawaiian Islands should be suspended immediately. A complete public environmenal assessment should follow. These islands and its people need to be protected and cleaned up in accordance with prior military actions and maneuvers and all military ceased for all time. 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0019

First Name: Gaye
Last_Name: Berger
Organization:
City:
State: CA
Date Submitted: 9/13/2007
Comment:

1 I am against military testing of weapons, particularly nuclear, in the area of the Hawaiian Islands. I believe it will be detrimental to the environment and peoples of Hawaii!

COMMENT NUMBER
D-N-0020

First Name: Ernest
Last_Name: Goitein
Organization:
City: Atherton
State: CA
Date Submitted: 9/13/2007
Comment:

1 The military behave like small chidren playing with their toys. Unaware or uneducated about the consequences of their games. Like small children we must stop the irreversible damage being done to our environment. Once destroyed it cannot be returned. I suppose it goes with the mindset of killing for which the miltary are trained. Retraining to respect life is what is needed now.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

First Name: Kayla Last_Name: Makortoff Organization: City: State: Date Submitted: 9/13/2007 Comment: SAVE THE HAWAIIN COAST	COMMENT NUMBER D-N-0021 1

First Name: laurel Last_Name: douglass Organization: City: State: Date Submitted: 9/13/2007 Comment: Please, dear government of America,, spare our dear Hawaii from any further expansion of war maneuvers. Hawaii has always welcomed all people from all nations and kingdoms here....harbors open to all....even fugitives from other lands... if they followed our peaceful ways. Even the mammoth whales come here to have their children, knowing it is a fair and safe haven. Do not despoil this precious place......under any guise....under any excuse.....under any codicil or amendment or law of any land. We treasure our home land as you perhaps do yours. with aloha for all, with malice toward none.	COMMENT NUMBER D-N-0022 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-N-0023

First Name: George
Last_Name: Simich
Organization: Victoria Street News
City: Nanaimo
State: BC
Date Submitted: 9/13/2007
Comment:
To whom this may concern:

1 Stop! Stop what you are cavalierly doing to this planet. To the neocons and neoliberals of the world, have you ever considered suicide--think about it. Christo-fascists going to heaven to sit on the Right hand of your pissy, little God. Kill youselves, not this planet; we need this planet to survive, but we do not need you. Spare Hawaii, spare the planet, spare us--do yourself and us a favour; cut your wrists; swallow some pills; stick your favourite toy--guns--in your mouth and kill yourself. Those pearly gates are waiting.

Peace

George Simich

COMMENT NUMBER

D-N-0024

First Name: Robert
Last_Name: Miyake-Stoner
Organization:
City: Aiea
State: HI
Date Submitted: 9/13/2007
Comment:
1 I do not support any military expansion in the Hawaii Range Complex. Furthermore, I reject both Alternatives 1 and 2. Instead, I insist that our government protect and defend Hawaii (its land, its ocean,its wildlife, and its people) from further harm and degradation.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0025

First Name: Serge
Last_Name: Simard
Organization: Atomic Credit
City: Trois-Rivières
State:
Date Submitted: 9/13/2007
Comment:

Since I have been irradiated or contaminated at the Gentilly 1 Nuclear Plant in Quebec, my life have been a hell. In my dreams I was thinking to go in Hawaii one day but Hydro-Quebec made this trip impossible after I have become a whistleblower in the nuclear plant that was a mess. Hope you will maintain this marvelous water blue as it was in my dreams. 1

Sincerely

Serge Simard

COMMENT NUMBER
D-N-0026

First Name: Simon
Last_Name: Teolis
Organization:
City: Santa Fe
State: NM
Date Submitted: 9/13/2007
Comment:

Obviously America will not be happy until we have destroyed or defiled every single creature and pristine enviornment that God ever created, but let's look at the bright side, perhaps by that time we will have taken ouselves out of the picture! 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0027

First Name: David
Last_Name: Kane
Organization:
City: Brooklyn
State: NY
Date Submitted: 9/13/2007
Comment:

1

With the recent discoveries of hundreds of heretofore unknown species -- with equally unknown chemical properties, that likely will give us whole new ways of fighting and curing diseases -- a Vast Untapped Database of Knowledge lies in the oceans and it is as irresponsible to ignore the damgage that active naval systems can have on this irreplaceable treasure as it is to ignore the greenhouse gases that are driving global warming.

We need someone to protect us from our own Navy when it comes to using the oceans to further test technologies known to harm ocean dwellers and even more dangerous to test new technologies on our distant ancestors who likely hold the keys to many questions we have concerning aging and evolution.

We need to set our priorities and it should be Obvious that our priority should be to life, not to death. The Navy, of course, sees things differently. That is their job. Our job is to protect the world our children will inherit. Will it be a world of war, or a world of peace.

What kind of world do you want your children's children to inherit from vou?

COMMENT NUMBER
D-N-0028

First Name: Paul
Last_Name: Grossman
Organization:
City: Plano
State: TX
Date Submitted: 9/13/2007
Comment:

1

Please stop being one of the major factors in the destruction of the wildlife of this planet !!!!

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-N-0029

First Name: Gayle
Last_Name: Roller
Organization:
City:
State:
Date Submitted: 9/13/2007
Comment:

1

What complete disrespect! Deafen and kill more whales, poison water and people through your "games" around Hawaii. Tone it down.

COMMENT NUMBER

D-N-0030

First Name: Linda
Last_Name: Bonura
Organization:
City: Denham Springs
State: LA
Date Submitted: 9/13/2007
Comment:

Aloha! I just found out that the Navy is planning on expanding its war games and numerous new weapon "toys" in an area of 235,000 square nautical miles around Hawaii! Incredibly, the Navy is proposing a major upgrading and expansion - in order to do more research, development, testing, and evaluation of military weapons and systems, to the tune of 140 (that is One Hundred Forty) projects, including even the use of Directed Energy Laser Weapons.

Why are they doing this? According to Section of the Environmental Impact Statement, "The purpose for the proposed action is to:
achieve and maintain fleet readiness using the HRC to support and conduct current, emerging, and future training events and RDT&E training and testing events; (2) expand warfare missions [Note: anti-war activists beware!] supported by the HRC, consistent with the requirements of the FRTP and other transformation initiatives; and (3) upgrade/modernize existing range capabilities to enhance and ensure the sustainability of

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
	D-N-0030 (cont.)
Navy training and testing. The Proposed Action is needed to provide combat capable forces ready to deploy worldwide"...	
For those wondering about radioactivity? I found mention of the words "radioactive materials" four times within Volume 3. One gets the feeling that, as usual, in its military "test" sites, Uncle Sam's not planning on just shooting blanks!	1
The adverse impact on whales, other marine wildlife, the air, and ocean is unfathomable. I will allow you to imagine what effects these weapons will have upon the environment and wildlife, and also, sadly, upon the health of the Hawaiian people.	2
Can we possibly get enough international outrage going within four (4) days to stop the Navy from getting away with this expansion that appears in only 2 (!) articles from Hawaii newspapers in a Google news search? The link to one of the article links is below. The other is filled with falsehoods (i.e, how great weapons testing is for whales) and is thus omitted. As you will soon discover for yourself, the Environmental Impact Statement for the Hawaii Range Complex is already filled with enough deception for one night's reading.	3
Can we do this? Or better put, how can we NOT do this? Can we stop the US military from further ruining the	

	COMMENT NUMBER
	D-N-0030 (cont.)
waters and marine wildlife around America's Hawaiian Paradise? Admittedly, it's a long shot. But isn't saving Hawaii and the Pacific Ocean worth a try?	

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0031

First Name: Don
Last_Name: Hirth
Organization: retired
City:
State:
Date Submitted: 9/13/2007
Comment:

1 This proposed act borders on almost complete insanity! Whales, dolphins and fish deserve a decent chance to survive and thrive. Our so called leaders appear facinated with even more devastating weapons. We have more than enough of them, now. When will these evils stop?

COMMENT NUMBER
D-N-0032

First Name: Pl
Last_Name: Norton
Organization:
City: Lewes
State: DE
Date Submitted: 9/13/2007
Comment:

1 Hawaii is not the military's play ground. Please stand the military and its games down in Hawaii and the Pacific.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0033

First Name: Janus
Last_Name: Wilhlem
Organization:
City: salem
State: or
Date Submitted: 9/13/2007
Comment:

1 Stop plans that will devastate the ocean life around Hawaii or anywhere else. How can these war games be considered more important that life on our planet? This is about our grandchildren, not only sealife. My grandkids, and yours too!

COMMENT NUMBER
D-N-0034

First Name: harriet
Last_Name: mitteldorf
Organization:
City: Pebble Beach
State: CA
Date Submitted: 9/14/2007
Comment:

1 I do not support any military expansion in the Hawaii Range Complex nor Alternatives 1 and 2. I believe our government should respect ocean wildlife and avoid any damaging behavior.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0035

First Name: Marguerite
Last_Name: Beavers
Organization: by Divine Design
City: Kihei
State: HI
Date Submitted: 9/14/2007
Comment:
PLEASE stop this foolishness. We will not get another chance to stop the madness if we don't do it now. 1

COMMENT NUMBER
D-N-0036

First Name: Lisa
Last_Name: Long
Organization: ResurrectingLiberty.com
City: Holualoa
State: HI
Date Submitted: 9/14/2007
Comment:
I support our armed forces, and believe they should be strong. 1
But I do not support more and more military buildup.

And I do not support weapons of mass destruction in our back yard.. or used in highly sensitive areas of the endangered species of the Hawaiian Islands, or used around and on civilian populations, ours or any others.

This must stop.. we have turned into a war nation.
America the Free is now America the Oppressor.

1000% NO!

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0037

First Name: Phyllis
Last_Name: Brown
Organization: none
City: Petaluma
State: CA
Date Submitted: 9/14/2007
Comment:

1 Please don't allow our weapons program to affect our fish and wildlife!

COMMENT NUMBER
D-N-0038

First Name: Nancy
Last_Name: Tally
Organization:
City: Lenexa
State: KS
Date Submitted: 9/14/2007
Comment:

Stop hurting one of the most beautiful places on earth, are earth is being destroyed by our own government, the waters around Hawaii should not be endangered,, stop before it is to late, 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0039

First Name: Emily
Last_Name: Dale
Organization:
City: Franklin
State: NC
Date Submitted: 9/14/2007
Comment:

1 Weapons testing in the area surrounding the Hawaiian Islands may push the destruction of marine life there over the brink. With global warming already affecting the oceans deleteriously, weapons testing activity may sound the death knell for millions of aquatic species. There will be a ripple effect on the entire food chain in that area.

The United States Navy was never intended to eliminate marine life, and yet this is repeated over and over again through wanton weapons testing.

Please reconsider your plans and find less harmful ways to do these activities.

COMMENT NUMBER
D-N-0040

First Name: Elle
Last_Name: Jordan
Organization: Care 2
City: Cambridge
State: MA
Date Submitted: 9/14/2007
Comment:

1 This is totally unexceptable and it will effect the health of people on the islands. What can they be thinking of? That is the problem, they aren't thinking at all. This doesn't make sense. Fighting in Iraq to protect this country? Then they do things like this. Senseless!

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-N-0041

First Name: Angela
Last_Name: Tafarl
Organization:
City:
State:
Date Submitted: 9/14/2007
Comment:

1

STOP! HOLD IT RIGHT THERE! THE PACIFIC PARADISE BELONGS TO EVERYONE. WE ARE CLAIMING OUR SOVEREIGNTY NOW. NO MORE MILITARY OPRESSION. THIS ACTION IS DESTRUCTIVE IN INTENT TO THE MARINE LIFE, HUMAN LIFE QUALITY,THE OCEAN, AIR, AND PEOPLE. WE PROTEST. DO NOT TRY TO FURTHER SPREAD MILITARISM, WAR, AND DESTRUCTIVE ACTS. THIS IS NOT REPRESENTATIVE OF WHAT THE PEOPLE WANT. NUCLEAR WEAPON AGE IS OVER. PLEASE MOVE ON TO PEACE. MAHALO.

COMMENT NUMBER

D-N-0042

First Name: Sherry
Last_Name: Sharp
Organization: s/e
City: Beaumont
State: TX
Date Submitted: 9/14/2007
Comment:

1

I emplore you not go forward with these exercises. There is absolutely no justification to jeopardize human life, wildlife, our environment of air and sea in such an irresponsible and reckless way! If these exercises must be taken, then measures must be put into place to do so without such dire circumstances!

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0043

First Name: Kem
Last_Name: Patrick
Organization:
City:
State:
Date Submitted: 9/14/2007
Comment:

An "depleted uranium" artillary shell, is ten pounds of DU. When fired, the result is billions of nano-particles of ceramic oxide, radio-active dust, taken up into the air to be wind blown wherever the breezes may take it. If a single microscopic particle is inhaled, cancer is likely is the result. Is the Navy, like the Army, who have already admitted they have done in Hawaii, going to be firing DU ammunition? 1

COMMENT NUMBER
D-N-0044

First Name: Lee
Last_Name: Bowden
Organization:
City: Hilo
State: HI
Date Submitted: 9/14/2007
Comment:

The military must act as a good neighbor if it is to operate in the NRC. 1
We will not stand by idly and see our environment and marine life abused.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0045

First Name: errol
Last_Name: gard
Organization:
City:
State: HI
Date Submitted: 9/14/2007
Comment:

1 We are under martial law, and have been for many years. The military/govt/corp establishment is about profits and control only.

The guns have been pointed at us for a long time. History has shown our govt will have no remorse when it decides to fire upon its own citizens.

But, what can you expect for a population transfixed by legal brawls on TV?

Much Aloha

e

COMMENT NUMBER
D-N-0046

First Name: adam
Last_Name: davis
Organization:
City: silver spring
State: md
Date Submitted: 9/14/2007
Comment:

1 i am opposed to any navy testing that may affect any sea life, ecosystem, or water quality in any detrimental or unknown way.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0047

First Name: Carla
Last_Name: Buscaglia
Organization:
City:
State:
Date Submitted: 9/14/2007
Comment:
Boys and Girls,

1 Speaking on behalf off all the marine life around the Hawaiian islands and beyond, please consider putting your new 'toys' away. Imagine spending all that energy and money on establishing peace - Heaven truly would be here on Earth.

Aloha,
Carla

COMMENT NUMBER
D-N-0048

First Name: Lela
Last_Name: Nickel
Organization:
City: Paia
State: Hi
Date Submitted: 9/14/2007
Comment:

1 I protest the continuation of the Naval exercises in the Pacific around Hawaii! Enough is enough!!! There has been so much evidence of the harm to our ocean resources as a result of the LAF Sonar program, the tons of toxic waste and chemical weapons dumped off our coast.
Instead of addressing the problems, apologizing to the public for exposure to such hazards and employing every effort to correct the situation, you want to do more testing? I don't think you have shown the proper reaction to your past infractions to be trusted to continue.

I hope you will understand that the health of Hawaii depends on healthy seas. You have not proven sensitive to our environment, therefore these 'tests' are not acceptable. Our safety is at stake from your exercises, not from enemies abroad!

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0049

First Name: Therese
Last_Name: Coniglio
Organization:
City:
State:
Date Submitted: 9/14/2007
Comment:

1 Please do not expand Navy weapons and war games, experiments, testing, etc. on or near Hawaii. Respect the aina, the ocean, the wildlife.

COMMENT NUMBER
D-N-0050

First Name: Lionel
Last_Name: Standish
Organization:
City:
State:
Date Submitted: 9/14/2007
Comment:

1 I do not support any military expansion in the Hawaii Range Complex. I reject both Alternatives 1 and 2, and that I insist instead that our government protects and defends Hawaii (its land, its ocean, its wildlife, and its people) from further harm and degradation.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0051

First Name: Stephen
Last_Name: Jones
Organization:
City:
State:
Date Submitted: 9/14/2007
Comment:

I oppose the expansion of weapons and weapons systems testing anywhere in the vicinity of my beloved Hawaiian Islands. 2

Additionally, to the extent that radioactive materials, (even the sort of 'depleted uranium' ordnance like what is being used in Iraq), have any part in this testing and evaluation program, the very idea that the United States, my country, would employ such weaponry for any reason is to me a shameful and cowardly act which in any truly civilized society or nation would be so abhorrent as to be unthinkable. 1

COMMENT NUMBER
D-N-0052

First Name: Carlyn
Last_Name: Battilla
Organization:
City: Trout Run
State: PA
Date Submitted: 9/14/2007
Comment:

I do not support any military expansion in the Hawaii Range Complex. I reject both Alternatives 1 and 2, and I insist instead that our government protects and defends Hawaii (its land, its ocean, its wildlife,and its people) from further harm and degradation. 1

As a previous employee of Pohakuloa Training Area, former resident of Hilo, and alumni of the University of Hawaii at Hilo, I highly disapprove of expansion!

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0053

First Name: Christoper
Last_Name: Schwartz
Organization: Truth Movement
City: Statesville
State: NC
Date Submitted: 9/14/2007
Comment:
I am absolutetly outraged with the fact that our tax dollars and our environment aswell as the health of Americians will be jepordized for the benefit of wageing more war. We strongly urge you to reconsider! We all know that these wars are carried out under false pretense and are extremely Unconstitutional.
Let's stop being "Libirators" and start being Americians!!!
Ron Paul 08! 1

COMMENT NUMBER
D-N-0054

First Name: Betty
Last_Name: Dean
Organization:
City: Sterling
State: AK
Date Submitted: 9/14/2007
Comment:
We reject Alternatives 1 & 2. We want the government to protect and defend Hawaii (the land, the ocean, the wildlife) Do not harm and degrade this beautiful place. We must preserve all of it. 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0055

First Name: Anna
Last_Name: Webb
Organization:
City: Hilo
State: HI
Date Submitted: 9/14/2007
Comment:

I am personally against the expansion of research, development, testing, and evaluation of military weapons and systems in Hawaii waters surrounding the islands. I oppose the use of Directed Energy Laser Weapons and feel that it is not only a threat to ocean wildlife but to humans as well. 1

I ask you to carefully consider your decision and if at all possible, find an alternative to this plan. There has to be more remote waters available to carry out the named projects.
Sincerely,
Anna Webb

COMMENT NUMBER
D-N-0056

First Name: Sharon
Last_Name: Ritchie
Organization:
City: West Mifflin
State: PA
Date Submitted: 9/14/2007
Comment:

I do not support any military expansion in the Hawaii Range Complex. I also reject both Alternatives 1 and 2, and insist, instead, that our government protects and defends Hawaii (its land, its ocean, its wildlife, and its people) from further harm and degradation. The adverse impact on whales, other marine wildlife, the air and the ocean i2 unfathomable. Please leave America's paradise alone. 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0057

First Name: Audrey
Last_Name: Stanzler
Organization:
City:
State: CA
Date Submitted: 9/15/2007
Comment:

i already knew that the military were getting exemptions that allowed them to pollute the waters of Hawaii, and that fact that there are 7 military bases with exemptions was always a worry. 1

if we keep allowing these things to happen we will have NO PARADISE's left for any of us to experience.

I want a stop to this fictitious war, and all the excuses they are using the urgency of security to get everything passed and then destroy everything that is pure and beautiful from our ecology, our wild animals, our air and our water.... all because of military and war games.

I am so sick of it i could just spew. Do NOT Allow this to happen to Hawaii.

COMMENT NUMBER
D-N-0058

First Name: patricia
Last_Name: nelson
Organization:
City:
State:
Date Submitted: 9/15/2007
Comment:

my children were born term and raised here............ 1
don't take a chance on doing something that might make them die here prematurely.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0059

First Name: Michael
Last_Name: McAvoy
Organization: Help Along The Way
City: Kailua Kona
State: HI
Date Submitted: 9/15/2007
Comment:

This is an abhorrent abuse of the Hawaiian territory and is set up through deception. I doubt that this matters, but I am firmly opposed. 1

COMMENT NUMBER
D-N-0060

First Name: Ronald
Last_Name: Fujiyoshi
Organization: Kanaka Council
City: Hilo
State: HI
Date Submitted: 9/15/2007
Comment:

The alternative that the U.S. Navy should take is one of not conducting any testing in the ocean or on the land in Hawaii. Under international law, I concur with the Permanent Court of Arbitration in The Hague, Netherlands in the case of Larsen vs. Kingdom of Hawaii that the legal entity of the Kingdom of Hawaii still exists. The U.S. Navy is part of a military occupation of the Kingdom of Hawaii. The U.S. Navy should cease and desist from conducting any tests in the ocean and underwater in the oceans surrounding the Hawaiian archepelago. The U.S. Navy should cease and desist from conducting any tests on the land of the Hawaiian archepelago. 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0061

First Name: Margo
Last_Name: Johnson
Organization:
City: Honolulu
State: HI
Date Submitted: 9/15/2007
Comment:

1 STOP killing the environment trying to figure out how to kill everything better, JUST STOP! think about how to communicate with your enimies better than KILLING them.

COMMENT NUMBER
D-N-0062

First Name: Bonnie
Last_Name: Morgan
Organization:
City: Lahaina
State: HI
Date Submitted: 9/15/2007
Comment:

1 The military has done enough damage to our islands ! Kahoolawee is uninhabitable ruined forever ,There are tons of nuclear waste encased in steel drums (2000) dumped off our shores .YOur sonar tests have killed whales .Not to mention the lingering efects of DU in our soil on the big isle and Oahu that supposedly you are testing for? How about cleaning up all the mess you have made here in this sacred part of the world instead of furthering destoying it and the health of our residents and your own military people exposed to it before you run another of your "tests'?

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0063

First Name: Shannon
Last_Name: Monkowski
Organization:
City: Holualoa
State: Hi
Date Submitted: 9/16/2007
Comment:

Haven't you people done enough damage to Hawaii and the environment. You should all be ashamed of yourselves. When God looks down upon the sacred creations of the beautiful earth and the life bestowed upon it, and there you all are in your activities of planning death and destruction everywhere, the sadness must be profound, the failures stark. 1

What gives you the right, and how can you live with yourselves. The things you do are worse than any thing any imagined enemy could conjure. You all disgust me, and the majority of the American people feel the same way I do.

COMMENT NUMBER
D-N-0064

First Name: Samadhi
Last_Name: Haapala
Organization: individual
City: Athol
State: MA
Date Submitted: 9/16/2007
Comment:

Are we not doing enough damagement to our wildlife, our people & our world already? If we spent half as much on testing for ways we can recycle, find new sources of energy and have a greener world for our children, and harvest solar heating, hydroponic growing, hydrocell cars, it would also be more read-ily available to everyone, not just the wealthy. We need good healthy food and an unpolluted environment to think right and feel right. Let's sort out our priorities! Thanks, Samadhi Haapala 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-N-0065

First Name: Patti
Last_Name: Montgomery
Organization:
City: Fort Bragg
State: CA
Date Submitted: 9/16/2007
Comment:
I'm outraged at the use of DU by the military in Hawaii, Iraq, and anywhere else on this planet. It's clear that the military cares not one iota for it's own people or anyone else who might be exposed to this heinous substance. I lived in Hawaii for 15 years, I have an ex husband (Viet Nam vet), two sons and two grandsons living in the islands - half of my entire family, and all of my desendents. I have been up close and personal with the sea life, and especially the cetaceans, there. 1
I was successful in driving out a guided missile destroyer, who illegally sought to r&r on Maui, with a laugh box, when I was 7 months pregnant. I worked with locals to stop the military from using Kahoolawe for a bombing target. If I weren't so old, I'd be inspired to come over there and kick some ass. Put that in your pipe and smoke it.
You need to start defending the Constitution (remember that oath you took?)
instead of trashing the planet and running corporate agendas.

jump up and live
long life
honey in the heart
no evil
thirteen thank yous

mpm

COMMENT NUMBER

D-N-0066

First Name: Dr. Shyrl
Last_Name: Matias
Organization:
City: Honolulu
State: HI
Date Submitted: 9/16/2007
Comment:
To Whom It May Concern:
I do not support any military expansion in the Hawaii Range Complex. I reject both Alternatives 1 and 2, and I respectfully request that our government protect and defend Hawaii (its land, its ocean, its wildlife, and its people) from further harm and degradation, particularly in conjunction with illegitimate war in Iraq. 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0067

First Name: Mark
Last_Name: Lacas
Organization:
City: Seattle
State: WA
Date Submitted: 9/17/2007
Comment:
Don't do it! What are you thinking anyway? 1

COMMENT NUMBER
D-N-0068

First Name: Roscoe
Last_Name: Flora
Organization: PSGS
City: Kapolei
State: HI
Date Submitted: 9/17/2007
Comment:
I support the U.S. Navy's operations at the Hawaii Range Complex 100%. I know the mission could not be accomplished without the intensive training this complex provides. 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0069

First Name: Sharon
Last_Name: Kaczorowski
Organization: none
City: Newark
State: DE
Date Submitted: 9/17/2007
Comment:

1 Please reconsider war exercises around Hawaii until the environmental impact is better understood. Readiness will mean nothing if we destroy or damage what we intend to defend. All of you have taken an oath to protect and serve this nation, not to harm it. I ask this as the daughter of a WWII Naval veteran.

COMMENT NUMBER
D-N-0070

First Name: Lindafaye
Last_Name: Kroll
Organization: Kahu O Kahiko
City: Keaau
State: HI
Date Submitted: 9/17/2007
Comment:

1 Before the Navy expands how about cleaning up the Superfund site you created? Clean up Pearl Harbor from
2 your toxic contamination. The Northwest Hawaii Islands are a protected reserved and should not be used as the Navy's playground to expand your toxic pollution in war games and the use of sonar that will have a negative impact on the marine life in the area and fragile ecosystem. Downsize not build-up

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0071

First Name: Russell
Last_Name: Hoffman
Organization: Selt
City: Carlsbad
State: CA
Date Submitted: 9/17/2007
Comment:
September 17th, 2007

Re: Hawaii Range Complex Environmental Impact Statement

To Whom It May Concern, US Government:

1 I just have NO IDEA who might have written the statement shown below, but I wish to submit it as my opposition statement to the proposed poisoning of nearly one quarter million square miles (unfenced) of the Pacific Ocean by the United States Navy.

Sincerely Yours,

Russell "Ace" Hoffman
P.O. Box 1936
Carlsbad, CA

COMMENT NUMBER
D-N-0071 (cont.)

==
September 13th, 2007
==

Death is upon us. A rogue army is maneuvering to destroy our planet. Its name is Navy.

U.S. Navy.

Step by step by step over the past decade, the military has asked for -- and received --enormous exemptions from caring for humanity. Environmental laws everyone else must obey -- laws which save lives -- mean nothing to them. No longer are they required to obey their civilian leaders. No longer are they required to atone for sins they commit. No longer are they culpable for YOUR death.

You, who they WERE charged to protect.

You, who WERE to be their masters.

You, who FUNDS them.

Citizens of the United States: Rise up! Rise up against your oppressors! Rise up against the randomization of death! Rise up against the destruction of YOUR HOMELAND!

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-N-0071 (cont.)

Rise up against the U.S. Navy!

A decade ago, the United States military was granted an exemption from environmental laws. The U.S. Navy is the most egregious -- and dirty -- of all militaries in history. They kill their own sailors, with radiation, with chemicals used in warfare, with chemicals used to keep their ships "ship-shape."

My friends are dying. Your friends are dying. You and I are dying because we cannot -- no, because we WILL NOT -- rein in these cutthroats.

The Navy's most recent crime involves directly poisoning nearly a quarter of a million square miles of "open ocean" -- where our fish grow, where our whales and dolphins frolic, where earth's balancing life develops. No fence will keep the poisons in the designated area.

They will use radiation weapons, Directed Energy Laser Weapons, pressure (concussive and / or vacuum (over- / under-pressure) killing devices, and nearly 150 other kinds of "toys."

These are the same guys who brought you Bikini, Eniwetok, and Rongelap. All radiation-poisoned islands.

The same guys who pollute Vieques, Puerto Rico with Depleted Uranium -- as well as Okinawa and various sites on the U.S. mainland. And Iraq. And Kosovo. And Afghanistan. And tomorrow? Iran.

COMMENT NUMBER

D-N-0071 (cont.)

The same guys who lie about how many of their own -- their submarine sailors -- are dying of brain tumors as their payment for service aboard nuclear submarines.

Hail the U.S. Navy! Professional killers! Professional planet-destroyers! Professional liars! Professionals in every way.

Damn the torpedos. Damn the missiles. Damn the truth. Damn the citizens they claim to protect. Damn us all.

Damn the U.S. Navy: Killers of U. S. citizens. Killers of the planet. Killers of us all.

(Written by a patriotic citizen.)

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Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

	COMMENT NUMBER
	D-N-0072
First Name: Reuben Last_Name: Balmores Organization: City: Kalaheo State: HI Date Submitted: 9/17/2007 Comment:	
PMRF has been a good neighbor to the surfing community up to this point. All I really care about is maintaining the current level of access to surfing spots at PMRF. That is from Kenikeni to Shenanigans. It would also be very beneficial to have access to areas south of Shenanigans to Kokole Point. Not so much the ability to drive on the Beach. But maybe a parking lot further south to allow parking and access by foot to these areas. Mahalo.	1

	COMMENT NUMBER
	D-N-0073
First Name: Karen Last_Name: Giles Organization: City: Portage State: PA Date Submitted: 9/17/2007 Comment:	
There should be NO ACTION-ALTERNATIVE taken on the Draft Environmental Impact Statement for the Hawaii Range Complex! Both alternatives are certain to have detrimental impact upon the Hawaiian people, the Pacific Ocean, and all life forms. The military's purpose is to defend our country, not to destroy it.	1
Radioactivity from Uranium munitions will remain in the environment for billions of years. U-238 is known to have a half-life of 4.5 billion years. This would have a negative impact on people, animals, environment and also on tourism. Cancer, leukemia and birth defects increase in areas where uranium munitions are tested or used. Since radioactive particles do not stay in one place, the damaging effects of these weapons and military war games affect other areas too.	2

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0074

First Name: Peter
Last_Name: Dearman
Organization:
City:
State:
Date Submitted: 9/17/2007
Comment:

Regarding the possibility of use in the Hawaiian ecosystem, accidental or intentional, of depleted uranium munitions including the "Advanced Hypersonic Weapon" under development that Military.com reports "could be fitted with a 900-pound penetrator warhead or 900 pounds of rods to impact at Mach 4 speed.", it should be born in mind that DU is pure metallic uranium that is only partially depleted (ca.60%) of its U-235 content. 1

The U-235 content of depleted uranium is typically 0.25 to 0.3 percent according to commonplace sources. The U-235 content of reactor fuel pellets and rods (directly comparable to DU shells, as they are both composed of solid and pure uranium) is typically 3 to 3.5% for the most common reactor types arouind the world.

Thus, it is easy to see that DU shells are at least one tenth the contaminant that reactor fuel pellets would be, especially if the DU is reduced to dust on shell impact and the self-shielding effect is removed.

COMMENT NUMBER
D-N-0074 (cont.)

Of course there are further concerns regarding this dust and its liklihood of entering living tissues, where the U-238 can cause ongoing cellular damage due to its alpha-emitting nature.

One must not forget the simple fact that uranium is a heavy metal and thereby toxic. It is a well known principle that heavy metals accumulate in the food chain.

Furthermore, there has been recent research demonstrating uranium's ability to bind to DNA, which would drastically increase the damaging effect of the radiation. The leader of this research at Northern Arizona University, Dr. Diane Stearns told me the following: "As for your question, each heavy metal is unique in the range of ways that it can damage DNA. In the case of binding to DNA it is well established for chromium, and recently discovered (by us) for uranium, but does not happen with, for example, nickel, cadmium, arsenic, or lead. It is my opinion that DU is a concern both as a heavy metal (chemical) and as a radioactive element. And yes, I agree that a heavy metal binding to DNA is bad, and a heavy metal that binds to DNA and is also radioactive is worse."

I humbly request that you consider deeply the implications of permitting a process to go forth that will end up contaminating the fragile Hawaiian ecosystem with what is properly classified as nuclear waste, and actually amounts to the near equivalent of nuclear fuel.

In peace,
Peter Dearman

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0075

First Name: Joe
Last_Name: Whetstone
Organization:
City: Bluffton
State: SC
Date Submitted: 9/17/2007
Comment:

Why not look for Osama bin Muhammad bin 'Awad bin Laden? 1

STOP: This foolish military testing program!!
You are harming what you should be protecting:
Human and animal health.
In addition you are causing socio/economic injustice to the native Hawaiian Islanders who live in this militarized impacted area. 2

COMMENT NUMBER
D-N-0076

First Name: Pat
Last_Name: Rydz
Organization: citizen of US
City: Pagosa Springs
State: CO
Date Submitted: 9/17/2007
Comment:

Please stop all military exercises in and around the Hawaiian Islands up to 2300 miles from those islands. 1
You will be endangering see life, human life and other animals with your DU poisoning similar to what is happening to our children in Iraq. I am appalled at how much I have to write to stop my gov at all levels from poisoning my environment and that of the children. WHAT IS WRONG WITH YOU... YOU HAVE AN OATH OF OFFICE YOU TOOK TO "PROTECT AND DEFEND" THE COUNTRY, ITS PEOPLE AND THE CONSTITUTION FROM "ALL" ENEMIES BOTH FOREIGN AND "DOMESTIC", which is the case right now. Thank you and I hope you see your choices very clearly now.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-N-0077

First Name: Tova
Last_Name: Fuller
Organization: Physicians for Social Responsibility
City: Los Angeles
State: CA
Date Submitted: 9/17/2007
Comment:
Subject: NO ACTION-ALTERNATIVE

1 As a medical student, I absolutely oppose the use of weapons of any kind in the Hawaiian Pacific. Use of radioactive materials and live fire is absolutely unacceptable and could potentially have a dramatic effect on human health and survival - directly and via detrimental effects to the environment.

I do NOT want my tax money going to support these war games - they make me feel much less safe rather than safer.

Tova Fuller
National Student Representative
Physicians for Social Responsibility

COMMENT NUMBER

D-N-0078

First Name: James
Last_Name: LaGarde
Organization:
City: Pocomoke City
State: MD
Date Submitted: 9/17/2007
Comment:

1 I am totally opposed to the Navy's intention to pollute the Hawaiian Islands and the Pacific Ocean with these terrible weapons. Take your military junk to another planet if you are so intent on destroying things - please leave the Earth alone!

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0079

First Name: Daniel
Last_Name: Hoffman
Organization:
City: Harbeson
State: DE
Date Submitted: 9/17/2007
Comment:
Pease do not make the whales become extinct for the good of our nation. 1
Sincerely Yours,

COMMENT NUMBER
D-N-0080

First Name: Seth
Last_Name: Kowitz
Organization:
City: Inver Grove Heights
State: MN
Date Submitted: 9/17/2007
Comment:
I am writing to express my opposition for Alternative Actions regarding a Draft Environmental Impact Statement for the Hawaii Range Complex. Our wildlife, and our oceans are all interconnected in the delicate ecological system we all share, wherever we are on this planet. The adverse consequences increased military operations and exercises will have on the Hawaiian Islands, the Hawaiian people, and the diverse marine and aquatic life including endangered species such as: humpback whales, green sea turtles, Hawaiian monk seals, Hawaiian stilt a'eo, and laysan albatross in the Pacific and on/around the Islands of: Kauai, Niihau, Kaula, Oahu, and Hawaii within a total area of 2.1 Million square nautical miles in the Pacific Ocean, are unfathomable and will affect all life everywhere detrimentally. For the sake of our planet's survival, I am calling on you to permanently suspend all plans for the Alternative Actions in the Hawaii Range Complex. Thank you. 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0081

First Name: Beth
Last_Name: Saxon
Organization: environmentalist wackos
City: Lawai
State: HI
Date Submitted: 9/17/2007
Comment:

Respect this beautiful island. Leave the sea life and the land alone. Stop all training exercises NOW!!! 1

COMMENT NUMBER
D-N-0082

First Name: Pono
Last_Name: McNeil
Organization: Kanaka Maoli , Hui_pu
City: Pearlcity
State: HI
Date Submitted: 9/17/2007
Comment:

There should be NO ACTION-ALTERNATIVE taken on the Draft Environmental Impact Statement for the Hawaii Range Complex! State your reasons for opposing the two Alternatives which are certain to have detrimental impact upon the Hawaiian people, the Pacific Ocean, and all life forms. 1

THERE SHOULD BE NO usa MILITARY AT ALL, THEY ARE ILLEGALLY OCCUPING OUR SOVEREIGN NATION !!! 2
DEOCCUPY NOW , GET THE FRICK OUT !!!TAKE ALL YOUR CRAP & WITH YOU

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0083

First Name: Miriam
Last_Name: Kurland
Organization:
City: mansfield center
State: ct
Date Submitted: 9/17/2007
Comment:

I am writing to comment on the Draft Environmental Impact Statement with public comments due today, September 17, that affects the Hawaiian Islands – the Hawaiian people and all forms of marine mammals and sea life including Endangered Species: humpback whales, green sea turtles, Hawaiian monk seals, Hawaiian stilt a'eo, and laysan albatross in the Pacific and on/around the Islands of: Kauai, Niihau, Kaula, Oahu, and Hawaii* … within 2.1 Million square nautical miles in the Pacific Ocean.

1 If all proceeds as planned according to the Hawaiian Range Complex Alternative Actions, damage caused to people living in Hawaii, to marine life - and the Pacific Ocean itself - will be unfathomable! There are even many risks acknowledged that are deemed as acceptable, such as the destruction of beaches, fish kills, and possible missile accidents that will affect humans, marine life and natural vegetation critical to ecological survival of all life forms on the Hawaiian Islands and in the Pacific. It is inexcusable to even consider any of these actions to be allowed. I urge you to act to protect Hawaii from this destructive plan.

COMMENT NUMBER
D-N-0084

First Name: Evelyn
Last_Name: Dymkowski
Organization: Citizen
City: Clinton
State: IA
Date Submitted: 9/17/2007
Comment:
Dear Sir or Madam,

The Hawaiian Range is a precious natural resource that we MUST pass on to our children undisturbed, as far as is within our means. This will not happen if it is used by the US Government for military purposes, which are entirely unnecessary for a nation that possesses the largest concentration of nuclear firepower on the globe. 1

May I point to the important following factors which also militate against the use of the Hawaiian islands for military exercises?

- the high use of energy
- the cumulative impacts upon human and animal health
- the socio/economic injustice to the native Hawaiian Islanders who live in this militarized impacted area,
- radioactive and chemical hazards and problems associated with storage and waste products
- the permanency of radioactivity from Uranium munitions in the environment (U-238, for example, has a

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0084 (cont.)

half-life of 4.5 Billion years)Good God!
- destruction to natural, pristine areas and natural resources and vegetation
- the erosion of air quality and water quality of the sea
- the financial taxpayers' burden of these military operations, I do not want this done with my money!
- the impact on Hawaiian tourism and desirability as a place to live
- the risks to health and safety of humans and all impacted life forms

I urge you to not to allow these beautiful islands to be destroyed by unnecessary military operations of any sort. Wake up, repent, stop this nonsense!

COMMENT NUMBER
D-N-0085

First Name: Darla
Last_Name: Sparks
Organization: Retired Citizen
City: Yukon
State: ok
Date Submitted: 9/17/2007
Comment:

Man and military will never be satisfied until they have polluted, spoiled, killed every living thing of worth on this planet. God/creator must weep. Why do you feel this is the correct way to be a caretaker of his/her gifts? Man is sick! 1
Stop these inmoral and worthless actions if you have any conscience left!

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0087

First Name: Terrilee
Last_Name: Kekoolani
Organization:
City: Honolulu
State: HI
Date Submitted: 9/17/2007
Comment:
September 17, 2007

Public Affairs Officer,
Pacific Missile Range Facility,
P.O. Box 128, Kekaha, Kauai, Hawaii, 96752-0128,
ATTN: HRC EIS/OEIS
Fax 808-335-4520
e-mail to deis_hrc@govsupport.us.

To: Commander, Hawaii Range Complex
From: Terrilee N. Kekoolani
Subject: Comments on the Draft EIS/OEIS for Hawai'i Navy Range Complex

My name is Terrilee N. Kekoolani. I am a kanaka maoli and resident of Hawaii living on Oahu.

1 I oppose the proposed expansion of the Navy Range Complex in Hawai'i.

COMMENT NUMBER
D-N-0087 (cont.)

Your EIS fails to consider the communities prefered alternative and that is to REDUCE the military's use of our environment and it's fatal, endless adverse impacts upon the Hawaiian Islands – the kanaka maoli and all Hawaii people, all forms of marine mammals and sea life including the humpback whales, green sea turtles, Hawaiian monk seals, Hawaiian stilt a'eo, and laysan albatross in the Pacific and on/around the Islands of: Kauai, Niihau, Kaula, Oahu, and Hawaii* … within a total area of 2.1 Million square nautical miles in the Pacific Ocean.

Approximately 150 weapons projects of numerous varieties are proposed – including radioactive materials (such as Depleted Uranium), electronic warfare, mines, cruise missiles, ballistic missiles, torpedoes, "weather rocket", land demolitions, "Explosive Ordnance Disposal", anti-submarine warfare, electronic combat, live-fire (real ordnance) exercises, high frequency, "chemical stimulant" weaponry, and newer "exotic" weaponry such as "Directed Energy" (such as lasers or particle beam weapons) and "Advanced Hypersonic Weapon" (AHW -- weighing less than 40,000 pounds and measuring less than 35 feet… envisioned as a boost -glide weapon capable of attacking targets up to 6,000 kilometers away in less than 35 minutes, according to defense officials.) are a part of your proposed plan.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

The use of these weapons in the name of national security does not make us "secure" in our islands. It is an abrasion of our sense of stewardship to the living things in our ocean, all connected and interdependent on one another. It is an assault on us, a native people and our traditional/cultural attachment to our ocean and ocean life, the very source of our beginnings. This is not national security, it is an assault, a war on our land, our ocean and our people.

The alternative to your proposals should be to ELIMINATE military exercises in our Hawaiian island waters and to clean up the toxic legacy you have left behind in Pearl Harbor. That would indeed provide the correct path to true security.

COMMENT NUMBER

D-N-0087 (cont.)

First Name: Janet
Last_Name: Rapoport
Organization:
City: Royal Oak
State: mi
Date Submitted: 9/17/2007
Comment:
Please stop all plans for this project to bring more weapons testing in Hawaii! 1

Please keep this place as it is!
We do not want more war and weapons especially here.
Please stop now!

COMMENT NUMBER

D-N-0088

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER

D-N-0089

First Name: dennis
Last_Name: chaquette
Organization: none
City: kapaa
State: hi
Date Submitted: 9/17/2007
Comment:

1 please cease all military activities in hawaii.

a military presence here is dangerous to the citizens of hawaii, and not safe for our fragile eco system and animals in the ocean when you conduct tests of war craft and weapons.

again, please do not conduct military activities in the state of hawaii.

COMMENT NUMBER

D-N-0090

First Name: Renee
Last_Name: Siegel
Organization: ABC Wellness Centre
City: Scottsdale
State: AZ
Date Submitted: 9/18/2007
Comment:

1 Please do not do anything that will destroy the plant life and beauty of the Hawaiin Islands with the proposed military operations.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0091

First Name: margaret
Last_Name: Watson
Organization:
City: Kapaa
State: HI
Date Submitted: 9/18/2007
Comment:

and so...we are in the eleventh hour to comment and still, I am speechless in the face of the Navy even wodering if they need an EIS to justify destroying Kauai, heaven on Earth....Of course you need the most comprehesive assessment on what you are proposing to do to our environment, our island, our home. I am embarrassed for you! I thought we could count on YOU! 1

COMMENT NUMBER
D-N-0092

First Name: Sherry
Last_Name: Sctt
Organization:
City: Holualoa
State: HI
Date Submitted: 9/18/2007
Comment:

It is unfathomable that the amage caused from such activities is not enough, in and itself, to cancel out any plans to continue this type of militry operation in Hawaii and surrounding waters. Why would any country destroy such a unique treasure? Especially one whose military is presently still engaged in rectifying similar activities in the past in these same environs? High levels of radioactvity has recently been discovered on Hawaii frompast activities at Pohakuloa Training Area and as a result of the public outcry the military is now investigating. If there isan appropriate placfor these war games it is cerainly not Hawaii d it's rich and unique environment. THANK YOU Maahalo for putting a stop to this insanity! 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0093

First Name: Roxie
Last_Name: Sylva
Organization: Student
City: Hilo
State: Hi
Date Submitted: 9/18/2007
Comment:

I am extremly against navy expansion within the Hawaii Range Complex. There are important sanctuaries included within this area. If the navy wants to practice there sonar or unmanned weapons practices, there are many other places in the world. Especially in the Hawaiian Archipelago, nothing shoud go on there because of Hawaii's endangered species. Once again I am totally against the navy's advances in this area. Thank you for your time. 1

COMMENT NUMBER
D-N-0094

First Name: Marguerite
Last_Name: Beavers
Organization: by Divine Design
City: Kihei
State: HI
Date Submitted: 9/18/2007
Comment:

the war military operations buildup/testing program, the high use of energy, the approval process for these actions, the cumulative impacts upon human and animal health, the socio/economic injustice to the native Hawaiian Islanders who live in this militarized, impacted area, radioactive and chemical hazards and problems associated with storage and waste products, the permanency of radioactivity from Uranium munitions in the environment (U-238, for example, has a half-life of 4.5 Billion years), destruction to natural, pristine areas and natural resources and vegetation, the erosion of air quality and water quality of the sea, the financial taxpayers' burden of these military operations, impact on Hawaiian tourism and desirability as a place to live, and the risks to health and safety of humans and all impacted life forms. 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0095

First Name: Kauwila
Last_Name: Duell
Organization:
City: Kailua Kona
State: HI
Date Submitted: 9/18/2007
Comment:
This will be short and to the point.

1 I OPPOSE any increase in any military training and other operations by any branch of the military within the state of Hawaii. And I do not support any alternative you have put forward in the EIS.

There are many reasons for this, including the cumulative impacts upon human and animal health, the socio/economic injustice to the native Hawaiian Islanders who live in this militarized impacted area, radioactive and chemical hazards and problems associated with storage and waste products, the permanency of radioactivity from Uranium munitions in the environment

But PRIMARILY I oppose this because Hawaii is sacred land. You are ALREADY desecrating sacred land, and now you propose to do more????

Your plans for expansion of war-related training operations are UNCONSCIONABLE and INEXCUSABLE to me, a resident and child of Hawaii.

COMMENT NUMBER
D-N-0096

First Name: Christal
Last_Name: Walker
Organization:
City: Orlando
State: FL
Date Submitted: 9/18/2007
Comment:
1 There should be NO ACTION-ALTERNATIVE taken on the Draft Environmental Impact Statement for the Hawaii Range Complex! These Alternative Actions will have an adverse, damaging impact upon the Hawaiian Islands the Hawaiian people and all forms of marine mammals and sea life including fragile and Endangered Species such as: humpback whales, green sea turtles, Hawaiian monk seals, Hawaiian stilt a'eo, and laysan albatross in the Pacific and on/around the Islands of: Kauai, Niihau, Kaula, Oahu, and Hawaii within a total area of 2.1 Million square nautical miles in the Pacific Ocean.

The proposed practices will have cumulative impacts on all human and animal health, because the ordinace pose radioactive and chemical hazards in their use and once they become waste products on the range(U-238, for example, has a half-life of 4.5 Billion years). Plus these activities will destroy pristine areas, the natural resources and vegetation.

The testing will have significant socio/economic injustice

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0096 (cont.)

to the native Hawaiian Islanders
who live in this militarized impacted area. They will have a diminished quality of life. They will be forced to deal with the erosion of their air and water quality for years to come.

Not to mention the adverse affects on every in the United States because our air, our wildlife, and our oceans are all interconnected in the ecological
system we all share.

These Alternative Actions will have an adverse, damaging impact upon the Hawaiian Islands the Hawaiian people and all forms of marine mammals and sea life including fragile and Endangered Species in the area and should not go forward.

COMMENT NUMBER
D-N-0097

First Name: Joy
Last_Name: Layman
Organization:
City: Uniondale
State: NY
Date Submitted: 9/18/2007
Comment:

Killing People in other nations is not enough NOW you want to kill our own people...wake up........ 1

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0098

First Name: Albert
Last_Name: Ritchey, Jr.
Organization:
City: Vestavia Hills
State: AL
Date Submitted: 9/18/2007
Comment:

1 NO ACTION-ALTERNATIVE taken on the Draft Environmental Impact Statement for the Hawaii Range Complex!

There are so many problems with these alternatives that will negatively impact the environment and quality of life of Hawaiians in land, air, sea and body that these should be soundly rejected.

COMMENT NUMBER
D-N-0099

First Name: Natalie
Last_Name: MacIntyre
Organization:
City: Santa Cruz
State: CA
Date Submitted: 9/18/2007
Comment:

1 Increasing military operations in Hawaii is problamitic in so many ways,
to the people that live on the Islands, to their heath, livlihoods, lives.
It is destructive to the plants and animals. Why would the US even consider doing something so harmful to its own people. It makes me want to cry and move to a country were the government cares for all citizens equallly.

Thank you.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0101

First Name: Elizabeth
Last_Name: Robbins
Organization:
City: Lyndonville
State: VT
Date Submitted: 9/18/2007
Comment:

1 The time has come where it is evident that every cent spent on weapons impacts our children, the environment and the world. We cannot waste the world's wealth on destruction. It is time to understand that a bigger nastier weapon will not make us safer, it will be another step in disater for the world. STOP this weapons testing. Start looking for ways to make the world, cleaner and safer and more nurturing for the being who inhabit it now and will in the future.

COMMENT NUMBER
D-N-0102

First Name: Elyse
Last_Name: Bekins
Organization:
City: Goleta
State: CA
Date Submitted: 9/18/2007
Comment:

1 I do not agree with placing this military complex on Hawaii at all. It is damaging to the environment and unnecessary at this pristine location. Stop escalating the military and do something that is smart, well thought out and productive.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0103

First Name: Barbara
Last_Name: Moore
Organization:
City: Honaunau
State: HI
Date Submitted: 9/18/2007
Comment:
sent Sep. 17
To whom it may concern,
When I was a child, Eisenhower led me to believe that peace was the only solution to our world problems. I believed him then and now I believe more than ever that he was right. Every time war has happened since World War II, I have felt that it is because we did not pay attention to Ike's wise advice. He warned us to beware of the Military/Industrial Complex.
With the trillions of dollars being spent on antagonizing 1
other nations by occupying their countries and asserting our military power with bigger and better and more expensive weapons, we can safely say that the MILITARY/INDUSTRIAL COMPLEX IS OUT OF CONTROL.
We need to stop this madness and treat all peoples with respect and kindness, helping them with their problems instead of being a problem.
I am particularly concerned about harming whales and 2
dolphins, as well as other creatures including humans. Sonar and laser warfare is ill-conceived and untested

COMMENT NUMBER
D-N-0103 (cont.)

technological madness that may have unknown disastrous results.
I realize that your livelihood is based on promoting war. 1
But what is this doing for your grandchildren? If your children are in Iraq now, they will likely have deformed babies that look blistered when they are born, due to DU. Please stop and think, is war right-livelihood? The answer is No!
Americans have awakened to the absurdity of our leaders taking our sons and daughters into battle with people who we don't hate or fear and who have done nothing to harm us. We are not buying that line any more. And we will not put up with killing a million people—especially when 90% of them are unarmed civilians. Forcing our service people to kill innocent Iraqis is something that eats at the souls of these individuals for the rest of their lives.
Military operations have polluted Hawaii. Depleted 4
Uranium is now here with us for the next 450,000 years. Why are you destroying our Paradise? Because no one has stopped you? There are now many people in Hawaii on to the fact that you have raped one of the most
pristine places on the planet. We believe that live fire in 3
the Aloha State is particularly inappropriate and will no
longer allow it to happen here. We don't trust you to look 4
after the welfare of our air, water, or land and it's inhabitants.
Now that you have finally admitted to polluted this sacred aina with DU, we ask that you close down Pahokuloa as a military training center--after you do whatever you can to clean up the land so that it might be returned to native Hawaiians where it rightfully belongs.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0104

First Name: John
Last_Name: Cragg
Organization:
City: Anahola
State: HI
Date Submitted: 9/18/2007
Comment:

I am opposing the proposed Alternative Actions. As a resident of Kaua'i, Hawai'i I respectfully wish to minimize military involvement on this island. 1

Thank you,
John Cragg

COMMENT NUMBER
D-N-0105

First Name: Megan
Last_Name: Bowman
Organization:
City: Anahola
State: HI
Date Submitted: 9/18/2007
Comment:

I am opposing the proposed Alternative Actions. As a resident of Kaua'i, Hawai'i I respectfully wish to minimize military involvement on this island. 1

Megan Bowman

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0106

First Name: Jennifer
Last_Name: Jastrab
Organization:
City: madison
State: wi
Date Submitted: 9/18/2007
Comment:

1 Didn't we learn our lesson with the Bikini islands? Hawaii is an environmental treasure. Find some other place to play war.

COMMENT NUMBER
D-N-0107

First Name: Patricia
Last_Name: Lemon
Organization:
City: Warwick
State: MA
Date Submitted: 9/19/2007
Comment:

1 The Navy should be protecting American citizens--and that means protecting our environment--not murdering harmless creatures on killing and torture sprees that add nothing to our security and degrade the world we depend upon for our very lives.

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

COMMENT NUMBER
D-N-0108

First Name: KATHY
Last_Name: MCELWAIN
Organization:
City: MOSINEE
State: WI
Date Submitted: 9/19/2007
Comment:

1 I'm outraged to hear of plans by the US Navy to test radioactive weapons in Hawaii. The Islands of Hawaii are environmental gems and Must be protected. The navy must do the environmental right thing to do and stop testind but more importantly..CLEAN up any previous radioactive materials left behind.

COMMENT NUMBER

Exhibit 13.4.4-1. Copy of Webmail Documents - Draft EIS/OEIS (Continued)

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Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS

Commenter	Comment #	Resource	EIS Section	Response Text
Nancy Levis	D-N-0001-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
Kristi Lyons	D-N-0002-1	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-W-0066-1.
Brett Hartl	D-N-0004-1	Alternatives		Thank you for your comment.
	D-N-0004-2	Biological Resources - Marine	3.1.2.4.1.3	The definition of Critical Habitat for the Hawaiian monk seal has not changed since 1988, and is a product of NMFS as reported by the Navy in the EIS/OEIS. The NMFS Critical Habitat definition and designation from 1988 is still the applicable reference document for regulatory purposes. Additional information from National Marine Fisheries Service 2007 Recovery Plan has been added to Chapter 3.0. Mitigation measures as presented in Chapter 6 are the same for any marine mammal (including right whales) no matter the species encountered/detected. The development of Recovery Plans for ESA listed species are not the mandate of the Navy, they are the responsibility of NMFS (in this case), and therefore beyond the scope of the proposed actions in this EIS/OEIS.
	D-N-0004-3	Alternatives	6.1	Section 6.1 presents the Navy's protective measures and describes steps that would be implemented to protect marine mammals and Federally listed species during HRC training events. This section also presents a discussion of other measures that have been considered and rejected because they are either: (a) not feasible; (b) present a safety concern; (c) provide no known or ambiguous protective benefit; or (d) have an unacceptable impact on training fidelity. In addition, the permitting process will include adaptive management aspects and as new information becomes available due to advancements in science, the Navy will modify procedures as necessary.
	D-N-0004-4	Program		Thank you for your comment.

Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Puanani Rogers --Ho`okipa Network	D-N-0005-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace, therefore there is no proposal to expand. It is true that the proposal includes alternatives that require increases in the frequency of training. The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary. The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter. The Navy does take its environmental stewardship role seriously, providing funds, efforts and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
	D-N-0005-2	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination.
	D-N-0005-3	Policy/NEPA Process		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
Nancy Bracewell	D-N-0006-1	Program		Thank you for your comment.
	D-N-0006-2	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
	D-N-0007-1	Program		Radioactive weapons are not part of the Proposed Action.

Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Jean Merrigan --Women's International League for Peace and Freedom	D-N-0008-1	Alternatives	1.1, 1.2, 1.3	The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
Phyllis Brown	D-N-0009-1	Socioeconomics		The training exercises that are conducted within the HRC are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
Gemma Walsh	D-N-0010-1	Program		Thank you for your comment.
Bonnie Beck --The People of Earth	D-N-0011-1	Policy/NEPA Process		Thank you for your comment.
Rev. Mark Seydel	D-N-0012-1	Policy/NEPA Process		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
Lynn Surgalla --ny911truth	D-N-0013-1	Miscellaneous		Thank you for your comment.
Frederick Ruch	D-N-0016-1	Program		Thank you for your comment.
Joseph Sanchez	D-N-0017-1	Alternatives		Thank you for your comment.
Bill Lewis	D-N-0018-1	Program		Navy practices conducted decades ago resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceed with the available funds.
Gaye Berger	D-N-0019-1	Program		The Proposed Action includes no plan to use nuclear weapons.
Ernest Goitein	D-N-0020-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter. The Navy does take its environmental stewardship role seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
Kayla Makortoff	D-N-0021-1	Program		Thank you for your comment.
Laurel Douglass	D-N-0022-1	Program		Thank you for your comment.
George Simich --Victoria Street News	D-N-0023-1	Program		Thank you for your comment.

Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Robert Miyake-Stoner	D-N-0024-1	Alternatives		Thank you for your comment.
Serge Simard --Atomic Credit	D-N-0025-1	Miscellaneous		Thank you for your comment.
Simon Teolis	D-N-0026-1	Policy/NEPA Process		Thank you for your comment.
David Kane	D-N-0027-1	Alternatives		Thank you for your comment.
Paul Grossman	D-N-0028-1	Policy/NEPA Process		Thank you for your comment.
Gayle Roller	D-N-0029-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared Naval force is not a discretionary matter.
Linda Bonura	D-N-0030-1	Hazardous Materials and Waste	2.0, '3.6.2.1.4, 4.1.7.1.1, 4.4.2.1	The weapons platforms, weapons, and munitions to be used in the training and test activities included in the Proposed Action are described in detail in Chapter 2.0 of the EIS/OEIS. The Proposed Action includes the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. More details on the analysis of potential impacts from these DU projectiles can be found in Section 4.1.7.1.1. This is the only use of DU in the HRC EIS/OEIS Proposed Action.
	D-N-0030-2	Biological Resources - Marine	3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS. The Navy does not maintain records of the exact quantities of weapons previously used in the HRC.
	D-N-0030-3	Miscellaneous		Thank you for your comment.
Don Hirth	D-N-0031-1	Policy/NEPA Process		Thank you for your comment.
PI Norton	D-N-0032-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared Naval force is not a discretionary matter.

Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Janus Wilhlem	D-N-0033-1	Program		Thank you for your comment.
Harriet Mitteldorf	D-N-0034-1	Alternatives		Thank you for your comment.
Marguerite Beavers	D-N-0035-1	Program		Thank you for your comment.
Lisa Long	D-N-0036-1	Program		Thank you for your comment.
Phyllis Brown	D-N-0037-1	Program		Thank you for your comment.
Nancy Tally	D-N-0038-1	Program		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment. Navy has provided protected haul-out locations for the Hawaiian monk seal, improved nesting habitat for the wedge-tailed shearwater, and organized volunteers to pick-up beach trash while documenting marine debris. Navy has also participated in a program to remove invasive plants from endangered Hawaiian stilt habitat. Navy has active programs to conserve energy and use renewable resources including solar powered water heating panels and shielded street lights.
Emily Dale	D-N-0039-1	Program		Thank you for your comment.
Elle Jordan	D-N-0040-1	Program		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment and health.
Angela TafarI	D-N-0041-1	Program		Thank you for your comment.
Sherry Sharp	D-N-0042-1	Program		The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary. The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter, but a Federal legal requirement. The Navy does take its environmental stewardship role seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.

Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kem Patrick	D-N-0043-1	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
Lee Bowden	D-N-0044-1	Program		Thank you for your comment.
Errol Gard	D-N-0045-1	Environmental Justice		Thank you for your comment.
Adam Davis	D-N-0046-1	Program		Thank you for your comment.
Carla Buscaglia	D-N-0047-1	Program		Thank you for your comment.
Lela Nickel	D-N-0048-1	Program	4.1.2.4.2	The use of low-frequency active (LFA) sonar is not included in the Proposed Action. Section 4.1.2.4.2 describes the difference between LFA and the proposed use of mid-frequency active (MFA) sonar. In addition, the Navy recognizes that past practices conducted decades ago resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceed with the available funds.
Therese Coniglio	D-N-0049-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore there is no proposal to expand. It is true that the proposal includes increases in the frequency of training.
Lionel Standish	D-N-0050-1	Alternatives		Thank you for your comment.
Stephen Jones	D-N-0051-1	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
	D-N-0051-2	Program		Thank you for your comment.
Carlyn Battilla	D-N-0052-1	Alternatives		Thank you for your comment.
Christoper Schwartz	D-N-0053-1	Program		Thank you for your comment.
Betty Dean	D-N-0054-1	Alternatives		Thank you for your comment.

Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Anna Webb	D-N-0055-1	Program		The Proposed Action does not include plans to acquire any new lands or rights over land, sea or airspace; therefore, there is no proposal to expand. It is true that the proposal includes increases in the frequency of training.
Sharon Ritchie	D-N-0056-1	Alternatives		Thank you for your comment.
Audrey Stanzler	D-N-0057-1	Policy/NEPA Process		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
Patricia Nelson	D-N-0058-1	Policy/NEPA Process		Thank you for your comment.
Michael McAvoy	D-N-0059-1	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense therein are noted but are beyond the scope of this EIS/OEIS.
Ronald Fujiyoshi --Kanaka Council	D-N-0060-1	Environmental Justice	2.2.1.1	As stated in Section 2.2.1.1 of the EIS/OEIS, an alternative that would decrease military training from current levels would not meet the purpose and need of the Proposed Action. A reduction in levels of training within the HRC would not support the Navy's ability to meet United States Code (U.S.C.) Title 10 requirements. In addition, a reduction in training operations could jeopardize the ability of specialty forces, transient units, and Strike Groups using the HRC for training purposes to be ready and qualified for deployment. Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.
Margo Johnson	D-N-0061-1	Policy/NEPA Process		Thank you for your comment.
Bonnie Morgan	D-N-0062-1	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination. HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the HRC EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.

Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Shannon Monkowski	D-N-0063-1	Policy/NEPA Process		Thank you for your comment.
Samadhi Haapala	D-N-0064-1	Policy/NEPA Process		Thank you for your comment.
Patti Montgomery	D-N-0065-1	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
Shyrl Matias	D-N-0066-1	Alternatives		Thank you for your comment.
Mark Lacas	D-N-0067-1	Program		Thank you for your comment.
Roscoe Flora --Perot Systems Government Services	D-N-0068-1	Program		Thank you for your comment.
Sharon Kaczorowski	D-N-0069-1	Policy/NEPA Process		Thank you for your comment.
Lindafaye Kroll --Kahu O Kahiko, Inc.	D-N-0070-1	Hazardous Materials and Waste		The Navy recognizes that past practices may have resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceeded as funds are available. The Proposed Action described in this EIS/OEIS addresses a need to continue and enhance personnel training, which is unrelated to ongoing, planned, or prospective remediation of historical contamination.
	D-N-0070-2	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
Russell Hoffman	D-N-0071-1	Program		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
Reuben Balmores	D-N-0072-1	Socioeconomics	3.3.1.1.3	There are no plans to change the existing levels of beach access at PMRF (see Section 3.3.1.1.3). Your comment regarding a new parking lot is noted, but is outside the scope of this EIS/OEIS.
Karen Giles	D-N-0073-1	Alternatives		Thank you for your comment.

Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Karen Giles	D-N-0073-2	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
Peter Dearman	D-N-0074-1	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
Joe Whetstone	D-N-0075-1	Program		Thank you for your comment.
	D-N-0075-2	Environmental Justice	4.12	Table 4.12-1 indicates the number of Native Hawaiians living in the state of Hawaii according to the U.S. Census Bureau, 2000. On each of the islands where Native Hawaiians live and the Proposed Action is discussed (Kauai, Maui, Hawaii, Oahu), there is no indication that the U.S. Navy has a negative impact on socioeconomic characteristics of Native Hawaiians.
Pat Rydz	D-N-0076-1	Program	4.1.7.1.1	The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment. The use of 20 mm projectiles, some of which may contain depleted uranium (DU) occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval (see Section 4.1.7.1.1).
Tova Fuller --Physicians for Social Responsibility	D-N-0077-1	Program		The Proposed Action includes no plan to use radioactive weapons. The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared Naval force is not a discretionary matter.
James LaGarde	D-N-0078-1	Program		Thank you for your comment.
Daniel Hoffman	D-N-0079-1	Policy/NEPA Process		Thank you for your comment.

Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Seth Kowitz	D-N-0080-1	Alternatives		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
Beth Saxon	D-N-0081-1	Program		Thank you for your comment.
Pono McNeil	D-N-0082-1	Alternatives		Thank you for your comment.
	D-N-0082-2	Environmental Justice		Your comments regarding ownership of the Hawaiian Islands and the inferred illegal presence of the U.S. Department of Defense are noted but are beyond the scope of this EIS/OEIS.
Miriam Kurland	D-N-0083-1	Program		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment. Navy has provided protected haul-out locations for the Hawaiian monk seal, improved nesting habitat for the wedge-tailed shearwater, and organized volunteers to pick-up beach trash while documenting marine debris. Navy has also participated in a program to remove invasive plants from endangered Hawaiian stilt habitat.
Evelyn Dymkowski	D-N-0084-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter. See response to comment D-E-0421-1
Darla Sparks	D-N-0085-1	Program		Thank you for your comment.
Terrilee Kekoolani	D-N-0087-1	Program	2.2.1.1	During scoping, the alternative to reduce the level of training operations in the HRC was suggested. As stated in Section 2.2.1.1 of the EIS/OEIS, an alternative that would decrease military training from current levels would not meet the purpose and need of the Proposed Action. A reduction in levels of training within the HRC would not support the Navy's ability to meet United States Code (U.S.C.) Title 10 requirements. In addition, a reduction in training operations could jeopardize the ability of specialty forces, transient units, and Strike Groups using the HRC for training purposes to be ready and qualified for deployment.
Janet Rapoport	D-N-0088-1	Program		Thank you for your comment.

Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Dennis Chaquette	D-N-0089-1	Program		The Assistant Secretary of the Navy (Installations & Environment) determines both the level and mix of training to be conducted and the range capabilities enhancements to be made within the HRC that best meet the needs of the Navy. The broad objectives set forth in this document are both reasonable and necessary. The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter, but a legal requirement under U.S. Code Title 10.
Renee Siegel	D-N-0090-1	Program		The Navy does take its environmental stewardship role seriously, providing funds, efforts and professional staff dedicated to this important matter. Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment. The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter.
Margaret Watson	D-N-0091-1	Policy/NEPA Process		Thank you for your comment.
Sherry Sctt	D-N-0092-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared Naval force is not a discretionary matter. Guidance provided to users of Pohakuloa Training Area will be followed.
Roxie Sylva	D-N-0093-1	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7	See response to comment D-E-0062-1 (re: Sanctuary).
Marguerite Beavers	D-N-0094-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared naval force is not a discretionary matter. See response to comment D-E-0421-1
Kauwila Duell	D-N-0095-1	Alternatives	3.6.2.1.4, 4.4.2.11, 4.6.2.1, 4.6.2.1.2.1, 4.6.2.1.4.1	The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment. All Navy activities will follow existing Army standard operating procedures, as well as future plans and regulations concerning depleted uranium at Makua Military Reservation and Pohakuloa Training Area. See Sections 3.6.2.1.4, 4.4.2.11, 4.6.2.1.2.1, and 4.6.2.1.4.1 in the EIS/OEIS.

Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Christal Walker	D-N-0096-1	Program		Thank you for your comment.
	D-N-0096-2	Environmental Justice		See response to comment D-N-0075-2.
Joy Layman	D-N-0097-1	Policy/NEPA Process		Thank you for your comment.
Albert Ritchey, Jr.	D-N-0098-1	Alternatives		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
Natalie MacIntyre	D-N-0099-1	Program		Thank you for your comment.
Elizabeth Robbins	D-N-0101-1	Program		Thank you for your comment.
Elyse Bekins	D-N-0102-1	Program		Thank you for your comment.
Barbara Moore	D-N-0103-1	Program		Your comments regarding the war in Iraq are noted but are outside the scope of this EIS/OEIS.
	D-N-0103-2	Alternatives	4.1.2.4, 4.1.2.4.11	See response to comment D-E-0062-2
	D-N-0103-3	Land Use		Thank you for your comment.
	D-N-0103-4	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment. Information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.
John Cragg	D-N-0104-1	Alternatives		Thank you for your comment.
Megan Bowman	D-N-0105-1	Alternatives		Thank you for your comment.
Jennifer Jastrab	D-N-0106-1	Program		The training exercises that are conducted within the HRC are not recreational but are necessary preparedness actions to enhance the likelihood of survival and safety of our Sailors, Soldiers, Airmen, and Marines. The requirement to have a trained and prepared Naval force is not a discretionary matter.
Patricia Lemon	D-N-0107-1	Program		Thank you for your comment.

Table 13.4.4-2. Responses to Webmail Comments - Draft EIS/OEIS (Continued)

Commenter	Comment #	Resource	EIS Section	Response Text
Kathy McElwain	D-N-0108-1	Hazardous Materials and Waste	3.6.2.1.4, 4.1.7.1.1, 4.4.2.1.	HRC EIS/OEIS proposed activities include the continued use of 20 mm projectiles, some of which may contain depleted uranium (DU). The Navy's use of these projectiles occurs far out to sea and is in accordance with Nuclear Regulatory Commission and Environmental Protection Agency approval. This is the only use of DU in the HRC EIS/OEIS Proposed Action. Additional information about DU and any potential effects on personnel and the environment has been added to Sections 3.6.2.1.4, 4.1.7.1.1, and 4.4.2.1.1 of the EIS/OEIS.

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Hawaii Range Complex

Final Environmental Impact Statement/
Overseas Environmental Impact Statement (EIS/OEIS)

Volume 4 of 5: Chapter 14

May 2008

Coordinator
Hawaii Range Complex
Pacific Missile Range Facility
P.O. Box 128
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HAWAII RANGE COMPLEX
FINAL ENVIRONMENTAL IMPACT STATEMENT/
OVERSEAS ENVIRONMENTAL IMPACT STATEMENT

Volume 4 of 5

MAY 2008

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COVER SHEET
FINAL ENVIRONMENTAL IMPACT STATEMENT/
OVERSEAS ENVIRONMENTAL IMPACT STATEMENT
HAWAII RANGE COMPLEX (HRC)

Lead Agency for the EIS:	U.S. Department of the Navy
Title of the Proposed Action:	Hawaii Range Complex
Affected Jurisdiction:	Kauai, Honolulu, Maui, and Hawaii Counties
Designation:	Final Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS)

Abstract

This Final EIS/OEIS has been prepared by the U.S. Department of the Navy (Navy) in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code § 4321 et seq.); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] §§ 1500-1508); Navy Procedures for Implementing NEPA (32 CFR § 775); and Executive Order 12114 (EO 12114), *Environmental Effects Abroad of Major Federal Actions*. The Navy has identified the need to support and conduct current, emerging, and future training and research, development, test, and evaluation (RDT&E) activities in the Hawaii Range Complex (HRC). The alternatives—the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3—are analyzed in this Final EIS/OEIS. All alternatives include an analysis of potential environmental impacts associated with the use of mid-frequency active (MFA) and high-frequency active (HFA) sonar. The No-action Alternative stands as no change from current levels of HRC usage and includes HRC training, support, and RDT&E activities, Major Exercises, and maintenance of the technical and logistical facilities that support these activities and exercises. Alternative 1 includes all ongoing training associated with the No-action Alternative, an increased tempo and frequency of such training (including increases in MFA and HFA sonar use), a new training event (Field Carrier Landing Practice), enhanced and future RDT&E activities, enhancements to optimize HRC capabilities, and an increased number of Major Exercises. Alternative 2 includes all of the training associated with Alternative 1 plus additional increases in the tempo and frequency of training (including additional increases in MFA and HFA sonar use), enhanced RDT&E activities, future RDT&E activities, and additional Major Exercises, such as supporting three Strike Groups training at the same time. Alternative 3 would include all of the training and RDT&E activities associated with Alternative 2. The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events, future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Alternative 3 is the Navy's preferred alternative.

This Final EIS/OEIS addresses potential environmental impacts that result from activities that occur under the No-action Alternative and proposed activities that would occur under Alternatives 1, 2, and 3. This EIS/OEIS also addresses changes and associated environmental analyses that were presented in the Supplement to the Draft EIS/OEIS. Environmental resource topics evaluated include air quality, airspace, biological resources (open ocean, offshore, and onshore), cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

Prepared by:	U.S. Department of Defense, Department of the Navy
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May 2008

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14.0 Comments and Responses—Supplement to the Draft EIS/OEIS

14.0 COMMENTS AND RESPONSES—SUPPLEMENT TO THE DRAFT EIS/OEIS

This chapter presents responses to comments received on the Draft Hawaii Range Complex (HRC) Supplement to the Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) (February 2008). The comments were expressed during the public comment period for the document. Section 14.1 provides an overview of the Public Involvement process, Section 14.2 is a summary of comments received; and Section 14.3 is a summary of responses. Section 14.4 includes data summary tables organized by the source of the comment: Written Public Comments, Email Public Comments, Public Hearing Comments, and Webmail Comments (Sections 14.4.1, 14.4.2, 14.4.3, and 14.4.4). See Chapter 13.0 for responses to comments received on the Draft HRC EIS/OEIS.

14.1 PUBLIC INVOLVEMENT PROCESS

Following publication of the Draft EIS/OEIS in July 2007, the Navy, in coordination with the National Marine Fisheries Service (NMFS), conducted a re-evaluation of the analysis in that document. This re-evaluation and subsequent identification of new information led the Navy to prepare a Supplement to the Draft document in February 2008. The purpose of the Supplement to the Draft EIS/OEIS was to address the following:

- Modifications to the analytical methodology used to evaluate the effects of mid-frequency active (MFA) sonar on marine mammals;
- Changes to the amount and types of sonar allocated to each of the alternatives; and,
- Development of a new alternative.

Notice of the Navy's intent to publish a Supplement to the Draft EIS/OEIS was published in the *Federal Register* on January 17, 2008. The Supplement was filed with U.S. Environmental Protection Agency for release to the public on February 22, 2008, and a Notice of Public Meeting was published in the *Federal Register* on February 26, 2008. The Supplement to the Draft EIS/OEIS was distributed to Federal, State, and local agencies; organizations; information repositories and libraries (see Table 13.2.1-1); and private citizens, with a request that all written comments be postmarked or received by April 7, 2008 (45 calendar days from release). The Navy also placed notices in the newspapers announcing the availability of the Supplement to the Draft EIS/OEIS and providing detailed information concerning locations and times for each of the public hearings (Table 14.1-1).

Four public hearings were held on March 13, 14, 17, and 18, 2008, on the islands of Kauai, Maui, Oahu, and Hawaii. The hearings were held in an open house format, presenting informational posters and written information and with Navy staff and project experts available to answer participants' questions. A court reporter recorded participants' oral comments and a tape recorder was provided for those participants wishing to provide additional comments. The interaction during the information sessions was productive and helpful to the Navy.

Table 14.1-1. Advertisements Published for the Supplement to the Draft EIS/OEIS Public Hearings and Comment Period

Hawaii Newspapers	*The Garden Island*	*Hawaii-Tribune Herald*	*The Honolulu Advertiser*	*Honolulu-Star Bulletin*	*The Maui News*
Dates Published	2/25/08	2/25/08	2/25/08	2/25/08	2/25/08
	3/4/08	3/9/08	3/9/08	3/11/08	3/5/08
	3/9/08	3/12/08			3/9/08

The purpose of the public hearings was to solicit public comments on the Supplement to the Draft EIS/OEIS. This chapter includes transcripts from the hearings and copies of written public comments received during the comment period.

Table 14.1-2 lists the locations where public hearings were held. During these public hearings, attendees were invited to ask questions and provide comments to the program representatives at each meeting. In addition, written comments were received from the public and regulatory agencies by letter, email, and through the HRC public website during the comment period. Comments have been considered and the analysis revised as appropriate into the Final EIS/OEIS. Comments received from the public concerning DoD policy and program issues outside the scope of analysis in the Supplement to the EIS/OEIS were not addressed in the Final EIS/OEIS.

Table 14.1-2. Public Hearing Locations, Supplement to the Draft EIS/OEIS

City (Island)	Date	Location
Lihue (Kauai)	Thursday, March 13, 2008	Kauai Community College
Kahului (Maui)	Friday, March 14, 2008	Maui Waena Intermediate School
Honolulu (Oahu)	Monday, March 17, 2008	Disabled American Veterans Memorial Hall
Hilo (Hawaii)	Tuesday, March 18, 2008	Hilo Hawaiian Hotel

At the public hearings, a Navy representative provided a clear and concise overview of the Supplement to the Draft EIS/OEIS. This was followed by individual testimony. A summary of attendance at the four public hearings is as follows:

Kauai: 40 individuals signed in
9 individuals provided verbal comments
7 individual provided written comments

Maui: 19 individuals signed in
6 individuals provided verbal comments
1 individual provided a tape recorded comment
2 individuals provided written comments

Oahu: 16 individuals signed in
1 individual provided verbal comments
1 individual provided written comments

Island of Hawaii: 24 individuals signed in
8 individuals provided verbal comments
3 individuals provided a tape recorded comment
3 individuals provided written comments (two written comments were provided by the same individual)

The Navy solicited additional comments from agencies and the public during the comment period that followed the public hearings for the Supplement to the Draft EIS/OEIS. The comment period ended on April 7, 2008.

14.2 SUMMARY OF COMMENTS

The Navy received 1,595 public comments on the Supplement to the Draft EIS/OEIS from 265 separate sources—251 were citizens, 8 represented organizations, and 6 represented government agencies. The majority of commenters were from Hawaii (199 of 265); however, the Navy also received comments from individuals residing in 20 other states and the District of Columbia. Table 14.2-1 shows the forums that the public used to submit their comments and the number of commenters for each forum.

Table 14.2-1. Number of Public Commenters—Supplement to the Draft EIS/OEIS

Source	Number of Commenters
Written	30
Email	198
Transcript of Public Hearings	28
Website	9
Total	**265**

The Navy received a total of 1,595 comments on the Supplement to the Draft EIS/OEIS. Table 14.2-2 presents a summary of the number of comments identified for each resource area and indicates the percentage of total comments that each resource area or issue received (rounded to the nearest tenth percent). Comments are organized by resource area. The text that follows gives an overview of comments received during the comment period. The first set of comments is organized alphabetically by resource area, concluding with Water Resources. The second set of comments covers non-resource specific issues or questions that were raised. Most resource areas are self-explanatory—“Biological Resources–Marine” includes all ocean and near shore comments, “Alternatives” includes all sonar comments. “Hazardous Materials and Waste” includes munitions debris issues. “Program” refers to concerns with the Proposed Action in general. “Policy/National Environmental Policy Act (NEPA) Process” refers to concerns with policies that lead to the Proposed Action.

Table 14.2-2. Number of Comments by Resource Area Supplement to the Draft EIS/OEIS

Resource Area	Number of Comments	Percent of Total
Air Quality	1	0.1%
Airspace	0	0%
Biological Resources - Marine	34	2.1%
Biological Resources - Terrestrial	0	0%
Cultural Resources	0	0%
Geology and Soils	0	0%
Hazardous Materials and Waste	15	0.9%
Health and Safety	0	0%
Land Use	1,135	71.2%
Noise	0	0%
Socioeconomics	1	0.1%
Transportation	0	0%
Utilities	0	0%
Water Resources	8	0.5%
Environmental Justice	1	0.1%
Alternatives	163	10.2%
Program	181	11.3%
Policy/NEPA Process	17	1.1%
Mitigation Measures	25	1.6%
Cumulative Impacts	4	0.3%
Miscellaneous	10	0.6%
Total	**1,595**	

Air Quality

There was one comment in this category, requesting that the Navy account for the cumulative effects of its actions on coral with rising sea levels caused by global warming.

Biological Resources—Marine

This category includes comments on all marine resources, including fish, mammals, and marine sanctuaries. Many of the comments were focused on the perceived harmful effects of detonations and MFA sonar on whales, sea turtles, fish, and marine life. Some of the comments were concerned with international stranding events. Specifically, the public requested additional information or clarification regarding:

- The affects of detonations on fish
- The seasonal effects of training on various species
- The accuracy of marine mammal research undertaken by the Navy
- The presence of current toothed-whale research undertaken by Robin Baird

- The inclusion of information regarding the 2004 stranding of melon-headed whales in Hanalei Bay
- The need to discuss minke whales
- The number of times an individual within a species group might be exposed to MFA
- The inclusion of humpback whale research
- Utilization of the National Defense Exemption from the Marine Mammal Protection Act (MMPA)
- The use and protection of the Northwestern Hawaiian Islands during Navy activities

Additional comments on marine biological resources included a request to address the indirect effects on the continued survival of endangered and threatened marine species and the health and safety of the general public through the potential bioaccumulation of hazardous materials in benthic species and coral, which form the basis of the food chain; a request to account for the risk or consequences of direct strikes on corals around the Main Hawaiian Islands and within Papahānaumokuākea Marine National Monument.

Hazardous Materials/Hazardous Waste

Comments regarding hazardous materials and waste focused on the clean-up of former and currently contaminated sites unassociated with this EIS/OEIS; the effects of increased training debris, including chaff, chemical stimulants, fuel and oil, toxic substances potentially being released into the coastal zone and materials used during the construction of various HRC enhancements; and the cumulative effects of simultaneous major exercises. There were also comments regarding potential impacts on corals; the potential for training debris or live ordnance to strike a marine mammal; toxic chemicals released by sonobuoys and the use of San Clemente Island, California, data for that analysis; and the potential for detonations to disperse PCBs and heavy metals in Pearl Harbor.

Land Use

The Navy received 1,135 identical form letter comments from 162 individuals about potential violations of the Coastal Zone Management Act (CZMA) and protection of Hawaii's coastal regions.

Socioeconomics

One commenter asked about the potential socioeconomic effects from Navy activities on fisheries.

Water Resources

Comments on water resources focused on effects on the State of Hawaii's waters, the need for a Department of the Army permit for activities over or under navigable waters of the United States, and any potential need for a National Pollutant Discharge Elimination System (NPDES) permit for wastewater/stormwater discharges.

Environmental Justice

One commenter noted that the Native Hawaiian community would be disproportionately affected if fish stocks were reduced as a result of Navy activities.

Alternatives

The largest number of comments in this category related to the use of sonar for Navy training. Most commenters expressed opposition to the use of sonar, particularly during certain seasons of the year or above certain decibel levels. Many commenters requested additional research into the effects of sonar on marine life, and several commenters asked about alternative technologies for detecting submarines, and the use of simulators in lieu of active training. There were also several comments related to the possibility that marine mammals experience “bends.” Some commenters requested the incorporation of specific research into the EIS/OEIS and suggested that the data sets, application of, and conclusions used during the risk function analysis were too narrow.

Additional comments regarding Alternatives were focused on the adequacy of the analysis, particularly in light of recent court decisions. There were also several comments regarding the use of data from the Sonar Positional Reporting System (SPORTS); a suggestion to add a new alternative in which no sonar would be used; the perception that the Navy does not prepare/release After Action Reports; and the perception that the addition of Alternative 3 in the Supplement to the Draft EIS/OEIS contains uncertainties and may result in underestimations of impacts.

Policy/National Environmental Policy Act Process

Comments on Navy Policy and the NEPA process included a suggestion to pursue a policy that would make whales a cultural treasure and a suggestion to include more involvement/ collaboration from various research scientists and organizations. In addition, two commenters questioned the expertise of the individuals preparing the Supplement to the Draft EIS/OEIS.

One commenter asked if conclusions in the EIS/OEIS were based in part on classified information, and if so, how the conclusions would change if the classified information was not considered.

There was also a comment concerning the Navy’s compliance with various Federal statutes, including the MMPA, the National Marine Sanctuaries Act, and the Coastal Zone Management Act.

Program

The Navy received 162 form letters about the perceived establishment of a live fire training range encompassing the entire Hawaiian Archipelago. Commenters on the overall Program were concerned that analysis was based on information not readily available to the public and potential violations of several Federal laws (e.g., the MMPA and Coastal Zone Management Act). There were also comments about basic or potentially misleading information provided in the EIS/OEIS, including the quantification of training exercises, the amount of hazardous materials introduced into the marine environment, and the issue of live fire at Makua. There were also requests for additional research before using sonar for military training.

Mitigation Measures

Most of the comments in this category were focused on the mitigation measures associated with marine mammals. One commenter was in agreement with the mitigation measures presented in the Supplement to the Draft EIS/OEIS. Specific comments included:

- Navy training should be conducted in places and at times where marine mammals would not be affected
- The level of mitigation measures is insufficient
- Navy training should be conducted in seasons when marine mammals are in lesser numbers (e.g., when whales are not migrating)
- Adherence to the restrictions issued by various courts between 2006 and 2008
- Additional information about pre- and post-monitoring efforts
- Requests to use non-harmful sounds to scare animals away from the sonar areas
- Requests to follow protective measures used by other nations
- Discussion of the mitigation measures offered by the Marine Mammal Commission on the Draft EIS/OEIS

Cumulative Impacts

Comments in this category were focused on the cumulative effect of sonar use with other stressors (pollution, warming water, fishing, etc.).

Miscellaneous

Miscellaneous comments included a request to add a commenter's name and the University of Hawaii, Hamilton Library to the distribution list; a request to note in the reference list, which references are, or are not publicly available; and a comment that secondary references were used, when primary references should have been cited.

14.3 SUMMARY OF RESPONSES

Some of the comments received on the Supplement to the Draft EIS/OEIS were declarative statements not requiring a direct response, but which are noted in the context of overall public review. Examples of comments on non-related topics include a request for a copy of the NAS Barbers Point closure EIS, an inquiry from a local Hawaiian firm regarding the hiring of employees, and a request to identify atomic materials, which the commenter believes are affecting marine life.

Some comments were related to the perception that the Navy intends to establish a live fire range encompassing the entire Hawaiian Archipelago. This general program-related comment is considered to be outside the scope of this EIS/OEIS and therefore required no revision to the text.

Some comments questioned the methodologies, analyses, and conclusions for various environmental resource impacts and mitigations presented in the Supplement to the Draft EIS/OEIS. For each of these comments, a specific response was prepared. New information and analysis supporting or changing the conclusions of the Supplement to the Draft EIS/OEIS have been incorporated into the text of the Final EIS/OEIS.

The Navy received many substantive comments during the rigorous Supplement to the Draft EIS/OEIS process. The Navy considered all public input as part of the decision-making process prior to issuing the Final EIS/OEIS.

The primary intent of the Supplement to the Draft EIS/OEIS was to provide additional information regarding the analytical methodology used to evaluate the effects of MFA sonar on marine mammals; therefore some of the comments were outside the scope of the Supplement to the Draft EIS/OEIS. However, to the extent possible, the Navy addressed the public comments discussed in Section 14.2 in the following manner:

Air Quality

The comment regarding cumulative effects of Navy activities on coral with rising sea levels caused by global warming is noted, but is beyond the scope of the Supplement to the Draft EIS/OEIS. Assuming that global warming is occurring and that human activities are the cause, global warming involves the activity of billions of human beings on every continent on Earth. It also involves the consumption of fossil fuels to such a degree and intensity that the intermittent and infrequent training activities presented in this EIS/OEIS are insignificant when compared to the scale.

Biological Resources—Marine

The analysis of effects in the Supplement to the Draft EIS/OEIS indicates that there should be no mortality from Navy training activities. Range clearance procedures and mitigations are intended to reduce the possibility of serious injury and mortality. The Letter of Authorization (LOA) issued by NMFS will place limits on the number and types of allowable takes (e.g., harassments) for all activities conducted within the HRC. Navy training has been going on for the past 60 years, and there has been no significant change in the sonar equipment in the last 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Though the Navy works to minimize impacts to marine mammals to the greatest extent practicable, they are not mandated by any statute to alleviate all risk to marine mammals. Over the past 30 years, the numbers of humpback whales around Hawaii appear to be increasing, and the Navy believes that sonar has not significantly affected marine mammals in general.

<u>The affects of detonations on fish</u>—The Navy recognizes that individual fish may be injured or killed as the result of several of the training events; however, these incidents are localized, and would not have a population impact on any individual species. The effect on fish from a given amount of explosive depends on location (including proximity to the detonation), season, and many other factors. The Navy has completed an Essential Fish Habitat and Coral Reef Assessment for the EIS/OEIS and concludes that Proposed Actions would not affect managed species (i.e., Essential Fish Habitat).

Seasonal avoidance for training—Avoidance of the seasonal presence of migrating marine mammals fails to take into account the fact that the Navy's current mitigation measures apply to all detected marine mammals no matter the season. Advance planning to avoid the seasonal presence of migrating marine mammals is not possible given the start of any "season" is variable (dependent on largely unknown environmental factors). To the degree possible, however, the Navy already has taken a proactive step in this regard by specifically informing all naval vessels to increase vigilance when the first humpback whales have been sighted around the Hawaiian Islands. Otherwise, limiting training operations to the remaining 6 months of the year would not only concentrate all annual training and testing activities into a shorter 6-month time period, but would also not meet the readiness requirements of the Navy to deploy trained forces.

Accuracy of marine mammal research undertaken by the Navy—The Navy's assessment of potential impacts on marine mammals reflects the use of the best available and applicable science determined in consultation with NMFS. Information concerning the scientific data used is provided in EIS/OEIS Sections 4.1.2 and 6.0.

Research conducted by Robin Baird—Mr. Baird is cited in several sections of the EIS/OEIS, including, but not limited to Sections 4.1.2.4.7, 4.1.2.4.9.8, and 4.1.2.4.10.1. Numerous documents and reports prepared by Mr. Baird are cited in Section 9.0 (references).

2004 stranding of melon-headed whales in Hanalei Bay—Section 4.1.2.4.10.3 of the EIS/OEIS provides a comprehensive discussion of the stranding of melon-headed whales in Hanalei Bay in 2004. The text describes the relationship of the stranding to both Navy Anti-Submarine Warfare (ASW) activities occurring approximately 25 nautical miles (nm) away from the incident and the activities of people and boats that were in the water with the whales at the time of the stranding. The stranding is not known to be directly related to Navy activities.

Need for minke whale discussion—The presence of minke whales has been noted in Section 4.1.2.5.3; however, there is no density information available for minke whales in Hawaiian waters given that they have rarely been seen during surveys. The lack of available data and comparative species makes it unreliable to extrapolate estimates of exposure to Navy sonar.

The number of times an individual within a species group might be exposed to MFA—as noted by the commenter, it would be virtually impossible to determine how many individuals within a given population would experience one or more exposures.

Humpback Whale Research—Information regarding the humpback whale and the Hawaiian Islands Humpback Whale National Marine Sanctuary was provided in Chapters 3.3 and 4.1 and is expanded in the EIS/OEIS.

Utilization of the National Defense Exemption from the MMPA—Sections 4.1.2.4.3 and 4.1.2.4.4 provide the regulatory framework and history behind the development of the Navy's compliance efforts with various statutes, including the MMPA.

Use of the Northwestern Hawaiian Islands—Sections 3.2 and 4.2 of the EIS/OEIS reviewed the Papahānaumokuākea Marine National Monument. The Navy complies with the Presidential

Proclamation 8031 (71 FR 36443, June 26, 2006) which states that all “activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities.” The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.

Hazardous Materials/Hazardous Waste

There were multiple comments related to Hazardous Materials/Hazardous Waste sections of the Draft EIS/OEIS. These were beyond the scope of the Supplement to the Draft EIS/OEIS; however, the Navy responded as follows:

The Navy recognizes that past practices conducted decades ago resulted in contamination of certain sites, such as Kahoolawe. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceed with the available funds. The island of Kahoolawe is one site that received priority funding in excess of $400 million and its own special legislation which resulted in a 10-year cleanup conducted in consultation with the State of Hawaii.

As discussed in Sections 3.1.4, 3.1.7, 4.1.4, and 4.1.7 of the EIS/OEIS, the type of sonobuoy used for the analysis in this EIS/OEIS is now in general use by the Navy. San Clemente Island information is used because that is where the Navy’s Sonobuoy Quality Assurance testing is done, and detailed information from that program is available. All sonobuoys of a given type are manufactured with the same quantities of constituents.

One commenter listed enhancements that are assumed to generate hazardous substances. As discussed in the EIS/OEIS, the Portable Undersea Tracking Range could be located anywhere within the area shown on Figure 2.2.3.6.3-1 and not necessarily consistently deployed in the same area. According to Section 2.2.3.6.3, the Navy proposes using the system for only 2 days per month. Development of the Acoustic Test Facility involves the addition of pinger equipment at Pier S291 on Ford Island, Beckoning Point piers, or on a mobile test site that could operate within the test area. As a result, there would be no disturbance of any contaminated sediments or soils containing PCBs. An environmental review of the proposed Range Operations Control Building construction was conducted that determined that the effects of the proposed construction on the environment are minimal and a categorical exclusion (CATEX) for the proposed project was approved on May 14, 2004. Hazardous waste discovered during construction will handled in compliance with applicable rules and regulations.

One commenter asked if there are any potential effects of 56,422 additional pieces of training debris. Navy training, RDT&E, and munitions debris are discussed in Sections 4.1.4 and 4.1.7. The majority of debris would be widely dispersed and accumulate in deep water far away from the coral reef. Therefore, there will be no quantifiable impact on habitat, any natural resource, including coral. The analysis presented in Section 4.1.7 assumed that hazardous constituents for each category of expended training material would be expended over only 20 percent of the training areas. But the probability that the materials would be expended in exactly the same location, given slight differences in the positions of Navy assets and lines of fire, and dispersal of expended materials by currents, is about zero. A total of about 654 tons of training material are expended per year under the No-action Alternative (see Table 4.1.4.1.1-1). Assuming an ocean floor area of about 235,000 nm^2, and making a further conservative assumption that the training materials are concentrated within 20 percent of this area, this is about 5.6 pounds per nm^2 per year of training material.

Bioaccumulation of hazardous materials in benthic species and coral is not known to accrue as a result of the Proposed Action because: (a) leach rates are very low, (b) leached materials are widely dispersed, so they affect different populations, and (c) the estimated ambient concentrations are generally within the "natural" range of these materials so uptake of these constituents would be similar to natural rates.

Direct strikes on coral reefs, which could be either strikes of missile debris or ordnance on coral reefs is unlikely, as described in Section 4.2.1.1.1.1. The majority of debris would be widely dispersed and in open ocean, far away from the coral reef. Therefore, there will be no quantifiable impact on habitat, any natural resource, including coral**.**

Land Use

The Navy received 162 form letters stating that the Navy is not meeting its obligations under the Hawaii Coastal Zone Management Program (CZMP). Specifically, Navy is in compliance with Section 205A-2 (6) of the CZMP, which addresses the spread of coastal pollution. As discussed in Section 4.1.7 and 4.3.2.1.8 of the EIS/OEIS, no direct or indirect effects associated with coastal hazards, specifically pollution, would occur as a result of the Proposed Action.

The form letter requested that Hawaii CZMP require the Navy to acquire a State incidental permit for harm to State-listed species. While the EIS/OEIS does consider impact to State-listed species, the Navy is not subject to the State's permitting process. The letter also calls for consistency with the objectives of marine protection requirements or Hawaii's CZMP, specifically, strict limits on activities in the Papahānaumokuākea Marine National Monument. Navy is conducting their active sonar training in only a fraction of the Monument; however, with mitigation none of the resources of the Monument will be affected. Lastly, the form letter called for more public participation in coastal management. The Navy has provided full disclosure of its activities in this EIS/OEIS, and is a participant in many organizations whose mission is the protection of coastal Hawaii.

Socioeconomics

Reduced fish catch rates as a result of underwater detonations are not anticipated (see Section 5.5.3.1 of the EIS/OEIS).

Water Resources

Depending on the action or construction being undertaken, a variety of Federal and State approvals, comments, and permits may be required. In addition, all construction activities would follow Spill Prevention, Control, and Countermeasures Plans and transportation safety measures; therefore, potential effects on surface and groundwater resulting from accidental spills of hazardous materials would be minimized.

The EIS/OEIS provides an analysis in Section 4.1.7 of how current levels and future levels of hazardous training materials, chemical simulants, and debris entering the ocean does and will comply with the State of Hawaii water quality standards and criteria and will not require an NPDES permit. The EIS/OEIS also evaluated the potential impacts of launch emissions, spills of toxic materials, and early flight termination on surface and groundwater. The analysis concluded that hydrogen chloride emissions would not significantly affect the chemical composition of surface or groundwater; that there would be no significant increase in aluminum oxide in surface waters due to launches; that sampling of surface waters in the vicinity of the launch site showed that hydrogen chloride, potentially deposited during past launches, has not affected surface water quality on the Pacific Missile Range Facility (PMRF) or adjacent areas; and that contamination from spills of toxic materials would be highly unlikely. An NPDES permit is not required for launch activity due to the lack of significant storm water runoff.

Environmental Justice

Reduced fish catch rates and any associated effects on the Native Hawaiian community are not anticipated.

Alternatives

The majority of the comments in this category were opposed to the use of sonar for Navy training. However, sonar is currently the best available technology for ASW. Although the Navy does do some simulated training, it does not fully develop the skills and capabilities necessary to attain appropriate military readiness. In addition, under NEPA, the choice of alternatives is bounded by some notion of feasibility. Agencies are not required to consider alternatives that are infeasible, ineffective, or inconsistent with its basic objectives.

Section 4.1.2.4.7 of the EIS/OEIS contains a discussion of the "bends-like" issue raised in several comments. It has not been demonstrated that sonar causes this effect.

The Navy's assessment of potential impacts on marine mammals reflects the use of the best available and applicable science determined in consultation with NMFS and the requirements of the Navy to train. Information concerning the scientific data used is provided in EIS/OEIS Sections 4.1.2 and 6.0.

The discussion of the development of the risk function has been expanded from that in the Supplement to the Draft EIS/OEIS and is presented in Section 4.1.2. The methodology used in this EIS/OEIS was developed in close coordination with NMFS. This represents the best available and most applicable science with regard to analysis of effects to marine mammals from MFA/HFA sound sources. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals (see Section 4.1.2), the risk function curve extends to 120 decibels (dB) sound pressure level (SPL) specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas during some parts of the year in Hawaiian waters.

Analysis of ongoing litigation is not part of the Proposed Action and alternatives nor is it necessary for compliance with the applicable laws and regulations. Some mitigations discussed in Chapter 6.0 overlap with mitigations raised during litigation.

The original analysis of effects of mid-frequency sonar on marine mammals was based on data prepared as part of the program described in Section 1.3 of the EIS/OEIS, which predates the Sonar Positional Reporting System (SPORTS) database. In early 2008, the Navy concluded that SPORTS provided enough information after only 18 months that it could be used as a partial basis for calculating sonar hours when combined with additional extrapolation for the sonar effects analysis. More information on SPORTS has been provided in Sections 2.2.2.4 and 4.1.2 of the EIS/OEIS. The SPORTS database will continue being refined and populated with data and used as the basis for future analysis on sonar use on range complexes.

The Navy does prepare and release After Action Reports. An After Action Report prepared for the 2006 Rim of the Pacific (RIMPAC) exercises, providing an analysis detailing the reasons for adoption, modification, or rejection of mitigation measures, is provided in Appendix F of the EIS/OEIS.

Policy/National Environmental Policy Act Process

One commenter asked about establishing a policy to protect whales as cultural treasures. The Navy realizes that many marine mammals are significant to the cultural heritage of the Hawaiian people; however, establishing such a policy is outside the scope of this EIS/OEIS.

Two comments requested increased involvement by scientists and research institutions. NEPA requires an interdisciplinary approach to analysis. This EIS/OEIS used the experience of a wide range of subject matter experts. Although they may be currently residing in other areas of the United States, the professionals preparing this EIS/OEIS have either lived and worked as environmental scientists in Hawaii or have been conducting environmental projects in Hawaii for many years. The Navy solicited comments and encouraged input from all Agencies, organizations, and individuals in Hawaii throughout the environmental impact analysis process, as reported in this chapter (see also Section 1.7.1 and Chapter 13.0 of the EIS/OEIS).

Program

The Navy received 162 form letters stating that the Navy intends to establish a live fire training range encompassing the entire Hawaiian Archipelago. The Navy is not proposing to establish a live fire training range encompassing the entire Hawaiian Archipelago. Only a fraction of the Papahānaumokuākea Marine National Monument is within the Navy's Hawaiian Islands Operating Area (OPAREA) on its western boundary near the northern border. Current and proposed live fire training takes place in OPAREA; however, these activities will not affect resources in the Hawaiian Islands Marine Refuge, Papahānaumokuākea Marine National Monument, or the Hawaiian Islands Humpback Whale National Marine Sanctuary. The Navy understands and respects the value and importance of Hawaii's marine sanctuaries to many people. They also recognize that the primary philosophy of these sanctuaries is protection and preservation and we share that philosophy. The Navy takes precautions to minimize harm to these areas.

Classified information was used for some of the analysis in the EIS/OEIS. Accurate conclusions could not be made if this information was not considered.

The Navy is in compliance with all applicable environmental laws and is consulting with the Hawaii Coastal Zone Management Program in accordance with the Coastal Zone Management

Act. Also, see response to comment S-T-0001-1 (see EIS/OEIS Sections 4.1.2.4 and 4.1.2.5.4).

Mitigation Measures

Navy training should be conducted in places and at times where marine mammals would not be affected—It is critical for the Navy to be able to conduct training in a variety of environmental and bathymetric conditions, which may overlap with marine mammal areas. Mitigation measures proposed in Chapter 6.0 should ensure that marine mammals would not be injured by Navy training activities. As discussed in Section 4.1.2, the analytical methodology used was developed in close coordination with NMFS. This represents the best available and most applicable science with regard to analysis of effects to marine mammals from MFA/HFA sound sources. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals, the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas during some parts of the year in Hawaiian waters. Section 1.3.2 describes why the Navy must train and why Hawaii is the most appropriate place to undertake the proposed actions.

Perceived insufficiency of mitigation measures—The full analysis of effects in the EIS/OEIS indicates that there should be no mortality from Navy training activities. Range clearance procedures and mitigations are intended reduce the possibility of serious injury and mortality to zero. The LOA issued by NMFS will place limits on the number and types of allowable takes (e.g., harassments) for all activities conducted within the HRC.

Mitigate marine mammal impacts using seasonal avoidance during Navy training—As discussed in Chapter 6.0, avoidance of the seasonal presence of migrating marine mammals fails to take into account the fact that the Navy's current mitigation measures apply to all detected marine mammals no matter the season. Advance planning to avoid the seasonal presence of migrating marine mammals is not possible given the start of any "season" is variable (dependent on largely unknown environmental factors). To the degree possible, however, the Navy already has taken a proactive step in this regard by specifically informing all naval vessels to increase vigilance when the first humpback whales have been sighted around the Hawaiian Islands. Otherwise, limiting training operations to the remaining 6 months of the year would not only concentrate all annual training and testing activities into a shorter 6-month time period, but would also not meet the readiness requirements of the Navy to deploy trained forces.

Restrictions issued by various courts—As discussed in Section 6.0, avoiding active sonar use within 12 nm from shore or 15.5 miles from the 200-m isobaths was made part of the RIMPAC 2006 authorization by NMFS and was based on the assumption that avoidance of the North American continental shelf was a prudent mitigation measure given the presence of beaked whales in the Gulf of Mexico. NMFS modified the measure for Hawaii because they had received a public comment during rulemaking for a proposed action taking place elsewhere. This measure lacks any scientific basis when applied to conditions in Hawaii. There is no scientific basis for requiring this mitigation measure in the Pacific and no known basis for the specific metrics. During RIMPAC 2006, this mitigation measure precluded active ASW training in the littoral region, which significantly affected realism and training effectiveness. This procedure had no observable effect on the protection of marine mammals during RIMPAC 2006, and its value is unclear (there is a lengthy history of sonar use in the Hawaiian Islands without any strandings or apparent effect on marine mammals). However, its effect on realistic training is significant.

Pre- and post-monitoring—As described in Chapter 6.0, the Navy is developing an Integrated Comprehensive Monitoring Plan (ICMP) to determine behavioral and population level changes to marine mammals within Navy ranges. This Plan will also continue or initiate studies of abundance, distribution, habitat utilization, etc. for sensitive species of concern using visual surveys, passive and acoustic monitoring, radar and data logging tags (satellite or radio linked to record data on acoustics, diving and foraging behavior, and movements). The Plan will include the evaluation of Navy lookouts that observe for all objects in or on the water including debris, periscopes, other vessels, and marine animals. As of this EIS/OEIS, the Navy and NMFS are developing an HRC-specific monitoring plan which may include third party monitoring efforts by qualified entities as a component of the ICMP for unit level exercises.

Use of non-harmful sound to scare animals from sonar event areas—Section 6.0 presents the range of Navy protective measures that would be implemented to protect marine mammals and federally listed species during training events. Among these is the use of passive detection capabilities to alert exercise participants to the presence of marine mammals in an event location.

Other Navies mitigation—Each nation has its own training needs based on that nation's forces, capabilities, missions, and environmental requirements. The Navy is a global environmental leader. As part of the Navy’s commitment to sustainable use of resources and environmental stewardship, the Navy incorporates mitigation measures that are protective of the environment into all of its activities. The Navy’s current mitigation measures reflect a balance between training requirements and Navy’s important role in ensuring environmental protection. These measures have been the subject of extensive discussions between NMFS and the Navy, and evaluated for mission impacts, probable effectiveness, and the ability to implement. Mitigation measures are described in detail in Chapter 6.0.

Mitigation measures proposed by the Marine Mammal Commission—EIS/OEIS Chapter 6.0, Mitigation Measures, presents the Navy’s protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. It should be noted that these protective measures have been standard operating procedures for unit-level ASW training since 2004. In addition, The Navy’s current mitigation measures reflect the use of the best available and applicable science balanced with the NMFS precautionary approach and the requirements of the Navy to train.

Cumulative Impacts

The discussion of cumulative effect of sonar use with other stressors (pollution, warming water, fishing, etc.) has been expanded in Section 5.0 of the EIS/OEIS.

Miscellaneous

The request to add a commenter’s name and the University of Hawaii, Hamilton Library to the distribution list was completed, and references were crosschecked. The reference list was not annotated with which are, or are not publicly available; however, those references that are available, or a referral to a repository where the item is housed, will become part of the EIS/OEIS Administrative Record.

14.4 SUMMARY TABLES

Sections 14.4.1 through 14.4.4 of the EIS/OEIS provide reproductions of all the original letters, emails, and transcripts that were received during the public comment period for the Supplement to the Draft EIS/OEIS. Responses to issues included in those documents are also provided. As shown below, the organization of Sections 14.4.1 through 14.4.4 provides a separate comment/response section for each of the forums (email, written, etc.) that the public used to submit their comments:

- 144.1 Written Public Comments
  - Table 14.4.1-1 Written Commenters on the Supplement to the Draft HRC EIS/OEIS
  - Exhibit 14.4.1-1 Copy of Written Documents
  - Table 14.4.1-2 Responses to Written Comments
- 14.4.2 Email Public Comments
  - Table 14.4.2-1 Email Commenters on the Supplement to the Draft HRC EIS/OEIS
  - Exhibit 14.4.2-1 Copy of Email Documents
  - Table 14.2.4.2-2 Responses to Email Comments
- 14.4.3 Public Hearing Comments
  - Table 14.4.3-1 Public Hearing Commenters on the Supplement to the Draft HRC EIS/OEIS
  - Exhibit 14.4.3-1 Copy of Public Hearing Documents
  - Table 14.4.3-2 Responses to Public Hearing Comments
- 14.4.4 Webmail Comments
  - Table 14.4.4-1 Webmail Commenters on the Supplement to the Draft HRC EIS/OEIS
  - Exhibit 14.4.4-1 Copy of Webmail Documents
  - Table 14.4.4-2 Responses to Webmail Comments

The first table in each section provides an index of the names of the individuals who submitted comments on the Supplement to the Draft EIS/OEIS. Each individual has been assigned an identification number. The code in the middle of the identification number indicates the source of the comment as follows:

- W = Written comments
- E = Email comments
- T = Transcript comments from public hearing
- N = Comments received via the public HRC website

Comments that were received during the public review period for the Supplement to the Draft EIS/OEIS were treated equally regardless of the form or commenter. A commenter can be listed multiple times. Each comment was carefully documented, thoroughly read and evaluated, and categorized according to the environmental resource area (see Table 14.2-2). Each of the identified issues was numbered as shown in the exhibit in each section. For example, if the 10th speaker presented in a transcript from a public hearing document (S-T-0010) provided comments on seven separate topics, those comments were numbered S-T-0010-1 through S-T-0010-7. Finally, the Navy responded to each comment, as provided in the second table in each section.

To follow comments and responses for a specific individual, find their commenter number (e.g., S-W-0042, S-E-0003, S-T-0021, S-N-0030) in the appropriate Commenters table; locate their document within the Copy of Documents exhibit; and use the issue numbers to identify corresponding responses in the Response Table.

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14.4.1 WRITTEN PUBLIC COMMENTS

Thirty commenters provided written comments on the Supplement to the Draft EIS/OEIS. Five of the 30 commenters were from governmental organizations.

Table 14.4.1-1 lists individuals who commented in writing, with their respective commenter identification number. This number can be used to find the written document that was submitted and to locate the corresponding table on which responses to each comment are provided.

Exhibit 14.4.1-1 presents reproductions of the written comment documents that were received in response to the Supplement to the Draft EIS/OEIS. Comment documents are identified by commenter ID number, and each statement or question that was categorized as addressing a separate environmental issue is designated with a sequential comment number (D-W-0082-1, D-W-0082-2, etc.).

Table 14.1-2 presents the responses to written comments on the Supplement to the Draft EIS/OEIS. Responses to specific comments can be found by locating the corresponding commenter ID number and sequential comment number identifiers.

Table 14.4.1-1. Commenters on the Supplement to the Draft EIS/OEIS (Written)

Commenter	Comment ID	Commenter	Comment ID
Chris Bane	S-W-0001	Clyde Namu'o on behalf of the State of Hawaii	S-W-0026
Jan Bappe	S-W-0002	Marilyn and Ed Pollock	S-W-0023
Laurel Brier	S-W-0003	Timothy Ragen on behalf of the Marine Mammal Commission	S-W-0024
Peter Courture	S-W-0020	Peter Rappa on behalf of University of Hawaii-Manoa	S-W-0030
Claire D'Gala	S-W-0004	Betty Rubble	S-W-0009
Raydiance Gonare	S-W-0005	Barbara Sinclair	S-W-0012
Marsha Green on behalf of the North American Ocean Noise Coalition	S-W-0025	V. Springs	S-W-0022
Cory Harden on behalf of the Sierra Club	S-W-0011	Katherine Stack	S-W-0013
Linda Harmon	S-W-0006	Kevin Sunada on behalf of the State of Hawaii	S-W-0027
C, Harvel	S-W-0028	Gabriela Taylor	S-W-0014
Peggy LeDoux	S-W-0007	Lee Tepley	S-W-0015
Diane Ley on behalf of the County of Hawaii	S-W-0021	Jason Turner	S-W-0016
Kaitlyn McKee	S-W-0008	Sonya Wolfe	S-W-0017
Nina Monasevitch	S-W-0029	Rulin Xiw	S-W-0018
Mike Moran	S-W-0010	Joann Yukimura on behalf of the Kauai County Council	S-W-0019

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COMMENT NUMBER
S-W-0001

SONAR

I am a tour boat captain here on Kauai and I have been performing sight seeing and whale watching tours for the last 18+ years here on Kauai.

1 While I understand the need for testing and training of SONAR, I feel that how it's done now and how it's been done for decades needs to change. While SONAR has been around since it was invented in 1912 it has become much more powerful since it's humble beginnings as an echo locator. Since the 1950's it has become ever more powerful and now is a good time to assess what kind of SONAR and how powerful we will allow in our waters.

Some things to consider:

- The International Whaling commission is against testing as it stands.
- European Union parliament has asked its members to reassess its SONAR use.
- Spain has taken steps to mitigate SONAR in its waters.
- Strandings caused by active sonar have occurred in Madeira (2000), Greece (1996), the U.S. Virgin Islands (1998, 1999), the Canary Islands (1985, 1988, 1989, 2002, 2004), the northwest coast of the United States (2003) and coastal waters off North Carolina (2005).
- And in July 2004 researchers uncovered an extraordinary concentration of whale strandings near Yokosuka, off of a major U.S. Navy base off the Pacific coast of Japan.
- There was a incident in Victoria BC where over a dozen porpoise died in the Juan de Fuca straight when the USS Shoup was using SONAR.
- I have witnessed several dozen Humpback whales off of Polihale beach Kauai during SONAR exercise leave the west side and head to the south side for more than 4 days. I've seen the reaction to this SONAR and I can only explain it the same when a herd of deer are startled by a gunshot. The closest Navy ship was well over 5 miles away.
- Ken Balcomb has led what is perhaps the longest running study on killer whales, or orcas has noticed very disturbing behavior from these animals when Navy ships are using SONAR (such as tight grouping and swimming close to shore) in the Puget sound.

2 These are just a few of the examples of the many hundreds of first hand expert accounts and known incidents of the affects of Navy SONAR.

The Navy's active sonar programs are in all likelihood responsible for many more whale strandings worldwide. The exact number is unknown as most of these animals will die in offshore waters and sink. Considering the remote location of Hawaii and vastness of the ocean surrounding it, it is not that much of a leap to assume many have died here and will die if SONAR is allowed to continue in its present level.

3 **In an article by John Cannon in ScienceNOW Daily News entitled "Why Do Whales Get the Bends?" [By John Cannon, ScienceNOW Daily News, 14 December 2007], he states:

The Cuvier's beaked whale is a master of the ocean's crushing depths. It can dive as deep as 2 kilometers in search of prey, the deepest known for any mammal. So scientists have been at a loss to explain why, in response to naval sonar testing, this champion cetacean sometimes succumbs to the same decompression sickness that afflicts scuba divers. A new mathematical model suggests that, by replicating the sounds of a predator, sonar forces the whale to adopt a risky diving pattern.

Researchers have suspected a link between sonar testing and whale deaths for nearly 20 years. In 2000, the U.S. Navy said its sonar exercises led six beaked whales to fatally beach themselves in the Bahamas, and stranded whales have died near sonar-testing sites in at least five other cases since then. It hasn't been clear how the sonar disorients the animals and causes such strandings, but some marine biologists suspect that the intense sound waves force whales to shoot to the surface, and they've found evidence that tiny nitrogen bubbles expand in the whales' tissues and damage vital organs (ScienceNOW, 9 October 2003). The same thing happens when scuba divers surface too quickly--a condition known as the bends. But a whale holds its breath when diving, preventing nitrogen buildup, so the theory didn't seem to hold water. A group led by marine biologist Peter Tyack of Woods Hole Oceanographic Institution in Massachusetts suspected that whales alter their diving behavior in some other way.

COMMENT NUMBER
S-W-0001 (cont.)

Whales make repeated shallow dives when trying to evade predators. The team wondered whether such behavior could be risky, especially because naval sonar--which is similar in frequency to the calls of the beaked whale's most feared adversary, the killer whale--could be forcing the whales to adopt a similar diving pattern. So the researchers mathematically analyzed dive behavior in Cuvier's beaked whales and in dolphins to test whether nitrogen bubbles could expand in whale tissue during repeated shallow dives. The team incorporated known physiological data into a model that charts how the bubble size might increase in the circulatory system, brain, muscles, and fat tissues when a whale dives repeatedly to between 30 and 80 meters for as long as 3 hours.

During normal diving behavior, scientists believe, the lungs of marine mammals collapse when they plunge past 72 meters in depth. That "clever mechanism," Tyack says, prevents nitrogen from infiltrating the bloodstream. The team's model predicts that if the whales' lungs do not collapse during a long series of shallow dives, the increased pressure can cause nitrogen bubbles to diffuse into tissues, increasing the risk of bubble formation on ascent. Limiting the duration of sonar testing may prevent the animals from diving in these harmful patterns, the team concludes in the current issue of Marine Mammal Science. 4

Noting that diving behavior is extraordinarily difficult to study in live animals, marine biologist Terrie Williams of the University of California, Santa Cruz, calls the model "extremely useful." As new research shores up gaps in the model's assumptions--with actual observations to corroborate the avoidance behavior, for example--scientists can try to home in on a safe length and level of sonar exercises, clarifying the murky waters surrounding this debate. "Now it's a question of how quickly [decompression sickness] happens," she says.

I understand the Navy's resistance to any restriction on their testing and training of SONAR, but we have to decide if we want to live in a world that is "safe" or in one where we randomly kill, harass and maim intelligent reasoning animals like our whales and dolphins that we have in Hawaii.

I have cataloged my sightings over the years crossing the Kaulakahi channel. These include: 5 Stripped dolphins, Rough tooth dolphins, Risso dolphins, Spinner dolphins, Pilot whales, Melon-headed whales, Pygmy killer whales, False killer whales (who's numbers are estimated to be less than 250 in Hawaiian waters and are genetically unique), Orca (who spend most of their time in offshore waters between 50 and 100 nm from shore with occasional forays into our local waters), I also see the Blainville beaked whale and Cuvier beaked whales, Cuvier beaked whales sightings have become less frequent since I started to log them over 10 years ago. (more in summer)

I don't think that every change I see is the result of military exercises, but I have seen direct and adverse reactions caused by the Navy's use of SONAR in our waters. I have seen the reaction of reef fish at Lehua during these exercises, and while they aren't dying and floating belly up, they are reacting and showing a startle response. Lehua rock is right next to and in between Ni'ihau and the Navy's military range. The state has recently tried to get the waters around Ni'ihau to be a marine reserve. I don't see how allowing SONAR so close to such a sensitive area is conducive to this goal.

I would wonder how the state of federal governments would feel if I took a boom box that was as loud as a F16 fighter jet on take off and blasted it in ecologically sensitive areas. I'm pretty sure I

COMMENT NUMBER S-W-0001 (cont.)

would be arrested. I think the Navy should be held accountable, and should be required to take every possible measure to ensure the safety of our marine mammals, no matter how inconvenient it may be to the Navy and it's exercises. I have every confidence the Navy will learn how to deal with these inconveniences and still be able to train our military men and women.

I feel that the recent rulings by several federal judges such as the honorable Ezra are a good start, but not strict enough to ensure the future of our local marine life. I'm not some tree hugging left wing extremist hippy that thinks we "should just hug it out". I understand the need for a strong defense, I served honorably in the US Coast Guard, I also strongly believe with the vast consensus among scientists that much more can be done to keep our fragile marine life in tact while the Navy can maintain its goal of protecting me an my country.

6 The Navy needs to be accountable, I would strongly recommend all the restrictions judge Ezra has in place, I agree with the 12 nm no SONAR zone around ALL the Hawaiian islands, I agree with the slow increase in volume over a period of time to allow animals to vacate the area, I feel that there should be at least a two hour scan using passive SONAR to make sure that there are no marine mammals in the area (two hours as a recent study shows that Cuvier beaked whales can spend over an hour resting un-moving on the surface as they recover and prepare for another dive), I feel that the limit on how close to a marine mammal SONAR can be used should be dependent on the type and volume of the SONAR, I also feel that shutting down SONAR when a marine mammal enters the area is appropriate because some animals may be tracking fish or traveling on a path from one feeding ground to the next that just happens to be in a Navy SONAR testing area.

I ask that you make your recommendations based on the side of caution on the side of our marine mammals physical and mental health.

Mahalo for listening to me.

Chris Bane

COMMENT NUMBER S-W-0002

Hawaii Range Complex Supplement to the Draft EIS/OEIS Written Comment Form

Please record your comments concerning the Hawaii Range Complex Supplement to the Draft EIS/OEIS on this form. Please include your name and address. You may submit this form by:

1) placing it in the comment box at tonight's meeting
2) mailing it to PMRF Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

All comments must be received no later than Apr. 7, 2008 to be considered in the Final EIS/OEIS.

Name: JAN BAPPE

Address:* HONOLULU HI

Comments: I have been concerned about the suffering caused by SONAR on ships. Our world has been given a wonderful gift with all the amazing creatures in our oceans. I feel we are responsible to protect them, basically from us. There is too much "unknown" from this SONAR. People say, "There is already lots of noise in the ocean" but just as there are many noises that we live with, there are some that are unbearable. We don't know about the possibility of our ocean creatures actually suffering with pain in their brains. I think we must find a gentle way to find the enemy. 1

thankyou.

* If you provide your mailing address, we will add you to our mailing list to receive future notices about this EIS/OEIS.

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-W-0003

March 13, 2008

RE: Hawaii Range Complex SDEIS/OEIS

1

Over 70 percent of all marine-mammal research in the US as well as 50 percent of all research worldwide is sponsored by the Navy. This has a corrupting effect on the research as those being funded will be reluctant to criticize defense-related projects if they want to retain their funding. Universities have become dependent on research grant money so that it has become a factor in professors getting tenure and career success. The Navy's research has focused on hearing thresholds to determine how loud and how close to whales its sonar can be operated before it affects the animals' behavior or causes temporary or permanent hearing loss. Navy research grants are project driven where the questions you ask are going to determine the answers you get. If the researcher discovers things that are negative or not what the Navy wants to hear, then that information is not to go public. ~~National~~ Natural Resource Defense Committee (NRDC) in 2002 discovered a series of emails from the navy's environmental manager for its low-frequency sonar system regarding a negative appraisal filed in a publicly accessible environmental-impact statement by a group of scientists. The navy reprimanded the researchers and told them they such be reporting directly to the Navy about their gripes and indicated that they could take their research money elsewhere. THERE NEEDS TO BE AN INDEPENDENT COUNCIL FOR MARINE MAMMAL RESEARCH. Navy sponsored or funded research is not reliable or credible. It's like trusting the tobacco industry to research the causes of lung cancer.

Laurel Brier

Anahola, HI

COMMENT NUMBER

S-W-0004

To Public Affairs Office 3/9/08
Pacific Missile Range Facility

1

I am in favor of absolutely No Sonar testing by the Navy or any + all other unknown to the public government peoples using Sonar in the Ocean, all oceans.

STOP Sonar use.
STOP WAR GAMES.
STOP WAR.

Speaking + Writing for myself + those sentient beings (ocean animals) you don't seem to be able to listen to,

Claire D'Gaia

Haiku Hi

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

HAWAII

Hawaii Range Complex
Supplement to the Draft EIS/OEIS
Written Comment Form

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1) placing it in the comment box at tonight's meeting
2) mailing it to PMRF Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

All comments must be received no later than Apr. 7, 2008 to be considered in the Final EIS/OEIS.

Name: Raydiance Grace

Address:* Pahoa, HI

Comments: I am deeply concerned about the "stranding & subsequent deaths of whales starting in the Bahamas around the year 2000 up to 2006 all within specific ranges of Sonar testing being done in these different areas. I intuitively know how incessing "loud" unknown sounds can disturb me — I know that unrestrained use of "sonar" could be very dangerous & deadly to sensitive animals that use sound to communicate with each other. Until the Navy can 100% prove that Sonar is not effecting negatively any mammals in the ocean where it is being proposed to be used — it should in all things for concerns of life-forms in the ocean be stopped. An Ecological Earnest,

Raydiance

* If you provide your mailing address, we will add you to our mailing list to receive future notices about this EIS/OEIS.

COMMENT NUMBER
S-W-0005
1

Hawaii Range Complex
Supplement to the Draft EIS/OEIS
Written Comment Form

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1) placing it in the comment box at tonight's meeting
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P.O. Box 128
Kekaha, HI 96752

All comments must be received no later than Apr. 7, 2008 to be considered in the Final EIS/OEIS.

Name: Linda Harmon

Address:* Hanapepe, Hi.

Comments: The part of the ocean that would be sonared is suppost to be santuary for sea creates. Don't allow the Navy to devistate the area with loud sound frequencies.

* If you provide your mailing address, we will add you to our mailing list to receive future notices about this EIS/OEIS.

COMMENT NUMBER
S-W-0006
1

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

MAUI

Hawaii Range Complex
Supplement to the Draft EIS/OEIS
Written Comment Form

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1) placing it in the comment box at tonight's meeting
2) mailing it to PMRF Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

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3-14-08

Name: Peggy LeDoux

Address:* , Hillsborough, CA

Comments:

Every year I come to Hawaii to see the glorious migration of the whales. It is a great joy in my life. I share this joy every year with friends and family. Our marine mammals are truely one of the great wonders of the world. I have discovered that through-out the world there has been damage to whales as a result of sonar testing. I also understand that the navy has invested tremendous money in staff and facilities here in Hawaii. I understand that. I do not understand why the navy cannot stop sonar testing during the whale migration season. We will always have international conflicts, but we may not always have our miraculous marine mammals. Please stop sonar testing during whale migration.

* If you provide your mailing address, we will add you to our mailing list to receive future notices about this EIS/OEIS.

COMMENT NUMBER
S-W-0007
1

Kauai

Hawaii Range Complex
Supplement to the Draft EIS/OEIS
Written Comment Form

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1) placing it in the comment box at tonight's meeting
2) mailing it to PMRF Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

All comments must be received no later than Apr. 7, 2008 to be considered in the Final EIS/OEIS.

Name: Kaitlyn L. McKee

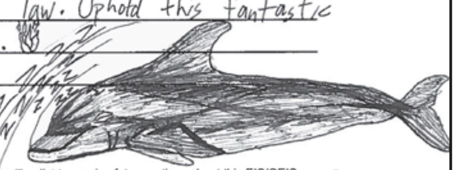
Address:* Kapaa HI

Comments: Aloha,

All I can say is from my heart and soul because my love, respect, and connection with the ocean and it's inhabitants runs deep. When you make your decision don't let these innocent creatures suffer for mankinds war. Preserve and protect, this is all we have.

"The greatness of a nation and it's moral progress can be judged by the way it's animals are treated" Gandhi

The North western Hawaiian Islands is now protected from harm by law. Uphold this fantastic monument ~~forever~~ forever.



P.S. shhhh.... we are sleeping

* If you provide your mailing address, we will add you to our mailing list to receive future notices about this EIS/OEIS.

Hear no evil see no evil speak no evil.

COMMENT NUMBER
S-W-0008
1

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

Kauai

Hawaii Range Complex Supplement to the Draft EIS/OEIS Written Comment Form

COMMENT NUMBER
S-W-0009

Please record your comments concerning the Hawaii Range Complex Supplement to the Draft EIS/OEIS on this form. Please include your name and address. You may submit this form by:

1) placing it in the comment box at tonight's meeting
2) mailing it to PMRF Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

All comments must be received no later than Apr. 7, 2008 to be considered in the Final EIS/OEIS.

Name: BETTY RUBBLE

Address:*

Comments: IF YOU REALLY CARE ABOUT YOUR PERSONNEL,
YOU WOULD STOP WASTING TIME, ENERGY, AND MONEY ON 1
EXPANDING THE RANGE & EXERCISES. WE WILL KEEP
MESSING WITH YOU, AND WILL KEEP SUPPORTING LAWYERS
TO FIGHT YOU, UNTIL YOU LOWER NOISE, PICK UP YOUR
TRASH, AND COMPLY WITH THE LAWS ON THE BOOKS.
WE HAVEN'T FORGOTTEN ABOUT 2004 AND NO MATTER
HOW YOU SUGAR COAT IT, MELON WHALES DON'T COME 2
INTO NEAR SHORE WATERS UNLESS THERE IS A
MAJOR PROBLEM. BACK OFF. [illegible]
[illegible] CHOKE POINTS ARE A RECIPE
FOR DISASTER IN SUCH VIBRANT WATERS.

* If you provide your mailing address, we will add you to our mailing list to receive future notices about this EIS/OEIS.

MI

COMMENT NUMBER
S-W-0010

Testimony Submitted on 3/14/08 in Kahului, Hi to U S Navy for Hawaii Range Complex SDEIS/OEIS comment session.

Aloha,
My name is Mike Moran from Kihei HI. Thanks for the opportunity to comment on this topic.

Once again, the Navy is failing to offer reasonable protection to our aquatic environment in Hawaii with this Draft EIS, nor offer reasonable explanation why these practice sessions must be held in near shore Hawaiian waters. In spite of overwhelming evidence of injury & death to whales & other marine mammals caused by mid frequency active sonar use, the Navy persists in doing so in the areas of HIHWNMS where mother whales are birthing on a regular recurring basis. 1

Unfortunately this Feb, 2008 version of the draft EIS in the exhausting 116 pages is an inadequate analysis by the Navy, as was the prior 2005 draft. The Navy insists on using selective science to form assumptions that neither do, nor apply in the real world marine environment, and chooses to ignore scientific evidences of injury & death to marine mammals, which occur in regions where active sonar use occurs. 2 Further the Navy refuses to make available "after action reports" to the public, this hiding specifically where these sonar use occurs to make it impossible to verify cause/effect relationships between to sonar use & marine mammals injury & death, including, but not limited to strandings. 3

There are at numerous ways active sonar can injure or kill marine mammals: ear and other tissue damage caused by the sonic waves; induced panic from the sonic waves causing strandings on shore; induced panic on deep diving whales to ascend too quickly causing "the bends," and even naturally occurring fairly rapid ascent combined with the sonic wave also causing "the bends" or decompression sickness.

The Navy acknowledges that **QUOTE** "Sonar exposure has been identified as a contributing cause or factor in five specific mass strandings: Greece in 1996; the Bahamas in March 2000; Madeira Portugal in 2000; the Canary Islands in 2002, and Spain in 2006." This is you, the Navy stating this, but you then choose to ignore this problem! Also ignored, is Hawaii's own July 11, 2004 mass strandings of 200 melon headed whales in the Hanalei Bay area of Kauai during naval exercises in that area. 4 Since again the Navy refuses to offer "after action reports" of sonar use relating to date, time or location, scientists are prohibited from being able to prove the likely cause/ effect relationship there.

As objective federal judges in courts in California and just 2/29/08 right here in Hawaii are issuing rulings calling for further mitigations by the Navy in use of active sonar, the Navy chooses to ignore the court rulings. 5 Judge David Ezra ruled that the Navy cannot conduct exercises within12 nautical miles of Hawaii's shorelines, which is where marine mammals that are particularly sensitive to sonar are found. He also ruled that the Navy must look for marine mammals for one hour each day before using sonar, & employ three lookouts exclusively to spot the animals before sonar use. However, tt was just reported by the Associated Press on March 12 "The Navy says it will go ahead with the planned anti-submarine warfare exercises this month, and **then** determine

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-W-0010 (cont.)

whether to seek additional clarifications and modifications from the judge." Let's just do it first, and then ask if this is what the ruling meant.
Mahalo,

Mike Moran

Kihei, HI

COMMENT NUMBER
S-W-0011

HA

COMMENTS ON FEBRUARY 2008 SUPPLEMENT TO DEIS/OEIS FOR
NAVY HAWAI'I RANGE COMPLEX
March 18, 2008 5 - 9 PM Hilo Hawaiian Hotel, Hilo
Cory Harden, Sierra Club, Moku Loa group

Include and analyze relevant information from recent court decisions on sonar, such as the March 2008 decisions in Federal courts in California and Hawai'i. 1

Are conclusions based in part on classified information? If so, how would the conclusions change if the classified information was not considered? 2

Identify alternatives to sonar that will not affect marine life--existing alternatives, and those that could be developed in the next five years or so. 3

As new forms of life are discovered in the ocean, when and how will the effects of sonar on them be evaluated? 4

Evaluate cumulative effects of sonar on marine life, added to other stressors affecting the oceans. In close to half of the world's oceans, ecosystems are already severely compromised by stressors caused by humans--pollution, warming water, damage to the sea floor, fishing, and more. [Science, 2-15-08] 5

p. 3-8 to 3-9 "There are significant limitations and challenges to any risk function derived to estimate the probability of marine mammal behavioral responses; these are largely attributable to sparse data…The three data sets represent the responses of only four species… None… represent experiments designed for behavioral observations of animals exposed to MFA sonar…" *In addition, two of the three data sets fail to consider numerous variables, described on p. 3-9.* 6
Given the "significant limitations" of the risk function method, conclusions based on this method appear to be unjustified.

p. 3-14 The old acoustic model yielded a larger-than-actual acoustic footprint when multiple ships were using sonar. The new model corrects this--but it should also correct for increased volume from multiple ships. 7

p. 3-15 Justify use of elephant seal data to analyze impacts to monk seals. 8

Table 3.3.1-1, p. 3-16 Lay-person language should be used--e.g. "harassment level" instead of "Risk Function 120-195 dB SPL" 9

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

HA

NCEAS from Cory Harden Sierra Club

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A Global Map of Human Impacts to Marine Ecosystems

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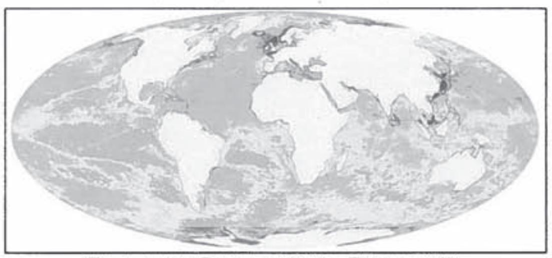
Why map the human impact to the world's oceans?

What happens in the vast stretches of the world's oceans - both wondrous and worrisome - has too often been out of sight, out of mind.

The sea represents the last major scientific frontier on planet earth - a place where expeditions continue to discover not only new species, but even new phyla. The role of these species in the ecosystem, where they sit in the tree of life, and how they respond to environmental changes really do constitute mysteries of the deep. Despite technological advances that now allow people to access, exploit or affect nearly all parts of the ocean, we still understand very little of the ocean's biodiversity and how it is changing under our influence.

The goal of the research presented here is to estimate and visualize, for the first time, the global impact humans are having on the ocean's ecosystems.

Our analysis, published in *Science, February 15, 2008* (no subscription required), shows that over 40% of the world's oceans are heavily affected by human activities and few if any areas remain untouched.



Very Low Impact (<1.4) | Medium Impact (4.95–8.47) | High Impact (12–15.52)
Low Impact (1.4–4.95) | Medium High Impact (8.47–12) | Very High Impact (>15.52)

Download the Marine Impacts KML to view the cumulative impact map in Google Earth.

How did we create this map?

There were 4 steps to creating this composite map.

1. We gathered or created maps (with global coverage) of all types of human activities that directly or indirectly have an impact on the ecological communities in the ocean's ecosystems. In total, we used maps for 17 different activities in categories like fishing, climate change, and pollution. We also gathered maps for 14 distinct marine ecosystems and modeled the distribution of 6 others.

2. To estimate the ecological consequences of these activities, we created an approach to quantify the

i.e. marine model KML

COMMENT NUMBER
S-W-0011 (cont.)

March 15. 08

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128 Kekaha, Hi 96753

I would like to voice my concern for the whales birthing in Hawaiian waters. (1)
Do the right thing!

1. Look for another location (its a big ocean out there.)
2. A new alternative way to test beside what is used now.
3. Revise time of year to test.

Sincerely,
Barbara Sinclair
a very concerned citizen

Ms. Barbara M. Sinclair

COMMENT NUMBER
S-W-0012

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-W-0013

Dear Officer, March 17, '08

Please do not destroy the sealife with sonar use. Mankind needs to learn from the animals, not kill them. Enough is enough. Thank you for hearing my cry. Katherine Stack

1

COMMENT NUMBER
S-W-0014

Hawaii Range Complex EIS/OEIS
Pacific Missile Range Facility
PO box 128
Kekaha, Hawaii 96752

From: Gabriela Taylor
Kapaa, Hi

I am commenting on the Draft EIS for planned Sonar Activities in Hawaii. I want to register a strong "NO" sonar in Hawaii waters where it can harm whales and other creatures. 1

Under no conditions should the navy use sonar in the Hawaiian waters.

Sincerely, Gabriela Taylor

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-W-0015

3 minute presenation for March 18, 2008 sonar meeting in Hilo

My name is Lee Tepley and I have a PhD in Physics. Almost 10 years ago I got heavily involved in the protest movement against LFA sonar. I did a lot of research on both LFA and mid-frequency sonar and, in 1992, I even got invited to give a paper at a National Marine Fisheries meeting near Washington, D.C.

It turned out to be a very important meeting. I participated in an informal debate on different ways that sonar could harm deep diving whales –and especially beaked whales. The concept of whales getting decompression sickness (same as "the bends") from sonar had been proposed many years earlier but was advanced at this meeting by Dr. John Potter who is a brilliant scientist. He came up with a new approach that is now generally accepted.

1 In fact, the last section of the draft EIS contains 3 references to beaked whales getting the bends from Sonar. **But in the main part of the EIS, this fact is not even considered. I think this is the greatest single defect of the EIS.** There are many other defects.

2 However, in an earlier version of the draft EIS, it was stated that deep diving whales are more likely to be killed by sonar than other cetaceans and that the Navy was considering adding a 1% increase in mortality to its complex dose function in circumstances that might increase the probability of beaked whale stranding. **However, the earlier version of the draft DEIS did not mention the possibility that strandings could result from the bends.**

And in the current version of the EIS, the Navy changed it's mind and did not even mention the "1% increase in mortality" and, of course, it did not mention beaked whales dying from the bends. **The Navy seems to hate the fact that whales can get the bends.**

Realistically, if deep diving whales get the bends from sonar they will die almost every time. Cirumstances which lead to stranding will also lead to death. **Therefore, the 1% increase in mortality that the Navy initially considered should have been almost 100%.**

3 **And the Navy also ignored beaked whales getting the bends in an EIS on LFA sonar in 2006.** This was pointed out in comments by Joel Reynolds – an attorney for NRDC. LFA sonar and mid-frequency sonar are not that much different. So did the Navy listen to the comments by Joel Reynolds?? Of course not.

I discuss some of the above on my new sonar web page. I may add new material soon. If you want to check it out, pick up the directions to get there at the end of this meeting.

4 A few more quick comments: The complex 110 page draft EIS is based on data from sonar tests of a few Beluga whales and Bottlenose dolphins in a tank and on Right whales and Killer whales in the ocean. The results are extrapolated to all the whales and dolphins in Hawaiian waters. **But in the draft EIS the Navy admits that none of this data is reliable.** Still, the Navy says that it is the best available data – and it lead to this incredibly complex 110 page draft EIS. **Based on such unreliable data, the DEIS should not even have been written. The Navy should be made to start over.**

Thank you.

Lee Tepley
PhD, Physics

P.S. To get to my sonar web page, Go to my Superferry web site at

http://web.mac.com/leetepley/Site/Introduction.html

Then, near the top of the page you will see "Link to Sonar HRC DEIS page". Click on this link. This opens a page with another link. Click on it and you should be there.

COMMENT NUMBER
S-W-0016

Cory (Martha) Harden

ASSISTANT PROFESSOR
MARINE SCIENCE
UH HILO

From: "Jason P. turner" <jpturner@hawaii.edu>
To: "Cory (Martha) Harden"
Sent: Monday, March 17, 2008 11:50 PM
Subject: Re: sonar hearing Mar 18

Cory,
The more I look at my schedule tomorrow I do not think i will be able to attend. Just a few points that I see upon investigating this document.

1 1)There are projected to be an extremely large amount of marine mammals affected by these activities - in the tens of thousands across tens of species

2) Humpback whales and Hawaiian monk seals - both endangered species represent the largest % of cetacean and pinniped impacts, respectively

2 3) Robin Baird who has been conducting survey investigations throughout the Hawaiian Island for Odonotocetes (toothed whales) for the past 6 years is not even mentioned in the DEIS, although most of what we know about toothed whales in Hawaii comes from him (he was a co-author in one paper regarding impacts of sound).

3 4) I saw a lot of information regarding specific action levels depending upon different situations but I did not see anything about pre and post monitoring and subsequent safeguards regarding what will happen when/if take occurs. For example, what type of pre & post monitoring efforts (indep of the Navy) are in place to ensure that we try to capture the specific impacts upon animals. Further, at what level of take will the operations be temporarily halter, modified, or shut down permanently

5) The DEIS consultants appear to have placed a great amount of time and efforts into modeling the effects of sound upon different marine mammals; however, without any pre-post monitoring efforts these exercises are academic at best

4 6) I'm concerned with the expertise provided by the group that prepared the DEIS; one member was listed as a "marine mammal biologist" and is a former NOAA employee, now an environmental consultant - all others appear be professional consultants with limited experience with marine mammals; further, no leading experts from the field of Marine Mammal Biology appear to have been involved in the preparation.

I hope this helps. You may use my name and mention these comments. I'm sorry I cannot be there; let me know if I need to prepare a letter and I would be happy to.
Aloha,
Jason

Have studied marine mammals for past 14 years; 4 published works and over 12 presentations. Director of Hilo Marine Mammal Response Network.

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

Page 2 o

Dr. Jason P. Turner
Assistant Professor
Department of Marine Science
Interim Director - KMEC
University of Hawai'i at Hilo

3/18/20

COMMENT NUMBER
S-W-0016 (cont.)

March 16, 2008

To whom it may concern,

This letter is in response to the news I recieved about the sonar testing that is happening off of Kauai waters...

I heard a story on the news today that made
me cry
whales and dolphins their brains bursting and
bleeding waiting slowly to die
Sonar testing, fear manifesting in the lives of
those who live so free, sonar testing
exploding and eroding into the sea
Sacred animals older than us here
falling prey to our deep seeded fear
Protecting ourselves while hurting another
Slaughtering sacred gifts of the mother
Why? why do the plants and animals
have to die?
Is it because our own material conviences
are to hard to deny?
Do you ever stop to think about the
actions of your actions?
Do you ever stop to think about the
actions of your actions?

How would you feel if you were one of those whales? With all our new technology isn't there another way? there must be! 1

COMMENT NUMBER
S-W-0017

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

Thank you for Reading!

- Sonya Wolfe

COMMENT NUMBER
S-W-0017 (cont.)

Hawaii Range Complex Supplement to the Draft EIS/OEIS Written Comment Form

Please record your comments concerning the Hawaii Range Complex Supplement to the Draft EIS/OEIS on this form. Please include your name and address. You may submit this form by:

1) placing it in the comment box at tonight's meeting
2) mailing it to PMRF Public Affairs Officer
   P.O. Box 128
   Kekaha, HI 96752

All comments must be received no later than Apr. 7, 2008 to be considered in the Final EIS/OEIS.

Name: Rulin Xiu

Address:* Keaau HI

Comments: The impact of sonar on sea mammals' emotional & physical well-being is reported in many severe incidents. I think it is time for us to take notice and do everything we can to prevent it happen again.

~~If we can't~~ I believe if our action impact the well-being of wild animals, it will impact our human's well-being in a more profound and powerful level.

let's all start to pay attention and do sensible thing that will serve us not harm us or anything.

* If you provide your mailing address, we will add you to our mailing list to receive future notices about this EIS/OEIS.

COMMENT NUMBER
S-W-0018
1

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

COUNTY COUNCIL
BILL "KAIPO" ASING, CHAIR
MEL RAPOZO, VICE CHAIR
TIM BYNUM
JAY FURFARO
SHAYLENE ISERI-CARVALHO
RONALD D. KOUCHI
JOANN A. YUKIMURA

OFFICE OF THE COUNTY CLERK
Council Services Division
Elections Division
Records Division
PETER A. NAKAMURA, County Clerk
ERNESTO G. PASION, Deputy County Clerk
Telephone: (808) 241-6371
Facsimile: (808) 241-6349

4396 RICE STREET, ROOM 206
LIHU'E, KAUA'I, HAWAI'I 96766-1371
E-mail: cokcouncil@kauai.gov

COMMENT NUMBER S-W-0019

TESTIMONY

by

COUNCILMEMBER JOANN A. YUKIMURA

In Re: Supplement to the Draft EIS/Overseas EIS
Hawaii Range Complex (HRC)

Kaua`i Community College

March 13, 2008

Thank you for this opportunity to provide input.

I speak as an individual Kaua`i County Council member who is deeply concerned about the impacts of high frequency active (HFA) sonar and mid-frequency active (MFA) sonar in naval training exercises upon ocean mammals.

I acknowledge the Navy's need to conduct realistic training in sonar detection 1
technology, but it should not be at the expense of ocean mammals. I acknowledge the Navy's 2
attempt to mitigate its impacts upon ocean mammals through its preferred third alternative, but I
do not believe those mitigation efforts are sufficient. Your executive summary states: "The 3
Navy finds harassment resulting from the proposed use of MFA/HFA sonar may affect
endangered blue whale, North Pacific right whale, fin whale, sei whale, humpback whale, sperm
whale and Hawaiian monk seals." This is unacceptable.

At a minimum it would seems that the training exercises should be conducted in the
summer months when whales are much less prevalent in Hawaiian waters. Secondly, there 4
should be found another way to detect submarines without sonar which invades the main
communication system of the ocean mammals and causes both psychological distress and
physical injury to these mammals. Human ingenuity has shown itself to be unlimited; surely
another method can be found to detect quiet submarines. The ocean is the kuleana of its
inhabitants; humans who enter the ocean should do so without causing harm.

Mahalo for your consideration of this testimony.

AN EQUAL OPPORTUNITY EMPLOYER

COMMENT NUMBER S-W-0020

Peter Courture

Hanalei Hawaii

19th March 2008

Public Affairs Office
Pacific Missile Range Facility
P.O. Box 128
Kekaha Hawaii 96752-0128
Attn HRC EIS/OEIS
Fax 808 335-4520
Email : hrs@govsupport.us

Messrs. et Madames :

I am extremely distressed to learn that our government still intends to condone sonar
testing in an area where whales and other sensitive marine life shelter. Due to the hazards such 1
testing presents to these lives, I respectfully request that you move your testing to a location
where such dangers are not presented and, in addition, ensure that such testing as is permitted is
done only in seasons when the humpback whales are not present in large numbers. Moreover, as
part of our governmental process, you owe those of us who can speak for the lives of those who
cannot a clear explanation why you must conduct this testing in such a sensitive area. According
to our system of government, your explanation should be made in a manner that affords us an
opportunity to respond. Finally, no such testing should be conducted without at least the same 2
mitigation measures which were adopted in 2006 after the Court challenges. It seems both
wasteful and disrespectful to skirt voluntary compliance, forcing human citizens to intervene.

As you know, the Hawaiian Islands, and especially Kauai, are key ecological shelters for important life, including dolphins, whales and others. The Hawaiian waters are important winter breeding grounds for, among others, thousands of endangered humpback whales. Melon head and pilot whales also frequent these waters.

It is undisputed (and the Navy has no contrary evidence) that the sort of testing (and 3
sonar emissions) proposed in the RIMPAC and USWEX exercises and especially mid-frequency
active sonar present a clear and present danger to endangered and highly intelligent marine
mammals. I have not fully outlined here the deficiencies such testing and the Navy's behavior
present under the law, but believe that your present and proposed actions violate the Marine 4
Mammal Protection Act, the National Marine Sanctuaries Act and the Coastal Zone Management
Act, to name a few.

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

In the South Pacific, I have been eye to eye with humpbacks underwater and had the pleasure to spiral with them as they revelled in the oceans we share. I have heard their songs and seen them leaping off the Kauai coastline. I believe that no one who has experienced the gazes and songs of the humpbacks could ever condone endangering them. You must be aware of this, but persist. You should be ashamed of your behavior and I beseech you to take corrective action before it is too late. No environmental statement can bear the slightest resemblance to truth absent a recognition of this obligation.

Yours sincerely,

Peter

Peter Courture

COMMENT NUMBER
S-W-0020 (cont.)

Harry Kim
Mayor

Jane H. T
Director

Diane L.
Deputy Dire

County of Hawaii

DEPARTMENT OF RESEARCH AND DEVELOPMENT

25 Aupuni Street, Room 109 • Hilo, Hawaii 96720-4252
(808) 961-8366 • Fax (808) 935-1205
E-mail: chresdev@co.hawaii.hi.us

March 31, 2008

Mr. Tom Clements
Public Affairs Officer
Pacific Missile Range Facility
P. O. Box 128
Kekaha, Hawai`i 96752-0128

RE: Hawaii Complex Range Draft Environmental Impact Statement/ Overseas Environmental Impact Statement

Dear ~~Mr. Clements~~: Tom

Thank you for providing the County of Hawai`i's Department of Research and Development with an opportunity to review and provide comments on the Hawaii Complex Range Draft Environmental Impact Statement/Overseas Environmental Impact Statement. Our Department has no comments or concerns at this time. 1

Thank you also for making arrangements to meet with Mayor Harry Kim. I know, he appreciated having the opportunity to speak with you and Commanding Officer Cudnohufsky.

Sincerely,

Diane

Diane Ley
Deputy Director

Hawai`i County is an Equal Opportunity Provider and Employer

COMMENT NUMBER
S-W-0021

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-W-0022

Hawaii Range Complex Supplement to the Draft EIS/OEIS Written Comment Form

Please record your comments concerning the Hawaii Range Complex Supplement to the Draft EIS/OEIS on this form. Please include your name and address. You may submit this form by:

1) placing it in the comment box at tonight's meeting
2) mailing it to PMRF Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

All comments must be received no later than Apr. 7, 2008 to be considered in the Final EIS/OEIS.

Name: Vallaria Springs

Address:* Pahoa, HI

Comments:

Sonar is being used as a Weapon of Mass Destruction to fellow intelligent Species and other intelligent Species. — 1

I Stand in opposition to this form of Cruel & Inhumane treatment

* If you provide your mailing address, we will add you to our mailing list to receive future notices about this EIS/OEIS.

COMMENT NUMBER
S-W-0023

March 24, 2008
Hawaii Range Complex EIS/OEIS
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawaii 96752-0128

RE: Navy war games and endangered sea mammals

Once again we are writing to strongly object to the Navy plans for war games and resulting marine mammal kill in the "protected" National Monument, the Northwestern Hawaiian Islands. It was mandated that this fish nursery and marine habitat be set aside to protect the endangered Monk Seal and threatened mammals as well as protecting one of the last remaining intact coral reefs. — 1

We have lived a great number of years on the sea in a 50' sailing boat. We have traveled great distances and have learned to love and cherish and appreciate the mysteries of the oceans and its residents. On many occasions we could listen to the songs of the whales through the hull of our boat; each song was unique, a language still unknown, still being studied. We have visited countries that protect and celebrate their natural resources and strive to protect them! It takes a mindset, it takes experiences, and it takes appreciation of God's gifts to understand the importance of each of Natures creatures. — 2

Unfortunately, the U.S.Navy seems hell bent on destroying ocean life and ignoring any protection of the animal residents of the Northwestern Islands. Why is this? Why do we have to go through this exercise every few years, writing and demanding that you work with us not against us in protecting the seas. The Navy has acknowledged that sonar activities will result in marine death. There is still time for you to stop. It is our hope that your decision will favor ceasing war games in and around the Northwestern Hawaiian Islands. — 1

Marilyn & Ed Pollock
Hanalei Hawaii
Marilyn Pollock Ed Pollock

Hanalei, HI

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

/07/2008 16:17 FAX 301 504 0099 MARINE MAMMAL COMM. 002

MARINE MAMMAL COMMISSION
4340 EAST-WEST HIGHWAY, ROOM 700
BETHESDA, MD 20814-4447

7 April 2008

Public Affairs Officer
Pacific Missile Range Facility
PO Box 128
Kekaha, HI 96752-0128

The Marine Mammal Commission, in consultation with its Committee of Scientific Advisors on Marine Mammals, has reviewed the supplement to the Draft Environmental Impact Statement/ Overseas Environmental Impact Statement (hereafter referred to as the SEIS) provided by the Department of the Navy to evaluate its planned Navy Pacific Fleet training and defense-related research on the Hawaii Range Complex (HRC). The SEIS specifically addresses three amendments to the original draft environmental impact statement (DEIS). These are (1) modification of the response function and procedure for estimating takes by Level B harassment, (2) a change in the amount and allocation of sonar use over the course of a typical year of training and exercises, and (3) introduction of a new preferred alternative, Alternative 3, which includes the increased level of activity of DEIS Alternative 2 except for sonar use, which would stay at the current level (the Navy's "No Action" alternative). All other aspects of the HRC environmental impact statement remain as written in the original DEIS, published in July 2007. The Marine Mammal Commission offers the following comments and recommendations.

RECOMMENDATIONS

The Marine Mammal Commission has identified three elements of the SEIS in need of further consideration and revision: estimation of risk, mitigation of risk, and—perhaps most important—evaluation of action alternatives. To address these concerns, the Marine Mammal Commission recommends that the Navy—

- rename its "No Action" alternative corresponding to the current level of action and incorporate a true "No Action" alternative in which active sonar would not be used; 1
- explain how the original analysis led to such a large error in estimated sonar use and provide some means of verifying and validating the numbers derived from the SPORTS database; and 2
- more fully explain the analytical procedures used with the new risk function and correct existing errors or sources of confusion to enable the reader to readily follow the process of risk estimation to its conclusion. 3

RATIONALE

Recommended revisions to the SEIS are as follows.

The No-Action Alternative: Environmental impact statements are required to include a "No-Action" alternative. The term "No-Action" has been used to designate the alternative in which the proposed action is not taken. As such, the no-action alternative provides a baseline for

PHONE: (301) 504-0
FAX: (301) 504-0

COMMENT NUMBER
S-W-0024

/07/2008 16:17 FAX 301 504 0099 MARINE MAMMAL COMM. 003

Navy Pacific Missile Range Facility
7 April 2008
Page 2

comparing the potential environmental effects of different alternatives. The Navy's continued use of the term "No-Action" to indicate an alternative of continued action at the current level may, therefore, lead to confusion and misunderstanding in two ways. First, as used by Navy, the no-action alternative may be the alternative of greatest environmental consequence, which is counterintuitive and may lead to confusion among decision-makers. Second, and perhaps more important, the use of the term "No-Action" to mean the current level of effort may effectively shift the baseline for comparison among alternatives. The key consideration here is that consequences of any course of action be fully explained. Even if the Navy persists in using the no-action alternative to mean continued action at the current level, it must ensure that the full environmental effects of all alternatives are described, not just those incremental effects arising from changes to the current action. To avoid these sources of confusion, the Marine Mammal Commission recommends that the Navy rename its "No Action" alternative corresponding to the current level of action and incorporate a true "No Action" alternative in which active sonar would not be used. The Commission concurs with the Navy that a true no-action alternative is not likely to be preferred, but the requirement for such an alternative cannot simply be dismissed, particularly when it forms a baseline for informed decision-making. 1

Selection of the Preferred Alternative: In changing its preference from Alternative 2 in the DEIS to a new Alternative 3 in the SEIS, the Navy has introduced new considerations without sufficient explanation. In the DEIS, the Navy went to great lengths to explain the requirements for realistic readiness training and to justify why none of that level of effort could be sacrificed without tangible, and unacceptable, losses to war-fighting capability and the associated risk to ships and sailors. In Alternative 3, the Navy proposes that it can field the additional vessels and associated aircraft, sailors, weapons, and sensor systems described in Alternative 2 of the original DEIS without a corresponding increase in sonar training. The discrepancy suggests that either the existing level of sonar training is more than necessary to protect existing assets or that the new assets will not require the same level of sonar-based protection. To resolve this apparent inconsistency, the Marine Mammal Commission recommends that the Navy more completely explain how it will achieve the desired level of anti-submarine warfare readiness without increasing the level of sonar use above current levels and, if so, why these same economies of sonar use cannot be applied to the other alternatives. 2

The Navy also introduces significantly modified estimates of sonar use in the SEIS (e.g., see page ES-3, Table ES-1). The overall result is a reduction of some 63 percent, or about one-third of the original estimate (from 3,495 hours of 53C equivalent usage to 1,284 hours in the case of the alternative for continuing at current levels). The magnitude of this change raises concerns about how such an error could have been made in the original DEIS and whether the newly introduced data from the Sonar Positional Reporting System (SPORTS) database, which has been in use for less than two years, accurately reflect "typical" use. The Marine Mammal Commission recommends that the Navy explain how its original analysis led to such a large error in estimated sonar use and provide some means of verifying and validating the numbers derived from the SPORTS database, either in an appropriately classified independent review or in a redacted, unclassified format that would allow some form of verification of either past or future SPORTS accuracy as a way of confirming the estimated level of risk described in the SEIS.

COMMENT NUMBER
S-W-0024 (cont.)

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-W-0024 (cont.)

Navy Pacific Missile Range Facility
7 April 2008
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New Risk Function: In the DEIS, the Navy translated a sinusoidal dose-response curve into a deterministic step-function threshold for ease of analysis (see Table J-3 and associated text). No similar translation of the new risk function is contained in the SEIS (also a sinusoidal curve but with a different slope and bounding parameters), leaving the reader uncertain as to whether the Navy used a different process for calculating risk from exposure surfaces or treated the new risk function curve in the same way, with the 3- or 4-sigma deviation from the 50 percent crossing point being used as a step threshold to conservatively interpret an otherwise continuous function. The uncertainty associated this new risk function, the novel changes to the amount and distribution of sonar use, the introduction of a 24-hour "refresh" rate for accumulating supra-threshold events, the elimination of land areas from the risk estimation surfaces, the elimination of overlapping footprints when multiple sonars are in use (pages 1–2), and other minor problems noted below all undermine confidence in the derived risk estimates and the protocol used to generate them. The Marine Mammal Commission recommends that the analytical procedures used with the new risk function be more fully explained and that errors or sources of confusion be corrected to enable the reader to readily follow the process of risk estimation to its conclusion. 3

Detailed Comments

The following detailed comments either reinforce our previously made points with reference to specific parts of the HRC SEIS or note additional areas of strength or weakness within the SEIS that merit consideration by the Navy.

- The estimated risks of exposure to sound above the level expected to result in a permanent threshold shift (PTS; see Executive Summary, Table ES-4) are provided to the neared tenth, whereas the corresponding risk estimates by species in Chapter 3 (Table 3.3.1.-1 on page 3-16 and Table 3.3.6-1) are all rounded to the nearest whole number, which is always zero. It is therefore impossible to reconcile the original values with the derived values used in the comparison of alternatives where a cumulative risk to humpback whales above 0.5 is rounded to 1 Level A take (pages ES-4–5). 4
- The SEIS is not clear as to whether the Level B "takes by sensory impairment" (page 3-5, lines 14–17) are added to the risk function estimate of Level B takes or whether they are treated separately for purposes of estimating overall Level B harassment. 5
- Table J-51 on page J-29 of the DEIS states that the transmission loss models used 5.5 kHz as the center frequency for the 53C sonars. If this is correct, then the SEIS should explain why this value was used instead of the typical nominal center frequency of 3.5 kHz. 6
- Efforts to scale certain factors and variables create several problems. First, the size of the grid cells for accumulating energy from multiple pings (e.g., on page J-28) is not clear, nor is it clear how these are reconciled to the R_{max} calculation described on pages J-30–31. On pages J-32–33, the calculation of impact volume is based on a mismatch between the boundaries of the bins used to calculate the various depths of the animals in a population based on dive data and the boundaries used to calculate received sound level (RL) with depth. In such cases, the SEIS seems to indicate that the portion of the population in a given depth bin, say 14 percent at 100–200 meters, is not distributed in some way over the 7

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multiple RL depth bins within the 100–200 meter bin (as many as 50 RL bins if 2-meter resolution is used), but rather the entire 14 percent is assigned to each RL depth bin. If our interpretation is correct, this approach could assume the equivalent of more than 100 percent of the estimated animal density for the entire water column within a single dive-depth bin and significantly overestimate the risk value for that grid cell (see section J.1.5.3, page J-46). The cumulative impact of this error would be considerable if in fact it represents a calculation error rather than a misunderstanding of the explanation of the risk estimation process.

- Page J-41, line 39, contains what appears to be a typographical error in which the depth distribution of Bryde's whale distribution is split into depth bins of 0–50 meters, 50–225 meters and <225 meters (which would seem to include the previous two bins). 10

Finally, to improve subsequent drafts of this EIS, we note that—

- secondary references are used when original references should be cited (p.3-1, lines 23–24); and 8
- the species accounts beginning on pages 3-18 all state that there will be ### individuals of the named species exposed, when the more correct probabilistic expression is then used in the remainder of the paragraph, namely that there will be ### exposures, but it is impossible to determine how many individuals within the population will experience one or more exposures, although we know that the exposures will not be evenly distributed throughout the members of the population. 9

* * * *

We hope that the Commission's comments on this SEIS, along with previously provided comments on the DEIS, are useful to the Navy as it develops the final EIS and associated request for a letter of authorization under the Marine Mammal Protection Act. Please contact me if you have any questions or wish to discuss our recommendations and comments.

Sincerely,

Timothy J. Ragen

Timothy J. Ragen, Ph.D.
Executive Director

Cc: CAPT Larry Rice, CNO N45
Hon. Donald Schregardus, DASN E
Craig Johnson, NOAA/NMFS OPR

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

International Ocean Noise Coalition
www.oceannoisecoalition.org

COMMENT NUMBER: S-W-0025

April 6, 2008

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128, Kekaha, Kauai,
Hawaii 96752-0128

ATTN: HRC EIS/OEIS

Re: Supplement to the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS/OEIS)
Federal Register Notice January 17, 2008 (Volume 73, Number 12) Pages 3242-3243

On behalf of the International Ocean Noise Coalition and its affiliate the Hawaii Ocean Noise Coalition, we submit the following comments on the Supplement to the Draft Environmental impact Statement/Overseas Environmental Impact Statement (Supplement) for the Hawaii Range Complex (HRC). These comments are in addition to our previous comments dated September 17, 2007.

The Supplement introduces modifications to the analytical methodology used to evaluate the effects of mid-frequency active sonar on marine mammals with regard to behavioral impacts and the use of a proposed risk function methodology; changes to the amount and types of sonar allocated to each of the alternatives; and development of a new alternative.

Risk Function Methodology

Wild animals display wide variety in terms of the five senses, including their capacity to hear. Just like humans, different individuals for the same species can display different reactions to a stimulus. Hearing capabilities among different individuals of different sexes or varying ages in the same species can differ considerably. Among different species the hearing capability may be even more pronounced. The Navy acknowledges these differences in the Supplement, and is therefore looking towards developing a dose-response or risk continuum function to determine the potential behavioral impacts of MFA sonar on marine mammals.

However the data set used in the Navy's dose-response function as described in the Supplement is very small – a few studies on a few captive toothed whales, one survey on wild baleen whales and one modeled prediction of the levels of MFA sonar received by a pod of orcas in the USS Shoup incident of 2003. Apart from being not representative of all marine mammals in the wild, the captive animals were accustomed to noise and responding to it, and the wild animals likely also had some degree of habituation, the North Atlantic right whales living in the congested Eastern Seaboard of the U.S. and the orcas of North West Washington State being accustomed to ship and whale-watching boat noise. 1

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The Navy and NMFS acknowledge this limitation and thus the risk functions are described as an "interim approach." As in our letter of September 17, 2007, we again point out the United States' obligations under Principle 15 of the United Nations Rio Declaration of 1992 to which the U.S. is a signatory that states "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

The Navy should not be using a lack of data as reason to press ahead with its preferred noise levels justifying it as the "best available science." Precaution should prevail, especially given the vastness of the Hawaii Range Complex, the uniqueness of the marine biodiversity in the area and the planned almost 2,000 hours of active sonar use (plus the dipping sonar, sonar buoys and MK-48 runs). 2

Apart from the limited data set, the risk continuum function approach does not account for non-auditory noise impacts, the impacts of masking or cumulative and synergistic effects of several noise sources. It does not account for long-term impacts on marine mammals. It also does not take into account impacts to individual animals, but populations of animals. This is troublesome given that in any population there could be key individuals which, if negatively impacted by MFA sonar exposure, could result in the population being adversely affected, for example, by following the key individual into a hazardous situation. 3

Given the limitations of the dose response methodology, once applied the Navy predicts that 50% of marine mammals will be behaviorally impacted at received levels of 165 dB re: 1μPa rms with the other 50% being behaviorally impacted at levels from 120 to 195 dB re: 1μPa rms.

We still maintain, as stated in our September 17, 2007 letter, that the whales in the Bahamas stranding died when exposed to levels of MFA sonar between 150 and 160 dB – which is still much lower than the levels at which the Supplement says 50% of animals will behaviorally respond.

The fact that the Navy predicts *any* animals being behaviorally impacted at 120 dB re: 1μPa rms, again should bring in application of a precautionary approach since those animals could be critical to the survival of a marine mammal population.

Reduced Modeled Number of MFA Sonar Hours and the New Alternative

In the Supplement, the Navy has reduced the predicted number of events or hours of active sonar use for the different alternatives presented in the DEIS/OEIS and introduced a new alternative which includes the maximum actions of alternative two, but results in the same number of events or hours of active sonar use as the 'no action alternative'.[1] 4

[1] The 'No action alternative' is a misnomer because it does not mean that the navy will not use MFA sonar or other noise generating sources, but that it will not increase its noise producing activities.

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International Ocean Noise Coalition
Hawaii Range Complex Supplement to the DEIS/OEIS Comments
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While we are pleased that the Navy's planned active sonar usage is decreased overall, we maintain that the number of hours of active sonar use is still too high and the levels of sonar too intense.

We appreciate the opportunity to submit these comments and look forward to them being addressed in full.

Sincerely,

Marsha L. Green

Marsha Green
North American Representative

Marti Townsend

Marti Townsend
Hawaiian Ocean Noise Coalition

COMMENT NUMBER
S-W-0025 (cont.)

PHONE (808) 594-1888 FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD07/3146C

April 4, 2008

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kaua'i 96752-0128
ATTN: HRC EIS/OEIS

RE: Draft Environmental Assessment and Overseas Environmental Impact Statement Supplement for Proposed Upgrades and Modernization in the Hawai'i Range Complex.

To Whom It May Concern:

The Office of Hawaiian Affairs (OHA) is in receipt of your request for written comments regarding the Draft Environmental Assessment (DEA) and Overseas Environmental Impact Statement (OEIS) Supplement for Proposed Upgrades and Modernization in the Hawai'i Range Complex. This State has a constitutional mandate, statutory requirements and a history of caselaw that forces it not to simply consider Native Hawaiians and their culture and traditions, but to preserve and protect Native Hawaiian culture and traditions. Therefore, the people of the State of Hawaii and the United States of America established a public trust which includes among other responsibilities, betterment of conditions for native Hawaiians. The people of the State of Hawaii reaffirmed their solemn trust obligation and responsibility to native Hawaiians and furthermore declared in the state constitution that there be an office of Hawaiian affairs to address the needs of the aboriginal class of people of Hawaii.[1]

OHA's Mission Statement is:

> To mālama Hawai'i's people and environmental resources, and OHA'a assets, toward ensuring the perpetuation of the culture, the enhancement of the lifestyle and the protection of entitlements of Native Hawaiians, while

[1] See Hawaii Revised Statutes (HRS) § 10-3(1).

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Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

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enabling the building of a strong and healthy Hawaiian people and nation, recognized nationally and internationally.

It is our duty to "[a]ssess[] the policies and practices of other agencies impacting on native Hawaiians and Hawaiians, and conduct[] advocacy efforts for native Hawaiians and Hawaiians."[2] In this capacity, we offer comments on this proposed project.

1 The introductory paragraph of the July 27, 2007 version of the DEA/OEIS states in section 4.1.2.4.9 that, "These exposure analyses assume that MFA sonar poses no risk to marine mammals if they are not exposed to sound pressure levels from the mid-frequency active sonar above some critical value." (emphasis added). OHA objects to this assumption and points to the very next sentence in the DEA/OEIS which states:

> Though, active sonar could have various indirect, adverse effects on marine mammals by disrupting food chains, a species' predators or a species' competitors; however, the Navy and NMFS (National Marine Fisheries Service) did not identify situations where this concern might apply to marine mammals under the National Marine Fisheries Service's jurisdiction.

2 OHA also points out that the DEA on page 4-17 states that, "A small number of fish are expected to be injured by detonation of explosive, and some fish located in proximity of the initial detonations can be expected to die." This is a direct contradiction. Further,
5 OHA stresses that potential adverse effects to what a species' eats, for example is a direct adverse effect to the species' itself. Therefore, OHA urges that the sonar analysis take these admitted potential effects into account.

3 OHA cannot support a proposed undertaking with the potential for severe harm that supports itself with an assumption and with an applicant that has been working "over the past several years" on developing an "original metric" based on that assumption.[3]

4 While it is clear that the Navy is using SPL rather than SEL and dose function analysis as the metric for behavioral disturbance, it is not clear why. The National Environmental Policy Act requires that actual analysis be provided for decision-makers so that an informed decision can be made. OHA realizes that SEL and acoustic threshold models create a bright line and a hard and fast point where the applicant is not allowed to go beyond when using sonar. The new effort to define a mathematically representative curve and applicable model input parameters is by its very definition in the supplement vague.[4] It creates a range where the harm may be evaluated and, therefore, inherently

[2] HRS § 10-3(4).
[3] DEA/OEIS section 4.1.2.4.9.
[4] Supplement, page es-2.

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contains more flexibility when calculating harm to species and Endangered Species Act take permits. OHA objects to this.

6 The DEIS on page 4-57 states,

> Using both of these methods (the confusing hybrid of acoustic dose-functions and acoustic thresholds) to predict the number of marine mammals that might be "taken" by mid-frequency active sonar during training exercises will over-estimate the number of mammals by between approximately 5 and 10 percent.

While this may sound good and serve to ensure that the Navy has applied for enough take permits, it is not what the law requires. Both the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) require a specific number for a limited number of permits. OHA stresses that an over-estimate is not acceptable and asks for a specific data set.

7 Additionally, the Navy themselves state in section 4.1.2.4.9.3 that "sound exposure level may be a better metric for estimating the potential effects of sonar exposures on an animal's hearing because it represents an accumulation of energy and the sensitivity of the mammalian ear degrades as energy accumulates." (emphasis added). Therefore, OHA was surprised to learn the Navy's reason for using their untried and original approach now is because, "using SPL rather than SEL makes more data available."[5] Further, the Navy states it will have to "interpret" acoustic dose-functions "to compensate for the biases and uncertainties that are inherent in the data used to produce them."[6]

OHA is concerned that the Navy proposes to use SPL based on an assumption (without analysis) that sonar poses no risk to marine mammals (despite the adverse effect to what they eat) if they are not exposed to SPL above some critical value. This is also in contradiction to what the Navy stated that other metrics are better for estimating harm and that their proposed method contains inherent biases and uncertainties. Therefore, OHA requests that more analysis be presented as to why the Navy is changing from one metric to another and further, to present clearly why the one they choose to use is the best method.

8 OHA also seeks clarification regarding the statements made in the DEIS/OEIS that it will "continue to use acoustic thresholds to estimate the probability of temporary or permanent threshold shifts and for behavioral responses to explosives."[7] Then, on the

[5] Section 4.1.2.4.9.3a, page 4-63.
[6] Section 4.1.2.4.9.4a, page 4-63b.
[7] Section 4.1.2.4.9, page 4-55.

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very next page (4-56), the Navy states that it will "continue to use acoustic thresholds to estimate the number of marine mammals that might be 'taken' through sensory impairment" for mammals exposed to mid-frequency sonar and that the Navy will use "acoustic dose functions to estimate the number of marine mammals that might be 'taken' by behavioral harassment" due to exposure to mid-frequency sonar.

OHA is unsure of what method the Navy is proposing to use in specific instances. Our confusion was only deepened when we read on page es-2 in the Supplement that, "Following publication of the DEIS/OEIS, the Navy continued working with the National Marine Fisheries Service to define a mathematically representative curve and applicable model input parameters that would be more appropriate than that used in the DEIS/OEIS." The DEIS/OEIS was published in July of 2007. Therefore, OHA asks if this new model is complete or is still being developed.[8] OHA also asks why the Navy did not just wait eight months to publish the DEIS/OEIS to incorporate what the Navy believes is a more appropriate model into the original draft. Additionally, it is OHA's understanding that while the Navy and NMFS are working together, NMFS has not approved or accepted the Navy's "original approach" towards acoustic modeling. OHA seeks clarification on this point from the Navy.

OHA is also concerned with the Sonar Positional Reporting System (SPORTS). OHA understands that SPORTS is a database tool that determines the geographic locations of sonar use. Further, we note that all commands employing mid frequency active (MFA) sonar and sonobuoys have been required to populate the SPORTS database by reporting MFA sonar use on a daily basis. OHA inquires as to when SPORTS became functional in estimating sonar usage geographically and to determine potential effects to marine mammals. 9

OHA points out that the Navy in their DEIS/OEIS states that, "Existing studies of behavioral effects of man-made sounds in marine environments remain inconclusive."[9] Therefore the Navy has to rely on "observations of various animals, including humans" to base the relationship represented by acoustic dose-function and behavioral response.[10] We appreciate that the Navy is trying to gather more data by using their original approach SEL model and that the Navy is making better use of its resources (SPORTS) to estimate effects to marine mammals. However, we do ask why SPORTS was not utilized earlier for this purpose and also inquire as to the accuracy, therefore, of previous data and 10

[8] The DEIS/OEIS on page 4-58 states, "Over time, as the amount of data available to generate acoustic dose-functions increases,the Navy and NMFS expect to develop a suite of dose-functions [...]". OHA asks how much data was gathered in the eight months since the July DEIS/OEIS was published and notes that this indicates that this model is still in progress.
[9] Section 4.1.2.4.9, page 4-53.
[10] Section 4.1.2.4.9, page 4-56.

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statements the Navy made regarding potential adverse effects of sonar to marine resources.

The purpose of the DEA is to weigh the environmental effects of various alternatives to the proposed project. OHA stresses that this cannot be done when the applicant creates original approaches for analysis in some cases, yet relies on the older approach in other cases, and then indicates that their preferred method is not only flawed, but still being developed. It seems clear that even the applicant acknowledges that in this case, in regard to the effects of mid frequency sonar on marine mammals, that both a lack of information exists and that there will be an adverse effect. For example, the Navy's new preferred alternative states on page es-4 of the Supplement that, "This alternative would allow the Navy to meet its future non-antisubmarine training and RDT&E mission objectives and <u>avoid increases in potential effects to marine mammals above historic levels of antisubmarine warfare (ASW) training in the HRC</u>. (emphasis added) 11

This is a clear admission that training in the HRC (Hawaii Range Complex) does have effects to marine mammals that must be adverse or negative if they are to be avoided. This statement directly counters other Navy statements made in the past. For example, the statement made in section 2.2 of the October 2007 Environmental Assessment (EA) for Undersea Warfare Exercise within the HRC which reads, "The use of mid-frequency active tactical sonar in ASW (anti-submarine warfare) training has been occurring in the Hawaiian Islands for over 60 years with no direct evidence of harm to marine mammals." That EA also states that, "based on the analysis presented herein, the U.S. Navy concludes that the proposed USWEX activities would result in no effect to blue whales, North Pacific right whales, Hawaiian monk seals, or endangered sea turtles."[11] 12

This contradiction once again raises concerns for OHA regarding the accuracy of the data that the Navy is using, the method that they choose to use to analyze adverse effects to marine resources and the validity of their past assurances that their actions caused no harm to marine mammals despite evidence to the contrary.[12] Therefore, OHA recommends adopting a precautionary approach towards this proposed action.[13] ,

[11] EA, 7.0 Conclusions and Recommendations, page 7-1.
[12] For example, the events in 1996 when an unusual stranding event took place involving 12 Cuvier's beaked whales in the Mediterranean Sea near Greece coinciding with sonar "sound detecting system trials," the nine Cuvier's beaked whales found dead on 24–25 September 2002 on the Canary Islands of Fuerteventura and Lanzarote in conjunction with the Neo Tapopn exercises, and the March 2000 occurrence, when whales of four different species, including Cuvier's beaked whales, two minke whales, and a dolphin stranded in the Bahamas as a result of tactical mid-frequency sonar transmitted from U.S. Navy vessels. Most notably, the subsequent Joint Interim Report for the Bahamas Marine Mammal Stranding Event of 15-16 March 2000, prepared by the Navy and NMFS, concluded that the Navy's mid-frequency sonar was the "most plausible source of this acoustic or impulse trauma."
[13] This principle has become a binding norm of customary international law. (1) Principle adopted by the UN Conference on the Environment and Development (1992) that in order to protect the environment, a

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Public Affairs Officer, Pacific Missile Range Facility
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Hawaiian waters are home to 27 species of marine mammals including five endangered whale species.[14] Further, OHA recognizes that the Hawaiian Monk seal is in crisis because the population is now declining at a rate of about 4 percent yearly.[15] Biologists estimate the current population at about 1,200 individuals.[16] Biologists' models predict the species' population will fall below 1,000 animals within the next three to four years, which places the Hawaiian Monk seal among the world's most endangered species.[17] All of this prompted the National Oceanic and Atmospheric Agency to sign a new Hawaiian Monk seal recovery plan in August 2007 which stated, "the Hawaiian monk seal is headed to extinction if urgent action is not taken."[18]

This is particularly important because most of the current Hawaiian Monk seal population is found in the HRC in the Northwestern Hawaiian Islands and the Papahānaumokuakea Marine National Monument. The DEIS/OEIS states on page 6-18, section 6.4.5 that, "No specific threats to monk seals from activities associated with the HRC were identified in the Plan." This statement contradicts all the prior evidence and the Navy's now preferred alternative as the Navy is now seeking to avoid increases in potential effects to marine mammals above historic levels of antisubmarine warfare (ASW) training in the HRC.

Our concerns are amplified when we read in the example illustrated in figure 4.1.2.4.9-2 of the DEIS/OEIS using the "particular acoustic dose-functions the Navy and NMFS (National Marine Fisheries Service) developed for this EIS", it states that "about 50 % of the marine mammals exposed to mid-frequency active sonar at a received level of 180dB would be expected to exhibit behavioral responses that NMFS would classify as harassment for the purposes of the MMPA." This apparently means that while there are 668 dose-function exposures to monk seals, this could actually only reflect those animals that "exhibit behavioral responses" to the exposure. Many more will be exposed, however, to a sound that could qualify as harassment under the MMPA and also a take under the ESA. Figure 4.1.2.4.9-2 uses a 50% ratio, which would mean that the entire population of monk seals in the entire State would be exposed. This needs to be

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precautionary approach should be widely applied, meaning that where there are threats of serious or irreversible damage to the environment, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation. (2) The precautionary principle permits a lower level of proof of harm to be used in policy-making whenever the consequences of waiting for higher levels of proof may be very costly and/or irreversible. See, for example, Ocean Policy Statement by the President, March 10, 1983, accompanying Proclamation No. 5030, 48 Fed. Reg. 10,605 (1983), the 1995 Migratory and Straddling Stocks Agreement and the 2000 Honolulu Convention, and it has also been recognized in regional and national decisions.

[14] They are the sperm, sei, fin, northern right, and blue whales.
[15] Honolulu Advertiser, August 21, 2007.
[16] Ibid.
[17] Ibid.
[18] Recovery Plan, page V.

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Public Affairs Officer, Pacific Missile Range Facility
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clarified. A precautionary approach should be adopted and a specific percentage or figure needs to be drawn for effected species and ESA take permits.

OHA appreciates being brought in to this consultation and looks forward to further commenting on this project as it develops. Thank you for the opportunity to comment. If you have any further questions or concerns please contact Grant Arnold at (808) 594-0263 or granta@oha.org.

Sincerely,

Clyde W. Nāmu'o

Clyde W. Nāmu'o
Administrator

C: Irene Ka'ahanui, Community Resources Coordinator
Office of Hawaiian Affairs, Moloka'i Office
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Kaunakakai, HI 96748

C: Community Resources Coordinator
Office of Hawaiian Affairs, Kaua'i Office
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C: Thelma Shimaoka, Community Resource Coordinator
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C: Lukela Ruddle, Community Resources Coordinator
Office of Hawaiian Affairs, Hilo Office
162 A Baker Avenue
Hilo, Hawai'i 96720-4869

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-W-0026 (cont.)

C: Ruby McDonald, Community Resources Coordinator
Office of Hawaiian Affairs, Kona Office
75-5706 Hanama Place Suite 107
Kailua-Kona, Hawai'i 96740

C: Pearl Ah Ho
Community Resources Coordinator
Office of Hawaiian Affairs, Lana'i Office
P.O. Box 631413 Lana'i City, 96763

C: James L. Connaughton, Chairman
Council on Environmental Quality
722 Jackson Place, NW
Washington, DC 20503

C: Chris Yates, Branch Chief.
National Marine Fisheries Service, Pacific Islands Region
1601 Kapi'olani Blvd., Suite 1110
Honolulu, Hawai'i 96814

C: Aulani Wilhelm, Superintendent
Papahānaumokuākea Marine National Monument, NOAA/NOS
6600 Kalaniana'ole Hwy, Suite 300,
Honolulu, Hawai'i 96825

C: Laura Thielen, Interim Director
State of Hawai'i Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawai'i 96809

C: Susan White, Superintendent, Papahānaumokuākea Marine National Monument
U.S. Fish and Wildlife Service
300 Ala Moana Blvd. ,Box 50167
Honolulu, Hawai'i 96850–5000

COMMENT NUMBER
S-W-0026 (cont.)

C: Mike Tosatto, Deputy Administrator
National Marine Fisheries Service, Pacific Islands Regional Office
1601 Kapi'olani Blvd., Ste 1110,
Honolulu, Hawai'i 96814

C: Patrick Leonard, Field Supervisor
U.S. Fish and Wildlife Service, Ecological Services
300 Ala Moana Blvd, Rm 5-231
Honolulu, Hawai'i 96850

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EPO-08-032

April 3,2008

Mr. J. P. Rios, Captain
Department of the Navy
Commander
United States Pacific Fleet
250 Makalapa Drive
Pearl Harbor, Hawaii 96860-3131

Dear Mr. Rios:

SUBJECT: Draft Environmental Impact Statement (DEIS) I Overseas Environmental Impact Statement (OEIS) for the Hawaii Range Complex

Thank you for allowing us to review and comment on the subject application. The document was routed to the various branches of the Department of Health (DOH) Environmental Health Administration. We have the following Clean Water Branch, Waste Water Branch and General comments.

Clean Water Branch

The Department of Health, Clean Water Branch (CWB), has reviewed the subject document and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at
http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria: 1

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

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Mr. Rios
April 3,2008
Page 2

2. Please call the Army Corps of Engineers at (808) 438-9258 to see if this project requires a Department of the Army (DA) permit. Permits may be required for work performed in, over, and under navigable waters of the United States. Projects requiring a DA permit also require a Section 401 Water Quality Certification (WQC) from our office. 2

3. You are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for NPDES general permit coverage by submitting a Notice of Intent (NOI) form: 3

   a. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi).

   b. Storm water associated with construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land a e a includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a lager common plan of development or sale. An NPDES permit is required before the start of the construction activities.

   c. Hydrotesting water.

   d. Construction dewatering effluent.

   You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before to the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at
   http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

4. For types of wastewater not listed in Item 3 above or wastewater discharging into Class 1 or Class AA waters, you may need an NPDES individual permit. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at 4
   http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

5. You must also submit a copy of the NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the CWB that SHPD has or is in the process of evaluating 5

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-W-0027 (cont.)

Mr. Rios
April 3,2008
Page 3

your project. Please submit a copy of your request for review by SHPD or SHPD's determination letter for the project along with your NOI or NPDES permit application, as applicable.

6

6. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at 586-4309.

Waste Water Branch

7

The document states that the proposed action is to support and conduct current and emerging training and RDT&E operations in the HRC and upgrade or modernize range complex capabilities to enhance and sustain Navy training and testing.

As wastewater generation and treatment and disposal are not a primary concern, we have no objections to the proposed action for the Hawaii Range Facility.

Should there be domestic wastewater generated, we advise the developer that it be treated and disposed of according to our rules.

All wastewater plans must meet Department's Rules, HAR Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. If you have any questions, please contact the Planning & Design Section of the Wastewater Branch at 586-4294.

General

8

We strongly recommend that you review all of the Standard Comments on our website: www.state.hi.us/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this project should be adhered to.

COMMENT NUMBER

S-W-0027 (cont.)

Mr. Rios
April 3,2008
Page 4

If there are any questions about these comments please contact Jiacai Liu with the Environmental Planning Office at 586-4346.

Sincerely,

KELVIN H. SUNADA, MANAGER
Environmental Planning Office

c: EPO
CWB
WWB

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER S-W-0028

Whales Dolphins 3-31-[illegible]
marine mammals

1 Please value the [illegible] and right to exist of our whales dolphins and marine mammals. Humans have made life harder, if not impossible for wildlife to survive. I wish we could find a way for your war games to not cause harm to our precious wildlife in the ocean. I know you want to be able to detect submarines, for protecting our coastlines but the loud sonar noise is too much agonizing painful injury to our sea mammals. Whales and dolphins are intelligent beings who have communication skills. Please [illegible] [illegible] [illegible] [illegible] endangered [illegible] life.

[illegible]

PS I have made comment before and was told [illegible] letter from your [illegible] that he "Dosen't [illegible] what I think" [illegible] I try again.

[illegible]

COMMENT NUMBER S-W-0029

Nina Monasevitch

Lihue, HI

PMRF Public Affairs Officer
P.O. Box 128
Kekaha, HI 96752

April 4, 2008

Re: HRC Supplement to Draft EIS/OEIS

To J.P. Rios and PMRF Public Affairs Officer.

I have read the HRC supplement to Draft EIS/OEIS and am very concerned at the inadequacy and incompleteness of the analysis and methodology. This supplement focuses on direct hearing damage and behavioral changes in marine mammals caused by sonar. It makes critical omissions involving stranding and death of deep diving whales caused by sonar. These include: 1
1) Sonar caused panic reactions leading to strandings followed by death
2) Sonar caused decompression sickness (the bends) followed by death
3) The bends caused by sonar even in the absence of panic

On pages 3.1 and 3.2 of HRC draft document the Navy admits that "Sonar exposure has been identified as a contributing cause or factor in five specific mass stranding events: Greece in 1996; the Bahamas in March 2000; Maderis, Portugal in 2000; the Canary Islands in 2002, and Spain in 2006". 2
All of these mass strandings were likely caused by the above three factors; panic, bubble formation and/or decompression sickness. Why are these items not included in your mathematical analysis? I find this blatantly inadequate, especially since you are failing to take into account published research on bubble growth in marine mammals, which indicates the potential for injury and death at levels far lower than the Navy proposes. The DSEIS also grossly mischaracterizes the support that the bubble growth theory has received in the scientific literature.

In addition, the DEIS omits the best available scientific evidence on exposure levels in sonar – related to mass strandings, particularly that the whales beached in the Bahamas stranding were exposed to no more than 160-65 dB of mid frequency sonar for 30 seconds.

The following scientific literature needs to be included in the EIS analysis, and it needs to be research and published by non-Navy scientists and contractors:

D.S. Houser, R. Howard and S. Ridgway, 'Can Diving-Induced Tissue Nitrogen Supersaturation Increase the Chance of Acoustically Driven Bubble Growth in Marine Mammals?' 213 Journal of Theoretical Biology 183, 190 (2001).

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-W-0029 (cont.)

L.A. Crum, M.R. Bailey, J. Guan, P.R. Hilmo, S.G. Kargl, T.J. Matula, and O.A. Sapozhnikov, 'Monitoring Bubble Growth in Supersaturated Blood and Tissue ex vivo and the Relevance to Marine Mammal Bioeffects.' 6(3) Acoustics Research Letters Online 214 (2005).

J. R. Potter, 'A Possible Mechanism for Acoustic Triggering of Decompression Sickness Symptoms in Deep-Diving Marine Mammals' Paper presented at the IEEE International Symposium on Underwater Technology 2004, Taipei Taiwan, April 2004.

With Hawaii being the mating and nursing grounds to majority of the population of the endangered North Pacific Humpback whale and the only home to critically endangered endemic Hawaiian Monk seal, I find it unconscionable that any type of sonar is allowed in Hawaiian waters. The Hawaiian Monk seal population is declining at 4% a year with current numbers at below 1,200. Monk seals are also deep divers, documented at depths of over 1700 feet. The commerce from Humpback whale watching industry is in the millions annually. In addition, there are 21 other species of cetaceans found in Hawaiian waters that will be adversely affected by sonar. A healthy marine ecosystem, including marine mammals, is critical to Hawaii, not just for tourist dollars, but also for the future survival of our entire planet.

Also, high intensity sonar's impact not only marine mammals but also have been shown to affect fish, giant squid and snow crabs. In a study by the British Defense Research Agency, exposure to sonar signals caused auditory damage, internal injuries, eye hemorrhaging and mortality in commercially caught fish. This presents the possibility that increasing production of intense underwater noise can significantly and adversely impact food supply, employment and the economies of maritime countries.

So, again I state your "science" in the DEIS is severely flawed and inadequate! I request this DEIS be re-done by non-Navy professionals.

I ask you to ask yourself the following, if the earth losses it's ability to sustain life due to destruction of the ecosystem (caused by sonar killing marine species and destroying marine ecosystem, which is the major factor in global health and climate stability) what purpose is your defense system? It's time to look at the big picture. And as we all know, what we take with us when we die is our soul, and the seeds of our actions. Please listen deeply to the truth of your soul.
Mahalo for your attention to this extremely important matter.

Aloha and Peace,

Nina Monasevitch

cc: L. Lingle, D. Akaka, D. Inouye, M. Hirano, N. Abercrombie, B. Baptise, G. Hooser, M. Morita, S. Sagum, B. Asing, M. Rapozo, T. Bynum, J. Fufaro, S. Iseri-Carvalho, R. Kouchi, J. Yukimura

2

COMMENT NUMBER
S-W-0030

APR-07-2008 MON 04:48 PM UH-ENVIRONMENTAL CNTR. 99563980 P. 02

Water Resources Research Center
Environmental Center

UNIVERSITY of HAWAI'I MĀNOA

April 7, 2008
RE:0776

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawaii 96752-0128

Dear Sir/Madam:

NEPA Draft Supplemental Environmental Impact Statement
Hawaii Range Complex

This Supplement to the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS/OEIS) for the Hawaii Range Complex (HRC) examines a newly proposed option to the alternatives proposed in the original DEIS/OEIS for the HRC prepared in July 2007. This newly proposed alternative includes all training and research, development, test and evaluation (RDT&E) activities described in Alternative 2 with reduced mid-frequency and high frequency active (MFA/HFA) sonar hours. These MFA/HFA sonar hours are at the same level as proposed in the No Action Alternative. Alternative 3 is now the Navy's preferred alternative.

This review was conducted with the assistance of Ryan Riddle, UH Environmental Center.

General Comments

We found the Supplemental DEIS/OEIS to be overly technical and very difficult to follow. Part 1502.8 of the CEQ Regulations requires that "[E]nvironmental impact statements shall be written in plain language and may use appropriate graphics so that decisionmakers and the public can readily understand them." The analysis in this supplement is on par with technical reports which usually accompany draft and final EISs and are aimed at subject specialists. We found it difficult to follow the data presented in this Supplement DEIS/OEIS and suspect most reviewers without training in acoustistical engineering will also find it difficult to evaluate. We suggest that Section Three be rewritten and resubmitted for review. 1

The Supplemental DEIS/OEIS fails to provide a map of where the training that will utilize the MFA/HFA sonar will take place. We understand that the actual training areas were shown in the DEIS/OEIS but it should be shown again in the Supplement. Part of the training 2

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Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

April 7, 2008
Page 2

was planned to take place in the Papahānaumokuākea Marine National Monument. We believe that the training should not take place in the waters within the boundary of the National Monument. This would be comparable to conducting infantry maneuvers near the Rainbow Bridge National Monument in Arizona or practicing marine landings on Liberty and Ellis Islands National Monument in New York Harbor.

Methodology for Applying Risk Function (pp. 3-3 – 3-6)

Does the "dose increase" referred to in the second paragraph of page 3-4, line 23 refer to the length of the dose or to its intensity? In other words, does dose increase in this context mean that the sonar is used for a longer period of time or is the sonar signal louder? 3

Summary of Compliance with ESA and MMPA Alternative 3 (p. 3-47)

In the section on ESA, there should be a comma between "fin whale and Hawaiian monk seal instead of a period in line 21. 4

In the section on MMPA, the Navy is requesting authorization from the National Marine Fisheries Service for 40,457 MMPA Level B harassment takes. This number seems very large. Can the Navy put the number into some kind of perspective? What do other training areas request? 5

Thank you for the opportunity to review this Draft EIS.

Sincerely,

Peter Rappa
Environmental Review Coordinator

cc: OEQC
James Moncur
Ryan Riddle

COMMENT NUMBER	COMMENT NUMBER
S-W-0030 (cont.)	

Exhibit 14.4.1-1. Copy of Written Documents - Supplement to the Draft EIS/OEIS (Continued)

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS

Commentor	Comment #	Resource	EIS Section	Response Text
Chris Bane	S-W-0001-1	Alternatives	4.1.2.4, 6.0	The full analysis of effects in the EIS/OEIS indicates that there should be no mortality from Navy training activities. Range clearance procedures and mitigations are intended reduce the possibility of serious injury and mortality. The LOA issued by NMFS will place limits on the number and types of allowable takes (e.g. harassments) for all activities conducted within the HRC (see Sections 4.1.2.4 and 6.0).
	S-W-0001-2	Biological Resources - Marine		Thank you for your comment.
	S-W-0001-3	Alternatives	4.1.2.4, 4.1.2.4.7	See response to Comment S-T-0005-1.
	S-W-0001-4	Alternatives	4.1.2.4, 4.1.2.4.7	See response to Comment S-T-0005-1.
	S-W-0001-5	Biological Resources - Marine		Thank you for your comment.
	S-W-0001-6	Mitigation Measures	1.0, 2.0, 6.0	The Supplement to the DEIS was not written to address these alternatives, does not propose to change the Fleet Response Training Plan (FRTP), and was not prepared to assess mitigation. To the extent that a response is required, the Navy considered the DEIS public comments in the preparation of the Supplement to the DEIS, where applicable. As discussed in Chapters 1.0 and 2.0 of the EIS/OEIS, Navy considers but rejects a reduction in training; does not consider alternate locations because this analysis would not be consistent with the purpose and need of this EIS/OEIS. Although Navy does do some simulated training, it does not fully develop the skills and capabilities necessary to attain appropriate military readiness. Navy's current mitigation measures and their use of the best available science balanced with the requirements of the Navy to train, results in Navy meeting its mission while being protective of the environment. Discussion of Mitigation measures has been revised in Chapter 6.0.
Jan Bappe	S-W-0002-1	Alternatives		Thank you for your comment.
Laurel Brier	S-W-0003-1	Biological Resources - Marine	4.1.2.4, 6.1.2	See response to comment S-T-0001-1. In addition, there is not a scientific basis for defining the parameters of "seasonal avoidance" (e.g., training only in the summer). As discussed in Section 6.1.2, seasonal avoidance, as a mitigation measure, is based on speculative findings from other areas of the world that do not have direct application to the unique environment present in Hawaii. Lacking any scientific basis for seasonal avoidance in Hawaii and lacking any evidence in Hawaii that there has ever been an impact resulting from the lack of these measures, there is no evidence that this mitigation measure would increase the protection of marine mammals. Because year-round deployment is critical for Navy operations, implementation of seasonal avoidance would, however, unacceptably impact the effectiveness of the training.
Claire D'Gaia	S-W-0004-1	Alternatives		Thank you for your comment.

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Raydiance Gonare	S-W-0005-1	Biological Resources - Marine		Thank you for your comment.
Linda Harmon	S-W-0006-1	Biological Resources - Marine		Thank you for your comment.
Peggy LeDoux	S-W-0007-1	Mitigation Measures	6.2.1	As discussed in Section 6.2.1, avoidance of the seasonal presence of migrating marine mammals fails to take into account the fact that the Navy's current mitigation measures apply to all detected marine mammals no matter the season. Advance planning to avoid the seasonal presence of migrating marine mammals is not possible given the start of any "season" is variable (dependent on largely unknown environmental factors). To the degree possible, however, Navy already has taken a proactive step in this regard by specifically informing all naval vessels to increase vigilance when the first humpback whales have been sighted around the Hawaiian Islands. Otherwise, limiting training operations to the remaining six months of the year would not only concentrate all annual training and testing activities into a shorter six-month time period, but would also not meet the readiness requirements of the Navy to deploy trained forces.
Kaitlyn McKee	S-W-0008-1	Biological Resources - Marine	3.2, 4.2	See response to Comment S-T-0006-1
Betty Rubble	S-W-0009-1	Alternatives		Thank you for your comment.
	S-W-0009-2	Biological Resources - Marine		Thank you for your comment.
Mike Moran	S-W-0010-1	Mitigation Measures	1.3.2, 4.1.2, 6.0	It is critical for the Navy to be able to conduct training in a variety of environmental and bathymetric conditions, which may overlap with marine mammal areas. Mitigation measures proposed in Chapter 6.0 should ensure that marine mammals would not be injured by Navy training activities. As discussed in 4.1.2, the analytical methodology used in this EIS/OEIS was developed in close coordination with NMFS. This represents the best available and most applicable science with regard to analysis of effects to marine mammals from MFA/HFA sound sources. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals, the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas during some parts of the year in Hawaiian waters. Section 1.3.2 describes why the Navy must train and why Hawaii is the most appropriate place to undertake the proposed actions.
	S-W-0010-2	Alternatives	4.2.1, 6.0	See response to Comment S-T-0005-2

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Mike Moran	S-W-0010-3	Alternatives	Appendix F	The Navy does prepare and release After Action Reports. An After Action Report prepared for the 2006 RIMPAC exercises, providing an analysis detailing the reasons for adoption, modification, or rejection of mitigation measures, is provided in Appendix F of the EIS/OEIS.
	S-W-0010-4	Biological Resources - Marine	4.1.2.4.10.3	Section 4.1.2.4.10.3 of the EIS/OEIS provides a comprehensive discussion of the stranding of melon-headed whales in Hanalei Bay in 2004. The text describes the relationship of the stranding to both Navy ASW activities occurring approximately 25 nm away from the incident and the activities of people and boats that were in the water with the whales at the time of the stranding.
	S-W-0010-5	Mitigation Measures	6.0	As discussed in Section 6.0, avoiding active sonar use within 12 nm from shore or 15.5 mi from the 200-m isobaths was made part of the RIMPAC 2006 authorization by NMFS and was based on the assumption that avoidance of the North American continental shelf was a prudent mitigation measure given the presence of beaked whales in the Gulf of Mexico. NMFS modified the measure for Hawaii because they had received a public comment during rulemaking for a proposed action taking place elsewhere. This measure lacks any scientific basis when applied to conditions in Hawaii. There is no scientific basis for requiring this mitigation measure in the Pacific and no known basis for the specific metrics. During RIMPAC 2006, this mitigation measure precluded active ASW training in the littoral region, which significantly impacted realism and training effectiveness. This procedure had no observable effect on the protection of marine mammals during RIMPAC 2006 and its value is unclear (there is a lengthy history of sonar use in the Hawaiian Islands without any strandings or apparent effect on marine mammals). However, its effect on realistic training is significant
Cory Harden Sierra Club	S-W-0011-1	Alternatives	6	Analysis of ongoing litigation is not part of the Proposed Action and alternatives nor is it necessary for compliance with the applicable laws and regulations. Some mitigations discussed in Chapter 6.0 overlap with mitigations raised during litigation.
	S-W-0011-2	Program	4.1.2.4.12.1, 4.1.2.4.12.2	As noted in Sections 4.1.2.4.12.1, 4.1.2.4.12.2, classified information is used for some of the analysis in the EIS/OEIS. Accurate conclusions could not be made if this information was not considered.
	S-W-0011-3	Alternatives		Sonar is currently the best available technology for ASW. Predictions about the future of sonar technology would be speculative and beyond the scope of the Supplement to the Draft EIS/OEIS and the EIS/OEIS.
	S-W-0011-4	Biological Resources - Marine		Predictions about the future of new ocean life forms and how they will be affected by sonar is beyond the scope of the Supplement to the Draft EIS/OEIS and the EIS/OEIS.

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Cory Harden Sierra Club	S-W-0011-5	Cumulative Impacts	5	The primary purpose of the Supplement to the Draft EIS/OEIS was to provide additional information regarding the analytical methodology used to evaluate the effects of MFA sonar on marine mammals. Cumulative effects of activities within the HRC are described within Section 5.0 of the Final HRC EIS/OEIS.
	S-W-0011-6	Alternatives	4.1.2.4.9.4	The risk function presented in EIS/OEIS Section 4.1.2.4.9.4 is based on three data sets that NMFS and Navy have determined are the best available and applicable science at this time. Until additional data are available, NMFS and the Navy have determined that these datasets are the most applicable for the direct use in the development of risk function parameters to describe what portion of a population exposed to specific levels of MFA sonar will respond in a manner that NMFS would classify as harassment.
	S-W-0011-7	Alternatives	4.1.2, Appendix J	Exactly right. Previously, the Navy treated two ships operating together as creating twice the volume as that from a single ship. Upon closer analysis, and due to the maximum SPL metric and the overlapping sound fields created by the ships, Navy found that the impact by two ships operating cooperatively for an hour was less than one ship operating independently for two hours and more than one ship operating independently for one hour. In Hawaii, 2 ships operating cooperatively create 194% of the volume of one ship, so it's almost double, but not quite. The results have been adjusted accordingly.
	S-W-0011-8	Alternatives	4.1.2.4.6	Navy used the northern elephant seal threshold because taxonomically, the elephant seal is more closely related to the Hawaiian monk seal than any other seal. A northern elephant seal and the Hawaiian monk seal are in the same sub-family. In addition, the audiogram of the northern elephant seal more closely approximates that of the Hawaiian monk seal.
	S-W-0011-9	Alternatives		Thank you for your comment.

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Barbara Sinclair	S-W-0012-1	Alternatives	1.0	As discussed in Chapter 1.0 of the EIS/OEIS, Navy does not consider alternate locations because this analysis would not be consistent with the purpose and need of this EIS/OEIS. Although Navy does do some simulated training, it does not fully develop the skills and capabilities necessary to attain appropriate military readiness. Navy training in the HRC has been going on for the past 60 years. There has been no significant change in the sonar equipment in the last 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Though the Navy works to minimize impacts on marine mammals to the greatest extent practicable, they are not mandated by any statute to alleviate all risk to marine mammals. Over the past 30 years, the numbers of humpback whales around Hawaii appear to be increasing and the Navy believes that sonar has not significantly affected marine mammals in general. Navy's current mitigation measures and their use of the best available science balanced with the requirements of the Navy to train, results in Navy meeting its mission while being protective of the environment.
Katherine Stack	S-W-0013-1	Alternatives	4.1.2.4, 6.0	The full analysis of effects in the EIS/OEIS indicates that there should be no mortality from Navy training activities. Range clearance procedures and mitigations are intended reduce the possibility of serious injury and mortality. The LOA issued by NMFS will place limits on the number and types of allowable takes (e.g. harassments) for all activities conducted within the HRC (see Sections 4.1.2.4 and 6.0).
Gabriela Taylor	S-W-0014-1	Alternatives		Thank you for your comment.
Lee Tepley	S-W-0015-1	Alternatives	4.1.2.4, 4.1.2.4.7	See response to Comment S-T-0005-1.
	S-W-0015-2	Alternatives	4.1.2.4, 4.1.2.4.7	See response to Comment S-T-0005-1.
	S-W-0015-3	Alternatives	4.1.2.4, 4.1.2.4.7	See response to Comment S-T-0005-1.
	S-W-0015-4	Alternatives		Thank you for your comment.
Jason Turner Department of Marine Science	S-W-0016-1	Alternatives	4.1.2.4, 6.0	The full analysis of effects in the EIS/OEIS indicates that there should be no mortality from Navy training activities. Range clearance procedures and mitigations are intended reduce the possibility of serious injury and mortality. The LOA issued by NMFS will place limits on the number and types of allowable takes (e.g. harassments) for all activities conducted within the HRC (see Sections 4.1.2.4 and 6.0).
	S-W-0016-2	Biological Resources - Marine	4.1.2.4.7, 4.1.2.4.9.8, 4.1.2.4.10.1, 9.0	Robin Baird is cited in several sections of the EIS/OEIS, including, but not limited to Sections 4.1.2.4.7, 4.1.2.4.9.8, and 4.1.2.4.10.1. Numerous documents and reports prepared by Mr. Baird are cited in Section 9.0 (references).

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Jason Turner Department of Marine Science	S-W-0016-3	Mitigation Measures	6.0	As described in Section 6.0, the Navy is developing an Integrated Comprehensive Monitoring Plan (ICMP) to determine behavioral and population level changes to marine mammals within Navy ranges. This Plan will also continue or initiate studies of abundance, distribution, habitat utilization, etc. for sensitive species of concern using visual surveys, passive and acoustic monitoring, radar and data logging tags (satellite or radio linked to record data on acoustics, diving and foraging behavior, and movements). The Plan will include the evaluation of Navy lookouts that observe for all objects in or on the water including debris, periscopes, other vessels, and marine animals. As of this EIS/OEIS, the Navy and NMFS are developing an HRC-specific monitoring plan which may include third party monitoring efforts by qualified entities as a component of the ICMP for unit level exercises. Observations of marine mammals and sea turtles during unit-level training exercises will also be recorded to add to a larger database.
	S-W-0016-4	Biological Resources - Marine	'1.7.1, 13,0, 14.0	See response to Comment S-T-0013-4.
Sonya Wolfe	S-W-0017-1	Alternatives	4.1.2.4	Section 4.1.2.4 of the EIS/OEIS discusses the potential effects on marine mammals from Navy mid-frequency active (MFA) sonar training in the HRC. This training has been going on for the past 60 years. There has been no significant change in the sonar equipment in the last 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Though the Navy works to minimize impacts on marine mammals to the greatest extent practicable, they are not mandated by any statute to alleviate all risk to marine mammals. Over the past 30 years, the numbers of humpback whales around Hawaii appear to be increasing and the Navy believes that sonar has not significantly affected marine mammals in general.
Rulin Xiw	S-W-0018-1	Cumulative Impacts		Thank you for your comment.
Joann Yukimura Kauai County Council	S-W-0019-1	Alternatives	4.1.2.4, 6.0	The full analysis of effects in the EIS/OEIS indicates that there should be no mortality from Navy training activities. Range clearance procedures and mitigations are intended reduce the possibility of serious injury and mortality. The LOA issued by NMFS will place limits on the number and types of allowable takes (e.g. harassments) for all activities conducted within the HRC (see Sections 4.1.2.4 and 6.0).
	S-W-0019-2	Mitigation Measures	4.1.2.4, 6.0	See response to comment S-T-0001-2.
	S-W-0019-3	Mitigation Measures	6.2.1	See response to comment S-T-0001-3.

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Joann Yukimura Kauai County Council	S-W-0019-4	Alternatives	4.1.2.4, 6.0	The full analysis of effects in the EIS/OEIS indicates that there should be no mortality from Navy training activities. Range clearance procedures and mitigations are intended reduce the possibility of serious injury and mortality. The LOA issued by NMFS will place limits on the number and types of allowable takes (e.g. harassments) for all activities conducted within the HRC (see Sections 4.1.2.4 and 6.0).
Peter Courture	S-W-0020-1	Mitigation Measures	6.2.1	See response to Comment S-T-0001-1. As discussed in Section 6.2.1, avoidance of the seasonal presence of migrating marine mammals fails to take into account the fact that the Navy's current mitigation measures apply to all detected marine mammals no matter the season. Advance planning to avoid the seasonal presence of migrating marine mammals is not possible given the start of any "season" is variable (dependent on largely unknown environmental factors). To the degree possible, however, Navy already has taken a proactive step in this regard by specifically informing all naval vessels to increase vigilance when the first humpback whales have been sighted around the Hawaiian Islands. Otherwise, limiting training operations to the remaining six months of the year would not only concentrate all annual training and testing activities into a shorter six-month time period, but would also not meet the readiness requirements of the Navy to deploy trained forces.
	S-W-0020-2	Mitigation Measures	6.0	EIS/OEIS Chapter 6.0, Mitigation Measures, presents the U.S. Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. It should be noted that these protective measures have been standard operating procedures for unit-level antisubmarine warfare training since 2004. In addition, The Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.
	S-W-0020-3	Alternatives	4.1.2	One of the express purposes of the analysis in the EIS/OEIS is to evaluate the potential impacts of Navy MFA/HFA sonar on marine mammals. As acknowledged by the National Resource Council, very little is known about the nature of the effects of sonar on marine mammals.
	S-W-0020-4	Program	4.1.2.4, 4.1.2.5.4	The Navy is in compliance with all applicable environmental laws and is consulting with the Hawaii Coastal Zone Management Program in accordance with the Coastal Zone Management Act. Also, see response to comment S-T-0001-1. (see EIS/OEIS Sections 4.1.2.4 and 4.1.2.5.4).
Diane Ley County of Hawaii	S-W-0021-1	Miscellaneous		Thank you for your comment.
V. Springs	S-W-0022-1	Policy/NEPA Process		Thank you for your comment.

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Marilyn & Ed Pollock	S-W-0023-1	Biological Resources - Marine	3.2, 4.2	Sections 3.2 and 4.2 of the EIS/OEIS analyzed the effects of proposed Navy training on that portion of the NWHI Marine National Monument that is affected by their activities and that analysis concludes that the Proposed Action will not result in injury or mortalities of marine mammals.
	S-W-0023-2	Mitigation Measures	6.0	Each nation has its own training needs based on that nation's forces, capabilities, missions, and environmental requirements. The Navy is a global environmental leader. As part of the Navy's commitment to sustainable use of resources and environmental stewardship, the Navy incorporates mitigation measures that are protective of the environment into all of its activities. The Navy's current mitigation measures reflect a balance between training requirements and Navy's important role in ensuring environmental protection. These measures have been the subject of extensive discussions between NMFS and the Navy, and evaluated for mission impacts, probable effectiveness, and the ability to implement. Mitigation measures are described in detail in Chapter 6.0.
Timothy Ragen Marine Mammal Commission	S-W-0024-1	Alternatives	2.2.1.1	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, the No-Action alternative is the continuation of current training practices. The "No-action" alternative continues with the present course of action until that action is changed. In requiring consideration of a No-action Alternative, the Navy compares the potential impacts of the proposed major Federal action to the known impacts of maintaining the status quo. This provides the public a range of potential effects based on a range of activity.
	S-W-0024-2	Alternatives	2.2.2.4, 4.1.2	The original analysis was based on data prepared as part of the program described in Section 1.3 of the final EIS, which predates the Sonar Positional Reporting System (SPORTS) database. In early 2008, the Navy concluded that SPORTS provided enough information after only eighteen months that it could be used as a partial basis for calculating sonar hours when combined with additional extrapolation for the sonar effects analysis. More information on SPORTS has been provided in sections 2.2.2.4 and 4.1.2 of the EIS/OEIS. The SPORTS database will continue being refined and populated with data and used as the basis for future analysis on sonar use on range complexes.
	S-W-0024-3	Alternatives	Appendix J	Appendix J has been revised to assist the reader to readily follow the process of risk estimation to its conclusion.
	S-W-0024-4	Alternatives	ES, 4.0	The calculations in the Executive Summary of the EIS/OEIS, show to the nearest tenth because the values are all below 1.0 and because Navy policy states that the ESA's "may affect" threshold is triggered with a value of 0.05. The table in Chapter 4.0, (SDEIS, 3.3.1-1) values are rounded to whole numbers. In this specific example, the fractional numbers in the ES table are all Humpback Whale exposures, the sum of which equals 0.5. This is rounded to 1 as shown in the Table in Chapter 4.0.

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Timothy Ragen Marine Mammal Commission	S-W-0024-5	Alternatives	4.1.2	The risk function plus the TTS equals the total level B harassment. Explained in Section 4.1.2.
	S-W-0024-6	Alternatives	Appendix J	Appendix J has been revised to assist the reader to readily follow the process of risk estimation to its conclusion.
	S-W-0024-7	Alternatives	4.1.2, Appendix J	There is a difference between ‘animals’ and ‘densities.’ Indeed, in the sperm whale example, the density of whales (animals/cubic km) in the first depth interval is a greater number than the number of animals in the water column, but that is because they are different units. A higher density doesn’t mean a large number of animals; it just means there are more of them in less space. The number of RL bins does not depend on the width of the depth intervals. Even with a very narrow depth interval, there could be sound received at all levels (even though the lower received levels may only be received in that interval a long distance from the source). Since the risk function weighs the risk of harassment all the way down to 120 dB, the RL bins must measure that low in every depth interval. As explained above, it is appropriate to multiply the animal densities by the expected ensonified volumes in each RL bin.
	S-W-0024-8	Miscellaneous		The two noted references are primary resources, which utilize raw data from other sources.
	S-W-0024-9	Biological Resources - Marine	4.1.2	Correct. It would be impossible to determine how many individuals within a given population would experience one or more exposures. The model does provide an estimate of the number of potential exposures to the species (based on densities of each species).
	S-W-0024-10	Alternatives	J.1.5.2.1	The value has been corrected to read >225 meters.

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Marsha Green North American Ocean Noise Coalition	S-W-0025-1	Alternatives	4.1.2.4.13.2	Based on the analysis presented in the EIS/OEIS (see Section 4.1.2.4.13.2), the Navy and NMFS do not believe there will be any serious or irreversible damage to the environment or biological resources from continuation of Navy activities, including sonar use. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals, NMFS and the Navy closely coordinated the development of the risk function to make use of the best available and applicable science. The cutoff for the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas and during some parts of the year in Hawaiian waters. Conversely, the Rio Declaration, Principle 15 does not apply because it addresses actions where there are threats of serious or irreversible damage indicating a “lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.” While the risk function is applied to exposed populations, the results address impacts on individual animals in that behavioral harassment occurs at the level of the individual. While data supporting quantitative analysis specific to key individuals are not available, the risk function allows us to account for variance in response between individuals within a population. The EIS/OEIS also accounts for non-auditory effects, long-term effects, and synergistic effects.
	S-W-0025-2	Alternatives	5.0	While the risk function is applied to exposed populations, the results address impacts on individual animals in that behavioral harassment occurs at the level of the individual. While data supporting quantitative analysis specific to key individuals are not available, the risk function allows us to account for variance in response between individuals within a population. The EIS/OEIS also accounts for non-auditory effects, long-term effects, and synergistic effects (refer to Chapter 5.0).
	S-W-0025-3	Alternatives	4.1.2	The Navy does predict that 50% of animals exposed to 165 dB will respond in a manner that NMFS classifies as Level B harassment; however, it is not correct to state that the other 50% are being behaviorally impacted at levels from 120 to 195 dB re: 1µPa rms. Please see Section 4.1.2, Figure 4.1.2.4.9.7-1. Navy and NMFS have used a science-based approach using the best available and most applicable science in assessing exposure effects. Regarding the commenter's concern for the application of the approach, see response to comment S-W-0025-1.
	S-W-0025-4	Alternatives		Thank you for your comment.

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Clyde Namu'o State of Hawaii	S-W-0026-1	Alternatives	4.1.2	The Navy and NMFS, in the role as regulator and as a cooperating agency, developed the risk function for analysis of impacts using the best available and applicable science. As described in Southall et al (2004) and as discussed in Section 4.1.2, there is paucity of data upon which to base threshold criteria; however, the Navy is following the recommendations of NMFS and using the criteria established by NMFS through a process of scientific review and recommendation.
	S-W-0026-2	Biological Resources - Marine	4.1.2.2.1	The effects of underwater detonations on fish is described in Section 4.1.2.2.1. The effects on fish from a given amount of explosive depends on location (including proximity to the detonation), season, and many other factors.
	S-W-0026-3	Alternatives		Thank you for your comment.
	S-W-0026-4	Alternatives		Thank you for your comment.
	S-W-0026-5	Alternatives		There should be no effects on the prey species of any protected species that could have impact on individuals of populations.
	S-W-0026-6	Alternatives	4.1.2	The Navy and NMFS, in the role as regulator and as a cooperating agency, developed the risk function for analysis of impacts using the best available and applicable science. As described in Southall et al (2004) and as discussed in Section 4.1.2, there is paucity of data upon which to base threshold criteria; however, the Navy is following the recommendations of NMFS and using the criteria established by NMFS through a process of scientific review and recommendation.
	S-W-0026-7	Alternatives	4.1.2	The Navy and NMFS, in the role as regulator and as a cooperating agency, developed the risk function for analysis of impacts using the best available and applicable science. As described in Southall et al (2004) and as discussed in Section 4.1.2, there is paucity of data upon which to base threshold criteria; however, the Navy is following the recommendations of NMFS and using the criteria established by NMFS through a process of scientific review and recommendation.
	S-W-0026-8	Alternatives	4.1.2	The discussion in 4.1.2 has been expanded to better describe the methodology. The development of this modeling is discussed in detail.

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Clyde Namu'o State of Hawaii	S-W-0026-9	Alternatives	2.2.2.4, 4.1.2	The original analysis was based on data prepared as part of the program described in Section 1.3 of the final EIS, which predates the Sonar Positional Reporting System (SPORTS) database. In early 2008, the Navy concluded that SPORTS provided enough information after only eighteen months that it could be used as a partial basis for calculating sonar hours when combined with additional extrapolation for the sonar effects analysis. More information on SPORTS has been provided in sections 2.2.2.4 and 4.1.2 of the EIS/OEIS. The SPORTS database will continue being refined and populated with data and used as the basis for future analysis on sonar use on range complexes.
	S-W-0026-10	Alternatives	2.2.2.4, 4.1.2	The original analysis was based on data prepared as part of the program described in Section 1.3 of the final EIS, which predates the Sonar Positional Reporting System (SPORTS) database. In early 2008, the Navy concluded that SPORTS provided enough information after only eighteen months that it could be used as a partial basis for calculating sonar hours when combined with additional extrapolation for the sonar effects analysis. More information on SPORTS has been provided in sections 2.2.2.4 and 4.1.2 of the EIS/OEIS. The SPORTS database will continue being refined and populated with data and used as the basis for future analysis on sonar use on range complexes.
	S-W-0026-11	Alternatives	4.1.2	See 4.1.2 for details of the sonar modeling.
	S-W-0026-12	Alternatives	4.1.2	In the past, The Navy has used different thresholds for effects on marine mammals. For example, 2006 RIMPAC EA used 173 dB as a threshold for behavioral effects under the MMPA. For the EIS/OEIS, NMFS has required a different risk function approach be used to determine harassment effects on marine mammals. This is reflected in the risk function curve found in Section 4.1.2. The Navy believes based on 60 years of sonar usage in Hawaii there have been no known harmful or long term effects on marine mammal populations or species.
	S-W-0026-13	Alternatives	4.1.2.6	The text has been revised regarding the Hawaiian Monk Seal in the EIS/OEIS for each of the alternatives.
Kevin Sunada State of Hawaii	S-W-0027-1		4.0	All proposed activities have been evaluated for potential impacts to State waters in the Chapter 4 Water Resource sections of the EIS/OEIS and found to not have impacts.
	S-W-0027-2			All Navy activities will follow existing Army regulations and standard operating procedures, as well as future plans and regulations.

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment # Resource	EIS Section	Response Text
Kevin Sunada State of Hawaii	S-W-0027-3	4.3.2.1.13	Depending on the action or construction being undertaken, a variety of Federal and State approvals, comments, and permits may be required. In addition, all construction activities would follow Spill Prevention, Control, and Countermeasures Plans and transportation safety measures; therefore, potential effects on surface and groundwater resulting from accidental spills of hazardous materials would be minimized. The EIS/OEIS also evaluated the potential impacts of launch emissions, spills of toxic materials, and early flight termination. The analysis concluded that hydrogen chloride emissions would not significantly affect the chemical composition of surface or groundwater; that there would be no significant increase in aluminum oxide in surface waters due to launches; that sampling of surface waters in the vicinity of the launch site showed that hydrogen chloride, potentially deposited during past launches, has not affected surface water quality on PMRF or adjacent areas; and that contamination from spills of toxic materials would be highly unlikely. A NPDES permit is not required for launch activity due to the lack of significant storm water runoff (see Section 4.3.2.1.13.2).
	S-W-0027-4	4.3.2.1.13	Depending on the action or construction being undertaken, a variety of Federal and State approvals, comments, and permits may be required. In addition, all construction activities would follow Spill Prevention, Control, and Countermeasures Plans and transportation safety measures; therefore, potential effects on surface and groundwater resulting from accidental spills of hazardous materials would be minimized. The EIS/OEIS also evaluated the potential impacts of launch emissions, spills of toxic materials, and early flight termination. The analysis concluded that hydrogen chloride emissions would not significantly affect the chemical composition of surface or groundwater; that there would be no significant increase in aluminum oxide in surface waters due to launches; that sampling of surface waters in the vicinity of the launch site showed that hydrogen chloride, potentially deposited during past launches, has not affected surface water quality on PMRF or adjacent areas; and that contamination from spills of toxic materials would be highly unlikely. A NPDES permit is not required for launch activity due to the lack of significant storm water runoff (see Section 4.3.2.1.13.2).

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment # Resource	EIS Section	Response Text
Kevin Sunada State of Hawaii	S-W-0027-5	4.3.2.1.13	Depending on the action or construction being undertaken, a variety of Federal and State approvals, comments, and permits may be required. In addition, all construction activities would follow Spill Prevention, Control, and Countermeasures Plans and transportation safety measures; therefore, potential effects on surface and groundwater resulting from accidental spills of hazardous materials would be minimized. The EIS/OEIS also evaluated the potential impacts of launch emissions, spills of toxic materials, and early flight termination. The analysis concluded that hydrogen chloride emissions would not significantly affect the chemical composition of surface or groundwater; that there would be no significant increase in aluminum oxide in surface waters due to launches; that sampling of surface waters in the vicinity of the launch site showed that hydrogen chloride, potentially deposited during past launches, has not affected surface water quality on PMRF or adjacent areas; and that contamination from spills of toxic materials would be highly unlikely. A NPDES permit is not required for launch activity due to the lack of significant storm water runoff (see Section 4.3.2.1.13.2).
	S-W-0027-6		Navy will comply with all State Water regulations for all its current and future operations at the HRC.
	S-W-0027-7		Thank you for your comment.
	S-W-0027-8		Thank you for your comment.
C. Harvel	S-W-0028-1		Thank you for your comment.
Nina Monasevitch	S-W-0029-1	4.1.2.4, 4.1.2.4.7	See response to Comment S-T-0005-1.
	S-W-0029-2	4.1.2, 6.0	See response to Comment S-T-0005-2.
Peter Rappa University of Hawaii-Manoa	S-W-0030-1		Thank you for your comment.
	S-W-0030-2	2	The EIS/OEIS states that sonar will take place in the HRC OPAREA.
	S-W-0030-3	4.1.2	The "dose" refers to the received level of sonar and not the length of the dose. We are not sure what the commenter means by intensity in this context. The higher the dose, the higher the received level.
	S-W-0030-4		The text has been revised.

Table 14.4.1-2. Responses to Written Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Peter Rappa University of Hawaii-Manoa	S-W-0030-5		5	As discussed in Chapter 5.0, comparing the number of takes between Navy OPAREAs is not relevant given that the marine mammal densities at each location are different and the amount of annual training is different.

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14.4.2 EMAIL PUBLIC COMMENTS

There were 198 emails from the public commenting on the Supplement to the Draft EIS/OEIS. A form letter made up 162 of the 198 emails.

Table 14.4.2-1 presents individuals who commented via email, with their respective commenter identification number. This number can be used to find the emailed document that was submitted and to locate the corresponding table in which responses to each comment are provided.

Exhibit 14.4.2-1 presents reproductions of the emails that were received in response to the Supplement to the Draft EIS/OEIS. Comment documents are identified by commenter ID number, and each statement or question that was categorized as addressing a separate environmental issue is designated with a sequential comment number.

Table 14.4.2-2 presents the responses to emailed comments to the Supplement to the Draft EIS/OEIS. Responses to specific comments can be found by locating the corresponding commenter ID number and sequential comment number identifiers.

Table 14.4.2-1. Commenters on the Supplement to the Draft EIS/OEIS (Email)

Commenter	Comment ID	Commenter	Comment ID
Jack Aaron	S-E-0114	Royelen Boykie	S-E-0160
Christine Ahia	S-E-0194	John and Joann Breeden	S-E-0115
Earlene Alexiou	S-E-0020	John Broussard	S-E-0199
Bobbie Alicen	S-E-0136	Andrea Brower	S-E-0077
Kathy-Lyn Allen	S-E-0032	Debbie Burack	S-E-0216
Nadine Apo	S-E-0025	Stu Burley	S-E-0001
Harvey Arkin	S-E-0127	Diana Burns	S-E-0112
Mikel Athon	S-E-0206	David Burns	S-E-0223
Chessa Au	S-E-0192	Carole Burstein	S-E-0068
Meghan Au	S-E-0036	Flemming Carstensen (Navy League)	S-E-0118
John Barnett	S-E-0080	Shannan Chan	S-E-0019
Richard Benton	S-E-0184	Glenn Chapman	S-E-0155
Carl Berg	S-E-0075	Shirley Chew	S-E-0119
Barbara Best	S-E-0079	Kelli Chin	S-E-0182
Laura and Andrew Binstock	S-E-0055	Randy Ching	S-E-0101
Patricia Blair	S-E-0029	Duane Choy	S-E-0168
Nova Blazej (USEPA)	S-E-0225	Janet Codispoti	S-E-0162
Trudy and Larry Blow	S-E-0097	Skye Coe	S-E-0140

Table 14.4.2-1. Commenters on the Supplement to the Draft EIS/OEIS (Email) (Continued)

Commenter	Comment ID	Commenter	Comment ID
Steve Colon (Navy League)	S-E-0078	Myron Gerhard	S-E-0099
Nola Conn	S-E-0048	Elaine Gima	S-E-0064
Tara Cornelisse	S-E-0169	Miguel Godinez	S-E-0014
Lowell Wes Cummins	S-E-0113	Jamesy Gonsalves	S-E-0011
Donna Lee Cussac	S-E-0006	Sharon Goodwin	S-E-0076
Fred & Claire Dauer	S-E-0117	Adrianna Grace	S-E-0067
Nancy Davlantes	S-E-0047	Rose Grady	S-E-0171
Danial Del Monte	S-E-0116	Jennifer Graybill	S-E-0091
Caren Diamond	S-E-0088	Mary Groode	S-E-0060
Lisa Diaz	S-E-0174	Ravi Grover	S-E-0033
Kathleen Dockett	S-E-0163	Jill Guillermo-Togawa	S-E-0198
Paul Doucette	S-E-0149	Patti Hackney	S-E-0130
John Dwork	S-E-0073	Libbie Hambleton	S-E-0166
Tanya Eldridge	S-E-0085	Kealakai Hammond	S-E-0147
Kim Elegado	S-E-0143	Cory Harden	S-E-0186
Ann Engerman	S-E-0065	Hilary Harts	S-E-0172
Marjorie Erway	S-E-0196	Cynthia Hathaway	S-E-0193
Raquel Esparza	S-E-0030	Mike Hendrickson	S-E-0131
Dinda Evans	S-E-0022	Sandra Herndon	S-E-0087
Summer Faria	S-E-0145	Fern Holland	S-E-0009
Lori Ferrell	S-E-0215	Ikaika Hussey	S-E-0201
Joel Fischer (University of Hawai'i)	S-E-0002	Robin James	S-E-0056
Stephanie Fitzgerald	S-E-0104	Scott Jarvis	S-E-0026
Katy Fogg	S-E-0034	Michael Jasny (Natural Resources Defense Council)	S-E-0213
Sophie Foulkes-Taylor	S-E-0090	Jonah Jensen	S-E-0037
Neil Frazer (University of Hawaii, Manoa)	S-E-0100	Ernest Jepson	S-E-0086
Debbie Friedman	S-E-0102	David Johnston	S-E-0158
Lauryn Galindo	S-E-0156	Michael Jones (University of Hawaii)	S-E-0003
Lisa Galloway	S-E-0010	Jay Jones	S-E-0063
Christina Gauen	S-E-0217	Leita Kaldi	S-E-0214

Table 14.4.2-1. Commenters on the Supplement to the Draft EIS/OEIS (Email) (Continued)

Commenter	Comment ID	Commenter	Comment ID
Emailer-Kealakai	S-E-0109	Michele McKay	S-E-0141
Serena Kaldi	S-E-0189	Madeleine Migenes	S-E-0061
Kanoe Kapu	S-E-0017	Ann Moffat	S-E-0161
Koalani Kaulukukui (Earthjustice)	S-E-0212	Nina Monasevitch	S-E-0106
Naia Kelly	S-E-0043	Carolyn Moore	S-E-0015
Lily Kempf	S-E-0084	Mike Moran	S-E-0038
Angela Kepler	S-E-0142	Jill Morgyn	S-E-0008
Brown Kevin	S-E-0178	Don Morrison (Pacific AquaScapes, Inc.)	S-E-0123
Dave Kisor	S-E-0021	Paul Moss	S-E-0187
Barbara Kranichfeld	S-E-0066	Kevin Nesnow	S-E-0205
Marina Kuran	S-E-0111	Tom Norris (Bio-Waves Inc.)	S-E-0209
Gordon LaBedz	S-E-0093	Tutabelle Ojeda	S-E-0013
Steve LaFleur	S-E-0042	Catherine Okimoto	S-E-0138
Jeffrey Lagrimas	S-E-0203	Ellen Okuma	S-E-0016
Helena Lake	S-E-0082	Jamie Oshiro	S-E-0204
Cindy Lance	S-E-0126	Richard Owen	S-E-0089
Aline Larkin	S-E-0157	Janice Palma-Glennie	S-E-0004
Teri Lawrence	S-E-0046	Jane Panju	S-E-0210
Marie Le Boeuf	S-E-0023	Lauri Peacock	S-E-0185
Peggy LeDoux	S-E-0094	Joy Perfetti	S-E-0044
Katie Leinweber	S-E-0035	Lauren Pomerantz	S-E-0040
Bobbi Leung	S-E-0071	Patricia S. Port (U.S. Dept of Interior)	S-E-0121
Bill Lewis	S-E-0051	Brooke Porter	S-E-0052
Alan Lott	S-E-0098	Richard Powers	S-E-0188
Rich Lucas	S-E-0058	Kelly Prince	S-E-0069
John Lyons	S-E-0054	Kyno Ravelo	S-E-0197
Denise Lytle	S-E-0173	Jacqueline Remington	S-E-0170
Richard Macke	S-E-0110	Gail Richard	S-E-0039
Raymond Madigan	S-E-0128	Anne Rivers	S-E-0108
Den Mark	S-E-0132	Cathy Robinson	S-E-0175
Laura Marsh	S-E-0183	Bina Robinson	S-E-0165
Lisa Marshall	S-E-0027	Constance Rocse	S-E-0041
Mary Martin	S-E-0207	Puanani Rogers	S-E-0092
Bryan Matsumoto	S-E-0219	Katy Rose	S-E-0074
Bobby McClintock	S-E-0018	John Rumbaugh	S-E-0096
Cathy McDuff	S-E-0057	Annalia Russell	S-E-0031

Table 14.4.2-1. Commenters on the Supplement to the Draft EIS/OEIS (Email) (Continued)

Commenter	Comment ID	Commenter	Comment ID
Jeff Sacher	S-E-0191	Janet Taylor	S-E-0107
Janos Samu	S-E-0081	Lee Tepley	S-E-0218
Noyita Saravia	S-E-0083	Healani Trembath	S-E-0024
Forest Shomer	S-E-0139	Leilani Trocki	S-E-0137
Emailer-Silvia	S-E-0211	Dona van Bloemen	S-E-0150
Cornelia Skipton	S-E-0179	Robert Wagner	S-E-0133
Stephen Skogman	S-E-0049	Briana Wagner	S-E-0028
Steve Slater	S-E-0059	Robert Wahinehookae	S-E-0148
Victoria Smith	S-E-0103	Ron Whitmore	S-E-0045
Jody Smith	S-E-0012	Lacie Whitten	S-E-0222
Whitney Stolman	S-E-0095	Mark Wichar	S-E-0005
Mary Stone	S-E-0190	Faith Wilcox	S-E-0053
David Strauch	S-E-0144	Donald Wilson	S-E-0122
Michael Swerdlow	S-E-0007	Anita Wintner	S-E-0050
Emailer-Sylvia	S-E-0072	Dawn Wooten	S-E-0181

SDEIS/OEIS

1 message

Stu Burley **Tue, Feb 26, 2008 at 2:57 AM**

To: sdeis_hrc@govsupport.us

Please make changes to the pages that show size of rockets that are and can be launched from PMRF. The charts are out of proportion and present the wrong picture.

Mahalo! Stu Burley

COMMENT NUMBER

S-E-0001

1

Fatal Flaws in Conclusions of Hawai`i Range Complex "Supplement to the DEIS/OESIS"

1 message

Joel Fischer **Wed, Feb 27, 2008 at 7:09 PM**

To: sdeis_hrc@govsupport.us

Thank you for this opportunity.

The last paragraph of the Executive Summary of this supplement says it all: There may be impacts of the use on Navy sonar on a variety of marine mammals.

Yet, repeatedly, the Navy has failed to heed these warnings and continued their exercises, putting many intelligent, sensitive creatures at risk. Why do an EIS if this is always the response?

The Navy must conduct training in places and at times where marine mammals will not be injured. That's all there is to it.

If the Navy continues to be so inhumane and so rigid as to not make these changes, there will be a constant barrage of court cases for the forseeable future.

What's the fatal flaw in the conclusions of this supplement? The Navy's failure to abide by it!

joel

Dr. Joel Fischer, ACSW
Professor
University of Hawai'i, School of Social Work
Henke Hall
Honolulu, HI 96822

"It is reasonable that everyone who asks justice should DO justice."
Thomas Jefferson

"There comes a time when one must take a position that is neither safe, nor politic, nor popular, but one must take it because one's conscience tells one that it is right."
Dr. Martin Luther King, Jr.

"Never, never, never quit."
Winston Churchill

COMMENT NUMBER

S-E-0002

1

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS

comments on the HRC DEIS/OEIS Supplement

1 message

Michael Jones — **Thu, Feb 28, 2008 at 2:24 PM**
To: sdeis_hrc@govsupport.us

28 Feb. 2008

via E-mail to: sdeis_hrc@govsupport.us

Below are my comments on the Supplement to the DEIS/OEIS for the Hawaii Range Complex. I received the Supplement on 26 Feb. 2008 possibly because I submitted scoping comments and comments on the DEIS/OEIS. However, my name is not included in the distribution list in section 6.0 so this list is incomplete. (I noted in my comments on the DEIS/OEIS that my name was not included in the distribution list for it despite the fact that I had submitted scoping comments for it.)

I also noted in my comments on the DEIS/OEIS that the very limited distribution of the draft EIS is not conducive to meaningful evaluation of technical aspects and suggested that the Univ. of Hawaii Environmental Center (which did submit comments on the DEIS/OEIS) and Hamilton Library should have been included. Neither is listed in the distribution list in section 6.0.

Finally, on 28 Aug. 2007 I requested 4 documents listed among the DEIS/OEIS references. I received 3 of them via E-mail a few days before the 17 Sept. deadline for comments. I was informed that the remaining document (Solis, P., 2004) "is not releasable to the public." The final EIS should note which of the references, including those in the Supplement, are not available for public review and explain the justification.

Michael Jones
Dept. of Physics & Astronomy
Univ. of Hawaii

Honolulu, Hawaii

COMMENT NUMBER: S-E-0003

1

From: Janice palma-glennie
Sent: Wednesday, March 05, 2008 3:00 PM
To: sdeis_hrc@govsupport.us
Subject: Protect Hawai'i's Coastal Resources, Limit Impact of Navy Range Expansion

Aloha Mr. Nakagawa

The U.S. Navy's proposal to establish a live-fire training range encompassing the entire Hawaiian Archipelago, including the highly protected Northwestern Hawaiian Islands Marine Refuge, Papahanaumokuakea Marine National Monument, and the Hawaiian Islands Humpback Whale Sanctuary, poses serious threats to the welfare of Hawaii's unique natural and cultural resources. The federal Coastal Zone Management Act of 1972 (CZMA) empowers states to protect their coastal resources from harm by requiring that federal activities affecting the coast be consistent with state laws protecting coastal zones. Hawaii's Coastal Zone Management Program is obligated to protect our unique natural and cultural resources by ensuring that the Navy's activities are proven to be safe for Hawaii's people and consistent with Hawai'i's laws.

As currently drafted the Navy's proposal is NOT consistent with Hawaii's efforts to protect our unique coastal resources. The Navy is proposing to dramatically increase and expand its training activities near Hawaii, including significant increases in live-fire bombing exercises, expanded use of high-intensity active sonar, and ballistic missile interceptions over the Northwestern Hawaiian Islands. To be consistent with Hawaii's coastal protections, the U.S. Navy must adopt meaningful mitigations for its activities.

Meaningful Mitigations Must Include:

1. STATE INCIDENTAL TAKE PERMIT FOR HARM TO ENDANGERED SPECIES

The Navy admits that its activities will harm threatened and endangered species listed under the federal Endangered Species Act, including the highly endangered Hawaiian monk seal and Pacific Humpback Whale. In total, the Navy expects its range expansion will kill 26 species of marine mammals, 7 of which are protected by the federal ESA. Hawaii state law, implemented through the CZMA, requires the Navy to acquire a state incidental take permit for harm to these species and to implement a plan "designed to result in an overall net gain in the recovery of Hawaii's threatened and endangered species." Hawaii Revised Statutes §195D.

2. PROHIBITION AGAINST THE SPREAD OF CONTAMINANTS AND POLLUTION

The Navy's proposed expansion includes live-fire training exercises that will introduce new contaminants into our environment or cause current contamination to spread. Objective six of Hawaii's CZMA regulations require the Department to prevent the spread of coastal pollution. Therefore, the Navy's activities must be limited to prevent the spread of pollution. This should include:
- prohibit the proposal to use chemicals in ballistic missile tests that simulate chemical and biological warfare.
- prohibit live-fire training

COMMENT NUMBER: S-E-0004

1

2

3

4

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

- prohibit activities at sites known or suspected to be contaminated with depleted uranium to prevent the spread of the contamination, including Pohakualoa and Makua Valley.

3. PROHIBITION ON ACTIVITIES THAT MAY AFFECT THE NORTHWESTERN HAWAIIAN ISLANDS STATE REFUGE AND THE PAPAHANAUMOKUAKEA MARINE MONUMENT

The Northwestern Hawaiian Islands are home to rare and endangered species and serve as a nursery for fishery stocks in the Main Hawaiian Islands. These islands are also of extreme historical and cultural significance to Native Hawaiians, as a place of religious sanctity, intact cultural features, and renewed customary practices. Both the state and federal governments acknowledge the importance of protecting this fragile, unique marine ecosystem and rare cultural landscape by establishing the first-ever state marine refuge and first-ever national marine monument. The Navy's current proposal will extend harmful military activities to this, the most highly protected marine ecosystem in the world. The state and federal governments have accepted responsibility for managing this ecosystem as a whole, across jurisdictional boundaries. Under this co-management regime, the state's kuleana to protect the nearshore waters of the Northwestern Hawaiian Islands includes the federal waters extending 50 miles from shore. To be consistent with Hawaii's commitment to protect the entire Northwestern Hawaiian Islands ecosystem, the Navy's activities in this area must be strictly limited. This includes: 5

- prohibit the testing of ballistic missiles over the Northwestern Hawaiian Islands
- prohibit the use of high-intensity active sonar in the Northwestern Hawaiian Islands
- prohibit any military maneuvers in and around the Northwestern Hawaiian Islands
- require the clean up of any military debris that entires the Northwestern Hawaiians Islands State Refuge or Federal Monument

4. SIGNIFICANT LIMITATIONS ON THE USE OF HIGH-INTENSITY ACTIVE SONAR

The Navy's proposed range expansion includes a significant increase in the use of "high-intensity active sonar." Indeed, this controversial technology is the subject of considerable litigation throughout the United States. Because the Navy's active sonar has already harmed Hawaii's marine environment, the proposal to increase its use must be considered with extreme caution. The CZM program should require the Navy to abide by ALL of the most protective measures designed to mitigate the harm inherent to active sonar. These measures have been developed over an extended period of time and circumstances, and include mitigations imposed by several different federal courts, international agencies, and foreign governments. In addition, the use of active sonar should be prohibited in the Northwestern Hawaiian Islands, the Hawaiian Islands Humpback Whale Sanctuary, and any location where marine mammals are known to frequent. 6 7

5. FULL PUBLIC DISCLOSURE OF NAVAL ACTIVITIES IN THE HAWAIIAN ISLANDS

The Navy's proposal to expand military activities in the Hawaiian Islands jeopardizes Hawaii's public trust resources and public health. To ensure that the strongest possible protections are implemented, the Navy must disclose all of its activities with the public. Moreover, Hawaii's coastal zone management regulations require that the department promote public participation in the protection of our coastal resources. The public cannot participate in the protection of our coastal resources without transparency and accountability from the responsible agencies. To this end, the Navy must: 8

- announce all training activities prior to commencement
- document all activities in and around the Hawaiian Islands in After Action Reports released to the public within 30 days of the activity.

Mahalo.

Janice palma-glennie

COMMENT NUMBER
S-E-0004 (cont.)

COMMENT NUMBER
S-E-0004 (cont.)
1

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0008

Protect Hawai‘i's Coastal Resources, Limit Impact of Navy Range Expansion

1 message

Jill Morgyn **Wed, Mar 5, 2008 at 4:50 PM**
Reply-To:
To: sdeis_hrc@govsupport.us

Aloha Mr. Nakagawa
1 The U.S. Navy's proposal to establish a live-fire training range encompassing the entire Hawaiian Archipelago, including the highly protected Northwestern Hawaiian Islands Marine Refuge, Papahanaumokuakea Marine National Monument, and the Hawaiian Islands Humpback Whale Sanctuary, poses serious threats to the welfare of Hawaii's unique natural and cultural resources. The federal Coastal Zone Management Act of 1972 (CZMA) empowers states to protect their coastal resources from harm by requiring that federal activities affecting the coast be consistent with state laws protecting coastal zones.
2 Hawaii's Coastal Zone Management Program is obligated to protect our unique natural and cultural resources by ensuring that the Navy's activities are proven to be safe for Hawaii's people and consistent with Hawai'i's laws.

As currently drafted the Navy's proposal is NOT consistent with Hawaii's efforts to protect our unique coastal resources. The Navy is proposing to dramatically increase and expand its training activities near Hawaii, including significant increases in live-fire bombing exercises, expanded use of high-intensity active sonar, and ballistic missile interceptions over the Northwestern Hawaiian Islands.

As a U.S. citizen and Hawaii resident who has volunteered as part of conservation efforts in the NWHI, I do NOT support military activity in the Northwestern Hawaiian Islands. I believe there should be places of ecological significance that are respected and protected as sanctuaries from human activity that is polluting, invasive, hostile and harmful to the NWHI's fragile wildlife and ecosystem.

In order for this planet to continue being a healthy habitat for animal and plant life beyond the next two generations, there has got to be significant change in government policies that begin to place the value of the planet's health above that of the country's love of making war.

3 Priorities have got to change, and this government has got to start listening to the people instead of plowing ahead with its 1940s values that continue to disrespect ALL LIFE on this planet.

Use your position of power to force change.

Keep the Navy OUT of the NWHI.

Sincerely,

Jill Stephanie Morgyn

Jill Morgyn

Volcano, HI

COMMENT NUMBER
S-E-0055

PROTECT OUR SEA MAMMALS

1 message

l e i l a h **Tue, Mar 11, 2008 at 2:19 AM**
To: sdeis_hrc@govsupport.us

1 PLEASE DO WHATEVER YOU CAN TO INSURE THE QUIET SAFETY FOR OUR DOLPHINS AND BEAUTIFUL WHALES. MY HUSBAND AND I CAN NOT MAKE IT TO THE HEARING DUE TO PRIOR COMMITMENTS. IT SADDENS ME TO THINK THAT WE WOULD NOT HAVE THE COMMON SENSE TO USE HUMANE PRACTICES AND NOT BE FINDING WHALES BEACHED DUE TO THE EXTREME TRAUMA OF NAVAL SONAR PRACTICES.
THANK YOU SINCERELY LAURA AND ANDREW BINSTOCK

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0059

Protect Hawai'i's Coastal Resources, Limit Impact of Navy Range Expansion

1 message

Steve Slater **Tue, Mar 11, 2008 at 2:18 PM**

To: sdeis_hrc@govsupport.us

Aloha Mr. Nakagawa

1 I would like to remind you of the unkept promises reguarding the 'Clean-Up' of Kahoolawe as well as the military denials, then confessions, about the use of Depleated Uranium. Huge amount of Superfund Clean-Up Sites. Our Military owes us more, we need protection on all levels, not just arrogant the, "we know what is best for you ..." attitude.

2 Any use of the Northwest Hawaiian Islands needs to honor Hawaii's guidelines for protection as well as President Clinton's intentions when the Marine Reserve Status was given.

Steve Slater

Paia, HI

COMMENT NUMBER
S-E-0072

(no subject)

1 message

Sylvia **Wed, Mar 12, 2008 at 12:52 PM**

To: sdeis_hrc@govsupport.us

1 I am opposed to the Navy doing any sonar testing in Hawaiian waters.
Please register my opposition.

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0078

Tesitimony is support of the US Navy
March 26th, 2008
CAPT Steve Colón
Member, Board of Directors of the Honolulu Council of the Navy League

The Navy is well aware of the fragile environment and the possible effect of sonar, radar, and other training devices that may impact marine life. That is why they plan exercises to avoid major marine mammal concentration areas whenever possible. The navy is truly dedicated to protecting marine mammals as evidenced by the Fourteen million dollars it spends annually on marine mammal research in FY 07 alone.

Moreover, The Navy has coordinated with the National Marine Fisheries Service to develop 29 protective measures to minimize the potential effects of MFA sonar on marine life. These measures allow the Navy to remain realistically and with respect for the ocean environment…in fact, these measures are in place and currently being used! The Navy also employs a myriad of other preventive measures to protect marine life such as: Station trained lookouts on the ships; Employing night vision and thermal imaging equipment; taking evasive action when marine mammals are spotted; establishing safety zones around ships; and listening for marine mammals.

There is no doubt that Navy training creates or affects some marine life, but the critical point is that Naval training is only a very small part of a much larger picture. Many other external factors are in the ocean at any given time; these include volcanic eruptions, lighting strikes, supertankers, offshore drilling and others. These factors combined with pollution, commercial shipping, fisher entanglements, disease, parasite infection, ship strikes, trauma and other natural factors lead to a rate of approximately 3,500 strandings of marine mammals every year on US shores alone, according to NOAA.

In conclusion, does naval training have any impact on marine life? Yes, To a minimal extent, especially when one considers the risk benefit ratio involved with ensuring our national security. That being said, the Navy is taking aggressive steps to protect marine mammals and other sea life and avoid engagement with them whenever possible and exhibiting sound environmental stewardship with our precious ocean resources. The Navy League of United States Honolulu Council supports the United States Navy's continued use of the HRC for training and testing as the military commanders and the President see fit. 1

Steve Colón is a retired Navy Reserve Captain and current President of the Hawaii division for Hunt Development Group, LP, a real estate development firm.

COMMENT NUMBER
S-E-0097

whales/sonar

1 message

Trudy Blow **Sat, Mar 15, 2008 at 1:09 PM**
To: sdeis_hrc@govsupport.us

We strongly oppose sonor testing in whale waters, especially during the winter months when the most whales are here. At the very least, do the testing in the summer and away from the islands. Surely that can be done. 1

We love and need the whales.

Trudy and Larry Blow
Kapa'a, Hawaii

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0098

sonar and whales

1 message

Alan Lott **Sun, Mar 16, 2008 at 6:14 PM**
To: sdeis_hrc@govsupport.us

I am adamantly opposed to the use of sonar by the navy, when the risk is too great to harm whales. It is time to scale back the military in a radical way. Alan lott aloha — 1

COMMENT NUMBER
S-E-0099

Sonar use near whales.

1 message

Myron Gerhard **Sun, Mar 16, 2008 at 6:59 PM**
To: sdeis_hrc@govsupport.us

Sonar should NOT be used around an known populations of whales, including near the Hawaii island complex. It is my perception that the U.S. Navy has no regard for the well-being of whales. — 1

Myron Gerhard

Littleton, CO

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0100

Against active sonar in Hawaii's coastal zone

1 message

Neil Frazer, PhD **Mon, Mar 17, 2008 at 10:44 AM**

To: sdeis_hrc@govsupport.us

Aloha Mr. Nakagawa
This is with regard to the U.S. Navy's proposal to establish a live-fire training range in Hawaiian Archipelago....

I am particularly opposed to the use of active sonar at any source level exceeding 150 deciBells relative to 1 microPacal at 1 meter. 1

As you know, sonar is used by the navy to detect enemy submarines. In order to improve detection, one can use a more powerful source, or one can add more receivers. Adding more receivers does not harm whales.

The modern trend in acoustical detection is toward passive sonar, in which artificial sources are not used.

I have authored and co-authored a number of peer-review papers on underwater sound (see my website), and my research in underwater sound has been sponsored by the Office of Naval Research.

Mahalo you for your service to our state.

Sincerely,
Neil Frazer

Professor of Geophysics
University of Hawaii at Manoa
Honolulu, HI 96822

Neil Frazer, PhD

Kailua, HI

COMMENT NUMBER
S-E-0102

sonar

1 message

DEBBIE FRIEDMAN **Mon, Mar 17, 2008 at 3:41 PM**
To: sdeis_hrc@govsupport.us

To Whom It May Concern, I believe more studies are needed to determine the short and long range effects of sonar testing and its harm to marine mammals, fish, people, coral and other sea animals and maybe even plants. It seems that the range the sonar can go is way farther than the area they say they stay within. Avoiding sonar during humpback whale season may help, and may minimize harming at least this marine mammal. What about the others? Monk seals, divers, snorkelers, dolphins and other whales. Aren't there other ways to spot submarines, like infrared type things or satellites in the air? Whenever I hear more sonar testing, I think, "Haven't they already tested it....many times, don't they already know if it works?" I do want our country to be protected and ready for anything from a country that doesn't like us, but don't we have other ways that wouldn't harm animals and disrupt ecosystems? Anyway, please stop the sonar or study it much more and use safeguards that would really work and include a wide enough area that's far away enough from living things. Thank you for listening, Debbie Friedman of Kalaheo,HI.

Comment numbers: 1, 2, 3, 4, 5, 6

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER S-E-0103

Sonar

1 message

Victoria Smith **Mon, Mar 17, 2008 at 4:13 PM**
To: sdeis_hrc@govsupport.us

I am against the sonar testing any where near Hawaii!!

I'm a diver and don't want to have my hearing damaged. What about those of us that don't hear about the testing going on? Would you go out in the water when you are testing? Neither to our marine animals and fish want to! 1

Victoria Smith, Wailuku, HI

COMMENT NUMBER S-E-0110

Critical Navy Training

1 message

Richard Macke **Wed, Mar 26, 2008 at 11:11 PM**
To: sdeis_hrc@govsupport.us

Tesitimony in support of the US Navy
March 26th, 2008
Richard Macke
Honolulu, HI

The war between single-focused special interest groups and our Maritime Services continues and continues to waste dwindling resources as the fight to ensure mission-realistic training continues. The Navy provides more funding to the study of effects of our maritime operations on marine mammals than all the other concerned entities combined. Fourteen million dollars spent on marine mammal research in FY 07 alone. The environmental lobby does not contribute to finding scientific answers to questions yet continues to challenge realistic and critically needed training evolutions. The fact that our judicial system largely supports their unfounded allegations is extremely troubling. The training that these special interest groups try to deny is exactly the training that is needed if we intend to fight and win our nations wars. It is inconceivable that, in a country as educated and aware as America, the unfounded assertions spread by these special interest groups continue to have success in thwarting training across a broad geography and all military services. The Navy has been recognized over and over by national environmental agencies and groups for their careful preservation of our environment. They have proven beyond the shadow of doubt that they can achieve the needed training without destroying the habitat. 1

Moreover, The Navy has coordinated with the National Marine Fisheries Service to develop 29 protective measures to minimize the potential effects of MFA sonar on marine life. These measures allow the Navy to remain realistically and with respect for the ocean environment…in fact, these measures are in place and currently being used! It has yet to be proven scientifically that MFA sonar creates a detrimental affect on marine life. Many external factors exist in the oceans of the world at any given time to include volcanic eruptions, lighting strikes, supertankers, offshore drilling, etc. These "non-Navy" factors lead to approximately 3,500 strandings of marine mammals every year on US shores alone, according to the National Oceanographic and Atmospheric Administration. 2 3

I most strongly urge every American to support the Navy in this insidious struggle. Too much of our national treasure and overextended Navy resources are being wasted in fighting to maintain critical training for the young men and women our country sends to sea.

Take care, dick.

Dick Macke

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-E-0111

Opposed to Navy Sonar Testing in Hawaii and Elsewhere

1 message

Marina Kuran **Wed, Mar 26, 2008 at 10:24 PM**
To: sdeis_hrc@govsupport.us

1 I am a resident of South Kona who wishes to express my extreme opposition to the U.S. Navy's proposal to expand its military training range across the Hawaiian Archipelago. I am opposed to missile testing as well as to both low frequency and mid-range sonar, both of which are extremely detrimental to marine mammals causing death by brain hemorrhage, a horrible sight to witness. The U.S. military has already destroyed much of the quality of life and beauty across the Hawaiian Islands with missile testing, stryker practice,the spread of radiation from depleted uranium at Schofield Barracks, Phakuloa which it first denied and then admitted, and in the thousands of DU canisters that were dropped along our coastlines, probably leaking radiation into the water, during World War II, the bombing and annhilation of Kahoolawe, and the list goes on and on. Enough is enough. The U.S. military, regardless of its branch, needs to be held accountable. It needs to obey the same laws that the rest of us obey.

2 The U.S. Navy's proposal is not only a violation of the National Environmental Policy Act and the Coastal Zone Management Act, but with the availability of passive listening devices to achieve the same level of national security without inflicting harm to marine life, it is not necessary. I also question the intent of designating marine sanctuaries such as the Northwest Hawaiian Islands Sate Marine Refuge, the Papahanaumokuakea Marine Monument, or the Pacific Humpback Whale Sanctuary if the marine life that is 3 supposed to be protected is not. This only makes a mockery of "protected sanctuaries" to keep the lay person out, but allow the Navy to harm and kill, again, beyond the laws. Protected for whom?

Humpback whales, for example, are already under siege from continued whaling by Japan, Norway and Iceland, eco-tourism, the Super Ferry and other boat activity, pollution, and orcas. Approximately only 3 out of 10 humpback whale babies make it back to Alaska alive.
Again, I oppose the U.S. Navy's proposal, once again, allowing the government to remain above the law.

Sincerely,

Marina Kuran

Captain Cook, HI

COMMENT NUMBER

S-E-0113

Navy Sonar

1 message

Wes Cummins **Fri, Mar 28, 2008 at 12:57 AM**
To: sdeis_hrc@govsupport.us

1 I love whales. I love the ocean and the creatures in it. I also believe sonar and the living sea can adjust to each other.
Sincerely,
Lowell Wes Cummins

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0114

Navy's use of sonar

1 message

Jack Aaron **Fri, Mar 28, 2008 at 1:49 AM**
To: sdeis_hrc@govsupport.us, Navy League - Honolulu Council <honolulunavyleague@hawaii.rr.com>

Dear Gentlepeople: I am definitely in support of the Navy's use of sonar and radar in marine mammal research. Their sonar training is vital in protecting national interests and safety of our Sailors and Marines. The NAVY is highly responsible and a leader in worldwide Marine & Mammal research. They have a long term plan and I feel no none is better suited to serve this interest then the Unites States Navy. 1

Sincerely,

Jack Aaron

COMMENT NUMBER
S-E-0115

sonar training

1 message

Joann Breeden **Fri, Mar 28, 2008 at 2:24 AM**

To: sdeis_hrc@govsupport.us

Bob,

John and I support the navy and the sonar training that is needed to continue protecting our country. 1

John and Joann Breeden

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-E-0116

navy sonar training

1 message

Fri, Mar 28, 2008 at 2:50 AM

To: sdeis_hrc@govsupport.us

I support the Navy sonar training. We Need to see who is out there especially with China kicking up her heels.
Daniel J Del Monte Jr

1

COMMENT NUMBER

S-E-0117

Navy Sonar

1 message

Fred Dauer

Fri, Mar 28, 2008 at 11:42 AM

To: sdeis_hrc@govsupport.us

I support the Navy position of use and training of sonar and their exercises. It is my opinion their research and findings are logical and should be considered and support their efforts.

Fred & Claire Dauer

1

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0118

Testimony in support of the US Navy

1 message

flemming carstensen — Fri, Mar 28, 2008 at 3:27 PM
To: sdeis_hrc@govsupport.us

TESTIMONY IN SUPPORT OF THE US NAVY

1 There is no doubt that Navy training creates or affects some marine life, but the critical point is that Naval training is only a very small part of a much larger picture. Many other external factors are in the ocean at any given time; these include volcanic eruptions, lighting strikes, supertankers, offshore drilling and others. These factors combined with pollution, commercial shipping, fisher entanglements, disease, parasite infection, ship strikes, trauma and other natural factors lead to a rate of approximately 3,500 stranding of marine mammals every year on US shores alone, according to NOAA.

In conclusion, does naval training have any impact on marine life? Yes, To a minimal extent, especially when one considers the risk benefit ratio involved with ensuring our national security. That being said, the Navy is taking aggressive steps to protect marine mammals and other sea life and avoid engagement with them whenever possible and exhibiting sound environmental stewardship with our precious ocean resources. The Navy League of United States Honolulu Council supports the United States Navy's continued use of the HRC for training and testing as the military commanders and the President see fit.

Respectfully,

Flemming H. Carstensen
Navy League Life Member
Honolulu Council

COMMENT NUMBER
S-E-0119

Sonar/Navy Training

1 message

Shirley Chew — Sat, Mar 29, 2008 at 5:26 PM
To: sdeis_hrc@govsupport.us

1 I support the use of naval sonar in training in the Pacific area for defense is critical. With the constant treat of terrorism and countries like North Korea and China with nuclear war heads, we must be constantly vigil. Our Navy must be allowed to prepare and train for our defense in Hawaii/US and to protect our allies in the Pacific. Now, with long range missile accuracy, our missile defense is from the sea. A strong defense protects our freedom as well as our lives. To balance the impact on sea mammals, the Navy can work in concert with marine biologists to determine the least damaging sound levels that still meet national security requirements. To ban the use of sonar is equivalent to blinding our Navy.

I love whales and respect our sea life, but our national security should be our first priority.

Shirleyanne Chew

Honolulu, Hawaii

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
1111 Jackson Street, Suite 520
Oakland, California 94607

IN REPLY REFER TO:
ER# 08/211

(Electronically Filed

2 April 2008

Hawaii Range Complex EIS/OEIS
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Hawaii 96752-0128

Subject: Review of the Draft Supplemental Environmental Impact Statement (DSEIS), for the Hawaii Range Complex (HRC) Project, Kauai, Honolulu, Maui, and Hawaii Counties, HI

To Hawaii Range Complex EIS/OEIS,

1 The Department of the Interior has received and reviewed the subject document and has no comments to offer.

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC
FWS, Region VIII

COMMENT NUMBER
S-E-0121

From: doioepc1478@aol.com [mailto:doioepc1478@aol.com]
Sent: Wednesday, April 02, 2008 1:23 PM
To: sdeis_hrc@govsupport.us
Subject: No Comments

The Department of the Interior has no comments.

Thank you for the opportunity to look at this document.

Carolyn R. Myers
Regional Environmental Intern
Office of Environmental Policy and Compliance
U.S. Department of the Interior, Region 9
1111 Jackson Street, Suite 520
Oakland, CA 94607-4807
(510) 817 - 1477 [voice]
(510) 419 - 0177 [fax]
doioepc1478@aol.com

COMMENT NUMBER
S-E-0121 (cont.)

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER: S-E-0122

From: Wilson. Donald H CTR PMRF

Sent: Friday, March 21, 2008 6:50 PM
To: deis_hrc@govsupport.us
Cc: Tauyan, Agnes T CIV CNRH, N00PA; Clements, Tom H CIV PMRF
Subject: SUPPLEMENT EIS MID FREQ SONAR COMMENTS

Dear Sir/Ma'am,

Attached are my comments related to the Draft EIS Supplemental dealing with active, mid-frequency sonar.

Would you please include these comments as part of your overall EIS?

Thank you very much.

Sincerely,

Donald H. Wilson
<<Draft EIS.doc>>

ATTACHMENT:

Hawaii Range Complex Supplement to the Draft EIS/OEIS
<u>Written Comment Form</u>
Name: Donald H. Wilson
Address: PO Box 399, Kekaha, HI 96752
Comments: Thank you for the opportunity to comment. As a former submariner, I am aware of the power of active sonar, regardless of frequency. Used indiscriminately, it could have a deleterious effect on marine life in proximity to the source – a fact the Navy well understands, and mitigates through a variety of means: additional lookouts, trained to spot marine mammals; reduced sonar power levels, and eventually, ceasing active sonar transmissions.

COMMENT NUMBER: S-E-0122 (cont.)

The Navy is aware of its responsibilities under federal law. Moreover, and perhaps equally important, the Navy has an abiding interest in, and commitment to, the very medium that assures its raison d'etre.

The Navy is not indifferent to cause and effect relationships,
particularly when Navy actions may be the cause. For that
reason, the Navy has carefully assessed, through scientific 1
study, the effects of mid-frequency active sonar, and
developed procedures to reduce if not eliminate, potential
hazards to marine mammals. That said, there is no activity 2
on the ocean that is risk-free, and the overwhelming majority
of marine mammal deaths are caused by inadvertent ship
strikes – primarily by commercial shipping. Yet there are no
calls for ceasing commercial shipping because world trade
demands it. Likewise, there is no outrage over commercial
whaling, despite the fact Japan and Norway continue to
harvest whales to "study" them and invariably sell the meat
to consumers.

American citizens must decide: impose ever-more restrictive regulations on the use of active sonars, and possibly suffer defeat in naval battles, or accept the fact that with mitigation, there will be some risk to marine mammals, while concurrently reducing risk to the Nation overall. Americans cannot reasonably expect to fund an expensive Navy to protect the Nation while mandating a training regime that is neither realistic, nor contributes to the way it would fight in war. In some scenarios, active sonar is the last resort to detect, localize, and ultimately destroy a threatening submarine. To restrict sonar use and training is ultimately to deny this capability to the Nation. Which begs the question:

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0122 (cont.)

1 if there are no alternatives – and there haven't been any since WWII – despite other technologies including magnetic anomaly detection, radar, passive sonar, visual, IR, etc., then why debate the merits of using active sonar in training scenarios? The Navy must have the ability to conduct realistic training that simulates how it would fight during war. To mandate further restrictions places Sailors and their vessels at risk and ultimately, places the country at risk too.

1 I support the use of active sonar, regardless of frequency, to ensure we have the technology and proficiency necessary to defend the Nation. Further restrictions on its use, imposed by jurists who do not appreciate the realities of war at sea, and encouraged by activists who ignore far greater risks to marine mammals is counterproductive, extremely shortsighted, and hypocritical.

COMMENT NUMBER
S-E-0123

From: Don Morrison
Sent: Monday, March 31, 2008 6:53 PM
To: deis_hrc@govsupport.us
Subject: FW: Written Testimony re: Supplemental Drat EIS/OEIS

To Whom It May Concern:

Please find attached my comments with regard to the issue.

Should you have any questions, my contact information follows.

Thank you.

Donald A. Morrison

CFO/Sec-Treas.

Pacific AquaScapes, Inc.

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0123 (cont.)

ATTACHMENT:

Testimony in support of the US Navy

March 31, 2008

Donald A. Morrison

Waipahu, HI

Once again, our courts have managed to render decisions that place the lives of our fellow citizens and members of our sea services at risk. Courts have ruled that loud sounds might harm whales and other marine mammals if not tightly controlled. What of the harm to human life if an enemy submarine was to launch an attack on one of our cities and the reason for the success of the attack is a lack of adequate training of our sea services?

Mid-Frequency Active Sonar (MFA) is critical to protecting us from quiet diesel-electric submarines. Our ships and submarines need realistic training in order to defend us. From early childhood our children play sports, musical instruments, learn to dance, and more. The common denominator between all these activities is "PRACTICE". As Americans we encourage our children to practice at home, go to practice, practice makes perfect. Whether it is our young children playing football, soccer, baseball or our athletes training for the Olympics – practice is essential! Yet for our Navy ships and submarines and the men and women who sail them, our courts are denying them the right to this training. Their skills need to be honed and perfected. Without constant realistic practice they lose the critical skills 1

COMMENT NUMBER
S-E-0123 (cont.)

that save lives. The lives of the men and women of the sea services and ours, the citizens of this country!

As for the environment and the mammals being protected, no one does more than the Navy to protect them. There are well documented safeguards in place that are used in all training exercises. The intent is certainly not to deliberately harm marine mammals. In fact the Navy spends millions on marine mammal research annually - $14 million in 2007 alone. They are dedicated to finding if there is a link between the exposure to active sonar and any problems with marine mammals. 2

I encourage all citizens of this country to support the United States Navy in this effort. Let the scientific foundation that the Navy is building to support their long-term environmental compliance plan be the guide. Let them continue their work with the National Marine Fisheries Service to protect marine life. Most importantly, allow the Navy to resume the realistic training required in the areas requested.

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-E-0155

Support to the Navy's Sonar Training and testing programs

1 message

Sat, Apr 5, 2008 at 3:20 AM

To: sdeis_hrc@govsupport.us
Cc: honolulunavyleague@hawaii.rr.com

I am proud to be a Navy League member and it was brought to my attention that the Navy remains in litigation over the use of Mid- Frequency Active (MFA) sonar.
I am stating that I and every knowledgeable person that I discussed this issue with, (military or civilian) has agreed that it is best for the United States Navy to continue use of the HRC for training and testing as the military commanders and the President see fit. With out these programs, the success of our Anti-Submarine Warfare (ASW) missions would be at risk for all participance.
Here in Hawaii, as in other areas of the world (we have programmed persons) these are groups or followers of persons that want no change, from what now exists.
Another driving force, for other programmed persons, is that here in Hawaii every place or every thing, on land or in the sea, has a religious connotation and each group, or joint groups are now interrupting what to do for any action to stop anything that they do not like. They pay lawyers, apply political pressure and issue orders and there followers obey. I state the above to inform the reader that these programmed persons have caused the Hawaii Government to loose millions and millions of dollars in planed programs and other actions. Almost every military action has been challenged by these groups, they search for some excuse to justify there cause. These programmed persons are the main ones that are challenging this project.
I am sure that there is some effect on some marine life, but bouncing the risk of minimal marine damage against ensuring our National Security, leaves no doubt that the risk is the best course to follow. This is especially true because of Navy's excellent description of what action they have taken to minimize the effects of MFA sonar on marine life. 1

Glenn P. Chapman

Honolulu, HI.

COMMENT NUMBER

S-E-0181

Protect Hawai'i's Coastal Resources, Limit Impact of Navy Range Expansion

1 message

Dawn Wooten Sat, Apr 5, 2008 at 11:57 PM

To: sdeis_hrc@govsupport.us

Aloha Mr. Nakagawa
If it is indeed true that the Navy will be using the protected Coastal regions as a firing range (or any other Mlitary activity).... I must object. Please be aware that this was protected for a reason that has not changed. Mahalo. 1

Dawn Wooten, Kauai Resident

Dawn Wooten

Lihue, HI

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0199

Protect Hawai'i's Coastal Resources, Limit Impact of Navy Range Expansion

1 message

John Broussard **Mon, Apr 7, 2008 at 4:09 PM**

To: sdeis_hrc@govsupport.us

Aloha Mr. Nakagawa

1 I don't understand why we have to repeatedly fight to get the government to stop torturing marine mammals and to follow the laws allowing states to protect their coastal areas from harmful activities.

These activities make a mockery of the concepts of national monuments, animal sanctuaries, and the Endangered Species Act..

Please do everything you can to stop live-fire exercises, pollution with toxic chemicals, and use of high-intensity sonar in what are supposed to be Hawaii's protected places...or anywhere that they wreak untold death and destruction.

John Broussard

Kamuela, HI

COMMENT NUMBER
S-E-0209

-----Original Message-----
From: Tom Norris
Sent: Monday, April 07, 2008 10:57 PM
To: 'sdeis_hrc@govsupport.us'
Cc: Ann Zoidis Mari Smultea
Subject: Comments for Hawaii Range Complex supplemental DEIS/OEIS

To: Department of the Navy

Re: Supplement to the Draft Environmental Impact Statement/

Overseas Environmental Impact Statement (DEIS/OEIS) for the

Hawaii Range Complex

Email: sdeis_hrc@govsupport.us

7 April 2008

Dear Sir or Madam:

We have reviewed the Supplement to the Draft Environmental Impact Statement/ Overseas Environmental Impact Statement (DEIS/OEIS)) for the Hawaii Range Complex and would like to provide the following comments with regards to estimated behavioral harassment exposures for non esa species (minke whales) – no action alternative. Please be aware that we are not directing these comments to the modifications to the analytical methods used to evaluate effect of sonar on marine mammals, rather to the assumptions underlying the density (or lack of) estimates for cetacean species in Hawaiian waters used in your analyses. 1

Abundance (or density) estimates for minke whales are not yet available for Hawaiian waters because this species has not been sighted in sufficient numbers to allow estimation using standard visual line-transect methods. The reasons for this are varied, but primarily is in part due to the fact that the dedicated NMFS surveys of Hawaiian waters were conducted in Fall, when few minke whales are expected to be present in Hawaiian waters. Even when they are present, minke whales can be difficult to sight. However information from several sources indicates that minke whales in fact occur in Hawaiian waters during the winter and spring. We have attached a file with some references for your convenience. Most of these data were collected using passive acoustic methods (i.e. listening for calls produced by minke whales). Analytical methods to estimate densities of animals have not yet been worked out for most marine mammal species that

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-E-0209 (cont.)

can only be detected with passive acoustic methods, therefore a reliable estimate is not yet possible. However we believe that it is important to note the presence of these animals, and perhaps to use an estimate for another species (as was done in your DEIS for fin whales) to derive a conservative estimate of exposure to Navy sonar.

We hope you will take this important information into consideration for the final draft of your EIS/OIES.

Respectfully Submitted,

Thomas Norris,

Ann Zoidis,

and Mari Smultea

Bio-Waves Inc.

Cetos Research Organization and

Smultea Environmental Sciences LLC.

COMMENT NUMBER

S-E-0209

References for Minke Whale Sightings and Acoustic Detections in Hawaiian Waters

Balcomb, K. C. Minasian, S. M., and Foster, L. 1987. The Whales of Hawaii, including all species of marine mammsals in Hawaiian and adjacent waters. Marine Mammal Fund. San Fransisco, CA. 99 pp.

Gedamke, J., D.P. Costa, and A. Dunstan (2001): Localization and visual verification of a complex minke whale vocalization. *J. Acoust. Soc. Am., 109,* 3038–3047.
(also see Gedamke's Ph.D. dissertation for additional references to N. Pacific 'boings')

Norris, T.F., Smultea, M. A., Zoidis, A. M., Rankin, S., Loftus, C., Oedekoven, O., Hayes, J. L., and Silva, E. 2005. A Preliminary Acoustic-Visual Survey of Cetaceans in Deep Waters around Ni'ihau, Kaua'i, and portions of O'ahu, Hawai'i from aboard the R/V *Dariabar,* February 2005. Prepared by: Cetos Research Organization, Bar Harbor, ME., under contract #2057SA05-F to Geo-Marine, Inc. for NAVFAC Pacific.

Rankin, S, and Barlow, J. 2005. Source of the North Pacific 'boing' sound attributed to minke whales. Journal of the Acoustical Society of America 118(5):3346-51.

Rankin , S, Norris, T.F., Smultea, M., Oedekoven, C., Zoidis, A., Silva, E., and Rivers, J. 2007. A Visual Sighting and Acoustic Detections of Minke Whales, Balaenoptera acutorostrata (Cetacea: Balaenopteridae), in Nearshore Hawaiian Waters. Pacific Science. 61(3): 395-398.

Thompson, P. O. & W. A. Friedl. 1982. A long term study of low frequency sounds from several species of whales off Oahu, Hawaii. Cetology, 45, 1-19.

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0210

Comment re: HRC Supplement to the Draft EIS/OEIS

1 message

Tue, Apr 8, 2008 at 2:31 AM

To: sdeis_hrc@govsupport.us

Pacific Missile Range Facility
Public Affairs Officer

Aloha,

Thankyou to those from our Navy who shared their knowledge regarding the Supplement to the Draft EIS/OEIS at the March 14th public comment session on Maui.

To my knowledge, mid-frequency active sonar is at least correlated with changes in behavior, strandings, and deaths of a number of cetaceans. 1

It is my understanding also that the effects from MFA sonar have been proven to be a factor in health damage to members of Navy personnel, diving during use of MFA sonar.

I urge that action be in favor of the complete health and safety of human lives, and complete health and safety of marine mammals.

with respect,
Jane Panju
Maui

COMMENT NUMBER
S-E-0211

(no subject)

1 message

Sylvia · Wed, Mar 12, 2008 at 12:52 PM

To: sdeis_hrc@govsupport.us

I am opposed to the Navy doing any sonar testing in Hawaiian waters. 1
Please register my opposition.

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

EARTHJUSTICE

BOZEMAN, MONTANA DENVER, COLORADO HONOLULU, HAWAI
INTERNATIONAL JUNEAU, ALASKA OAKLAND, CALIFORN
SEATTLE, WASHINGTON TALLAHASSEE, FLORIDA WASHINGTON, D

COMMENT NUMBER

S-E-0212

April 7, 2008

By U.S. and Electronic Mail

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kauai, Hawai'i 96752-0128
ATTN: HRC EIS/OEIS
deis_hrc@govsupport.us

Re: Department of the Navy's 2007 Draft Hawai'i Range Complex ("HRC") Environmental Impact Statement ("DEIS") and 2008 Supplemental Draft Hawai'i Range Complex EIS ("SDEIS")

Dear Sir or Madam:

Please accept these comments in response to the above-captioned DEIS and SDEIS. The DEIS preferred alternative includes:

1) An increase in the "tempo and frequency" of training exercises;
2) New and intensified Research Development Testing & Executing ("RDT&E") operations;
3) Addition of multiple strike group training; and
4) Addition of a second strike group to Rim of the Pacific ("RIMPAC") exercises

All of the above activities would remain the same under the new preferred alternative introduced in the SDEIS, with the exception that overall sonar usage in Hawai'i will not increase above what the Navy defines as baseline sonar activity.

LEGAL FRAMEWORK

The National Environmental Policy Act of 1969 ("NEPA") "declares a broad national commitment to protecting and promoting environmental quality." Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 348 (1989). To achieve this critical goal, NEPA requires that each federal agency consider the potential environmental impacts of any "major Federal actions significantly affecting the quality of the human environment" through the preparation of an EIS. Id.; NEPA § 102(2)(c), 42 U.S.C. § 4332. This directive is known as a "set of action-forcing procedures that require that agencies take a 'hard look' at environmental consequences." Robertson, 490 U.S. at 349 (quoting Kleppe v. Sierra Club, 427 U.S. 390, 410, n.21 (1976)).

The requirement to prepare an EIS "serves NEPA's action-forcing purpose in two important respects." Robertson, 490 U.S. at 349. First, "the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant

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COMMENT NUMBER

S-E-0212 (cont.)

environmental impacts[,]" and second, "the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision." Id. (emphasis added). Judicial review generally focuses on whether the dual goals of NEPA have been satisfied.

NEPA's mandate that federal agencies take a "hard look" requires high quality information and accurate scientific analysis. 40 C.F.R. § 1500.1(b). "General statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." Klamath-Siskiyou Wilderness Center v. Bureau of Land Management, 387 F.3d 989, 994 (9th Cir. 2004) (quoting Neighbors of Cuddy Mountain v. United States Forest Service, 137 F.3d 1372, 1380 (9th Cir 1998)). If it is possible to quantify effects objectively, NEPA requires that the Navy do so. Id.

The Navy must consider reasonably foreseeable effects including "ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative." 40 C.F.R. § 1508.8 (emphasis added).

THE DEIS AND SDEIS ARE INADEQUATE

For the reasons detailed below, the Navy's HRC DEIS fails to comply with both the letter and spirit of NEPA by failing to provide detailed information about its proposed action, failing to consider adequate alternatives, and failing to seriously analyze the environmental risks and consequences of its preferred alternative.

The DEIS fails to provide fundamental information about its proposed action

The DEIS falls far short of NEPA's fundamental purpose to "insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken" by failing to provide basic information about the scope of the proposed action. 40 C.F.R. § 1500.1(a) (emphasis added).

Specifically, the DEIS fails to quantify the number of additional individual training exercises the Navy proposes to conduct during each major exercise. For example, although the DEIS at 4-372 explains that the number of Explosive Ordnance Disposal ("EOD") training operations at the EOD Land Range will increase from 85 to 93 per year under Alternative 2, the DEIS at 4-374 admits that "Multiple Strike Group Training would result in an unspecified number of additional training events at the EOD Land Range." 1

The number of exercises to be carried out each year is essential information to understand the full gamut of effects from each proposed alternative. For example, the number of increased exercises directly affects the amount of hazardous materials introduced to Hawai'i's marine environment. The Navy states its increased training will inject up to 56,422 additional "hazardous training materials" into Hawai'i each year. DEIS at 4-183. An unspecified number of additional multiple strike group training operations will result in an unspecified number of additional hazardous training materials. Without this basic underlying information, it is 2

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0212 (cont.)

Earthjustice Comments on HRC DEIS and DSEIS
April 7, 2008
Page 3

impossible to quantify the increased effect on Hawai'i's coastal uses and resources from the preferred alternative.

3 The DEIS also presents inaccurate information about its baseline activities. In one instance, the Navy claims that live-fire exercises currently occur at Makua Military Reservation ("MMR"), when, in fact, pursuant to a consent decree entered by the district court for the district of Hawai'i, no live-fire exercises have been conducted at Makua since the summer of 2004. Notably, the Army's draft environmental impact statement for military training at MMR recognizes that the "no action" alternative is no military training at MMR. Likewise, the Navy's DEIS must inform the public the baseline at MMR is no live-fire training.

Lacking complete and accurate information about the scope of the proposed action, it is impossible for the Navy to take the required hard look at the Navy's proposed action, or for the public to adequately participate in the NEPA process.

The DEIS fails to analyze alternatives adequately

In enacting NEPA, Congress intended that all federal agencies, including the Navy, would consider in their review of project proposals "choices or alternatives that might be pursued with less environmental harm." Lands Council v. Powell, 395 F.3d 1019, 1027 (9th Cir. 2005). The heart of an EIS is its discussion of alternatives. 40 C.F.R. § 1502.14. Every EIS must contain a "rigorous and objective" analysis of "all reasonable alternatives" to the proposed action, including a discussion of the "no action" alternative as a base-point to which the proposed action can be compared. 40 C.F.R. § 1502.14(a); see also City of Carmel-by-the-Sea v. United States DOT, 123 F.3d 1142, 1155 (9th Cir. 1997).

"The existence of a viable but unexamined alternative renders an environmental impact statement inadequate." Citizens for a Better Henderson v. Hodel, 768 F.2d 1051, 1057 (9th Cir. 1985). The requisite alternatives are determined by the stated purposes and goals underlying the proposed agency action, however, "an agency cannot define its objectives in unreasonably narrow terms." City of Carmel, 123 F.3d at 1155.

The DEIS proffers three alternatives. The "no-action" alternative contemplates continued baseline activity at HRC. Alternative 1 will increase the "tempo and frequency" of training exercises, double the number of strike groups associated with RIMPAC, add an additional training operation, and increase the number and intensity of Research Development Training and Execution ("RDT&E") operations in Hawai'i. Alternative 2 includes all the proposed activity under Alternative 1, plus an additional increase in the "tempo and frequency" of training exercises, additional new RDT&E operations, and the addition of multiple strike group training. The SDEIS adds an Alternative 3, the preferred alternative, which involves all the proposed actions of Alternative 2, minus any increase in overall sonar hours.

4 A similar alternatives analysis proffered by the Navy in its Undersea Warfare Exercise ("USWEX") Environmental Assessment ("EA") was flatly rejected by the district court for the district of Hawai'i in February 2008:

COMMENT NUMBER
S-E-0212 (cont.)

Earthjustice Comments on HRC DEIS and DSEIS
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> In essence, the Navy's alternatives analysis consists of a preferred option, which allows them to undertake the maximum level of USWEXs to meet their operational objectives, a second option, which mirrors the first option except that it decreases the amount of USWEXs by four (or one-third of the proposed total in Alternative 1), and a third option, which allows them to conduct the same exercises, just not consolidated into a single USWEX, and which is summarily dismissed as fundamentally inconsistent with naval training objectives. Moreover, the No Action Alternative is a true "no action" alternative in name only; in reality, this option would allow the Navy, though not in the manner required by its training needs, to engage in exercises using MFA sonar at much the same level and frequency as the preferred alternatives.
>
> This alternatives analysis essentially relegates environmental considerations to secondary status and, thus, runs contrary to the goal of NEPA. The goal of the statute is to ensure that federal agencies infuse in project planning a thorough consideration of environmental values. The consideration of alternatives requirement furthers that goal by guaranteeing that agency decision makers have before them and take into proper account all possible approaches to a particular project (including total abandonment of the project) which would alter the environmental impact and the cost-benefit balance. The kind of thorough consideration of environmental values called for by NEPA is not possible when the end result-engaging in military exercises using devices that are potentially harmful to the environment-is predetermined. The Court also fails to see how a "no action" alternative that involves the continuation of individual training exercises using MFA sonar subject to the Navy's discretionary environmental review falls within NEPA's explicit alternatives analysis requirement.
>
> The Navy's alternatives analysis fails to meet NEPA's standards and, as a result, Plaintiffs have a high likelihood of success on this claim.

Ocean Mammal Institute v. Gates, 2008 WL 564664, *13-14 (Feb. 29, 2008 D. Hawai'i) (internal quotation marks and citation omitted) (emphasis in the original). As in Ocean Mammal Institute, the Navy has "tailor[ed] its environmental analysis so narrowly as to preclude anything but its desired result" and has relied on a spurious alternative in violation of NEPA. Id.

The DEIS fails to analyze adequately high-intensity, mid-frequency sonar

The Navy's analysis of mid-frequency active sonar has been rejected time and again by each court faced with it, resulting in injunctions enjoining the Navy from carrying out its plans. See NRDC v. Winter, CV-06-4131 (C.D. Cal. 2006) (Winter I); NRDC v. Winter, CV-010335-FMC, 2007 WL 2481037 (C.D. Cal. Aug. 7, 2007) (Winter II); and Ocean Mammal Institute v. Gates, 2008 WL 564664 (Feb. 29, 2008 D. Hawai'i). The Navy's analysis in the HRC DEIS and 5
SDEIS has not significantly changed from the analyses that have been continually struck down. The Navy now applies a new methodology to estimate risk of behavioral effects, while any consequence analysis remains conspicuously missing.

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

Earthjustice Comments on HRC DEIS and DSEIS
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COMMENT NUMBER
S-E-0212 (cont.)

Most strikingly, the risk function fails to account for the cumulative effects of ASW from (1) execution of USWEX, RIMPAC, and multiple strike groups training in Hawai'i over time; (2) multiple strike groups engaging in sonar exercises simultaneously; and (3) a double strike group RIMPAC. "Cumulative effects analysis requires the [DEIS] to analyze the impact of a proposed project in light of that project's interaction with the effects of past, current, and reasonably foreseeable future projects." Lands Council v. Powell, 395 F.3d 1019, 1027 (9th Cir. 2005) (citing 40 C.F.R. § 1508.7). This DEIS fails to analyze the effects of past, present, and future use. 6

In addition, in Winter I, Winter II, and Ocean Mammal Institute, the Navy and the courts had before them discrete training exercises carried out by single strike groups. Here, the Navy proposes to intensify its training with an additional strike group during RIMPAC and multiple strike group training. The Navy has erred by failing to factor this increased intensity into its analysis of sonar-induced risk and consequences.

The DEIS fails to analyze adequately effects from increased "training debris"

Along with increased tempo and frequency of training and RDT&E operations comes an increase in hazardous materials left behind in Hawai'i's coastal environment. The Navy recognizes that "[s]ome training materials, including gun ammunition, bombs and missiles, targets, sonobuoys, chaff, and flares, will be expended on the range and not recovered." DEIS at 4-176. The Navy also recognizes that "debris in the marine environment is a great hazard and can be harmful to wildlife[,]" DEIS at 4-77, and "[h]igh concentrations of potentially toxic substances within marine mammals along with an increase in new diseases have been documented in recent years," DEIS at 4-78. Despite this harm, the Navy illegally failed to analyze adequately the risk and consequences posed by the training debris it will inject into Hawai'i's coastal zone.

Initially, the Navy failed to quantify the amount of additional training debris that will be deposited in Hawai'i's waters. The Navy brushes aside any potential effects of 56,422 additional pieces of training debris (plus any additional waste generated by major exercises), declaring "[w]ithin the approximately 235,000 sq. nmi. of ocean encompassed by the HRC, however, the amount of ocean bottom habitat affected by a few tons per year of training debris will be insignificant, even assuming that some portions of the training areas are used more heavily than others." DEIS at 4-177 to 4-178. Among other things, the Navy: 7

- Improperly relied on data from the San Clemente Island Ordnance Database to estimate the amount of toxic chemicals released by sonobuoys, without demonstrating whether San Clemente's sonobuoy use is consistent with Hawai'i's sonobuoy use. DEIS at 4-178. 8
- Failed to disclose the components of chaff or the amount of chaff per package. DEIS at 4-179. 9
- Failed to clarify the quantity, type, and source of hazardous materials expected to be generated by intensified RDT&E operations such as "additional chemical simulants" and increased missile launches. DEIS at 4-180. 10

Earthjustice Comments on HRC DEIS and DSEIS
April 7, 2008
Page 6

COMMENT NUMBER
S-E-0212 (cont.)

- Failed to account for additional hazardous materials generated by HRC enhancements, such as the debris generated by the proposed Portable Undersea Tracking Range; construction of an open-water Acoustic Test Facility off Ford Island; demolition of 13 buildings within PMRF; and construction of a 90,000 sq. ft. Range Operations Control Building in PMRF; and enhancement of the Explosive Ordnance Disposal ranges. 11
- Failed to quantify instances in which the "incidental release" of fuel and oil could occur. DEIS at 4-192. 12

Chalking up the 56,422 additional "hazardous training materials" to be introduced annually to Hawai'i's marine environment to a "few tons per year" without any attempt at quantification does not meet NEPA's standard of "high quality information." 40 C.F.R. § 1500.1(b). The amount of additional training debris must be quantified before a "hard look" at the effects can even begin. Accordingly, the Navy's discussion of the effects of training debris is seriously flawed:

- The Navy failed to address the cumulative effects of increasing the amounts of training debris in a coastal zone already littered with 80 years of the Navy's expended training materials. The Navy ends its "analysis" at the acknowledgment that "the amounts of toxic substances being released to the environment[] will gradually increase over the period of military use. Concentrations of some substances in sediments surrounding the disposed items will increase over time, possibly inhibiting benthic flora and fauna." DEIS at 4-176 to 4-177. "General statements about possible effects and some risk do not constitute a hard look absent a justification regarding why more definitive information could not be provided." Klamath-Siskiyou, 387 F.3d at 994. 13
- The Navy failed to address the cumulative effects of introducing training debris in heavy concentrations by simultaneous unit-level and major exercises. The same phrase cut-and-pasted over and over again throughout the DEIS demonstrates that the cumulative effects of intensified training have not been considered: "Potential impacts from Major Exercises will be similar to those described earlier for training operations and RDT&E." 14
- The Navy failed to address the cumulative effects of conducting training and RDT&E operations in certain areas more often than in others. In the few instances that the Navy provides probability of risk analyses, it fails to account for the fact that training exercises are often conducted at that same location. See, e.g., DEIS at 4-178 (estimating the rate of deposition for pyrotechnic residues at 0.01 lb/nmi/year based on an area of 235,000 nm). 15
- The Navy failed to address the indirect effect on the continued survival of endangered and threatened marine species and the health and safety of the general public through the potential bioaccumulation of hazardous materials in benthic species and coral, which form the basis of the food chain. 16
- The Navy failed to assess adequately the probability of training debris or live ordnance directly striking marine mammals. If it is possible to quantify risk, the Navy must do so. 17

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER S-E-0212 (cont.)

Klamath-Siskiyou, 387 F.3d at 994. Instead, it improperly concluded that the possibility of being struck by a missile is small, based on a probability analysis conducted for the Point Mugu Sea Range EIS and the fact that the TOA is 2.1 million nmi. DEIS at 4-212. The existence of a probability analysis in the Point Mugu EIS indicates that the risk is quantifiable. Moreover, the risk analysis cannot be diluted with the assumption that the entire 2.1 million nmi. will be used. In fact, the DEIS recognizes that certain portions of the TOA are used more heavily than others. See DEIS at 4-198 ("Of particular concern are overflight of and the potential for debris on Nihoa and Necker islands").

- The Navy failed to account for the risk or consequences of direct strikes on corals around the main Hawaiian Islands and within Papahanaumokuakea National Marine Monument (which protects 70% of the United States' coral reefs). Direct impacts on coral indirectly affects threatened and endangered species through destruction of their habitat and food sources. In addition, the Navy failed to account for the cumulative effects of its proposed action on coral with rising sea levels caused by global warming. 18 23

- The Navy failed to analyze the risk of turtle and marine mammal entanglement in expended sonobuoy parachutes and torpedo air stabilizer canopies, which it admits will sink to the seafloor where currents could cause them to billow. A billowing parachute could attract and entangle threatened sea turtles and endangered Hawaiian monk seals or other marine life. 19

The DEIS fails to analyze adequately effects of increased detonations on fish

Similarly, the Navy has failed to quantify the amount of increased detonations within the marine environment or to analyze the direct, indirect, and cumulative effects of increased and intensified exercises and activities involving explosives on Hawai'i's fish population.[1] For example, in listing the effects of underwater detonation on fish, the Navy concludes without analysis that live fire rounds "pose little risk to fish unless they were to be near the surface of at the point of impact." DEIS at 4-16. At page 4-326, the Navy admits that Pu'uloa Mine Neutralization and Salvage Operations occur within Essential Fish Habitat and will result in the loss of fish and benthic communities, but it fails to quantify the risk of loss for any of the alternatives. Without this initial analysis, it is impossible to quantify the indirect socioeconomic effects attendant with harm to fisheries. Further, as the DEIS notes that the Native Hawaiian community would be disproportionately affected if fish stock were reduced, triggering environmental justice concerns. DEIS at 4-466. 20 21 22

"The purpose of NEPA is to require disclosure of relevant environmental considerations that were given a 'hard look' by the agency, and thereby to permit informed public comment on proposed action and any choices or alternatives that might be pursued with less environmental harm." Lands Council, 395 F.3d at 1027. Because the Navy failed to "put on the table, for the

[1] The Navy has refused to analyze Essential Fish Habitat in the HRC EIS because it claims to have done that analysis in the Essential Fish Habitat & Coral Reef Assessment for the Hawai'i Range Complex. DEIS at 4-13. Earthjustice was unable to locate a copy of that document online. It is well-established that "NEPA documents are inadequate if they contain only narratives of expert opinions." Klamath-Siskiyou Wildlands Center, 387 F.3d at 996.

COMMENT NUMBER S-E-0212 (cont.)

deciding agency's and for the public's view, a sufficiently detailed statement of environmental impacts and alternatives so as to permit informed decision making[,]" the Navy cannot legally base a Record of Decision on this DEIS, and must issue a revised DEIS that discloses the full extent of the proposed action, properly analyzes alternatives, and addresses all reasonably foreseeable direct, indirect, and cumulative effects. Id.

Sincerely,

Koalani Kaulukukui
Associate Attorney

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-E-0213

NRDC

NATURAL RESOURCES DEFENSE COUNCIL

By Electronic and Regular Mail

April 7, 2008

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kauai, Hawaii 96752-0128
ATTN: HRC EIS/OEIS
deis_hrc@govsupport.us

Re: Draft Supplemental Environmental Impact Statement for the Hawaii Range Complex

Dear Sir or Madam:

On behalf of the Natural Resources Defense Council ("NRDC'), The Humane Society of the United States, the International Fund for Animal Welfare, Cetacean Society International, Ocean Mammal Institute, the International Ocean Noise Coalition, Seaflow, and Ocean Futures Society and its founder Jean-Michel Cousteau, and on behalf of our millions of members, thousands of whom reside in Hawaii, we are writing to submit comments on the Navy's Draft Supplemental Environmental Impact Statement! Overseas Environmental Impact Statement for the Hawaii Range Complex ("DSEIS"). See 73 Fed. Reg. 10232 (Feb. 26,2008).[1]

I. Alternatives Analysis

1

In September, we called of attention to several deficiencies in the Navy's alternatives analysis: the Navy's refusal to consider a reduction in the level of current training in the Hawaii Range Complex ("HRC") or the siting of exercises in locations outside the range; the failure of the DEIS to analyze meaningfully whether a different mix of simulators and at-sea exercises would accomplish its aims; and the failure to adequately consider a range of mitigation measures that would achieve the Navy's core aim while minimizing environmental harm. DEIS Comments at 28-32. We are dismayed to see that none of these faults have been corrected in the supplemental document,

[1] NRDC is aware that comments may be submitted separately by government agencies, individual scientists, environmental organizations, and the public. The comments that follow do not constitute a waiver of any factual or legal issue raised by any of these organizations or individuals and not specifically discussed herein. We hereby incorporate by reference all comments separately submitted on both the DEIS and DSEIS.

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COMMENT NUMBER

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notwithstanding several recent court rulings that would seem to compel a different approach than the Navy has taken thus far.

The only aspect of the alternatives to change is the number of sonar use hours modeled for each suite of events. In general, the numbers of modeled hours are far lower than those set forth in the DEIS, so that, for example, the hours assigned to surface-ship tactical sonars in the Navy's No-Action Alternative have decreased by half - a change due, apparently, to the Navy's application of its Sonar Positional Reporting System (SPORTS). Following the release of the DEIS, the Navy determined that the SPORTS system might aid in quantifying the number of sonar use hours expected under each alternative. DSEIS at 1-3. We note, however, that the SPORTS system is a relatively novel means of centralizing data on mid-frequency sonar use, and the large discrepancy in use hours between the DEIS and DSEIS raises some question about its reliability. We therefore request that the Navy compare SPORTS data with logs retained by the Pacific Fleet, over a sample period, to confirm that SPORTS reporting does indeed capture all mid-frequency sonar use in the Hawaii Range Complex. Assuming that this is the case, we request that the Navy publicly report the total number of sonar use hours occurring on the HRC on a semi-annual basis, to ensure that levels remain below the levels established here.

II. Analysis of Species "Take"

2

The threshold used in the DSEIS differs from the one used by the Navy to estimate marine mammal take during RIMPAC 2006 and during subsequent major exercises off Hawaii and California. In short, instead of using an EL standard of 173 dB re 1 $\mu Pa^{2}\cdot s$, which NMFS had insisted the Navy adopt, the Navy rather applies a behavioral risk function that begins at 120 dB re 1 µPa and reaches its mean at 165 dB re 1 µPa.

The Navy's adoption of this risk function has significant implications for its Navy's analysis. Under the current 173 dB (EL) standard, the RIMPAC 2006 event was expected to result in slightly less than 33,000 behavioral takes of marine mammals; under the proposed standard, RIMPAC events conducted with the same number of hours of sonar use would supposedly cause fewer than 6,000 takes. DSEIS at 3-24. Under the current standard, the conduct of 6 USWEX events was predicted to cause over 30,000 behavioral takes of marine mammals; under the proposed one, annual takes would not exceed 18,000. DSEIS at 3-26. Across the Hawaii Range Complex, the Pacific Fleet estimates that sonar training will result each year in approximately 45,000 behavioral takes of marine mammals, including behavioral impacts coinciding with temporary hearing loss. DSEIS at 3-17. These differences suggest that the predicted take-while still very large-represents far less than what the Fleet would have estimated had it continued to use the previous standard. (Indeed, we request that the Navy provide a take estimate using the 173 dB (EL) standard.)

As the Navy should well know, agencies are not entitled to substantial deference under the Administrative Procedure Act when they reverse previously held positions. Among the most significant problems:

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

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First, the Navy again relies on inapposite studies of temporary threshold shift in captive animals for its primary source of data. Marine mammal scientists have long recognized the deficiencies of using captive subjects in behavioral experiments, and to blindly rely on this material, to the exclusion of copious data on animals in the wild, is not supportable by any standard of scientific inquiry. Cf 42 C.F.R. § 1502.22. The problem is exacerbated further by the fact that the subjects in question, rougWy two belugas and five bottlenose dolphins, are highly trained animals that have been working in the Navy's research program in the SPAWAR complex for years.[2] Indeed, the disruptions observed by Navy scientists, which included pronounced, aggressive behavior ("attacking" the source) and avoidance of feeding areas associated with the exposure, occurred during a research protocol that the animals had been rigorously trained to complete.[3] The SPAWAR studies have several other major deficiencies that NMFS, among others, has repeatedly pointed out; and in relying so heavily on them, the Navy has once again ignored the comments of numerous marine mammal behaviorists on the Navy's USWTR DEIS, which sharply criticize the Navy for putting any serious stock in them.[4] 3

Second, the Navy appears to have misused data garnered from the Haro Strait incident---one of only three data sets it considers-by including only those levels of sound received by the "J" pod of killer whales when the USS Shoup was at its closest approach (see discussion below at section A.2). DEIS at 4-51. These numbers represent the maximum level at which the pod was harassed; in fact, the whales were reported to have broken off their foraging and to have engaged in significant avoidance behavior at far greater distances from the ship, where received levels would have been orders of magnitude lower.[5] Not surprisingly, then, the Navy's results are inconsistent with other studies of the effects of various noise sources, including mid-frequency sonar, on killer whales. We must insist that the NaVY provide the public with its propagation analysis for the Haro Strait event, and also describe precisely how this data 4

2 See, e.g., S.H. Ridgway, D.A. Carder, R.R. Smith, T. Kamolnick, C.E. Schlundt, and W.R. Elsberry, Behavioral Responses and Temporary Shift in Masked Hearing Threshold of Bottlenose Dolphins, Tursiops truncatus, to 1-Second Tones of 141 to 201 dB re 1 uPa (1997)(SPAWAR Tech. Rep. 1751, Rev. 1).

3 C.E. Schlundt, 1.1. Finneran, D.A. Carder, and S.H. Ridgway, Temporary Shift in Masked Hearing Thresholds of Bottlenose Dolphins, Tursiops truncates, and White Whales, Delphinapterus leucas, after Exposure to Intense Tones, 107 Journal of the Acoustical Society of America 3496, 3504 (2000).

4 See comments from M. Johnson, D. Mann, D. Nowacek, N. Soto, P. Tyack, P. Madsen, M. Wahlberg, and B. Møhl, received by the Navy on the Undersea Warfare Training Range DEIS. These comments, and those of the fishermen cited below, are hereby incorporated into this letter. See also Letter from Rodney F. Weiher, NOAA, to Keith Jenkins, Naval Facilities Engineering Command Atlantic (Jan. 30, 2006); Memo, A.R. document 51, NRDC v. Winter, CV 06-4131 FMC (JCx) (undated NOAA memorandum).

5 See, e.g., NMFS, Assessment of Acoustic Exposures on Marine Mammals in Conjunction with USS Shoup Active Sonar Transmissions in the Eastern Strait of Juan de Fuca and Ham Strait, Washington-5 May 2003 at 4-6 (2005); Letter from D. Bain to California Coastal Commission (Jan. 9,2007).

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set, along with results from the SPAWAR and Nowacek et al. studies, were factored into its development of the behavioral risk function.

Third, the Navy excludes a substantial body of both experimental and opportunistic research on the impacts of ocean noise on marine mammals. For example, the Navy does not consider the established literature on harbor porpoises, which have evinced a strong sensitivity to many types of anthropogenic sound at levels well below those captured by the Navy's risk function. The DEIS recently prepared for the Navy's Atlantic Fleet Active Sonar Training, in implicit acknowledgment of these data, sets an absolute take threshold of 120 dB (SPL) for the species; yet neither the Atlantic Fleet DEIS nor the instant DEIS includes any of these studies in its data set. DEIS at 4-48,4-50-51. The result is clear bias, for even if one assumes (for argument's sake) that the SPAWAR data has value, the Navy has included a relatively insensitive species in setting its general standard for marine mammals while excluding a relatively sensitive one.

In short, by placing great weight on the SPAWAR data, excluding other relevant data, and misusing the Haro Strait data, the Navy has produced a risk function that is belied by the existing record.[6] That record clearly demonstrates a high risk of significant behavioral impacts from mid-frequency sources, including mid-frequency sonar, on a diverse range of wild species (e.g., right whales, minke whales, killer whales, harbor porpoises, Dall's porpoises) at levels well below the "K" value of 165 dB (SPL), and well below 150 dB (SPL), where the Navy assumes take is minimal.[7] 5

Fourth, any risk function must take account of the social ecology of some marine mammal species. For species that travel in tight-knit groups, an effect on certain individuals can adversely influence the behavior of the whole. Pilot whales, for 6

6 It should further be noted that the Nowacek et al. 2004 study, the one other data set considered by the Navy, indicates that more than 50% of exposed animals responded profoundly at sound pressure levels below 135 dB re 1 μPa.

7 See, e.g., id.; R.A. Kastelein, H.T. Rippe, N. Vaughan, N.M. Schooneman, W.C. Verboom, and D. de Haan, The Effects of Acoustic Alarms on the Behavior of Harbor Porpoises in a Floating Pen, 16 Marine Mammal Science 46 (2000); P.F. Olesiuk, L.M. Nichol, MJ. Sowden, and J.K.B. Ford, Effect of the Sound Generated by an Acoustic Harassment Device on the Relative Abundance of Harbor Porpoises in Retreat Passage, British Columbia, 18 Marine Mammal Science 843 (2002); NMFS, Assessment of Acoustic Exposures on Marine Mammals in Conjunction with USS Shoup Active Sonar Transmissions in the Eastern Strait of Juan de Fuca and Ham Strait, Washington, 5 May 2003 at 10 (2005); D.P. Nowacek, M.P. Johnson, and P.L. Tyack, North Atlantic Right Whales CEubalaena glacialis) Ignore Ships but Respond to Alerting Stimuli, 271 Proceedings of the Royal Society of London, Part B: Biological Sciences 227 (2004); Statements of D. Bain, K. Balcomb, and R. Osborne (May 28,2003) (taken by NMFS enforcement on Haro Strait incident); Letter from D. Bain to California Coastal Commission (Jan. 9, 2007); E.C.M.Parsons, l. Birks, P.G.H. Evans, J.C.D. Gordon, J.H. Shrimpton, and S. Pooley, The Possible Impacts of Military Activity on Cetaceans in West Scotland, 14 European Research on Cetaceans 185-190 (2000); P. Kvadsheim, F. Benders, P. Miller, L. Doksaeter, F. Knudsen, P. Tyack, N. Nordlund, F.-P. Lam, F. Samarra, L. Kleivane, and O.R. Godø, Herring (Sild), Killer Whales (Spekkhogger) and Sonar - the 3S-2006 Cruise Report with Preliminary Results (2007). See also A.A. Truett, Ecological Risk to Cetaceans from Anthropogenic Ocean Sound: Characterization Analysis Using a Professional Judgment Approach to Uncertainty 95 (2007).

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

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example, are prone to mass strand for precisely this reason; and the plight of the 200 melon-headed whales in Hanalei Bay, and of the "J" pod of killer whales in Haro Strait, as described in our DEIS comment letter, may be pertinent examples. Should the pod or group contain a few sensitive individuals, the entire social unit could experience harassment-a dynamic that is not reflected in the Navy's risk function. In developing its "A" parameter, the Navy must take account of such potential indirect effects. 42 C.F.R. § 1502.16(b).

7

Fifth, the Navy's exclusive reliance on sound pressure levels ("SPLs") in setting a behavioral threshold is misplaced. The discussion in the DEIS speaks repeatedly of uncertainty in defining the risk function and recapitulates, in its summary of the earlier methodology, the benefits implicit in the use of a criterion that takes duration into account. It is therefore appropriate for the Navy to set dual thresholds for behavioral effects, one based on SPLs and one based either on energy flux density levels ("ELs") or another measure of exposure or exercise duration.

8

Sixth, as noted in our comments on the DEIS, the Navy's threshold is applied in such a way as to preclude any assessment of long-term behavioral impacts on marine mammals. It does not account, to any degree, for the problem of repetition: the way that apparently insignificant impacts, such as subtle changes in dive times or vocalization patterns, can become significant if experienced repeatedly or over time.[8] The problem is only compounded by the Navy's failure to consider the best available evidence of population structuring in Hawaiian marine mammals, as discussed in our DEIS comment letter.

9

For all these reasons, the behavioral risk function utilized by the Navy in this DEIS is fundamentally inconsistent with the scientific literature on acoustic impacts, and, indeed, with marine mammal science in general, and, if used to support a Record of Decision, would violate NEPA. Further, the model is highly sensitive to changes in the Navy's assumptions, meaning that its assumptions result in significant underestimates of take. Please note that we will forward a more detailed, technical analysis expanding on these points later this month.

[8] The importance of this problem for marine mammal conservation is reflected in a recent NRC report, which calls for models that, inter alia, translate such subtle changes into disruptions in key activities like feeding and breeding that are significant for individual animals. National Research Council. Marine Mammal Populations and Ocean Noise: Determining When Noise Causes Biologically Significant Effects 35-68 (2005). Additional evidence relevant to the problem of stress in marine mammals is summarized in AJ. Wright, N. Aguilar Soto, AL. Baldwin, M. Bateson, C.M. Beale, C.Clark, T. Deak, E.F. Edwards, A. Fernandez, A. Godinho, L. Hatch, A. Kakuschke, D. Lusseau, D. Martineau, L.M. Romero, L. Weilgart, B. Wintle, G. Notarbartolo di Sciara, and V. Martin, "Do marine mammals experience stress related to anthropogenic noise?" (in press and forthcoming 2008) (attached to this letter).

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Very truly yours,

Michael Jasny
Senior Policy Analyst

Encl.

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0218

MY Comments on the SDEIS/OEIS

1 message

Lee Tepley **Wed, Apr 9, 2008 at 1:48 AM**
To: sdeis_hrc@govsupport.us

1 In the the Supplement to the draft EIS, the Navy admits that it's complex 112 page data analysis is based on an incredibly large number of approximations as listed below. At the Hilo meeting a Navy representative told me that under the circumstances, the Supplement to the draft EIS was "the best that they could do". I think that it is disgraceful that the Navy should have based a complex mathematical analysis on such poor data.

My first question is: Why did the Navy base the complex mathematical analysis in the Supplement to the draft EIS on such incredibly poor data??

Below I have copied a number of the approximations on which the Supplement to the draft EIS is based. The approximations started at about page 3-3.

There is widespread consensus that cetacean response to MFA sound signals needs to be better defined using controlled experiments.

Until additional data is available, NMFS and the Navy have determined that the following three data sets are most applicable for the direct use in developing risk function parameters for MFA/HFA sonar. These data sets represent the only known data that specifically relate altered behavioral responses to exposure to MFA sound sources.

The only mysticete data available resulted from field experiments in which were exposed to a range frequency sound sources from 120 Hz to 4500 Hz.

Although these observations were made in an uncontrolled environment, the sound field that may have been associated with the sonar operations had to be estimated, and the behavioral observations were reported for groups of whales, not individual whales, the observations associated

with the USS SHOUP provide the only data set available of the behavioral responses of wild, non-captive animal upon exposure to the AN/SQS-53 MFA sonar.

Observations from this reconstruction included an approximate closest approach time which was correlated to a reconstructed estimate of received level at an approximate whale location

There are significant limitations and challenges to any risk function derived to estimate the probability of marine mammal behavioral responses; these are largely attributable to sparse data. Ultimately there should be multiple functions for different marine mammal taxonomic groups, but the current data are insufficient to support them.

The risk function presented here is based on three data sets that NMFS and Navy have determined are the best available science at this time. The Navy and NMFS acknowledge each of these data sets has limitations. However, this risk function, if informed by the limited available datarelevant to the MFA sonar application, has the advantages of simplicity and the fact that there is precedent for its application and foundation in marine mammal research. While NMFS considers all data sets as being

weighted equally in the development of the risk function, the Navy believes the SSC San Diego data is the most rigorous and applicable for the following reasons:

COMMENT NUMBER
S-E-0218 (cont.)

The risk function presented here is based on three data sets that NMFS and Navy have determined are the best available science at this time. The Navy and NMFS acknowledge each of these data sets has limitations. However, this risk function, if informed by the limited available data relevant to the MFA sonar application, has the advantages of simplicity and the fact that there is precedent for its application and foundation in marine mammal research. While NMFS considers all data sets as being

weighted equally in the development of the risk function, the Navy believes the SSC San Diego data is the most rigorous and applicable for the following reasons:

• The data represents the only source of information where the researchers had complete control over and ability to quantify the noise exposure conditions.

However, the Navy and NMFS do agree that the following are limitations associated with the three data sets used as the basis of the risk function:

• The three data sets represent the responses of only four species: trained bottlenose dolphins and beluga whales, North Atlantic right whales in the wild and killer whales in the wild.

• None of the three data sets represent experiments designed for behavioral observations of animals exposed to MFA sonar.

• The behavioral responses of marine mammals that were observed in the wild are based solely on an estimated received level of sound exposure; they do not take into consideration (due to minimal or no supporting data):

– Potential relationships between acoustic exposures and specific behavioral activities (e.g., feeding, reproduction, changes in diving behavior, etc.), variables such as bathymetry, or acoustic waveguides;

– Differences in individuals, populations, or species, or the prior experiences, reproductive state, hearing sensitivity, or age of the marine mammal.

• The observations of behavioral response were from exposure to alert stimuli that contained mid-frequency components but was not similar to a MFA sonar ping.

This 18-minute alert stimuli is in contrast to the average 1-sec ping every 30 sec in acomparatively very narrow frequency band used by military sonar.

• The observations of behavioral harassment were complicated by the fact that there were other sources of harassment in the vicinity (other vessels and their interaction with the animals during the observation).

• The observations were anecdotal and inconsistent. There were no controls during the observation period, with no way to assess the relative magnitude of the any observed response as opposed to baseline conditions.

In view of the incredibly large number of approximations above (and other approximations not listed), please tell me why this draft EIS should be taken seriously?? 1

My 2nd question is based on the fact that the Supplement to the draft EIS does not even mention the strong possibility of deep diving whales (and especially beaked whales) getting decompression sickness (the "bends) from exposure to an unknown (but possibly low) level of MFA sonar. 2

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

Question #2. Why was the above totally ignored in the 2nd draft EIS??

Sincerely,

Lee Tepley

Ph. D. Physics.

COMMENT NUMBER

S-E-0218 (cont.)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

April 10, 2008

Tom Clements
Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128
Kehaha, Kauai, HI 96752-0128

Subject: Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS), Hawaii Range Complex, Hawaii (CEQ # 20070312)

Dear Mr. Clements:

The U.S. Environmental Protection Agency (EPA) has reviewed the above-referenced document pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. Our detailed comments are enclosed.

EPA reviewed the Draft Environmental Impact Statement (DEIS) and provided comments to the Department of the Navy (DON) on September 17, 2007. We rated the DEIS as Environmental Concerns - Insufficient Information (EC-2) due to concerns regarding impacts to marine resources from the preferred alternative. We recommended additional alternatives be evaluated and a more precautionary approach be taken regarding the use of mid-frequency active (MFA) sonar in training exercises due to the substantial uncertainty of these impacts on marine resources. We also requested additional information regarding impacts to fish from MFA sonar and additional discussion of the potential for underwater detonations to disperse polychlorinated biphenyls (PCBs) and heavy metal contamination in Pearl Harbor.

DON has prepared this Supplemental DEIS (SDEIS) to address impacts to marine mammals from Navy acoustic sources. Specifically, the Navy has changed the methodology used to estimate sonar hours of mid-frequency active (MFA) use for the exercises and has changed the methodology used to evaluate effects of MFA sonar on marine mammals. The new methodologies result in substantially lower estimates of sonar hours and predicted adverse impacts to marine mammals.

The Supplement DEIS also includes an additional Alternative 3 which proposes the same increased frequency and tempo of training events, addition of major exercises including supporting up to three Strike Groups, and increased research, development, test and evaluation (RDT&E) operations as the previously preferred Alternative 2, but with the amount of MFA sonar use as occurs in current ongoing training, RDT&E operations and support of existing range

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COMMENT NUMBER

S-E-0225

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
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capabilities (No Action Alternative). Alternative 3 is the new preferred alternative.

1 We must commend the Navy for reducing the proposed increase in mid-frequency sonar use under Alternative 2. However, we have concerns regarding the changes to the methodologies for impact assessment, the basis of which contains substantial uncertainties, and for the possibility that impacts could be underestimated. 2 We are also concerned with impacts to the endangered Hawaiian Monk Seal, especially since the threshold for harassment has been raised in the SDEIS for this species. The Hawaiian Monk Seal is in precipitous decline with extinction a real possibility in the Northwest Hawaiian Islands. 3, 4 Additionally, we note that the Record of Decision for this action will utilize the National Defense Exemption from the Marine Mammal Protection Act. We are rating the DSEIS as Environmental Concerns - Insufficient Information (EC-2) (see enclosed "Summary of Rating Definitions").

EPA recommends the Navy identify and explore additional ways of minimizing MFA sonar use in its Anti-submarine Warfare (ASW) training and utilize the NEPA process to develop a broader range of alternatives which avoid potentially significant impacts (40 CFR 1500.2(e)). 5 We encourage precaution, as a remedy for the significant uncertainties that abound in the impact assessment, and in the use of MFA sonar. 6 We also encourage collaboration and joint fact-finding with interested agencies and organizations to resolve disputes over scientific and technical issues.

7 We note that EPA's comments on the DEIS regarding the potential for underwater detonations to disperse polychlorinated biphenyls (PCBs) and heavy metal contamination in Pearl Harbor and our request for disclosure of the amount of munitions use and their associated pollutants for all alternatives were not addressed in this SDEIS. We continue to extend these requests.

EPA appreciates the opportunity to review this SDEIS. When the Final EIS is released for public review, please send one copy to the address above (mail code: CED-2). If you have any questions, please contact me at (415) 972-3846 or Karen Vitulano, the lead reviewer for this project, at 415-947-4178 or vitulano.karen@epa.gov.

Sincerely,

For Connell Dunning

Nova Blazej, Manager
Environmental Review Office

Enclosure: Summary of EPA Rating Definitions
EPA's Detailed Comments

cc: Chris Yates, National Marine Fisheries Service

COMMENT NUMBER
S-E-0225 (cont.)

SUMMARY OF EPA RATING DEFINITIONS

This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the EIS.

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

ADEQUACY OF THE IMPACT STATEMENT

Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

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COMMENT NUMBER
S-E-0225 (cont.)

EPA DETAILED COMMENTS ON THE SUPPLEMENTAL DRAFT ENVIRONMENTAL IMPACT STATEMENT, HAWAII RANGE COMPLEX, HAWAII, APRIL 9, 2008

Minimizing Mid-Frequency Sonar Use

We understand the need for the Navy to use mid-frequency active (MFA) sonar in its anti-submarine warfare (ASW) training. MFA sonar is currently the only way to detect modern quiet submarines, and the Navy maintains that its use is the only way to provide realistic training and testing with this sonar technology. However, the potentially significant impacts from MFA sonar on marine mammals are of significant concern to the public, as evidenced in high litigation for these projects. EPA is also concerned about these impacts, especially considering future anticipated effects of climate change on marine ecosystems[1] and the additional strain MFA sonar impacts may have on increasingly stressed resources. 8

EPA recommends a comprehensive strategy for meeting ASW training needs while minimizing the use of MFA sonar. Since, as the Navy indicates, the effective use of sonar is a perishable skill that must be practiced frequently, additional means of practicing these skills should be developed. Computer-assisted simulations of sonar use and response that simulates what sonar technicians see on ship should be explored, if this is not already occurring, to augment and complement the use of MFA sonar in training. The drawbacks of simulation must be compared to training situations that include the various court and agency imposed restrictions on MFA sonar use, not to an ideal situation with no restrictions. 9

The clear identification of minimum training needs with regard to MFA sonar use can be useful in planning training programs that minimize MFA sonar use and maximize the skills gained from its use. This was the basis for our comment on the DEIS which recommended that the document include a range of alternatives developed with reference to how well they meet immediate and future training needs. Without specifically identifying minimum training needs, it is difficult to devise alternatives that avoid potentially significant impacts. The inclusion of an additional alternative in the SDEIS that proposes to stretch the existing hours of MFA sonar use (no action alternative) across additional training exercises demonstrates that there is flexibility in the amount of MFA sonar use that occurs during training. The NEPA documents do not identify the minimum requirements that are needed for the Hawaii Range Complex, nor is there evidence of Navy coordination with other Range Complexes in Southern California, the Northern Mariana Islands, and the Pacific Northwest for opportunities to maximize the training benefit of MFA sonar use. 10

EPA also encourages the Navy to consider the benefits of collaboration in addressing this controversial issue. The Council on Environmental Quality, by releasing new guidance on Collaboration in NEPA[2], has communicated the need for Federal agencies to better engage interested parties in collaborative environmental analysis and federal decision-making. We understand national security issues would limit some opportunities to collaborate, but we suspect 11

[1] Intergovernmental Panel on Climate Change, 4th Assessment Report ""Impacts, Adaptation and Vulnerability", Section 4.4.9 – Oceans and Shallow Seas. Available: http://www.ipcc.ch/ipccreports/ar4-wg2.htm

[2] Available: http://www.nepa.gov/ntf/Collaboration_in_NEPA_Oct_2007.pdf

COMMENT NUMBER
S-E-0225 (cont.)

that some opportunities with other interested parties may exist, such as in developing a broader range of alternatives and/or in joint fact-finding (an inclusive and deliberative process to foster mutual learning and resolve disputes over scientific and technical issues). Collaboration might offer an alternative to litigation and we recommend its consideration.

Recommendation: EPA recommends that the FEIS identify all efforts that the Navy is taking to minimize MFA sonar use in ASW training and to identify additional opportunities to meet training needs while minimizing MFA sonar use. We continue to recommend that a broader range of alternatives be evaluated, and the identification of minimum training requirements and minimum sonar use for ASW exercises will facilitate the development of alternatives that avoid potentially significant impacts (40 CFR 1500.2(e)). 12

We also recommend the Navy explore the use of simulations to augment the use of MFA sonar training, or if this is occurring, to invest in better simulations. We request that information about these efforts be included in the FEIS. We also recommend coordination of ASW training that is occurring in other Range Complexes in Southern California, the Northern Mariana Islands, and the Pacific Northwest for opportunities to maximize the benefit gained from each MFA sonar use. 13

We encourage collaboration with interested outside parties where possible, especially in the development of alternatives and in joint fact-finding to resolve disputes over scientific and technical issues. Please address this possibility in the FEIS. 14

Changes to Sonar Hours

The new method of calculating sonar hours utilizes the Sonar Positional Reporting System (SPORTS), a database tool established in March 2006 to determine geographic locations of sonar use and into which all commands employing MFA sonar and sonobuoys are to input MFA sonar use daily. We commend the Navy for attempting to refine the estimated sonar hour usage originally collected, and for including submarine sonar in the analysis in the SDEIS (p. 2-1). However, very little information regarding the SPORTS database is revealed in the SDEIS. We understand from the Navy that the database is classified, had been in use for 14 months, and contained some inaccuracies that were corrected using best professional judgment. Since so little information about this data is revealed, it is not clear that the SPORTS data is in fact more representative; certainly the documentation in the SDEIS does not demonstrate this. Since this new method of calculating sonar use produced an estimate that is much lower than that estimated in the DEIS, more information is needed to substantiate its use to ensure that sonar use is not being underreported. 15

Recommendation: The FEIS should include more information about the data in the SPORTS database. The FEIS should also provide detail of the method previously used, which we understand from the Navy was based on a 2-year study for the Range Complex Management Plan and involved estimates and the use of best professional judgment. Additional discussion as to why the SPORTS method is considered more accurate should 16

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-E-0225 (cont.)

be included in the FEIS. EPA recommends that this discussion include a comparison of the attributes and limitations of both methodologies in a comparative manner for the benefit of the reader and decision-maker.

Analytical Methodology

17 The Supplemental Draft Environmental Impact Statement (SDEIS) modifies the analytical methodology used to evaluate marine mammal behavior responses to MFA sonar in the Hawaii Range Complex (HRC). The DEIS had used a dose function analytical approach, and the SDEIS uses a risk function developed with the National Marine Fisheries Service (NMFS). The SDEIS indicates that this change resulted from efforts to develop more appropriate model input parameters (p. es-2) in the hopes of increasing the accuracy of the Navy's assessment. It also indicates that the Navy believed that the methodology in the DEIS had overestimated potential effects (p. 3-14).

We commend the Navy for attempting to refine and improve methods for impact analysis, however substantial limitations and uncertainty appear to exist for the risk function. The SDEIS admits the risk function is based on "very limited data" (p. 3-6) consisting of just three data sets. One of the three data sets used acoustic stimuli that was unlike the Navy's MFA sonar (p. 3-9), and another data set's observations were "anecdotal and inconsistent" and lacked controls (p. 3-10). Additionally, the data sets represent responses from a limited number of species (four).

18 *Recommendation:* EPA has concerns due to the substantial scientific uncertainty associated with the data that informed the Navy's new methodology. In the process of refining methods for impact analysis, the Navy should ensure that impacts are not underreported. Because of the high level of uncertainty, it is prudent to err on the side of more precaution. We recommend application of buffers in calculating impacts to account for this uncertainty and that considers cumulative impacts that these resources are receiving from other stressors. As we stated in our comments on the DEIS, the determination of impact significance, as it relates to NEPA disclosure, must consider this uncertainty.[3]

19 As mentioned above, opportunities for joint fact-finding with interested parties to resolve disputes over scientific and technical issues should be considered.

Impacts to the Hawaiian Monk Seal

20 The impact analysis in the SDEIS raised the threshold for determining harassment to the endangered Hawaiian monk seal (HMS). The determination of temporary threshold shift (TTS), a temporary shift in hearing sensitivity, and the permanent threshold shift (PTS), a permanent hearing loss, were altered to utilize the TTS of the elephant seal which the SDEIS states is more closely related to the HMS than other pinnipeds. The SDEIS provides very little information regarding this change, which appears to be based on the information from one researcher. We

[3] The Council on Environmental Quality Regulations for Implementing NEPA state that "the degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks" should be considered in evaluating significance (40 CFR 1508.27 (b) 5)

COMMENT NUMBER
S-E-0225 (cont.)

are concerned with potentially underestimating impacts to the HMS because the species is in such precipitous decline, with extinction of the Northwest HMS a real possibility.[4]

Recommendation: Provide additional information in the FEIS regarding the use of a higher harassment threshold for the rapidly declining HMS. Unless there is complete scientific agreement that these thresholds are more appropriate, we recommend against change to the assessment methodology, believing a more precautionary approach is appropriate for such a vulnerable species.

Additional Comment

We recommend that the tables in Chapter 3 of the SDEIS be reviewed as it appears there are some errors, at least for the humpback whale PTS in Table 3.3.1-1 and on pages 3-22, 3-26, and 3-28. 22

[4] Western Pacific Regional Fishery Management Council, Pacific Islands Fishery News, Winter 2008

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment S-E-0005 was the same as that of S-E-0004. This comment was submitted by Mark Wichar of Vancouver, WA.	S-E-0005
The text of comment S-E-0006 was the same as that of S-E-0004. This comment was submitted by Donna Lee Cussac of Cleveland, TN.	S-E-0006
The text of comment S-E-0007 was the same as that of S-E-0004. This comment was submitted by Michael Swerdlow of Waikoloa, HI.	S-E-0007
The text of comment S-E-0009 was the same as that of S-E-0004. This comment was submitted by Fern Holland of Kapa'a, Kauai, HI.	S-E-0009
The text of comment S-E-0010 was the same as that of S-E-0004. This comment was submitted by Lisa Galloway of Honolulu, HI.	S-E-0010
The text of comment S-E-0011 was the same as that of S-E-0004. This comment was submitted by Jamesy Gonsalves of Honolulu, HI.	S-E-0011
The text of comment S-E-0012 was the same as that of S-E-0004. This comment was submitted by Jody Smith of Honolulu, HI.	S-E-0012
The text of comment S-E-0013 was the same as that of S-E-0004. This comment was submitted by Tutabelle Ojeda of Keaau, HI.	S-E-0013
The text of comment S-E-0014 was the same as that of S-E-0004. This comment was submitted by Miguel Godinez of Hanalei, HI.	S-E-0014

	COMMENT NUMBER
The text of comment S-E-0015 was the same as that of S-E-0004. This comment was submitted by Carolyn Moore of Mesa, AZ.	S-E-0015
The text of comment S-E-0016 was the same as that of S-E-0004. This comment was submitted by Ellen Okuma of Kea'au, HI.	S-E-0016
The text of comment S-E-0017 was the same as that of S-E-0004. This comment was submitted by Kanoe Kapu of Hilo, HI.	S-E-0017
The text of comment S-E-0018 was the same as that of S-E-0004. This comment was submitted by BOBBY McClintock of Honolulu, HI.	S-E-0018
The text of comment S-E-0019 was the same as that of S-E-0004. This comment was submitted by Shannan Chan of Honolulu, HI.	S-E-0019
The text of comment S-E-0020 was the same as that of S-E-0004. This comment was submitted by Earlene Alexiou of Soquel, CA.	S-E-0020
The text of comment S-E-0021 was the same as that of S-E-0004. This comment was submitted by Dave Kisor of Riverside, CA.	S-E-0021
The text of comment S-E-0022 was the same as that of S-E-0004. This comment was submitted by Dinda Evans of San Diego, CA.	S-E-0022
The text of comment S-E-0023 was the same as that of S-E-0004. This comment was submitted by Marie Le Boeuf of Makawao, HI.	S-E-0023
The text of comment S-E-0024 was the same as that of S-E-0004. This comment was submitted by Healani Trembath of Lihue, HI.	S-E-0024

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment S-E-0025 was the same as that of S-E-0004. This comment was submitted by Nadine Apo of Denver, CO.	S-E-0025
The text of comment S-E-0026 was the same as that of S-E-0004. This comment was submitted by Scott Jarvis of Hanalei, HI.	S-E-0026
The text of comment S-E-0027 was the same as that of S-E-0004. This comment was submitted by Lisa Marshall of Houston, TX.	S-E-0027
The text of comment S-E-0028 was the same as that of S-E-0004. This comment was submitted by Briana Wagner of Hagerstown, MD.	S-E-0028
The text of comment S-E-0029 was the same as that of S-E-0004. This comment was submitted by Patricia Blair of Kailua, HI.	S-E-0029
The text of comment S-E-0030 was the same as that of S-E-0004. This comment was submitted by Raquel Esparza of Hollywood, CA.	S-E-0030
The text of comment S-E-0031 was the same as that of S-E-0004. This comment was submitted by Annalia Russell of Kapa'a, HI.	S-E-0031
The text of comment S-E-0032 was the same as that of S-E-0004. This comment was submitted by Kathy-Lyn Allen of Pueblo, CO.	S-E-0032
The text of comment S-E-0033 was the same as that of S-E-0004. This comment was submitted by Ravi Grover of Chicago, IL.	S-E-0033

	COMMENT NUMBER
The text of comment S-E-0034 was the same as that of S-E-0004. This comment was submitted by Katy Fogg of Olympia, WA.	S-E-0034
The text of comment S-E-0035 was the same as that of S-E-0004. This comment was submitted by Katie Leinweber of Kihei, HI.	S-E-0035
The text of comment S-E-0036 was the same as that of S-E-0004. This comment was submitted by Meghan Au of Waimanalo, HI.	S-E-0036
The text of comment S-E-0037 was the same as that of S-E-0004. This comment was submitted by Jonah Jensen of Lawai, HI.	S-E-0037
The text of comment S-E-0038 was the same as that of S-E-0004. This comment was submitted by Mike Moran of Kihei, HI.	S-E-0038
The text of comment S-E-0039 was the same as that of S-E-0004. This comment was submitted by Gail Richard of Menlo Park, CA.	S-E-0039
The text of comment S-E-0040 was the same as that of S-E-0004. This comment was submitted by Lauren Pomerantz of Kihei, HI.	S-E-0040
The text of comment S-E-0041 was the same as that of S-E-0004. This comment was submitted by Constance Rocse of Lahaina, HI.	S-E-0041
The text of comment S-E-0042 was the same as that of S-E-0004. This comment was submitted by Steve LaFleur of Paia, HI.	S-E-0042
The text of comment S-E-0043 was the same as that of S-E-0004. This comment was submitted by Naia Kelly of Haiku, HI.	S-E-0043

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment S-E-0044 was the same as that of S-E-0004. This comment was submitted by Joy Perfetti of Haiku, HI.	S-E-0044
The text of comment S-E-0045 was the same as that of S-E-0004. This comment was submitted by Ron Whitmore of Hilo, HI.	S-E-0045
The text of comment S-E-0046 was the same as that of S-E-0004. This comment was submitted by Teri Lawrence of Lahaina, HI.	S-E-0046
The text of comment S-E-0047 was the same as that of S-E-0004. This comment was submitted by Nancy Davlantes of Greendale, WI.	S-E-0047
The text of comment S-E-0048 was the same as that of S-E-0004. This comment was submitted by Nola Conn of Anahola, HI.	S-E-0048
The text of comment S-E-0049 was the same as that of S-E-0004. This comment was submitted by Stephen Skogman of Kula, HI.	S-E-0049
The text of comment S-E-0050 was the same as that of S-E-0004. This comment was submitted by Anita Wintner of Kihei, HI.	S-E-0050
The text of comment S-E-0051 was the same as that of S-E-0004. This comment was submitted by Bill Lewis of Volcano, HI.	S-E-0051
The text of comment S-E-0052 was the same as that of S-E-0004. This comment was submitted by Brooke Porter of Wailuku, HI.	S-E-0052
The text of comment S-E-0053 was the same as that of S-E-0004. This comment was submitted by Faith Wilcox of Westport, ME.	S-E-0053

	COMMENT NUMBER
The text of comment S-E-0054 was the same as that of S-E-0004. This comment was submitted by John Lyons of Makawao, HI.	S-E-0054
The text of comment S-E-0056 was the same as that of S-E-0004. This comment was submitted by Robin James of Ashland, OR.	S-E-0056
The text of comment S-E-0057 was the same as that of S-E-0004. This comment was submitted by Cathy McDuff of Haiku, HI.	S-E-0057
The text of comment S-E-0058 was the same as that of S-E-0004. This comment was submitted by Rich Lucas of Haiku, HI.	S-E-0058
The text of comment S-E-0060 was the same as that of S-E-0004. This comment was submitted by Mary Groode of Kihei, HI.	S-E-0060
The text of comment S-E-0061 was the same as that of S-E-0004. This comment was submitted by Madeleine Migenes of Haiku, HI.	S-E-0061
The text of comment S-E-0063 was the same as that of S-E-0004. This comment was submitted by Jay Jones of , HI.	S-E-0063
The text of comment S-E-0064 was the same as that of S-E-0004. This comment was submitted by Elaine Gima of Kahului, HI.	S-E-0064
The text of comment S-E-0065 was the same as that of S-E-0004. This comment was submitted by Ann Engerman of Paia, HI.	S-E-0066
The text of comment S-E-0066 was the same as that of S-E-0004. This comment was submitted by Barbara Kranichfeld of Haiku, HI.	S-E-0066

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	COMMENT NUMBER
The text of comment S-E-0067 was the same as that of S-E-0004. This comment was submitted by Adrianna Grace of Haiku, HI.	S-E-0067
The text of comment S-E-0068 was the same as that of S-E-0004. This comment was submitted by Carole Burstein of Kihei, HI.	S-E-0068
The text of comment S-E-0069 was the same as that of S-E-0004. This comment was submitted by Kelly Prince of Kihei, HI.	S-E-0069
The text of comment S-E-0070 was the same as that of S-E-0004. This comment was submitted by Gail Richard of Menlo Park, CA.	S-E-0070
The text of comment S-E-0071 was the same as that of S-E-0004. This comment was submitted by Bobbi Leung of Los Angeles, CA.	S-E-0071
The text of comment S-E-0073 was the same as that of S-E-0004. This comment was submitted by John Dwork of Maui, HI.	S-E-0073
The text of comment S-E-0074 was the same as that of S-E-0004. This comment was submitted by Katy Rose of Hanalei, HI.	S-E-0074
The text of comment S-E-0075 was the same as that of S-E-0004. This comment was submitted by Carl Berg of Lihue, HI.	S-E-0075
The text of comment S-E-0076 was the same as that of S-E-0004. This comment was submitted by Sharon Goodwin of Kapaa, HI.	S-E-0076
The text of comment S-E-0077 was the same as that of S-E-0004. This comment was submitted by Andrea Brower of Anahola, HI.	S-E-0077

	COMMENT NUMBER
The text of comment S-E-0079 was the same as that of S-E-0004. This comment was submitted by Barbara Best of Wailuku, HI.	S-E-0079
The text of comment S-E-0080 was the same as that of S-E-0004. This comment was submitted by John Barnett of Kapaa, HI.	S-E-0080
The text of comment S-E-0081 was the same as that of S-E-0004. This comment was submitted by Janos Samu of Kalaheo, HI.	S-E-0081
The text of comment S-E-0082 was the same as that of S-E-0004. This comment was submitted by Helena Lake of Cardiff by the Sea, CA.	S-E-0082
The text of comment S-E-0083 was the same as that of S-E-0004. This comment was submitted by Noyita Saravia of Kahuku, HI.	S-E-0083
The text of comment S-E-0084 was the same as that of S-E-0004. This comment was submitted by Lily Kempf of Colorado Springs, CO.	S-E-0084
The text of comment S-E-0085 was the same as that of S-E-0004. This comment was submitted by Tanya Eldridge of Nantucket, MA.	S-E-0085
The text of comment S-E-0086 was the same as that of S-E-0004. This comment was submitted by Ernest Jepson of Kihei, HI.	S-E-0086
The text of comment S-E-0087 was the same as that of S-E-0004. This comment was submitted by Sandra Herndon of Kapaa, HI.	S-E-0087

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	COMMENT NUMBER
The text of comment S-E-0088 was the same as that of S-E-0004. This comment was submitted by Caren Diamond of Hanalei, HI.	S-E-0088
The text of comment S-E-0089 was the same as that of S-E-0004. This comment was submitted by Richard Owen of Kihei, HI.	S-E-0089
The text of comment S-E-0090 was the same as that of S-E-0004. This comment was submitted by Sophie Foulkes-Taylor of Lahaina, HI.	S-E-0090
The text of comment S-E-0091 was the same as that of S-E-0004. This comment was submitted by Jennifer Graybill of New York, NY.	S-E-0091
The text of comment S-E-0092 was the same as that of S-E-0004. This comment was submitted by Puanani Rogers of Kapaa, HI.	S-E-0092
The text of comment S-E-0093 was the same as that of S-E-0004. This comment was submitted by Gordon LaBedz of Waimea, HI.	S-E-0093
The text of comment S-E-0094 was the same as that of S-E-0004. This comment was submitted by Peggy LeDoux of Kihei, HI.	S-E-0094
The text of comment S-E-0095 was the same as that of S-E-0004. This comment was submitted by Whitney Stolman of San Francisco, CA.	S-E-0095
The text of comment S-E-0096 was the same as that of S-E-0004. This comment was submitted by John Rumbaugh of Phoenix, AZ.	S-E-0096

	COMMENT NUMBER
The text of comment S-E-0101 was the same as that of S-E-0004. This comment was submitted by Randy Ching of Honolulu, HI.	S-E-0101
The text of comment S-E-0104 was the same as that of S-E-0004. This comment was submitted by Stephanie Fitzgerald of Hanalei, HI.	S-E-0104
The text of comment S-E-0106 was the same as that of S-E-0004. This comment was submitted by Nina Monasevitch of Lihue, HI.	S-E-0106
The text of comment S-E-0107 was the same as that of S-E-0004. This comment was submitted by Janet Taylor of Hilo, HI.	S-E-0107
The text of comment S-E-0108 was the same as that of S-E-0004. This comment was submitted by Anne Rivers of Lahaina, HI.	S-E-0108
The text of comment S-E-0109 was the same as that of S-E-0004. This comment was submitted by Kealakai of Honolulu, HI.	S-E-0109
The text of comment S-E-0112 was the same as that of S-E-0004. This comment was submitted by Diana Burns of Keaau, HI.	S-E-0112

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	COMMENT NUMBER
The text of comment S-E-0126 was the same as that of S-E-0004. This comment was submitted by Cindy Lance of Honolulu, HI.	S-E-0126
The text of comment S-E-0127 was the same as that of S-E-0004. This comment was submitted by Harvey Arkin of Honolulu, HI.	S-E-0127
The text of comment S-E-0128 was the same as that of S-E-0004. This comment was submitted by Raymond Madigan of Honolulu, HI.	S-E-0128
The text of comment S-E-0129 was the same as that of S-E-0004. This comment was submitted by Lisa Galloway of Honolulu, HI.	S-E-0129
The text of comment S-E-0130 was the same as that of S-E-0004. This comment was submitted by Patti Hackney of Wailuku, HI.	S-E-0130
The text of comment S-E-0131 was the same as that of S-E-0004. This comment was submitted by Mike Hendrickson of Denver, CO.	S-E-0131
The text of comment S-E-0132 was the same as that of S-E-0004. This comment was submitted by Den Mark of Vancouver, WA.	S-E-0132
The text of comment S-E-0133 was the same as that of S-E-0004. This comment was submitted by Robert Wagner of Lawrenceville, GA.	S-E-0133
The text of comment S-E-0134 was the same as that of S-E-0004. This comment was submitted by Nina Monasevitch of Lihue, HI.	S-E-0134

	COMMENT NUMBER
The text of comment S-E-0135 was the same as that of S-E-0004. This comment was submitted by Mike Moran of Kihei, HI.	S-E-0135
The text of comment S-E-0136 was the same as that of S-E-0004. This comment was submitted by Bobbie Alicen of Kea'au, HI.	S-E-0136
The text of comment S-E-0137 was the same as that of S-E-0004. This comment was submitted by leilani Trocki of Alta Loma, CA.	S-E-0137
The text of comment S-E-0138 was the same as that of S-E-0004. This comment was submitted by Catherine Okimoto of Pahoa, HI.	S-E-0138
The text of comment S-E-0139 was the same as that of S-E-0004. This comment was submitted by Forest Shomer of Port Townsend, WA.	S-E-0139
The text of comment S-E-0140 was the same as that of S-E-0004. This comment was submitted by Skye Coe of Kihe'i, HI.	S-E-0140
The text of comment S-E-0141 was the same as that of S-E-0004. This comment was submitted by Michele McKay of Honolulu, HI.	S-E-0141
The text of comment S-E-0142 was the same as that of S-E-0004. This comment was submitted by Angela Kepler of Haiku, HI.	S-E-0142
The text of comment S-E-0143 was the same as that of S-E-0004. This comment was submitted by Kim Elegado of Hanalei, HI.	S-E-0144
The text of comment S-E-0144 was the same as that of S-E-0004. This comment was submitted by David Strauch of Hoholulu, HI.	S-E-0144

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment S-E-0145 was the same as that of S-E-0004. This comment was submitted by Summer Faria of Pearl City, HI.	S-E-0145
The text of comment S-E-0146 was the same as that of S-E-0004. This comment was submitted by Jill Morgyn of Kurtistown, HI.	S-E-0146
The text of comment S-E-0147 was the same as that of S-E-0004. This comment was submitted by Kealakai Hammond of Honolulu, HI.	S-E-0147
The text of comment S-E-0148 was the same as that of S-E-0004. This comment was submitted by Robert Wahinehookae of Honolulu, HI.	S-E-0148
The text of comment S-E-0149 was the same as that of S-E-0004. This comment was submitted by PAUL DOUCETTE of Wailuku, HI.	S-E-0149
The text of comment S-E-0150 was the same as that of S-E-0004. This comment was submitted by Dona van Bloemen of Santa Monica, CA.	S-E-0150
The text of comment S-E-0151 was the same as that of S-E-0004. This comment was submitted by Dinda Evans of San Diego, CA.	S-E-0151
The text of comment S-E-0152 was the same as that of S-E-0004. This comment was submitted by Janice Palma-Glennie of Kailua-kona, HI.	S-E-0152

	COMMENT NUMBER
The text of comment S-E-0153 was the same as that of S-E-0004. This comment was submitted by Scott Jarvis of Hanalei, HI.	S-E-0153
The text of comment S-E-0154 was the same as that of S-E-0004. This comment was submitted by Annalia Russell of Kapa'a, HI.	S-E-0154
The text of comment S-E-0156 was the same as that of S-E-0004. This comment was submitted by Lauryn Galindo of Hanalei, HI.	S-E-0156
The text of comment S-E-0157 was the same as that of S-E-0004. This comment was submitted by Aline Larkin of Saco, ME.	S-E-0157
The text of comment S-E-0158 was the same as that of S-E-0004. This comment was submitted by David Johnston of Wailuku, HI.	S-E-0158
The text of comment S-E-0159 was the same as that of S-E-0004. This comment was submitted by Miguel Godinez of Hanalei,, HI.	S-E-0159
The text of comment S-E-0160 was the same as that of S-E-0004. This comment was submitted by Royelen Boykie of Washington, DC.	S-E-0160
The text of comment S-E-0161 was the same as that of S-E-0004. This comment was submitted by Ann Moffat of Wilmette, IL.	S-E-0161
The text of comment S-E-0162 was the same as that of S-E-0004. This comment was submitted by Janet Codispoti of Pahoa, HI.	S-E-0162

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment S-E-0163 was the same as that of S-E-0004. This comment was submitted by Kathleen Dockett of Washington, DC.	S-E-0163
The text of comment S-E-0164 was the same as that of S-E-0004. This comment was submitted by Lisa Marshall of Houston, TX.	S-E-0164
The text of comment S-E-0165 was the same as that of S-E-0004. This comment was submitted by Bina Robinson of Swain, NY.	S-E-0165
The text of comment S-E-0166 was the same as that of S-E-0004. This comment was submitted by Libbie Hambleton of Destin, FL.	S-E-0166
The text of comment S-E-0167 was the same as that of S-E-0004. This comment was submitted by Katy Rose of Hanalei, HI.	S-E-0167
The text of comment S-E-0168 was the same as that of S-E-0004. This comment was submitted by Duane Choy of Honolulu, HI.	S-E-0168
The text of comment S-E-0169 was the same as that of S-E-0004. This comment was submitted by Tara Cornelisse of San Rafael, CA.	S-E-0169
The text of comment S-E-0170 was the same as that of S-E-0004. This comment was submitted by Jacqueline Remington of Waimanalo, HI.	S-E-0170
The text of comment S-E-0171 was the same as that of S-E-0004. This comment was submitted by Rose Grady of Kailua, HI.	S-E-0171

	COMMENT NUMBER
The text of comment S-E-0172 was the same as that of S-E-0004. This comment was submitted by Hilary Harts of Kula, HI.	S-E-0172
The text of comment S-E-0173 was the same as that of S-E-0004. This comment was submitted by Denise Lytle of Fords, NJ.	S-E-0173
The text of comment S-E-0174 was the same as that of S-E-0004. This comment was submitted by Lisa Diaz of Kailua-Kona, HI.	S-E-0174
The text of comment S-E-0175 was the same as that of S-E-0004. This comment was submitted by Cathy Robinson of Mobile, AL.	S-E-0175
The text of comment S-E-0177 was the same as that of S-E-0004. This comment was submitted by Katy Fogg of Olympia, WA.	S-E-0177
The text of comment S-E-0178 was the same as that of S-E-0004. This comment was submitted by Brown Kevin of Kaunakakai, HI.	S-E-0176
The text of comment S-E-0179 was the same as that of S-E-0004. This comment was submitted by Cornelia Skipton of Rockville, MD.	S-E-0179
The text of comment S-E-0180 was the same as that of S-E-0004. This comment was submitted by Nancy Davlantes of Greendale, WI.	S-E-0180
The text of comment S-E-0182 was the same as that of S-E-0004. This comment was submitted by Kelli Chin of Honolulu, HI.	S-E-0182

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment S-E-0183 was the same as that of S-E-0004. This comment was submitted by Laura Marsh of Kapaa, HI.	S-E-0183
The text of comment S-E-0184 was the same as that of S-E-0004. This comment was submitted by Richard Benton of , HI.	S-E-0184
The text of comment S-E-0185 was the same as that of S-E-0004. This comment was submitted by Lauri Peacock of Hobbs, NM.	S-E-0185
The text of comment S-E-0186 was the same as that of S-E-0004. This comment was submitted by Cory Harden of Hilo, HI.	S-E-0186
The text of comment S-E-0187 was the same as that of S-E-0004. This comment was submitted by Paul Moss of White Bear Lake, MN.	S-E-0187
The text of comment S-E-0188 was the same as that of S-E-0004. This comment was submitted by Richard Powers of Naalehu, HI.	S-E-0188
The text of comment S-E-0189 was the same as that of S-E-0004. This comment was submitted by Serena Kaldi of Kaneohe, HI.	S-E-0189
The text of comment S-E-0190 was the same as that of S-E-0004. This comment was submitted by Mary Stone of Kalaheo, HI.	S-E-0190
The text of comment S-E-0191 was the same as that of S-E-0004. This comment was submitted by Jeff Sacher of Kamuela, HI.	S-E-0191
The text of comment S-E-0192 was the same as that of S-E-0004. This comment was submitted by Chessa Au of Ronkonkoma, NY.	S-E-0192

	COMMENT NUMBER
The text of comment S-E-0193 was the same as that of S-E-0004. This comment was submitted by Cynthia Hathaway of Keaau, HI.	S-E-0193
The text of comment S-E-0194 was the same as that of S-E-0004. This comment was submitted by Christine Ahia of Hilo, HI.	S-E-0194
The text of comment S-E-0196 was the same as that of S-E-0004. This comment was submitted by Marjorie Erway of Kailua-Kona, HI.	S-E-0196
The text of comment S-E-0197 was the same as that of S-E-0004. This comment was submitted by Kyno ravelo of HI, .	S-E-0197
The text of comment S-E-0198 was the same as that of S-E-0004. This comment was submitted by Jill Guillermo-Togawa of HI, .	S-E-0198
The text of comment S-E-0200 was the same as that of S-E-0004. This comment was submitted by Michael Swerdlow of HI, .	S-E-0200
The text of comment S-E-0201 was the same as that of S-E-0004. This comment was submitted by Ikaika Hussey of Kanehoe, HI.	S-E-0201
The text of comment S-E-0202 was the same as that of S-E-0004. This comment was submitted by Nina Monasevitch of Lihue, HI.	S-E-0202
The text of comment S-E-0203 was the same as that of S-E-0004. This comment was submitted by Jeffrey Lagrimas of Hilo, HI.	S-E-0203
The text of comment S-E-0204 was the same as that of S-E-0004. This comment was submitted by Jamie Oshiro of Honolulu, HI.	S-E-0204

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

	COMMENT NUMBER
The text of comment S-E-0205 was the same as that of S-E-0004. This comment was submitted by Kevin Nesnow of Honolulu, HI.	S-E-0205
The text of comment S-E-0206 was the same as that of S-E-0004. This comment was submitted by Mikel Athon of Cedar Hill, TX.	S-E-0206
The text of comment S-E-0207 was the same as that of S-E-0004. This comment was submitted by Mary Martin of Honolulu, HI.	S-E-0207

	COMMENT NUMBER
The text of comment S-E-0214 was the same as that of S-E-0004. This comment was submitted by Leita Kaldi of Bradenton, FL.	S-E-0214
The text of comment S-E-0215 was the same as that of S-E-0004. This comment was submitted by Lori Ferrell_Lori of Kailua-Kona, HI.	S-E-0215
The text of comment S-E-0216 was the same as that of S-E-0004. This comment was submitted by Debbie Burack of New York, NY.	S-E-0216
The text of comment S-E-0217 was the same as that of S-E-0004. This comment was submitted by Christina Gauen of Kailua, HI.	S-E-0217
The text of comment S-E-0219 was the same as that of S-E-0004. This comment was submitted by Bryan Matsumoto of Temple City, CA.	S-E-0219
The text of comment S-E-0220 was the same as that of S-E-0004. This comment was submitted by Donna Cussac of Cleveland, TN.	S-E-0220
The text of comment S-E-0221 was the same as that of S-E-0004. This comment was submitted by Faith Willcox of Westport, ME.	S-E-0221
The text of comment S-E-0222 was the same as that of S-E-0004. This comment was submitted by Lacie Whitten of Honolulu, HI.	S-E-0222
The text of comment S-E-0223 was the same as that of S-E-0004. This comment was submitted by David Burns of Keaau, HI.	S-E-0223
The text of comment S-E-0224 was the same as that of S-E-0004. This comment was submitted by Carolyn Moore of Mesa, AZ.	S-E-0224

Exhibit 14.4.2-1. Copy of Email Documents - Supplement to the Draft EIS/OEIS (Continued)

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Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS

Commentor	Comment #	Resource	EIS Section	Response Text
Stu Burley	S-E-0001-1	Program	2.2.2.4.1	The figure showing relative missile size has been updated.
Joel Fischer University of Hawai'i	S-E-0002-1	Mitigation Measures	1.3.2, 4.1.2, 6.0	It is critical for the Navy to be able to conduct training in a variety of environmental and bathymetric conditions, which may overlap with marine mammal areas. Mitigation measures proposed in Chapter 6.0 should ensure that marine mammals would not be injured by Navy training activities. As discussed in 4.1.2, the analytical methodology used in this EIS/OEIS was developed in close coordination with NMFS. This represents the best available and most applicable science with regard to analysis of effects to marine mammals from MFA/HFA sound sources. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals, the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas during some parts of the year in Hawaiian waters. Section 1.3.2 describes why the Navy must train and why Hawaii is the most appropriate place to undertake the proposed actions.
Michael Jones University of Hawaii	S-E-0003-1	Miscellaneous	10.0	Your name has been added to the Chapter 10.0 distribution list of the Final EIS/OEIS. The University of Hawaii, Hamilton Library has been added to the list of libraries in Chapter 10.0 of the Final EIS/OEIS. Indicating which references are and are not available is not required under NEPA; however, those references that are available, or a referral to a repository where the item is housed, will become part of the EIS/OEIS Administrative Record.
Janice Palma-Glennie	S-E-0004-1	Program	2.0	The Navy is not proposing to establish a live fire training range encompassing the entire Hawaiian Archipelago. Only a fraction of the Papahanaumokuakea Marine National Monument is within the Navy's Hawaiian Islands Operating Area on its western boundary near the northern border. Current and proposed live fire training takes place in the Hawaiian Islands Operating Area; however, these activities will not affect resources in the Hawaiian Islands Marine Refuge, Papahanaumokuakea Marine National Monument, or the Hawaiian Islands Humpback Whale Sanctuary. We understand and respect the value and importance of Hawaii's marine sanctuaries to many people. We also recognize that the primary philosophy of these sanctuaries is protection and preservation and we share that philosophy. The Navy takes precautions to minimize harm to these areas.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Janice Palma-Glennie	S-E-0004-2	Land Use - CZMA	4.1.2.4; 4.1.2.5.4	The Navy is in coordination with Hawaii's Office of Planning as it relates to CZMA compliance. Section 4.1.2.4 of the EIS/OEIS discusses the potential effects on marine mammals from Navy mid-frequency active (MFA) sonar training in the HRC. This training has been going on for the past 60 years. There has been no significant change in the sonar equipment in the last 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Though the Navy works to minimize impacts on marine mammals to the greatest extent practicable, they are not mandated by any statute to alleviate all risk to marine mammals. Over the past 30 years, the numbers of humpback whales around Hawaii appear to be increasing and the Navy believes that sonar has not significantly affected marine mammals in general.
	S-E-0004-3	Land Use - CZMA	6	While the Navy does consider effects to State listed species, federal agencies are not subject to the State's permitting process. The Navy will ensure that its activities are consistent with the State's CZMP enforceable policies to the maximum extent practicable. To achieve this, the Navy considers the use of mitigation measures (see Section 6.0), such as avoidance, as necessary in consultations with the state. In addition, the Navy is fully complying with requirements of the ESA and MMPA which also address the majority of state listed species coincident with federal listings.
	S-E-0004-4	Land Use - CZMA	3.6.2.1.4, 4.3.2.1.7.2., 4.8	The objective of Section 205A-2 (6) of the Hawaii Coastal Zone Management Program (CZMP) is to reduce hazards to life and property from tsunami, storm waters, stream flooding, erosion, subsidence, and pollution. No direct or indirect effects associated with coastal hazards, specifically pollution, would occur as a result of the Proposed Action. The top three preferred stimulant chemicals would be TBP, glyceryl tributyrate, and propylene glycol; none of the proposed stimulant chemicals are considered hazardous substances or constituents (Section 4.3.2.1.7.2). Fragments of expended training materials, e.g. ammunition, bombs and missiles, targets, sonobuoys, chaff, and flares, could be deposited on the ocean floor. The widely dispersed, intermittent, minute size of the material minimizes the impact. Wave energy and currents will further disperse the material. The density of debris deposits would be too low to be toxic. Regarding depleted uranium (DU), as detailed in Section 3.6.2.1.4, the U.S. Army is developing guidance to fully address the existence of depleted uranium at the PTA. Navy will follow this guidance for their proposed training activities at PTA and at Makua Military Reservation, if applicable. Thus, the Proposed Action is consistent to the maximum extent practicable with the applicable and enforceable CZMP Coastal Hazards policies.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Janice Palma-Glennie	S-E-0004-5	Land Use - CZMA	3.2, 4.1.2, 4.1.4, 4.2	The requirements for the Navy are laid out by the laws that created these Federal and state designated areas. Sections 3.2 and 4.2 of the EIS/OEIS reviewed the Papahanaumokuakea Marine National Monument. The Presidential Proclamation 8031 (71 FR 36443, June 26, 2006) establishing the Papahanaumokuakea Marine National Monument exempted "activities and exercises of the Armed Forces" from the prohibitions on activities in the Monument, in recognition of the importance of on-going missile testing over and within Monument boundaries. However, the Proclamation does require that all activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities. As discussed in 4.2, due to the infrequency and short duration of tests, the large ocean areas in which testing would occur, and the relatively small number of boosters or large debris that could impact Monument waters, it is highly unlikely that harm to marine mammals or other sensitive marine life or resources would occur. Sections 4.1.2, Biological Resources - Open Ocean, 4.1.4, Hazardous Materials & Waste - Open Ocean, and 4.2, Northwestern Hawaiian Islands, include details regarding missile intercept and the debris associated with these intercepts.
	S-E-0004-6	Land Use - CZMA	6.0	Navy is conducting their active sonar training consistent with the objectives of marine protection required by the Hawaii's CZMP. Mid-frequency sonar hours for current training, No-Action Alternative, and for the preferred alternative, Alternative 3, would be at the same. Chapter 6.0 of the EIS/OEIS presents the Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during sonar training events. It should be noted that these protective measures have been standard operating procedures for unit level antisubmarine warfare training since 2004. In addition, the Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.
	S-E-0004-7	Land Use - CZMA	3.2, 4.2	The Navy's Coastal Consistency Determination, in accordance with Hawaii's Coastal Zone Management Program, reviewed the activities proposed to be conducted internal or external to coastal ecosystems. The NWHI, the Hawaiian Islands Humpback Whale Sanctuary, and many locations throughout the HRC provide habitat for several special-status species. The Ecosystem Reserve, National Wildlife Refuge, and Monument designations will regulate human interaction with these geographic areas including those areas within the Coastal Zone. Navy's active sonar training may affect marine mammals; thus the Navy is continuing to consult with NMFS under Section 7 of the ESA, and is working with NMFS pursuant to the MMPA to mitigate these affects.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Janice Palma-Glennie	S-E-0004-8	Land Use - CZMA	6.1.4, Appendix F	As the state defines promoting public participation in coastal management, the Navy's Proposed Action is consistent. This EIS/OEIS provides full disclosure of Navy's activities. In addition, the U.S. Navy participates in the Hawaii Islands Humpback Whale National Marine Sanctuary Advisory Council, the Northwest Hawaiian Islands Coral Reef Ecosystem Reserve working group (now the Papahanaumokuakea Marine National Monument), Coastal America, the Hawaii Ocean and Coastal Council, the Kauai Invasive Species Committee, and numerous other advisory bodies. Regarding published reports, the Navy provides NMFS an After Action Report for USWEX and RIMPAC within 120 days of the training. Information from the RIMPAC 2006 After Action Report is provided in Appendix F of the Final EIS/OEIS (see Sections 6.1.4 and Appendix F of the Final EIS/OEIS).
Mark Wichar	S-E-0005-1	Program		See Comment ID S-E-0004-1
	S-E-0005-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0005-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0005-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0005-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0005-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0005-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0005-8	Land Use - CZMA		See Comment ID S-E-0004-8
Donna Lee Cussac	S-E-0006-1	Program		See Comment ID S-E-0004-1
	S-E-0006-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0006-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0006-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0006-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0006-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0006-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0006-8	Land Use - CZMA		See Comment ID S-E-0004-8
Michael Swerdlow	S-E-0007-1	Program		See Comment ID S-E-0004-1
	S-E-0007-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0007-3	Land Use - CZMA		See Comment ID S-E-0004-3

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Michael Swerdlow	S-E-0007-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0007-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0007-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0007-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0007-8	Land Use - CZMA		See Comment ID S-E-0004-8
Jill Morgyn	S-E-0008-1	Program		See response to comment S-E-0004-1.
	S-E-0008-2	Land Use - CZMA	3.3.2.1.8, 4.1.4, 4.8	The Navy has determined that in light of the applicable enforceable policies in the State of Hawaii's Coastal Zone Management Program(CZMP), there are no adverse direct or indirect (cumulative or secondary) effects on coastal uses or resources and the Proposed Action and its Alternatives are consistent to the maximum extent practicable with the enforceable policies of Hawaii's Coastal Zone Management Program. Inert bombs are used for land-based bombing exercises; these exercises would increase from 165 (current training, or the No-action Alternative) to 250 (Alternatives 2 and 3) events per year. Bombing exercise at sea use non-explosive rounds and inert bombs; these exercises would increase from 35 (No-action Alternative or current training) to 38 (Alternatives 2 and 3) annual events. Mid-frequency sonar hours for the preferred alternative, Alternative 3, would be at the same level as identified for the No-action Alternative (current training). The SDEIS presented the refined methodology as applied to the adjusted sonar-use hours. Some current flight trajectories could result in missiles such as the Terminal High Altitude Area Defense (THAAD) flying over portions of the Papahānaumokuākea Marine National Monument, but the EIS/OEIS noted that twelve or less potential annual missile flight trajectories may cross Monument airspace. Preliminary results of debris analysis indicate that debris is not expected to severely harm threatened, endangered, migratory, or other endemic species on or offshore of Nihoa and Necker Islands. The probability for debris to hit birds, seals, or other wildlife will be extremely low. Quantities of falling debris will be very low and widely scattered so as not to present a toxicity issue. Falling debris will also have cooled down sufficiently so as not to present a fire hazard for vegetation and habitat. If feasible, consideration will be given to alterations in the missile flight trajectory, to further minimize the potential for debris impacts.
	S-E-0008-3	Policy/NEPA Process		Thank you for your comment.
Fern Holland	S-E-0009-1	Program		See Comment ID S-E-0004-1
	S-E-0009-2	Land Use - CZMA		See Comment ID S-E-0004-2

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Fern Holland	S-E-0009-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0009-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0009-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0009-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0009-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0009-8	Land Use - CZMA		See Comment ID S-E-0004-8
Lisa Galloway	S-E-0010-1	Program		See Comment ID S-E-0004-1
	S-E-0010-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0010-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0010-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0010-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0010-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0010-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0010-8	Land Use - CZMA		See Comment ID S-E-0004-8
Jamesy Gonsalves	S-E-0011-1	Program		See Comment ID S-E-0004-1
	S-E-0011-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0011-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0011-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0011-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0011-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0011-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0011-8	Land Use - CZMA		See Comment ID S-E-0004-8
Jody Smith	S-E-0012-1	Program		See Comment ID S-E-0004-1
	S-E-0012-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0012-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0012-4	Land Use - CZMA		See Comment ID S-E-0004-4

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Jody Smith	S-E-0012-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0012-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0012-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0012-8	Land Use - CZMA		See Comment ID S-E-0004-8
Tutabelle Ojeda	S-E-0013-1	Program		See Comment ID S-E-0004-1
	S-E-0013-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0013-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0013-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0013-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0013-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0013-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0013-8	Land Use - CZMA		See Comment ID S-E-0004-8
Miguel Godinez	S-E-0014-1	Program		See Comment ID S-E-0004-1
	S-E-0014-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0014-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0014-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0014-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0014-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0014-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0014-8	Land Use - CZMA		See Comment ID S-E-0004-8
Carolyn Moore	S-E-0015-1	Program		See Comment ID S-E-0004-1
	S-E-0015-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0015-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0015-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0015-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0015-6	Land Use - CZMA		See Comment ID S-E-0004-6

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Carolyn Moore	S-E-0015-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0015-8	Land Use - CZMA		See Comment ID S-E-0004-8
Ellen Okuma	S-E-0016-1	Program		See Comment ID S-E-0004-1
	S-E-0016-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0016-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0016-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0016-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0016-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0016-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0016-8	Land Use - CZMA		See Comment ID S-E-0004-8
Kanoe Kapu	S-E-0017-1	Program		See Comment ID S-E-0004-1
	S-E-0017-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0017-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0017-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0017-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0017-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0017-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0017-8	Land Use - CZMA		See Comment ID S-E-0004-8
Bobby McClintock	S-E-0018-1	Program		See Comment ID S-E-0004-1
	S-E-0018-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0018-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0018-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0018-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0018-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0018-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0018-8	Land Use - CZMA		See Comment ID S-E-0004-8

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Shannan Chan	S-E-0019-1	Program		See Comment ID S-E-0004-1
	S-E-0019-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0019-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0019-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0019-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0019-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0019-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0019-8	Land Use - CZMA		See Comment ID S-E-0004-8
Earlene Alexiou	S-E-0020-1	Program		See Comment ID S-E-0004-1
	S-E-0020-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0020-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0020-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0020-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0020-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0020-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0020-8	Land Use - CZMA		See Comment ID S-E-0004-8
Dave Kisor	S-E-0021-1	Program		See Comment ID S-E-0004-1
	S-E-0021-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0021-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0021-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0021-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0021-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0021-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0021-8	Land Use - CZMA		See Comment ID S-E-0004-8
Dinda Evans	S-E-0022-1	Program		See Comment ID S-E-0004-1
	S-E-0022-2	Land Use - CZMA		See Comment ID S-E-0004-2

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Dinda Evans	S-E-0022-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0022-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0022-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0022-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0022-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0022-8	Land Use - CZMA		See Comment ID S-E-0004-8
Marie Le Boeuf	S-E-0023-1	Program		See Comment ID S-E-0004-1
	S-E-0023-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0023-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0023-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0023-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0023-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0023-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0023-8	Land Use - CZMA		See Comment ID S-E-0004-8
Healani Trembath	S-E-0024-1	Program		See Comment ID S-E-0004-1
	S-E-0024-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0024-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0024-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0024-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0024-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0024-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0024-8	Land Use - CZMA		See Comment ID S-E-0004-8
Nadine Apo	S-E-0025-1	Program		See Comment ID S-E-0004-1
	S-E-0025-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0025-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0025-4	Land Use - CZMA		See Comment ID S-E-0004-4

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Nadine Apo	S-E-0025-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0025-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0025-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0025-8	Land Use - CZMA		See Comment ID S-E-0004-8
Scott Jarvis	S-E-0026-1	Program		See Comment ID S-E-0004-1
	S-E-0026-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0026-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0026-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0026-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0026-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0026-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0026-8	Land Use - CZMA		See Comment ID S-E-0004-8
Lisa Marshall	S-E-0027-1	Program		See Comment ID S-E-0004-1
	S-E-0027-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0027-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0027-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0027-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0027-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0027-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0027-8	Land Use - CZMA		See Comment ID S-E-0004-8
Briana Wagner	S-E-0028-1	Program		See Comment ID S-E-0004-1
	S-E-0028-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0028-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0028-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0028-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0028-6	Land Use - CZMA		See Comment ID S-E-0004-6

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Briana Wagner	S-E-0028-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0028-8	Land Use - CZMA		See Comment ID S-E-0004-8
Patricia Blair	S-E-0029-1	Program		See Comment ID S-E-0004-1
	S-E-0029-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0029-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0029-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0029-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0029-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0029-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0029-8	Land Use - CZMA		See Comment ID S-E-0004-8
Raquel Esparza	S-E-0030-1	Program		See Comment ID S-E-0004-1
	S-E-0030-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0030-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0030-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0030-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0030-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0030-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0030-8	Land Use - CZMA		See Comment ID S-E-0004-8
Annalia Russell	S-E-0031-1	Program		See Comment ID S-E-0004-1
	S-E-0031-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0031-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0031-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0031-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0031-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0031-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0031-8	Land Use - CZMA		See Comment ID S-E-0004-8

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Kathy-Lyn Allen	S-E-0032-1	Program		See Comment ID S-E-0004-1
	S-E-0032-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0032-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0032-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0032-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0032-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0032-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0032-8	Land Use - CZMA		See Comment ID S-E-0004-8
Ravi Grover	S-E-0033-1	Program		See Comment ID S-E-0004-1
	S-E-0033-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0033-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0033-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0033-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0033-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0033-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0033-8	Land Use - CZMA		See Comment ID S-E-0004-8
Katy Fogg	S-E-0034-1	Program		See Comment ID S-E-0004-1
	S-E-0034-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0034-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0034-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0034-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0034-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0034-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0034-8	Land Use - CZMA		See Comment ID S-E-0004-8
Katie Leinweber	S-E-0035-1	Program		See Comment ID S-E-0004-1
	S-E-0035-2	Land Use - CZMA		See Comment ID S-E-0004-2

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Katie Leinweber	S-E-0035-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0035-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0035-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0035-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0035-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0035-8	Land Use - CZMA		See Comment ID S-E-0004-8
Meghan Au	S-E-0036-1	Program		See Comment ID S-E-0004-1
	S-E-0036-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0036-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0036-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0036-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0036-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0036-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0036-8	Land Use - CZMA		See Comment ID S-E-0004-8
Jonah Jensen	S-E-0037-1	Program		See Comment ID S-E-0004-1
	S-E-0037-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0037-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0037-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0037-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0037-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0037-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0037-8	Land Use - CZMA		See Comment ID S-E-0004-8
Mike Moran	S-E-0038-1	Program		See Comment ID S-E-0004-1
	S-E-0038-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0038-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0038-4	Land Use - CZMA		See Comment ID S-E-0004-4

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Mike Moran	S-E-0038-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0038-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0038-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0038-8	Land Use - CZMA		See Comment ID S-E-0004-8
Gail Richard	S-E-0039-1	Program		See Comment ID S-E-0004-1
	S-E-0039-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0039-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0039-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0039-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0039-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0039-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0039-8	Land Use - CZMA		See Comment ID S-E-0004-8
Lauren Pomerantz	S-E-0040-1	Program		See Comment ID S-E-0004-1
	S-E-0040-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0040-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0040-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0040-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0040-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0040-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0040-8	Land Use - CZMA		See Comment ID S-E-0004-8
Constance Rocse	S-E-0041-1	Program		See Comment ID S-E-0004-1
	S-E-0041-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0041-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0041-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0041-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0041-6	Land Use - CZMA		See Comment ID S-E-0004-6

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Constance Rocse	S-E-0041-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0041-8	Land Use - CZMA		See Comment ID S-E-0004-8
Steve LaFleur	S-E-0042-1	Program		See Comment ID S-E-0004-1
	S-E-0042-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0042-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0042-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0042-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0042-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0042-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0042-8	Land Use - CZMA		See Comment ID S-E-0004-8
Naia Kelly	S-E-0043-1	Program		See Comment ID S-E-0004-1
	S-E-0043-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0043-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0043-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0043-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0043-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0043-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0043-8	Land Use - CZMA		See Comment ID S-E-0004-8
Joy Perfetti	S-E-0044-1	Program		See Comment ID S-E-0004-1
	S-E-0044-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0044-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0044-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0044-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0044-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0044-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0044-8	Land Use - CZMA		See Comment ID S-E-0004-8

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Ron Whitmore	S-E-0045-1	Program		See Comment ID S-E-0004-1
	S-E-0045-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0045-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0045-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0045-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0045-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0045-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0045-8	Land Use - CZMA		See Comment ID S-E-0004-8
Teri Lawrence	S-E-0046-1	Program		See Comment ID S-E-0004-1
	S-E-0046-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0046-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0046-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0046-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0046-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0046-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0046-8	Land Use - CZMA		See Comment ID S-E-0004-8
Nancy Davlantes	S-E-0047-1	Program		See Comment ID S-E-0004-1
	S-E-0047-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0047-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0047-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0047-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0047-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0047-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0047-8	Land Use - CZMA		See Comment ID S-E-0004-8
Nola Conn	S-E-0048-1	Program		See Comment ID S-E-0004-1
	S-E-0048-2	Land Use - CZMA		See Comment ID S-E-0004-2

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Nola Conn	S-E-0048-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0048-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0048-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0048-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0048-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0048-8	Land Use - CZMA		See Comment ID S-E-0004-8
Stephen Skogman	S-E-0049-1	Program		See Comment ID S-E-0004-1
	S-E-0049-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0049-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0049-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0049-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0049-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0049-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0049-8	Land Use - CZMA		See Comment ID S-E-0004-8
Anita Wintner	S-E-0050-1	Program		See Comment ID S-E-0004-1
	S-E-0050-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0050-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0050-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0050-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0050-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0050-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0050-8	Land Use - CZMA		See Comment ID S-E-0004-8
Bill Lewis	S-E-0051-1	Program		See Comment ID S-E-0004-1
	S-E-0051-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0051-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0051-4	Land Use - CZMA		See Comment ID S-E-0004-4

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Bill Lewis	S-E-0051-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0051-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0051-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0051-8	Land Use - CZMA		See Comment ID S-E-0004-8
Brooke Porter	S-E-0052-1	Program		See Comment ID S-E-0004-1
	S-E-0052-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0052-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0052-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0052-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0052-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0052-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0052-8	Land Use - CZMA		See Comment ID S-E-0004-8
Faith Wilcox	S-E-0053-1	Program		See Comment ID S-E-0004-1
	S-E-0053-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0053-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0053-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0053-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0053-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0053-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0053-8	Land Use - CZMA		See Comment ID S-E-0004-8
John Lyons	S-E-0054-1	Program		See Comment ID S-E-0004-1
	S-E-0054-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0054-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0054-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0054-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0054-6	Land Use - CZMA		See Comment ID S-E-0004-6

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
John Lyons	S-E-0054-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0054-8	Land Use - CZMA		See Comment ID S-E-0004-8
Laura and Andrew Binstock	S-E-0055-1	Biological Resources - Marine	4.1.2.4, 6.0	The full analysis of effects in the EIS/OEIS indicates that there should be no mortality from Navy training activities. Range clearance procedures and mitigations are intended reduce the possibility of serious injury and mortality. The LOA issued by NMFS will place limits on the number and types of allowable takes (e.g. harassments) for all activities conducted within the HRC (see Sections 4.1.2.4 and 6.0).
Robin James	S-E-0056-1	Program		See Comment ID S-E-0004-1
	S-E-0056-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0056-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0056-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0056-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0056-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0056-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0056-8	Land Use - CZMA		See Comment ID S-E-0004-8
Cathy McDuff	S-E-0057-1	Program		See Comment ID S-E-0004-1
	S-E-0057-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0057-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0057-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0057-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0057-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0057-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0057-8	Land Use - CZMA		See Comment ID S-E-0004-8
Rich Lucas	S-E-0058-1	Program		See Comment ID S-E-0004-1
	S-E-0058-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0058-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0058-4	Land Use - CZMA		See Comment ID S-E-0004-4

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Rich Lucas	S-E-0058-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0058-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0058-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0058-8	Land Use - CZMA		See Comment ID S-E-0004-8
Steve Slater	S-E-0059-1	Hazardous Materials and Waste		The Navy recognizes that past practices conducted decades ago resulted in contamination of certain sites. Since that time, Congress has created and funded programs to identify those sites in need of remediation and proceed with the available funds. The island of Kahoolawe is one site that received priority funding in excess of $400 million and its own special legislation which resulted in a 10-year cleanup conducted in consultation with the State of Hawaii.
	S-E-0059-2	Biological Resources - Marine	3.2, 4.2	Sections 3.2 and 4.2 of the EIS/OEIS reviewed the PapahŪnaumokuŪkea Marine National Monument, The Navy complies with the Presidential Proclamation 8031 (71 FR 36443, June 26, 2006) which states that all "activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities."
Mary Groode	S-E-0060-1	Program		See Comment ID S-E-0004-1
	S-E-0060-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0060-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0060-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0060-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0060-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0060-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0060-8	Land Use - CZMA		See Comment ID S-E-0004-8
Madeleine Migenes	S-E-0061-1	Program		See Comment ID S-E-0004-1
	S-E-0061-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0061-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0061-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0061-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0061-6	Land Use - CZMA		See Comment ID S-E-0004-6

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Madeleine Migenes	S-E-0061-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0061-8	Land Use - CZMA		See Comment ID S-E-0004-8
Jay Jones	S-E-0063-1	Program		See Comment ID S-E-0004-1
	S-E-0063-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0063-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0063-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0063-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0063-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0063-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0063-8	Land Use - CZMA		See Comment ID S-E-0004-8
Elaine Gima	S-E-0064-1	Program		See Comment ID S-E-0004-1
	S-E-0064-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0064-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0064-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0064-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0064-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0064-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0064-8	Land Use - CZMA		See Comment ID S-E-0004-8
Ann Engerman	S-E-0065-1	Program		See Comment ID S-E-0004-1
	S-E-0065-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0065-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0065-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0065-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0065-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0065-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0065-8	Land Use - CZMA		See Comment ID S-E-0004-8

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Barbara Kranichfeld	S-E-0066-1	Program		See Comment ID S-E-0004-1
	S-E-0066-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0066-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0066-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0066-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0066-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0066-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0066-8	Land Use - CZMA		See Comment ID S-E-0004-8
Adrianna Grace	S-E-0067-1	Program		See Comment ID S-E-0004-1
	S-E-0067-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0067-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0067-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0067-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0067-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0067-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0067-8	Land Use - CZMA		See Comment ID S-E-0004-8
Carole Burstein	S-E-0068-1	Program		See Comment ID S-E-0004-1
	S-E-0068-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0068-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0068-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0068-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0068-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0068-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0068-8	Land Use - CZMA		See Comment ID S-E-0004-8
Kelly Prince	S-E-0069-1	Program		See Comment ID S-E-0004-1
	S-E-0069-2	Land Use - CZMA		See Comment ID S-E-0004-2

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Kelly Prince	S-E-0069-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0069-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0069-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0069-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0069-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0069-8	Land Use - CZMA		See Comment ID S-E-0004-8
Bobbi Leung	S-E-0071-1	Program		See Comment ID S-E-0004-1
	S-E-0071-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0071-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0071-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0071-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0071-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0071-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0071-8	Land Use - CZMA		See Comment ID S-E-0004-8
Emailer- Sylvia	S-E-0072-1	Alternatives		Thank you for your comment.
John Dwork	S-E-0073-1	Program		See Comment ID S-E-0004-1
	S-E-0073-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0073-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0073-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0073-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0073-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0073-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0073-8	Land Use - CZMA		See Comment ID S-E-0004-8
Katy Rose	S-E-0074-1	Program		See Comment ID S-E-0004-1
	S-E-0074-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0074-3	Land Use - CZMA		See Comment ID S-E-0004-3

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Katy Rose	S-E-0074-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0074-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0074-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0074-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0074-8	Land Use - CZMA		See Comment ID S-E-0004-8
Carl Berg	S-E-0075-1	Program		See Comment ID S-E-0004-1
	S-E-0075-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0075-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0075-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0075-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0075-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0075-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0075-8	Land Use - CZMA		See Comment ID S-E-0004-8
Sharon Goodwin	S-E-0076-1	Program		See Comment ID S-E-0004-1
	S-E-0076-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0076-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0076-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0076-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0076-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0076-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0076-8	Land Use - CZMA		See Comment ID S-E-0004-8
Andrea Brower	S-E-0077-1	Program		See Comment ID S-E-0004-1
	S-E-0077-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0077-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0077-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0077-5	Land Use - CZMA		See Comment ID S-E-0004-5

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Andrea Brower	S-E-0077-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0077-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0077-8	Land Use - CZMA		See Comment ID S-E-0004-8
Steve Colon Honolulu Council of the Navy League	S-E-0078-1	Miscellaneous		Thank you for your comment.
Barbara Best	S-E-0079-1	Program		See Comment ID S-E-0004-1
	S-E-0079-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0079-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0079-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0079-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0079-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0079-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0079-8	Land Use - CZMA		See Comment ID S-E-0004-8
John Barnett	S-E-0080-1	Program		See Comment ID S-E-0004-1
	S-E-0080-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0080-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0080-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0080-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0080-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0080-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0080-8	Land Use - CZMA		See Comment ID S-E-0004-8
Janos Samu	S-E-0081-1	Program		See Comment ID S-E-0004-1
	S-E-0081-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0081-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0081-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0081-5	Land Use - CZMA		See Comment ID S-E-0004-5

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Janos Samu	S-E-0081-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0081-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0081-8	Land Use - CZMA		See Comment ID S-E-0004-8
Helena Lake	S-E-0082-1	Program		See Comment ID S-E-0004-1
	S-E-0082-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0082-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0082-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0082-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0082-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0082-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0082-8	Land Use - CZMA		See Comment ID S-E-0004-8
Noyita Saravia	S-E-0083-1	Program		See Comment ID S-E-0004-1
	S-E-0083-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0083-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0083-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0083-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0083-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0083-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0083-8	Land Use - CZMA		See Comment ID S-E-0004-8
Lily Kempf	S-E-0084-1	Program		See Comment ID S-E-0004-1
	S-E-0084-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0084-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0084-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0084-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0084-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0084-7	Land Use - CZMA		See Comment ID S-E-0004-7

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Lily Kempf	S-E-0084-8	Land Use - CZMA		See Comment ID S-E-0004-8
Tanya Eldridge	S-E-0085-1	Program		See Comment ID S-E-0004-1
	S-E-0085-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0085-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0085-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0085-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0085-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0085-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0085-8	Land Use - CZMA		See Comment ID S-E-0004-8
Ernest Jepson	S-E-0086-1	Program		See Comment ID S-E-0004-1
	S-E-0086-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0086-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0086-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0086-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0086-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0086-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0086-8	Land Use - CZMA		See Comment ID S-E-0004-8
Sandra Herndon	S-E-0087-1	Program		See Comment ID S-E-0004-1
	S-E-0087-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0087-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0087-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0087-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0087-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0087-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0087-8	Land Use - CZMA		See Comment ID S-E-0004-8
Caren Diamond	S-E-0088-1	Program		See Comment ID S-E-0004-1

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Caren Diamond	S-E-0088-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0088-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0088-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0088-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0088-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0088-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0088-8	Land Use - CZMA		See Comment ID S-E-0004-8
Richard Owen	S-E-0089-1	Program		See Comment ID S-E-0004-1
	S-E-0089-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0089-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0089-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0089-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0089-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0089-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0089-8	Land Use - CZMA		See Comment ID S-E-0004-8
Sophie Foulkes-Taylor	S-E-0090-1	Program		See Comment ID S-E-0004-1
	S-E-0090-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0090-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0090-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0090-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0090-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0090-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0090-8	Land Use - CZMA		See Comment ID S-E-0004-8
Jennifer Graybill	S-E-0091-1	Program		See Comment ID S-E-0004-1
	S-E-0091-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0091-3	Land Use - CZMA		See Comment ID S-E-0004-3

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Jennifer Graybill	S-E-0091-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0091-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0091-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0091-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0091-8	Land Use - CZMA		See Comment ID S-E-0004-8
Puanani Rogers	S-E-0092-1	Program		See Comment ID S-E-0004-1
	S-E-0092-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0092-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0092-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0092-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0092-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0092-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0092-8	Land Use - CZMA		See Comment ID S-E-0004-8
Gordon LaBedz	S-E-0093-1	Program		See Comment ID S-E-0004-1
	S-E-0093-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0093-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0093-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0093-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0093-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0093-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0093-8	Land Use - CZMA		See Comment ID S-E-0004-8
Peggy LeDoux	S-E-0094-1	Program		See Comment ID S-E-0004-1
	S-E-0094-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0094-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0094-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0094-5	Land Use - CZMA		See Comment ID S-E-0004-5

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Peggy LeDoux	S-E-0094-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0094-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0094-8	Land Use - CZMA		See Comment ID S-E-0004-8
Whitney Stolman	S-E-0095-1	Program		See Comment ID S-E-0004-1
	S-E-0095-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0095-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0095-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0095-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0095-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0095-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0095-8	Land Use - CZMA		See Comment ID S-E-0004-8
John Rumbaugh	S-E-0096-1	Program		See Comment ID S-E-0004-1
	S-E-0096-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0096-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0096-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0096-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0096-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0096-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0096-8	Land Use - CZMA		See Comment ID S-E-0004-8

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Trudy and Larry Blow	S-E-0097-1	Alternatives	4.1.5.1.1, 6.2.1	As discussed in Section 6.2.1, seasonal avoidance, as a mitigation measure, is based on speculative findings from other areas of the world that do not have direct application to the unique environment present in Hawaii. Lacking any scientific basis for seasonal avoidance in Hawaii and lacking any evidence in Hawaii that there has ever been an impact resulting from the lack of these measures, there is no evidence that this mitigation measure would increase the protection of marine mammals. Because year-round deployment is critical for Navy operations, implementation of seasonal avoidance would, however, unacceptably impact the effectiveness of the training. Regarding divers, As stated in Section 4.1.5.1.1, research was conducted for mid-frequency active (MFA) sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonar. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours.
Alan Lott	S-E-0098-1	Alternatives		Thank you for your comment.
Myron Gerhard	S-E-0099-1	Alternatives	6.0	EIS/OEIS Chapter 6.0, Mitigation Measures, presents the U.S. Navy's protective measures, outlining steps that would be implemented to protect marine mammals and Federally listed species during training events. It should be noted that these protective measures have been standard operating procedures for unit-level antisubmarine warfare training since 2004. In addition, The Navy's current mitigation measures reflect the use of the best available science balanced with the National Marine Fisheries Service (NMFS) approach and the requirements of the Navy to train.
Neil Frazer University of Hawaii, Manoa	S-E-0100-1	Alternatives	1.3.2, 1.3.3	As discussed in Section 1.3.2 and 1.3.3, the Navy must use passive and active sonar.
Randy Ching	S-E-0101-1	Program		See Comment ID S-E-0004-1
	S-E-0101-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0101-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0101-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0101-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0101-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0101-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0101-8	Land Use - CZMA		See Comment ID S-E-0004-8

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Debbie Friedman	S-E-0102-1	Alternatives		Thank you for your comment.
	S-E-0102-2	Alternatives	4.1.5.1.1, 6.2.1	As discussed in Section 6.2.1, seasonal avoidance, as a mitigation measure, is based on speculative findings from other areas of the world that do not have direct application to the unique environment present in Hawaii. Lacking any scientific basis for seasonal avoidance in Hawaii and lacking any evidence in Hawaii that there has ever been an impact resulting from the lack of these measures, there is no evidence that this mitigation measure would increase the protection of marine mammals. Because year-round deployment is critical for Navy operations, implementation of seasonal avoidance would, however, unacceptably impact the effectiveness of the training. Regarding divers, As stated in Section 4.1.5.1.1, research was conducted for mid-frequency active (MFA) sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonar. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours.
	S-E-0102-3	Alternatives		Sonar is currently the best available technology for ASW.
	S-E-0102-4	Alternatives		The vast majority of sonar use discussed and analyzed in this EIS/OEIS pertains to training not testing.
	S-E-0102-5	Alternatives	4.1.2.4	Section 4.1.2.4 of the EIS/OEIS discusses the potential effects on marine mammals from Navy mid-frequency active (MFA) sonar training in the HRC. This training has been going on for the past 60 years. There has been no significant change in the sonar equipment in the last 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Though the Navy works to minimize impacts on marine mammals to the greatest extent practicable, they are not mandated by any statute to alleviate all risk to marine mammals. Over the past 30 years, the numbers of humpback whales around Hawaii appear to be increasing and the Navy believes that sonar has not significantly affected marine mammals in general.
	S-E-0102-6	Alternatives		Thank you for your comment.
Victoria Smith	S-E-0103-1	Alternatives	4.1.5.1.1	As stated in Section 4.1.5.1.1, research was conducted for mid-frequency active (MFA) sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonar. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Stephanie Fitzgerald	S-E-0104-1	Program		See Comment ID S-E-0004-1
	S-E-0104-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0104-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0104-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0104-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0104-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0104-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0104-8	Land Use - CZMA		See Comment ID S-E-0004-8
Nina Monasevitch	S-E-0106-1	Program		See Comment ID S-E-0004-1
	S-E-0106-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0106-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0106-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0106-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0106-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0106-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0106-8	Land Use - CZMA		See Comment ID S-E-0004-8
Janet Taylor	S-E-0107-1	Program		See Comment ID S-E-0004-1
	S-E-0107-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0107-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0107-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0107-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0107-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0107-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0107-8	Land Use - CZMA		See Comment ID S-E-0004-8
Anne Rivers	S-E-0108-1	Program		See Comment ID S-E-0004-1
	S-E-0108-2	Land Use - CZMA		See Comment ID S-E-0004-2

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Anne Rivers	S-E-0108-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0108-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0108-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0108-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0108-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0108-8	Land Use - CZMA		See Comment ID S-E-0004-8
Emailer- Kealakai	S-E-0109-1	Program		See Comment ID S-E-0004-1
	S-E-0109-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0109-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0109-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0109-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0109-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0109-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0109-8	Land Use - CZMA		See Comment ID S-E-0004-8
Richard Macke	S-E-0110-1	Policy/NEPA Process		Thank you for your comment.
	S-E-0110-2	Mitigation Measures		Thank you for your comment.
	S-E-0110-3	Alternatives		Thank you for your comment.
Marina Kuran	S-E-0111-1	Program		Thank you for your comment.
	S-E-0111-2	Alternatives	1.3.2, '4.1.2.4, 4.1.2.4.11	The use of sonar as presented in the EIS/OEIS does not violate the CZMA. Takes may be authorized as long as negligible impact on marine mammal populations and species occurs. Sonar does not violate NEPA, as this is a process statute. The Navy must use both passive and active sonar, as discussed in Section 1.3.2

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Marina Kuran	S-E-0111-3	Biological Resources - Marine	3.2, 3.7, 4.2, 4.7, 12	Navy's activities proposed internal or external to the Humpback Whale National Marine Sanctuary, are allowed by the Sanctuary as indicated in 15 CFR Part 922, Subpart Q. None of the activities have been modified such that they would be likely to destroy, cause the loss of, or injure any Sanctuary resource in a manner significantly greater than what had been previously reviewed by NOAA at the time of the Sanctuary's creation. Under the Sanctuary regulations, military activities are allowed within the sanctuary and not subject to vessel/aircraft approach distances, discharge of materials prohibitions within the sanctuary and consultation requirements if they are "classes of military activities, internal and external to the Sanctuary, conducted prior to 1997" (provided in Exhibit C-1 of the EIS/OEIS). New types of military activity conducted after 1997 is also allowable but subject to prohibited activities such as vessel/aircraft approach to humpback whales and discharge of materials. Sections 3.2 and 4.2 of the EIS/OEIS reviewed the NWHI Marine Monument. Navy notes that Presidential Proclamation 8031 (71 FR 36443, June 26, 2006), which established the Monument under the authority of the Antiquities Act (16 U.S.C. 431), made the prohibitions required in the Proclamation, such as the prohibition on entry into the Monument, inapplicable to activities and exercises of the Armed Forces. Navy acknowledges, as stated in the Proclamation, that it is their obligation to ensure that all "activities and exercises of the Armed Forces shall be carried out in a manner that avoids, to the extent practicable and consistent with operational requirements, adverse impacts on monument resources and qualities."
Diana Burns	S-E-0112-1	Program		See Comment ID S-E-0004-1
	S-E-0112-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0112-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0112-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0112-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0112-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0112-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0112-8	Land Use - CZMA		See Comment ID S-E-0004-8
Lowell Wes Cummins	S-E-0113-1	Alternatives		Thank you for your comment.
Jack Aaron	S-E-0114-1	Alternatives		Thank you for your comment.
John and Joann Breeden	S-E-0115-1	Alternatives		Thank you for your comment.
Danial Del Monte	S-E-0116-1	Alternatives		Thank you for your comment.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Fred & Claire Dauer	S-E-0117-1	Alternatives		Thank you for your comment.
Flemming Carstensen Navy League	S-E-0118-1	Cumulative Impacts		Thank you for your comment.
Shirley Chew	S-E-0119-1	Alternatives		Thank you for your comment.
Patricia S. Port US Dept of Interior	S-E-0121-1	Miscellaneous		Thank you for your comment.
Donald Wilson	S-E-0122-1	Alternatives		Thank you for your comment.
	S-E-0122-2	Cumulative Impacts		Thank you for your comment.
Don Morrison Pacific AquaScapes, Inc.	S-E-0123-1	Alternatives		Thank you for your comment.
	S-E-0123-2	Mitigation Measures		Thank you for your comment.
Cindy Lance	S-E-0126-1	Program		See Comment ID S-E-0004-1
	S-E-0126-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0126-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0126-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0126-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0126-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0126-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0126-8	Land Use - CZMA		See Comment ID S-E-0004-8
Harvey Arkin	S-E-0127-1	Program		See Comment ID S-E-0004-1
	S-E-0127-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0127-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0127-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0127-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0127-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0127-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0127-8	Land Use - CZMA		See Comment ID S-E-0004-8
Raymond Madigan	S-E-0128-1	Program		See Comment ID S-E-0004-1

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Raymond Madigan	S-E-0128-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0128-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0128-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0128-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0128-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0128-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0128-8	Land Use - CZMA		See Comment ID S-E-0004-8
Patti Hackney	S-E-0130-1	Program		See Comment ID S-E-0004-1
	S-E-0130-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0130-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0130-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0130-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0130-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0130-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0130-8	Land Use - CZMA		See Comment ID S-E-0004-8
Mike Hendrickson	S-E-0131-1	Program		See Comment ID S-E-0004-1
	S-E-0131-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0131-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0131-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0131-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0131-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0131-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0131-8	Land Use - CZMA		See Comment ID S-E-0004-8
Den Mark	S-E-0132-1	Program		See Comment ID S-E-0004-1
	S-E-0132-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0132-3	Land Use - CZMA		See Comment ID S-E-0004-3

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Den Mark	S-E-0132-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0132-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0132-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0132-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0132-8	Land Use - CZMA		See Comment ID S-E-0004-8
Robert Wagner	S-E-0133-1	Program		See Comment ID S-E-0004-1
	S-E-0133-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0133-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0133-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0133-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0133-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0133-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0133-8	Land Use - CZMA		See Comment ID S-E-0004-8
Bobbie Alicen	S-E-0136-1	Program		See Comment ID S-E-0004-1
	S-E-0136-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0136-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0136-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0136-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0136-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0136-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0136-8	Land Use - CZMA		See Comment ID S-E-0004-8
Leilani Trocki	S-E-0137-1	Program		See Comment ID S-E-0004-1
	S-E-0137-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0137-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0137-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0137-5	Land Use - CZMA		See Comment ID S-E-0004-5

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Leilani Trocki	S-E-0137-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0137-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0137-8	Land Use - CZMA		See Comment ID S-E-0004-8
Catherine Okimoto	S-E-0138-1	Program		See Comment ID S-E-0004-1
	S-E-0138-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0138-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0138-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0138-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0138-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0138-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0138-8	Land Use - CZMA		See Comment ID S-E-0004-8
Forest Shomer	S-E-0139-1	Program		See Comment ID S-E-0004-1
	S-E-0139-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0139-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0139-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0139-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0139-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0139-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0139-8	Land Use - CZMA		See Comment ID S-E-0004-8
Skye Coe	S-E-0140-1	Program		See Comment ID S-E-0004-1
	S-E-0140-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0140-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0140-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0140-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0140-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0140-7	Land Use - CZMA		See Comment ID S-E-0004-7

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Skye Coe	S-E-0140-8	Land Use - CZMA		See Comment ID S-E-0004-8
Michele McKay	S-E-0141-1	Program		See Comment ID S-E-0004-1
	S-E-0141-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0141-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0141-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0141-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0141-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0141-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0141-8	Land Use - CZMA		See Comment ID S-E-0004-8
Angela Kepler	S-E-0142-1	Program		See Comment ID S-E-0004-1
	S-E-0142-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0142-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0142-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0142-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0142-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0142-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0142-8	Land Use - CZMA		See Comment ID S-E-0004-8
Kim Elegado	S-E-0143-1	Program		See Comment ID S-E-0004-1
	S-E-0143-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0143-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0143-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0143-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0143-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0143-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0143-8	Land Use - CZMA		See Comment ID S-E-0004-8
David Strauch	S-E-0144-1	Program		See Comment ID S-E-0004-1

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
David Strauch	S-E-0144-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0144-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0144-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0144-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0144-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0144-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0144-8	Land Use - CZMA		See Comment ID S-E-0004-8
Summer Faria	S-E-0145-1	Program		See Comment ID S-E-0004-1
	S-E-0145-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0145-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0145-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0145-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0145-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0145-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0145-8	Land Use - CZMA		See Comment ID S-E-0004-8
Kealakai Hammond	S-E-0147-1	Program		See Comment ID S-E-0004-1
	S-E-0147-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0147-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0147-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0147-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0147-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0147-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0147-8	Land Use - CZMA		See Comment ID S-E-0004-8
Robert Wahinehookae	S-E-0148-1	Program		See Comment ID S-E-0004-1
	S-E-0148-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0148-3	Land Use - CZMA		See Comment ID S-E-0004-3

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Robert Wahinehookae	S-E-0148-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0148-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0148-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0148-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0148-8	Land Use - CZMA		See Comment ID S-E-0004-8
Paul Doucette	S-E-0149-1	Program		See Comment ID S-E-0004-1
	S-E-0149-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0149-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0149-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0149-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0149-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0149-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0149-8	Land Use - CZMA		See Comment ID S-E-0004-8
Dona van Bloemen	S-E-0150-1	Program		See Comment ID S-E-0004-1
	S-E-0150-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0150-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0150-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0150-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0150-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0150-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0150-8	Land Use - CZMA		See Comment ID S-E-0004-8
Glenn Chapman	S-E-0155-1	Mitigation Measures		Thank you for your comment.
Lauryn Galindo	S-E-0156-1	Program		See Comment ID S-E-0004-1
	S-E-0156-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0156-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0156-4	Land Use - CZMA		See Comment ID S-E-0004-4

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Lauryn Galindo	S-E-0156-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0156-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0156-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0156-8	Land Use - CZMA		See Comment ID S-E-0004-8
Aline Larkin	S-E-0157-1	Program		See Comment ID S-E-0004-1
	S-E-0157-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0157-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0157-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0157-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0157-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0157-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0157-8	Land Use - CZMA		See Comment ID S-E-0004-8
David Johnston	S-E-0158-1	Program		See Comment ID S-E-0004-1
	S-E-0158-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0158-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0158-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0158-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0158-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0158-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0158-8	Land Use - CZMA		See Comment ID S-E-0004-8
Royelen Boykie	S-E-0160-1	Program		See Comment ID S-E-0004-1
	S-E-0160-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0160-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0160-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0160-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0160-6	Land Use - CZMA		See Comment ID S-E-0004-6

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Royelen Boykie	S-E-0160-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0160-8	Land Use - CZMA		See Comment ID S-E-0004-8
Ann Moffat	S-E-0161-1	Program		See Comment ID S-E-0004-1
	S-E-0161-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0161-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0161-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0161-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0161-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0161-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0161-8	Land Use - CZMA		See Comment ID S-E-0004-8
Janet Codispoti	S-E-0162-1	Program		See Comment ID S-E-0004-1
	S-E-0162-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0162-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0162-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0162-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0162-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0162-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0162-8	Land Use - CZMA		See Comment ID S-E-0004-8
Kathleen Dockett	S-E-0163-1	Program		See Comment ID S-E-0004-1
	S-E-0163-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0163-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0163-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0163-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0163-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0163-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0163-8	Land Use - CZMA		See Comment ID S-E-0004-8

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Bina Robinson	S-E-0165-1	Program		See Comment ID S-E-0004-1
	S-E-0165-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0165-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0165-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0165-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0165-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0165-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0165-8	Land Use - CZMA		See Comment ID S-E-0004-8
Libbie Hambleton	S-E-0166-1	Program		See Comment ID S-E-0004-1
	S-E-0166-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0166-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0166-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0166-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0166-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0166-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0166-8	Land Use - CZMA		See Comment ID S-E-0004-8
Duane Choy	S-E-0168-1	Program		See Comment ID S-E-0004-1
	S-E-0168-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0168-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0168-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0168-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0168-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0168-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0168-8	Land Use - CZMA		See Comment ID S-E-0004-8
Tara Cornelisse	S-E-0169-1	Program		See Comment ID S-E-0004-1
	S-E-0169-2	Land Use - CZMA		See Comment ID S-E-0004-2

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Tara Cornelisse	S-E-0169-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0169-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0169-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0169-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0169-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0169-8	Land Use - CZMA		See Comment ID S-E-0004-8
Jacqueline Remington	S-E-0170-1	Program		See Comment ID S-E-0004-1
	S-E-0170-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0170-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0170-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0170-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0170-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0170-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0170-8	Land Use - CZMA		See Comment ID S-E-0004-8
Rose Grady	S-E-0171-1	Program		See Comment ID S-E-0004-1
	S-E-0171-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0171-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0171-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0171-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0171-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0171-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0171-8	Land Use - CZMA		See Comment ID S-E-0004-8
Hilary Harts	S-E-0172-1	Program		See Comment ID S-E-0004-1
	S-E-0172-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0172-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0172-4	Land Use - CZMA		See Comment ID S-E-0004-4

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Hilary Harts	S-E-0172-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0172-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0172-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0172-8	Land Use - CZMA		See Comment ID S-E-0004-8
Denise Lytle	S-E-0173-1	Program		See Comment ID S-E-0004-1
	S-E-0173-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0173-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0173-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0173-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0173-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0173-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0173-8	Land Use - CZMA		See Comment ID S-E-0004-8
Lisa Diaz	S-E-0174-1	Program		See Comment ID S-E-0004-1
	S-E-0174-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0174-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0174-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0174-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0174-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0174-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0174-8	Land Use - CZMA		See Comment ID S-E-0004-8
Cathy Robinson	S-E-0175-1	Program		See Comment ID S-E-0004-1
	S-E-0175-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0175-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0175-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0175-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0175-6	Land Use - CZMA		See Comment ID S-E-0004-6

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Cathy Robinson	S-E-0175-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0175-8	Land Use - CZMA		See Comment ID S-E-0004-8
Brown Kevin	S-E-0178-1	Program		See Comment ID S-E-0004-1
	S-E-0178-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0178-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0178-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0178-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0178-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0178-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0178-8	Land Use - CZMA		See Comment ID S-E-0004-8
Cornelia Skipton	S-E-0179-1	Program		See Comment ID S-E-0004-1
	S-E-0179-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0179-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0179-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0179-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0179-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0179-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0179-8	Land Use - CZMA		See Comment ID S-E-0004-8
Dawn Wooten	S-E-0181-1	Program		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
Kelli Chin	S-E-0182-1	Program		See Comment ID S-E-0004-1
	S-E-0182-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0182-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0182-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0182-5	Land Use - CZMA		See Comment ID S-E-0004-5

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Kelli Chin	S-E-0182-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0182-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0182-8	Land Use - CZMA		See Comment ID S-E-0004-8
Laura Marsh	S-E-0183-1	Program		See Comment ID S-E-0004-1
	S-E-0183-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0183-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0183-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0183-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0183-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0183-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0183-8	Land Use - CZMA		See Comment ID S-E-0004-8
Richard Benton	S-E-0184-1	Program		See Comment ID S-E-0004-1
	S-E-0184-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0184-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0184-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0184-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0184-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0184-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0184-8	Land Use - CZMA		See Comment ID S-E-0004-8
Lauri Peacock	S-E-0185-1	Program		See Comment ID S-E-0004-1
	S-E-0185-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0185-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0185-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0185-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0185-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0185-7	Land Use - CZMA		See Comment ID S-E-0004-7

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Lauri Peacock	S-E-0185-8	Land Use - CZMA		See Comment ID S-E-0004-8
Cory Harden	S-E-0186-1	Program		See Comment ID S-E-0004-1
	S-E-0186-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0186-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0186-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0186-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0186-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0186-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0186-8	Land Use - CZMA		See Comment ID S-E-0004-8
Paul Moss	S-E-0187-1	Program		See Comment ID S-E-0004-1
	S-E-0187-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0187-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0187-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0187-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0187-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0187-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0187-8	Land Use - CZMA		See Comment ID S-E-0004-8
Richard Powers	S-E-0188-1	Program		See Comment ID S-E-0004-1
	S-E-0188-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0188-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0188-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0188-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0188-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0188-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0188-8	Land Use - CZMA		See Comment ID S-E-0004-8
Serena Kaldi	S-E-0189-1	Program		See Comment ID S-E-0004-1

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Serena Kaldi	S-E-0189-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0189-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0189-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0189-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0189-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0189-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0189-8	Land Use - CZMA		See Comment ID S-E-0004-8
Mary Stone	S-E-0190-1	Program		See Comment ID S-E-0004-1
	S-E-0190-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0190-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0190-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0190-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0190-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0190-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0190-8	Land Use - CZMA		See Comment ID S-E-0004-8
Jeff Sacher	S-E-0191-1	Program		See Comment ID S-E-0004-1
	S-E-0191-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0191-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0191-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0191-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0191-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0191-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0191-8	Land Use - CZMA		See Comment ID S-E-0004-8
Chessa Au	S-E-0192-1	Program		See Comment ID S-E-0004-1
	S-E-0192-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0192-3	Land Use - CZMA		See Comment ID S-E-0004-3

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Chessa Au	S-E-0192-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0192-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0192-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0192-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0192-8	Land Use - CZMA		See Comment ID S-E-0004-8
Cynthia Hathaway	S-E-0193-1	Program		See Comment ID S-E-0004-1
	S-E-0193-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0193-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0193-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0193-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0193-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0193-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0193-8	Land Use - CZMA		See Comment ID S-E-0004-8
Christine Ahia	S-E-0194-1	Program		See Comment ID S-E-0004-1
	S-E-0194-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0194-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0194-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0194-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0194-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0194-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0194-8	Land Use - CZMA		See Comment ID S-E-0004-8
Marjorie Erway	S-E-0196-1	Program		See Comment ID S-E-0004-1
	S-E-0196-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0196-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0196-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0196-5	Land Use - CZMA		See Comment ID S-E-0004-5

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Marjorie Erway	S-E-0196-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0196-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0196-8	Land Use - CZMA		See Comment ID S-E-0004-8
Kyno Ravelo	S-E-0197-1	Program		See Comment ID S-E-0004-1
	S-E-0197-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0197-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0197-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0197-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0197-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0197-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0197-8	Land Use - CZMA		See Comment ID S-E-0004-8
Jill Guillermo-Togawa	S-E-0198-1	Program		See Comment ID S-E-0004-1
	S-E-0198-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0198-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0198-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0198-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0198-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0198-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0198-8	Land Use - CZMA		See Comment ID S-E-0004-8
John Broussard	S-E-0199-1	Biological Resources - Marine		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment. The Navy has provided protected haul-out locations for the Hawaiian monk seal, improved nesting habitat for the wedge-tailed shearwater, and organized volunteers to pick-up beach trash while documenting marine debris. The Navy has also participated in a program to remove invasive plants from endangered Hawaiian stilt habitat and has active programs to conserve energy and use renewable resources.
Ikaika Hussey	S-E-0201-1	Program		See Comment ID S-E-0004-1

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Ikaika Hussey	S-E-0201-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0201-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0201-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0201-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0201-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0201-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0201-8	Land Use - CZMA		See Comment ID S-E-0004-8
Jeffrey Lagrimas	S-E-0203-1	Program		See Comment ID S-E-0004-1
	S-E-0203-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0203-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0203-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0203-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0203-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0203-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0203-8	Land Use - CZMA		See Comment ID S-E-0004-8
Jamie Oshiro	S-E-0204-1	Program		See Comment ID S-E-0004-1
	S-E-0204-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0204-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0204-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0204-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0204-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0204-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0204-8	Land Use - CZMA		See Comment ID S-E-0004-8
Kevin Nesnow	S-E-0205-1	Program		See Comment ID S-E-0004-1
	S-E-0205-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0205-3	Land Use - CZMA		See Comment ID S-E-0004-3

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Kevin Nesnow	S-E-0205-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0205-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0205-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0205-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0205-8	Land Use - CZMA		See Comment ID S-E-0004-8
Mikel Athon	S-E-0206-1	Program		See Comment ID S-E-0004-1
	S-E-0206-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0206-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0206-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0206-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0206-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0206-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0206-8	Land Use - CZMA		See Comment ID S-E-0004-8
Mary Martin	S-E-0207-1	Program		See Comment ID S-E-0004-1
	S-E-0207-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0207-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0207-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0207-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0207-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0207-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0207-8	Land Use - CZMA		See Comment ID S-E-0004-8

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Tom Norris Bio-Waves Inc.	S-E-0209-1	Biological Resources - Marine	4.1.2.5.3	The presence of minke whales has been noted in Section 4.1.2.5.3; however, as stated in your comment, there is no density information available for minke whales in Hawaiian waters given that they have rarely been seen during surveys. The lack of available data and comparative species makes it unreliable to extrapolate estimates of exposure to Navy sonar. The commenter is correct that it is difficult to estimate densities for species, like minke whales, that are best detected acoustically. However, the modeling effort used density data for all the marine mammal species present in Hawaii provided by NMFS. NMFS is the Federal agency vested with the responsibility for maintaining the most current information about marine mammal species and who has the expertise to evaluate these data.
Jane Panju	S-E-0210-1	Alternatives	4.1.5.1.1	Divers will not be located where the active sonar is used. As stated in Section 4.1.5.1.1, research was conducted for mid-frequency active (MFA) sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonar. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours.
Emailer- Sylvia	S-E-0211-1	Miscellaneous		Thank you for your comment.
Koalani Kaulukukui Earthjustice	S-E-0212-1	Program	2.2.2.3	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, Chapter 2.0 provides the quantity of additional individual training exercises that the Navy has proposed. Major Exercises (USWEX, RIMPAC, and multiple strike groups training in Hawaii) is an aggregate of existing training events that are captured under the mission of Antisubmarine Warfare (ASW), on Table 2.2.2.3-1.
	S-E-0212-2	Program	4.1.2.4.3	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, the tables in Section 4.1.4.1.1 of the EIS/OEIS provide the training materials information requested (i.e., the percent of change resulting from Navy's proposed actions).
	S-E-0212-3	Program	2.2.2	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, the No-action alternative, or current training, was derived from environmental analysis that pre-dates the noted 2004 consent decree.
	S-E-0212-4	Alternatives	1.3.3, 2.2	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, Section 1.2 of the EIS/OEIS provided background information regarding the EIS/OEIS origins as part of the TAP. Analysis of alternatives in TAP is to be limited in geography to within each range complex.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Koalani Kaulukukui Earthjustice	S-E-0212-5	Alternatives	4.1.2.4.3	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, text in Section 4.1.2.4.3 of the EIS/OEIS has been revised to capture the consequences analysis. Navy and NMFS coordinated on the risk function methodology to estimate effects on marine mammals.
	S-E-0212-6	Alternatives	5	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, the synergistic affects of sonar usage is addressed in Chapter 5.0, cumulative affects of Navy activities.
	S-E-0212-7	Hazardous Materials and Waste	4.1.4., 4.1.7	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, Navy training, RDT&E, and munitions debris are discussed in Sections 4.1.4 –Hazardous Waste, Open Ocean and 4.1.7- Water Resources, Open Ocean. The majority of debris would be widely dispersed and accumulate in deep water far away from the coral reef. Therefore, there will be no quantifiable impact on habitat, any natural resource, including coral. A total of about 654 tons per year are expended under the No-action Alternative (see Table 4.1.4.1.1-1). Assuming an ocean floor area of about 235,000 nm2, and making a further conservative assumption that the training materials are concentrated within 20 percent of this area, this is about 5.6 lb per nm2 per year.
	S-E-0212-8	Hazardous Materials and Waste	3.1.4, 3.1.7, 4.1.4, 4.1.7	The types of sonobuoys used for the analysis in this EIS/OEIS are those now in the Navy's inventory and in common use; the type of item used is determined by its function, not the training location. San Clemente Island information is used because that is where the Navy's Sonobuoy Quality Assurance testing is done, and detailed information from that program is available. All sonobuoys of a given type are manufactured with the same quantities of constituents. Sections 3.1.4, 3.1.7, 4.1.4, and 4.1.7 of the EIS/OEIS discuss sonobuoys, based on those sonobuoys now in general use by the Navy.
	S-E-0212-9	Hazardous Materials and Waste	4.1.4.1.1, 4.1.7.1.1	The comment is beyond the scope of the Supplement. To the extent that a response is required, the components of chaff are discussed in Sections 4.1.4.1.1 and 4.1.7.1.1 of the EIS/OEIS.
	S-E-0212-10	Hazardous Materials and Waste	4.1.3, '4.1.7	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, Sections 4.1.3 and 4.1.7 include discussions of the quantities and types of hazardous materials generated during both training and RDT&E activities. Analysis is based on the type of launch events and activities. Missile and Aerial Target activity impact on water resources is discussed in Section 4.1.7.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Koalani Kaulukukui Earthjustice	S-E-0212-11	Hazardous Materials and Waste	2.2.3.6, 4.4.2.2.3	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, none of the enhancements mentioned are expected to generate hazardous substances. The Portable Undersea Tracking Range could be located anywhere within the area shown on Figure 2.2.3.6.3-1 and not necessarily consistently deployed in the same area. According to Section 2.2.3.6.3, the Navy proposes using the system for only 2 days per month. Development of the Acoustic Test Facility involves the addition of pinger equipment at pier S291 on Ford Island, Beckoning Point piers, or on a mobile test site that could operate within the test area. As a result, there would be no disturbance of any contaminated sediments or soils containing PCBs (see Sections 2.2.3.6 and 4.4.2.2.3). An environmental review of the proposed Range Operations Control Building construction was conducted that determined that the effects of the proposed construction on the environment are minimal and a categorical exclusion (CATEX) for the proposed project was approved on 14 May 2004. Hazardous waste discovered during construction will handled in compliance with applicable rules and regulations.
	S-E-0212-12	Hazardous Materials and Waste	4.1.7.1.1	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, Section 4.1.7.1.1 addresses incidental released of POL.
	S-E-0212-13	Hazardous Materials and Waste	4.1.4, 4.1.7	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, with regard to the issue of previous contamination by Navy activities in the coastal zone of the HRC, neither good data on the existing contamination levels nor good information on what the Navy previously expended or where it was expended is available. Analysis regarding the coastal zone is found in the offshore sections of the EIS/OEIS (e.g., 4.1.4 and 4.1.7).
	S-E-0212-14	Hazardous Materials and Waste	4.1.4, 4.1.7	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, Major Exercises are, for the most part, aggregates of the individual training activities, which are addressed quantitatively in Sections 4.1.4 and 4.1.7.
	S-E-0212-15	Hazardous Materials and Waste	4.1.7, 4.1.4.1.1	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, the analysis presented in Section 4.1.7 assumed that hazardous constituents for each category of expended training material would be expended over only 20% of the training areas. But the probability that the materials would be expended in exactly the same location, given slight differences in the positions of Navy assets and lines of fire, and dispersal of expended materials by currents, is about zero. A total of about 654 tons per year, are expended under the No-action Alternative (see Table 4.1.4.1.1-1). Assuming an ocean floor area of about 235,000 nm2, and making a further conservative assumption that the training materials are concentrated within 20 percent of this area, this is about 5.6 lb per nm2 per year.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Koalani Kaulukukui Earthjustice	S-E-0212-16	Hazardous Materials and Waste	3.1.2.1, 4.1.2.1	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, bioaccumulation of hazardous materials in benthic species and coral is not known to occur as a result of the Proposed Action because: (a) leach rates are very low, (b) leached materials are widely dispersed, so they affect different populations, and (c) the estimated ambient concentrations are generally within the "natural" range of these materials so uptake of these constituents would be similar to natural rates.
	S-E-0212-17	Hazardous Materials and Waste		The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, if the Navy assumes the exercises are in Whisky 188 (35, 632 nm) and not the TOA , Point Mugu (27,183 nm) Marine Mammal density is approximately 1/10 the density of the Point Mugu Range. The probability of debris impact is less than 1 in a million compared to Point Mugu, and will be much less in Whisky 188.
	S-E-0212-18	Hazardous Materials and Waste	3.1.2.1, 4.1.2.1.1.1	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, direct strikes on coral reefs, which could be either strikes of missile debris or ordnance on coral reefs. It is unlikely that there will be any physical impact on a reef, as described in 4.2.1.1.1.1.
	S-E-0212-19	Hazardous Materials and Waste	5.0	Chapter 5.0 of the EIS/OEIS discusses entanglement, most specifically as it relates to commercial fishing. Sonobuoy parachutes and torpedo air stabilizer canopies could be deposited on the ocean floor. The widely dispersed, intermittent, minute size of the material minimizes the impact. Wave energy and currents will further disperse the materials.
	S-E-0212-20	Biological Resources - Marine	5	'The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, the Navy recognizes that individual fish may be injured or killed as the result of several of the training events; however, these incidents are localized, and would not have a population impact on any individual species. Potential impacts on Essential Fish Habitat (EFH) are discussed and evaluated in Essential Fish Habitat and Coral Reef Assessment for the Hawaii Range Complex EIS/OEIS (U.S. Department of the Navy, 2007b) and a summary for each proposed Navy training activity is provided. Due to the mitigation measures implemented to protect sensitive habitats, and the localized and temporary impacts of the Proposed Action and alternatives, it is concluded that the potential impact of the Proposed Action and alternatives would have no effect on EFH.
	S-E-0212-21	Socioeconomics	5.5.3.1, 5.5.10	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, reduced fish catch rates and any associated economic effects are not anticipated (see Section 5.3.3.1)
	S-E-0212-22	Environmental Justice	5.5.3.1, 5.5.10	'The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, reduced fish catch rates and any associated economic effects are not anticipated (see Sections 5.5.3.1 and 5.5.10).

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Koalani Kaulukukui Earthjustice	S-E-0212-23	Air Quality	4.3.2.1.1	The comment is beyond the scope of the Supplement to the Draft EIS/OEIS. To the extent that a response is required, your comments regarding the cumulative effects of Navy's proposed action on coral with rising sea levels caused by global warming are noted but are beyond the scope of this EIS/OEIS. Global warming, the degree to which it is occurring, and human activity impacts that may be contributing to global warming, are the subject of intense scientific debate. Assuming for the sake of argument that global warming is occurring and that human activities are the cause, global warming involves the activity of billions of human beings on every continent on Earth. It also involves the consumption of fossil fuels to such a degree and intensity that the intermittent and infrequent training activities presented in this EIS are insignificant when compared to the scale of human activity occurring on a daily basis throughout the world.
Michael Jasny Natural Resources Defense Council	S-E-0213-1	Alternatives	1.0, 2.0, 6.0	The Supplement to the DEIS was not written to address these alternatives, does not propose to change the Fleet Response Training Plan (FRTP), and was not prepared to assess mitigation. To the extent that a response is required, the Navy considered the DEIS public comments in the preparation of the Supplement to the DEIS, where applicable. As discussed in Chapters 1.0 and 2.0 of the EIS/OEIS, Navy considers but rejects a reduction in training; does not consider alternate locations because this analysis would not be consistent with the purpose and need of this EIS/OEIS. Although Navy does do some simulated training, it does not fully develop the skills and capabilities necessary to attain appropriate military readiness. Navy's current mitigation measures and their use of the best available science balanced with the requirements of the Navy to train, results in Navy meeting its mission while being protective of the environment. Discussion of Mitigation measures has been revised in Chapter 6.
	S-E-0213-2	Alternatives	4.1.2	A complete discussion of the background for development and application of the risk function curve to analyze the behavioral effects on marine mammals from MFA/HFA sound sources is provided in Section 4.1.2. As stated in this section, the risk function methodology was developed in coordination with NMFS. NMFS and Navy believe that the use of the risk continuum is the better method of applying the best available science to analyze behavioral harassment. The EIS/OEIS does not present the energy flux density results with a threshold of 173dB.
	S-E-0213-3	Alternatives		Navy, working with NMFS, is using the best available science to assess impacts on mammals.
	S-E-0213-4	Alternatives		Navy, working with NMFS, is using the best available science to assess impacts on mammals.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Michael Jasny Natural Resources Defense Council	S-E-0213-5	Alternatives	4.1.2.4.10.1	Navy did review the established literature on harbor porpoises, but there are no harbor porpoises in Hawaii.
	S-E-0213-6	Alternatives	4.1.2	Section 4.1.2 of the EIS/OEIS discusses how the risk function accounts for physiology as well as social behavior.
	S-E-0213-7	Alternatives		Thank you for your comment.
	S-E-0213-8	Alternatives	6.8	The commenter attached a paper that reached the conclusion that repetition of sonar has long-term behavioral impacts on marine mammals; however, Navy can find no logical tie-in from analysis in this particular paper that would lead to that conclusion. The paper pertains to electrically shocking rats, which does not appear to tie to noise and marine mammals. Navy is studying the long-term population level effects of sonar and is also developing a monitoring plan as part of this EIS/OEIS effort.
	S-E-0213-9	Alternatives	4.1.2	The current methodology was developed in extensive consultation with NMFS and does not account for the Navy's mitigation measures to reduce the effects of MFA/HFA sonar on marine mammals. Consequently, the modeling and threshold levels developed for analysis of impacts on marine mammals universally erred on overestimating the number of takes.
	S-E-0213-10	Alternatives	4.1.2	The three data sets used to calculate the mid-point of the risk function were weighted equally. As in response to S-E-0213-4, the Haro Strait data were appropriately applied. NMFS and the Navy included the best available and most applicable data in the development of the risk function. See Section 4.1.2. An expanded discussion of the analysis of the data sets used to develop the risk function curve is presented in Section 4.1.2 of the EIS/OEIS. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals, NMFS and the Navy closely coordinated the development of the risk function to represent the best available science. The cutoff for the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient during some parts of the year in Hawaiian waters.
Leita Kaldi	S-E-0214-1	Program		See Comment ID S-E-0004-1
	S-E-0214-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0214-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0214-4	Land Use - CZMA		See Comment ID S-E-0004-4

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Leita Kaldi	S-E-0214-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0214-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0214-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0214-8	Land Use - CZMA		See Comment ID S-E-0004-8
Lori Ferrell	S-E-0215-1	Program		See Comment ID S-E-0004-1
	S-E-0215-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0215-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0215-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0215-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0215-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0215-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0215-8	Land Use - CZMA		See Comment ID S-E-0004-8
Debbie Burack	S-E-0216-1	Program		See Comment ID S-E-0004-1
	S-E-0216-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0216-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0216-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0216-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0216-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0216-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0216-8	Land Use - CZMA		See Comment ID S-E-0004-8
Christina Gauen	S-E-0217-1	Program		See Comment ID S-E-0004-1
	S-E-0217-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0217-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0217-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0217-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0217-6	Land Use - CZMA		See Comment ID S-E-0004-6

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Christina Gauen	S-E-0217-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0217-8	Land Use - CZMA		See Comment ID S-E-0004-8
Lee Tepley	S-E-0218-1	Alternatives	1.3.2, 4.1.2	The analytical methodology used in this EIS/OEIS was developed in close coordination with NMFS. This represents the best available and most applicable science with regard to analysis of effects to marine mammals from MFA/HFA sound sources. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals (see Section 4.1.2), the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas during some parts of the year in Hawaiian waters. Section 1.3.2 describes why the Navy must train and why Hawaii is the most appropriate place to undertake the proposed actions.
	S-E-0218-2	Alternatives	4.1.2	It has not been established that whales "get the bends." As explained in Section 4.1.2, the issue was raised and other potential hypotheses with regards to causes of marine mammal strandings remain highly speculative.
Bryan Matsumoto	S-E-0219-1	Program		See Comment ID S-E-0004-1
	S-E-0219-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0219-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0219-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0219-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0219-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0219-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0219-8	Land Use - CZMA		See Comment ID S-E-0004-8
Lacie Whitten	S-E-0222-1	Program		See Comment ID S-E-0004-1
	S-E-0222-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0222-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0222-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0222-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0222-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0222-7	Land Use - CZMA		See Comment ID S-E-0004-7

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Lacie Whitten	S-E-0222-8	Land Use - CZMA		See Comment ID S-E-0004-8
David Burns	S-E-0223-1	Program		See Comment ID S-E-0004-1
	S-E-0223-2	Land Use - CZMA		See Comment ID S-E-0004-2
	S-E-0223-3	Land Use - CZMA		See Comment ID S-E-0004-3
	S-E-0223-4	Land Use - CZMA		See Comment ID S-E-0004-4
	S-E-0223-5	Land Use - CZMA		See Comment ID S-E-0004-5
	S-E-0223-6	Land Use - CZMA		See Comment ID S-E-0004-6
	S-E-0223-7	Land Use - CZMA		See Comment ID S-E-0004-7
	S-E-0223-8	Land Use - CZMA		See Comment ID S-E-0004-8
Nova Blazej USEPA	S-E-0225-1	Alternatives	4.1.2	The current methodology was developed in extensive consultation with NMFS and does not account for the Navy's mitigation measures to reduce the effects of MFA/HFA sonar on marine mammals. Consequently, the modeling and threshold levels developed for analysis of impacts on marine mammals universally erred on overestimating the number of takes.
	S-E-0225-2	Alternatives	4.1.2.4.6	Additional information regarding the Hawaiian Monk Seal has been added to Section 4.1.2.4.6.
	S-E-0225-3	Biological Resources - Marine	4.1.2.4.3, 4.1.2.4.4	Sections 4.1.2.4.3 and 4.1.2.4.4 provide the regulatory framework and history behind the development of the Navy's compliance efforts with various statutes, including the Marine Mammal Protection Act.
	S-E-0225-4	Alternatives	4.1.2.4.3, 4.1.2.4.4	See response to Comment S-E-0225-3.
	S-E-0225-5	Alternatives		Thank you for your comment.
	S-E-0225-6	Alternatives	7	Both Navy and NMFS have participated extensively over the past several years in national and international forums and studies under the auspices of the National Research Council and the US Commission on Ocean Policy concerning the effects of anthropogenic ocean noise on marine mammals. Part of this collaborative effort was to develop a methodology and/or criteria for assessing the effects of these anthropogenic noises on marine mammals. Further, as your comment indicates, the use of sonar is a controversial issue. Litigation efforts by local and national interest groups around the US were in process during the scoping of this EIS/OEIS. These litigation efforts complicate the Navy's capability to engage in meaningful discussion and collaboration for this EIS/OEIS.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Nova Blazej USEPA	S-E-0225-7	Hazardous Materials and Waste	3.1.7	Section 3.1.7 describes the contaminants in bottom sediments in Pearl Harbor. However, underwater detonations at Lima Landing (the only underwater detonation training at Pearl Harbor) would not suspend enough materials to be an issue in regards to the potential to disperse polychlorinated biphenyls (PCBs) and heavy metal contamination in Pearl Harbor.
	S-E-0225-8	Alternatives	4.1.2.4	Section 4.1.2.4 of the EIS/OEIS discusses the potential effects on marine mammals from Navy mid-frequency active (MFA) sonar training in the HRC. This training has been going on for the past 60 years. There has been no significant change in the sonar equipment in the last 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Though the Navy works to minimize impacts on marine mammals to the greatest extent practicable, they are not mandated by any statute to alleviate all risk to marine mammals. Over the past 30 years, the numbers of humpback whales around Hawaii appear to be increasing and the Navy believes that sonar has not significantly affected marine mammals in general.
	S-E-0225-9	Alternatives	2.2.1.3	As noted in Section 2.2.1.3 of the EIS/OEIS, computer simulators and other types of simulation training tools are already used extensively in the Navy's training program. Computer technologies provide excellent tools for implementing a successful, integrated training program while reducing the risk and expense typically associated with training at sea. Although it is an essential component of training, computer simulation cannot substitute for the high-stress environment (such as personnel experience under combat conditions) that would be encountered during an actual non-training situation. At the present state of the art for sonar simulator software, the Navy is unable to produce virtual imaging that equals the complexity and variability of real time, real world MFA sonar. Conducting all Naval training by simulation is deemed inadequate and fails to meet the purpose and need of the Proposed Action.
	S-E-0225-10	Alternatives	1.3.3, 2.2.1	Navy's training needs were identified as part of the TAP process described in Section 1.3.3. Training alternatives were developed using different levels of intensity and frequency of training alternatives. These form the basis of the alternatives. Likewise, the levels of intensity and frequency were used when considering and rejecting various alternatives described in Section 2.2.1. Alternative 2 provided the Navy the greatest level of flexibility regarding training activities on the HRC. Based on current evaluations of training involving the use of mid-frequency active in the near future, Navy has requested a letter of authorization for mid-frequency active sonar use using the no action alternative analysis of sonar effects. Other training activities consistent with Alternative 2, including activities not associated with Navy training, may occur if Alternative 3 is implemented by the Navy.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Nova Blazej USEPA	S-E-0225-11	Policy/NEPA Process		See response to comment S-E-0225-6.
	S-E-0225-12	Alternatives	2	The Navy believes that they have identified and analyzed reasonable alternatives for its activities within the HRC.
	S-E-0225-13	Alternatives	2.2.1.3	As noted in Section 2.2.1.3 of the EIS/OEIS, computer simulators and other types of simulation training tools are already used extensively in the Navy's training program. Computer technologies provide excellent tools for implementing a successful, integrated training program while reducing the risk and expense typically associated with training at sea. Although it is an essential component of training, computer simulation cannot substitute for the high-stress environment (such as personnel experience under combat conditions) that would be encountered during an actual non-training situation. At the present state of the art for sonar simulator software, the Navy is unable to produce virtual imaging that equals the complexity and variability of real time, real world MFA sonar. Conducting all Naval training by simulation is deemed inadequate and fails to meet the purpose and need of the Proposed Action.
	S-E-0225-14	Policy/NEPA Process	7	Both Navy and NMFS have participated extensively over the past several years in national and international forums and studies under the auspices of the National Research Council and the US Commission on Ocean Policy concerning the effects of anthropogenic ocean noise on marine mammals. Part of this collaborative effort was to develop a methodology and/or criteria for assessing the effects of these anthropogenic noises on marine mammals. Further, as your comment indicates, the use of sonar is a controversial issue. Litigation efforts by local and national interest groups around the US were in process during the scoping of this EIS/OEIS. These litigation efforts complicate the Navy's capability to engage in meaningful discussion and collaboration for this EIS/OEIS.
	S-E-0225-15	Alternatives	2.2.2.4, 4.1.2	The original analysis was based on data prepared as part of the program described in Section 1.3 of the final EIS, which predates the Sonar Positional Reporting System (SPORTS) database. In early 2008, the Navy concluded that SPORTS provided enough information after only eighteen months that it could be used as a partial basis for calculating sonar hours when combined with additional extrapolation for the sonar effects analysis. More information on SPORTS has been provided in sections 2.2.2.4 and 4.1.2 of the EIS/OEIS. The SPORTS database will continue being refined and populated with data and used as the basis for future analysis on sonar use on range complexes.
	S-E-0225-16	Alternatives	4.1.2.4.9.8	Additional information about SPORTS has been added to Section 4.1.2.4 of the EIS/OEIS.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Nova Blazej USEPA	S-E-0225-17	Alternatives	1.3.2, 4.1.2	The analytical methodology used in this EIS/OEIS was developed in close coordination with NMFS. This represents the best available and most applicable science with regard to analysis of effects to marine mammals from MFA/HFA sound sources. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals (see Section 4.1.2), the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas during some parts of the year in Hawaiian waters. Section 1.3.2 describes why the Navy must train and why Hawaii is the most appropriate place to undertake the proposed actions.
	S-E-0225-18	Alternatives	5.2.1	The modeling undertaken does so, as explained in Appendix J, based on marine mammal densities evenly distributed over the entire area of potential effect. This is conservative since the tendency is to overestimate effects given that marine mammals appearing in pods will be easier to detect and therefore be avoided by use of the Navy's standard operating procedures serving as mitigation measures. Potential indirect effects were discussed in Section 4.1.2.4.12 and Section 5.3.3.2 of the Draft EIS/OEIS. This discussion was expanded in Section 5.2.1 of the EIS/OEIS.
	S-E-0225-19	Policy/NEPA Process	7	Both Navy and NMFS have participated extensively over the past several years in national and international forums and studies under the auspices of the National Research Council and the US Commission on Ocean Policy concerning the effects of anthropogenic ocean noise on marine mammals. Part of this collaborative effort was to develop a methodology and/or criteria for assessing the effects of these anthropogenic noises on marine mammals. Further, as your comment indicates, the use of sonar is a controversial issue. Litigation efforts by local and national interest groups around the US were in process during the scoping of this EIS/OEIS. These litigation efforts complicate the Navy's capability to engage in meaningful discussion and collaboration for this EIS/OEIS.
	S-E-0225-20	Alternatives	4.1.2.4.6	Navy used the northern elephant seal threshold because taxonomically, the elephant seal is more closely related to the Hawaiian monk seal than any other seal. A northern elephant seal and the Hawaiian monk seal are in the same sub-family. In addition, the audiogram of the northern elephant seal more closely approximates that of the Hawaiian monk seal.
	S-E-0225-21	Alternatives	4.1.2.4.6	Navy used the northern elephant seal threshold because taxonomically, the elephant seal is more closely related to the Hawaiian monk seal than any other seal. A northern elephant seal and the Hawaiian monk seal are in the same sub-family. In addition, the audiogram of the northern elephant seal more closely approximates that of the Hawaiian monk seal.

Table 14.4.2-2. Responses to Email Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Nova Blazej USEPA	S-E-0225-22	Biological Resources - Marine	3.3.1, 3.3.4, 3.4.1, 3.4.2	Sections 3.3.1, 3.3.4, 3.4.1, and 3.4.2 of the Supplement to the Draft EIS/OEIS have been reviewed for accuracy and revised as appropriate.

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14.4.3 PUBLIC HEARING COMMENTS

Twenty-eight people testified at the public hearings held in Hawaii for the Supplement to the Draft EIS/OEIS.

Table 14.4.3-1 presents individuals who testified at the hearings with their respective commenter identification number. This number can be used to find their testimony in the four transcripts prepared for hearings in Kauai, Oahu, Maui, and the Island of Hawaii and to locate the corresponding table on which responses to each comment are provided.

Exhibit 14.4.3-1 presents reproductions of the hearing transcripts for the Supplement to the Draft EIS/OEIS. Transcripts are identified by commenter ID number, and each statement or question that was categorized as addressing a separate environmental issue is designated with a sequential comment number.

Table 14.4.3-2 presents the responses to testimony on the Supplement to the Draft EIS/OEIS. Responses to specific comments can be found by locating the corresponding commenter ID number and sequential comment number identifiers.

Table 14.4.3-1. Commenters on the Supplement to the Draft EIS/OEIS (Public Hearings)

Commenter	Comment ID	Commenter	Comment ID
Jim Albertini on behalf of the Maloaina Center for Nonviolent Education in Action	S-T-0017	Peggy Ledoux	S-T-0020
Chris Bane	S-T-0002	Nina Monasevitch	S-T-0005
Laurel Brier	S-T-0003	Mike Moran	S-T-0023
Ray Catania	S-T-0008	Richard Morris	S-T-0027
Craig Davies	S-T-0009	Star Newland	S-T-0016
Bruce Douglas	S-T-0025	Cedar Poivier	S-T-0024
Duane Erway	S-T-0011	Puanani Rogers	S-T-0006
Neil Frazer	S-T-0021	Harriet Smith	S-T-0019
Raydiance Gonare	S-T-0018	Summer Star	S-T-0028
Roberta Goodman (Cetacea Nation)	S-T-0015	Carl Stepath	S-T-0007
Sharon Goodwin on behalf of the Kauai Alliance for Peace and Social Justice	S-T-0004	Elizabeth Stone	S-T-0022
Cory Harden on behalf of the Sierra Club	S-T-0013	Lee Tepley	S-T-0010
Michael Hyson on behalf of the Sirius Institute and Cetacean Commonwealth	S-T-0012	Dwight Vincente	S-T-0014
Barbara Kranichfeld	S-T-0026	JoAnn Yukimura on behalf of the Kauai County Council	S-T-0001

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COMMENT NUMBER

Hawaii Range Complex Supplement
To The Draft EIS/OEIS
Information And
Oral Comment Session
Kauai Community College
Lihue, Hawaii
Thursday, March 13, 2008
5:00 P.M.

Reporter's Transcript

Before: Elsie Terada, CSR NO. 437
Certified Shorthand Reporter

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THURSDAY, MARCH 13, 2008; LIHUE, HAWAII
5:00 P.M.

VIDA MOSSMAN: Aloha.

THE AUDIENCE: Aloha.

VIDA MOSSMAN: Thank you very much for coming tonight. I'm Vida Mossman, and I will be the moderator for tonight's hearing on the Navy's Supplement to the Draft Hawaii Range Complex Environmental Impact Statement. Poster stations will remain open until 9:00 p.m. to enable you to engage with members of the team. Here to receive your comments are Captain Cudnohofsky, who is both the Commanding Officer of the Pacific Missile Range Facility and the officer in charge for the Hawaii Range Complex; Ms. Jolie Harrison of the National Marine Fisheries Service in Washington, D.C., and Mr. Lewis Michaelson, who will assist me in moderating this hearing.

To ensure that we get an accurate record of what is said, please help me respect the following ground rules. First, speak clearly and slowly into the microphone, starting with your name and any organization you represent. Second, you will have three minutes to speak. Third, if you have a written statement, you may turn it in, at the registration table located right when you walk in, and/or you may

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read it out loud within the time limit. You may also provide additional comments for three minutes at the oral comment station located in that corner of the room. Fourth, please honor any request that I make for you to stop speaking. If you reach the three-minute time limit, to aid you in knowing when your time is almost up, my assistant will hold up a card when you have 30 seconds left. This should allow you to find a comfortable place to wrap up your comments.

Our first speaker for this evening is Councilwoman Joann Yukimura.

S-T-0001

COUNCILWOMAN YUKIMURA: Thank you, Vida, Captain Cudnohofsky, and panel members. Thank you for this opportunity to provide some input. I do so with a certain amount of humility. I haven't had a whole lot of time to delve into the subject matter, so I may have blind spots or information lacking, but I want to express my thoughts, so far as I'm able to understand this issue.

I speak as an individual Kauai Councilmember who's deeply concerned about the impacts of high-frequency active sonar and mid-frequency active sonar in Navy training exercises upon ocean mammals. I acknowledge the Navy's need to conduct realistic training in sonar detection technology, but it should

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not be at the expense of ocean mammals. I also acknowledge the Navy's attempt to mitigate its impacts upon mammals, ocean mammals, through its preferred third alternative, which, as I understand, you know, does reduce the number of sonar hours' exposure, I guess. But I do not believe these mitigation efforts are sufficient.

3

Your exercise summary states the Navy finds harassment resulting from the proposed use of MFA/HFA sonar may affect endangered Blue Whale, North Pacific Right Whale, Fin Whale, Sei Whale, Humpback Whales, Sperm Whale, and Hawaiian Monk Seals, and, to me, this is unacceptable. At a minimum, it would seem that the training exercises should be conducted in the summer months when whales are much less prevalent in Hawaiian waters, to my understanding.

4

Secondly, there should be found another way to detect submarines without sonar, which invades the main communication system of ocean mammals, and causes both psychological distress and physical injury to these mammals. Human ingenuity has shown itself to be unlimited. Surely, another method can be found to detect quiet submarines. The ocean is the kuleana of its inhabitants, and humans who enter the ocean should do so without causing harm.

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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Mahalo for your consideration of this testimony and if there is information I should have, that I'm ignorant of, I am open to learning more. Thank you.

VIDA MOSSMAN: Thank you. Thank you, Councilwoman Yukimura.

Our next speaker will be Craig Davis, followed by Chris Bane.

CRAIG DAVIS: I'm not quite prepared yet. I just got here, and I might come back later, if I could.

VIDA MOSSMAN: Later? Okay.

Chris Bane?

S-T-0002

CHRIS BANE: Hi, how you're doing? My name is Chris Bane. I didn't have a lot to time to prepare this, so I'm hoping it's not too scattered out of there. Anyway, I'm just basically going to read what I wrote, so I don't get too out there. Anyway, my name is Chris Bane, like I said. I'm a boat tour captain. I've been working here, on Kauai, for 18 years. I go across the channel of Ni`ihau four days a week. I go across the channel, I see the animals that are out there, and -- anyway, well, I understand there's a need for testing and training of sonar. I also feel that how it's done now and how it's been done for decades needs to change.

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I think that the sonar has been around -- well, sonar has been around since, what, 1912, but it's a lot different than it was, when it was an echo locator. It's become much more powerful, and we have to basically access what kind of sonar and how powerful we're going to want in the waters around Kauai.

Some things that I looked up, some things that I've read, found on the Internet, which was interesting, was the amount of different incidences have occurred worldwide. Here, around Hawaii, we don't have a lot of people going too far offshore, so there's really a lot of stuff that's going on, out there, we can't really see. Being on the tour boat, going across the channel, it's kind of opened my eyes, as far as what I've been able to see and what I kind of realized what's out there. So far, I've seen Cuvier's Beaked Whales, Blainville's Beaked Whales, there's Pilot Whales, there's Melon-Headed Whales.

I know that Ms. Yukimura said that there's more animals during the winter months and less during the summer. From my experience, the mammals that are most affected by this, are the Tooth Whales and the Odontocetes, and unfortunately I see those more in the summertime than during the winter. So there's actually a higher incidence closer to shore, of these animals.

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Everybody thinks about the Humpback Whales, but there's a lot more out there. You got Pilot Whales, we just saw Pilot Whales two days ago, hanging out. We see, you know, Melon-Headed Whales three days ago, with some Humpback Whales, but we do see a lot more during the summer months than during the winter. I've been logging these things for the past ten years. I've been logging them in my site, if you would like to see them. If you e-mail me, and I could send them out to you. I got an Excel spreadsheet. Anyway, you know, basically, the biggest problem in having the sonar isn't so much the fact that it kills the animals, as much as what it does to the animals as well, I think, is just a big of a fact.

The study that I read, and I'll try and summarize this, and I'll give you a copy of my sheet here. But to try and summarize, basically, the latest study that came out by John Cannon in "Science Now Daily News" in December 2007, basically refers to the Cuvier's Beaked Whales and how they're dying from the bends. These animals die from the bends from -- they dive to 6-, 7,000 feet, one of the deepest dives and they get the bends. And they're getting the bends because they're going down, coming up, going down, a flight response when they hear the sonar.

2

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So, basically, what I ask from you guys, you know, is, really -- I know it's inconvenient for the Navy to kind of go on these facts that Judge Ezra and others have asked for, as far as, you know, slowly raising the sound up, doing sonar offshore, really making sure there's no animals in the area, listening with passive sonar, making sure these animals aren't in the area. And basically, like I said, I'm not a far extremist left-wing hippie, tree-hugging kind of a guy, you know. I do understand that we need a strong defense, but I also understand that we need these animals out there, and, you know -- I mean, we don't even --

VIDA MOSSMAN: Mr. Bain? Thank you, your time is up.

Do we have any other speakers who have signed up?

FEMALE SPEAKER: I would like to give him my three minutes.

VIDA MOSSMAN: I'm sorry.

CHRIS BANE: That's all right. I got two more pages, so.

CAPTAIN CUDNOHOFSKY: We can take your written testimony, as well, sir.

CHRIS BANE: Yeah. And I gave the testimony to

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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you guys.

VIDA MOSSMAN: We've got another oral station there, if you want to go for another three minutes, they'll record your statement, if you'd like.

CHRIS BANE: Okay.

VIDA MOSSMAN: We're going to take a short recess and reconvene when we've got more speakers.

CHRIS BANE: Okay. Or I'll wait till everybody talks, then we can discuss if anybody wants to hear what I have to say.

VIDA MOSSMAN: We're going to take a short recess and reconvene when we've got more speakers, okay?

(Pause from 5:43 p.m. to 6:10 p.m.)

VIDA MOSSMAN: Before we proceed with receiving more comments, PMRF Commanding Officer Captain Cudnohofsky would like to say a few words. Skipper?

CAPTAIN CUDNOHOFSKY: Aloha and good evening to all of you. I'm Captain Aaron Cudnohofsky. I'm the Pacific Missile Range Facility Commander and the Hawaii Range Complex Coordinator. Welcome to tonight's public hearing on our Supplemental Draft Environmental Impact Statement for the Hawaii Range Complex. I just have a couple things to say, but I promise to keep my comments short, so that we can maximize your time for comment.

I'd like to acknowledge our elected

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officials, Joann Yukimura, who was here earlier, I think she had to leave, and then Ron Sakoda was here as well. I think he may be in the other room. But thank you to them for showing up. I know they're very busy and it's good to have them and their comments.

As most of you know, we went through the EIS process and associated Public Hearings this past fall. This effort, the Supplemental EIS, is not a revisit of those EIS issues. It's specifically focused on the use of active sonar here in the Hawaii Range Complex. We ask that you keep your comments focused on the mid-frequency active sonar issues only, as that is what the focus of the hearing is, and it helps keep the comments on target.

As we all learned in grade school, 70 percent of the earth is covered by water. What you may not realize is that 80 percent of the world's population lives on or near the coastline, and 90 percent of the world's trade is carried by the maritime shipping industry. $1.1 trillion worth of goods are imported to and exported from the United States through maritime shipping. Any disruption to the global system caused by instability has a direct impact on our economy and our quality of life.

The training we do here on the Hawaii Range

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Complex is of vital importance not only to our military forces, but that of our allies. PMRF is home to the largest underwater instrumented range in the world. Here we train U.S. and allied personnel to operate in the ocean environment, in order to ultimately protect our nation. Our services operate on a full spectrum of operations, to include humanitarian ops, training and engaging with other nation's militaries, protecting the sea lanes and many others. Preventing wars is as important as winning wars, and to do this, we need a strong, well-trained and well-equipped navy.

The greatest threat to our Navy today is the quiet diesel submarine. Over 50 nations have submarines in their inventory and that number is expected to grow as the diesel submarine is relatively inexpensive and very capable. They are extremely difficult to detect, virtually invisible to passive radar or passive sonar, and that is why we need to have well-trained sailors. Consider the investment in training in a sonar operator. A Special Warfare SEAL requires two years of training, a sonar operator, three years of training. An aviator requires about three and a half years of training. That provides some insight into the skill level required to achieve that capability. But it doesn't end there, as it is a

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perishable skill and requires constant training. Who would want to fly with a pilot who hasn't trained to land the airplane or fly it in the last six months or a year? I certainly wouldn't.

These sonar operators not only protect their own ships from the torpedoes of our enemies, they are charged with protecting the entire fleet, as well as any merchant ships that may be transiting hazardous waters. Who can forget the small frigates escorting the tankers and cargo ships during the Gulf War? PMRF provides vital training for these sonar operators and they depend on this vital training to hone their skills before going into harm's way. They also deserve the best technology our country can provide them, and that is the mid-frequency active sonar.

At the Pacific Missile Range Facility, we employ nearly 800 civilians. These are predominantly Hawaiian people, from families that have provided generations of dedicated and capable people to our workforce.

It is from this talented pool that we entrust our important work, from managing our Range Fleet Training Department to actually conducting military training events like our Hollywood operations, where perspective submarine Commanding Officers and Executive

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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13 Officers are tested and ultimately certified to command U.S. Navy submarines. You'll find people born and raised in Hawaii involved, some may be your friends and family members. We are the largest high-tech employer here on Kauai. But what we do is not just about technology and employment. We recognize our responsibility as stewards of a very special place, PMRF and our oceans. The Navy spends $10-14 million a year on marine mammal research. This may or may not sound like a lot of money to you, but consider this: The U.S. Navy sponsored approximately 70 percent of all the U.S. research on the effects of man-made sound on marine mammals and approximately 50 percent of all such research conducted in the world. The Navy is sensitive to the need to protect the environment and is proud of its record of environmental stewardship. Hopefully you had a chance to visit our poster stations in the other room. We take a formal approach to our environmental management, but our success can also be attributed to the input we receive from the community, as I stated before, Hawaii families work here, and they care about their environment and surroundings. Speaking of input from the community, that's		14 why we're here tonight, and I'll wrap it up, so we can get yours. I can't stress enough how important your involvement is in this process. You have taken time from your busy lives to participate in this democratic process, and we appreciate it. Let's make this a time to share not only our views, but our respect for one another. Mahalo. VIDA MOSSMAN: Okay. I'd just like to basically go over the ground rules. Please speak clearly and slowly into the microphone, starting with your name and any organization you represent. Each of you will have three minutes to speak. When your three minutes are up, to aid you in knowing when your time is almost up, my assistant will hold up a card when you have 30 seconds left. This should enable you to wrap it up. Okay. So our next speakers will be, in this order, Laurel Brier, Sharon Goodwin, Nina Monasevitch, Puanani Rogers, and Dr. Carl Stepath. How about you, Mr. Davis? CRAIG DAVIS: (Inaudible.) VIDA MOSSMAN: Okay. Laurel Brier. LAUREL BRIER: My main point is, is just this. That there needs to be an independent council for mammal research, for marine mammal research, and it's exactly as the Captain said for that reason. Right	S-T-0003 1

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now, 70 percent of the research is being done by the Navy for the U.S., 50 percent of what's being done worldwide is sponsored, paid for by the Navy, which leads to a correction of the research.

You know, that, of course, you're going to -- so many universities are now dependent on that money, that they're going to give the results that are being asked for. And it has been uncovered and discovered by the Natural Resource Defense Committee in 2002, e-mails that were discovered of the Navy compromising research that was published in the "Environmental Impact" magazine, and it wasn't basically results that the Navy wanted, and so they were threatened with losing their funding. And you can imagine that goes on. That when universities, professors are very dependent on their funding, they are going to -- it's project-driven research, and you tend to get the results that you're looking for.

So I see that as the biggest problem. To me, it's like asking the tobacco company to do the research on lung cancer, that we need an independent council doing this research, if we really want to get credible information.

VIDA MOSSMAN: Thank you. Sharon Goodwin.

SHARON GOODWIN: I'm Sharon Goodwin, and I S-T-0004

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represent the Kauai Alliance for Peace and Social Justice. Both state and federal legislation arising from our overwhelming -- both state and federal 1 legislation arising from overwhelming public support to protect the entire Hawaiian archipelago makes it incumbent upon you to require the Navy to abide by Hawaii's coastal protection laws. This means, essentially, that the Navy needs to drastically cut back its operations or move them someplace else. Your responsibility is to protect this valuable marine ecosystem. The Navy's responsibility is to protect 2 America. And if it calls the Hawaiian archipelago part of America, then it will not conduct missile, live-fire, or high-intensive active sonar in the archipelago.

From a larger perspective, why would 700 3 military bases in over 200 countries, a budget equal to or surpassing the military budget of all other countries combined, a Navy with submarines prowling the earth's oceans, with the capability to extinguish human life many times over, why must the defense department and Navy now intrude upon this very remote, pristine, and delicate archipelago?

VIDA MOSSMAN: Nina?

NINA MONASEVITCH: Aloha. My name is Nina S-T-0005

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Monasevitch. I'm here, representing marine mammals. I do work with the critically endangered Hawaiian monk seal. Their numbers are decreasing at 4 percent a year. Really serious issues in getting these numbers back at a sustainable place. As you probably know, the Hawaiian monk seals are endemic. We are very fortunate to have them here in these islands. The only state in the nation that has the endangered Hawaiian humpback whale, in addition, about 23 other marine mammals.

1 My concern is, I have read the Draft EIS, the original one and the supplement, and I found some real inadequacies in it. It's almost totally ignoring the three most likely causes of stranding and death caused by sonar, to deep-diving whales, and we do have deep-diving whales. Also, by the way, monk seals are deep-diving mammals. Specifically, it ignores sonar-caused panic reactions, leading to strandings, followed by death, and sonar-caused decompression sickness, the bends, also followed by death. It ignores the bends caused by sonar, even in the absence of panic.

The draft EIS makes the same critical omissions that the Navy made in the draft EIS for low-frequency active sonar prepared in 2005. This is despite the fact that the earlier omissions were

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pointed out by Joel Reynolds, an attorney for NRDC, in his comments on earlier draft EIS.

There are at least four ways in which low-frequency or mid-frequency sonar can injure or kill whales. One, direct tissue damage, including ear damage caused by the intense underwater sound wave. The 116-page Draft Environment Impact Statement concentrates entirely on this point. It almost ignores the following three points. Panic caused by intense sound wave, which can cause whales to strand or die onshore. Panic which can cause deep-diving whales, especially beaked whales, to ascend too rapidly and get decompression sickness, also called the bends.

Whales can and do get the bends. When they ascend too rapidly, bubble sometimes form in their blood, and their blood forms dissolved air. The bubbles can block the flow to the brain and their vital organs.

Four, rapid ascent by deep-diving whales not caused by panic. Fairly rapid ascent can occur, normally, without causing the bends. However, it might cause the bends in the presence of mid-frequency sonar.

In addition, I'd like to point out that what Laurel said, brought up about the research, and there is scientific research by Dr. Potter, that was pointed 2

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out in 2002, in these hearings, which isn't even covered, it's completely ignored in this EIS. Very disconcerting to me, that you're ignoring scientific research which has been proven and has been funded independently, that it's not being included in this research. So it's really clear that, like Laurel is pointing out, the research that you don't want to see that may be detrimental to your vision because it's kills whales, is not being included, so.

VIDA MOSSMAN: Thank you.

NINA MONOSAVICH: Please listen to your heart. Mahalo.

VIDA MOSSMAN: Thank you. Puanani Rogers.

PUANANI ROGERS: Aloha ahi ahi. Good evening, everybody. Puanani Rogers...(speaks Hawaiian). Born, raised, and still live in the ahupua`a, Kealia, with my children, my grandchildren, and my great granddaughter. I love this `aina, I love this island. This is the only island I can call home. Therefore, it is my kuleana or responsibility that we protect it as much as we can. I'm very questionable about whether what the United States Navy is doing, will not cause harm to our `aina. That was one of my most concerns.

I had a nice conversation, by the way, with the Commander here, and he kind of answered a lot of my

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questions already, so. My glasses, it's dirty, I can't see. I'll ask some others, some other questions. The ones I asked was, can they be sure that there would be no harm. And I stand on the universal law that says no harm, no harm be done to any living thing or nonliving thing, anything that has to do with this planet, anything that has to do with any life form, the universal law is, to cause no harm.

My other question was whether they were going to be shooting their missiles over the northwest Hawaiian islands, because of my concern for our kapae `aina, our archipelago. Hawaii is not just these eight islands. We extend north, northwest, up, thousands of miles further north. We, as kanaka maoli, must always remember that we're connected to all of those islands as well, and have just as much concern with those islands as we do for Kauai.

The answer to that, was that you wouldn't be shooting over Necker Island or Nihoa, which is what I had found out, doing some research to prepare for something to speak here. That you were going to go more west, and not be anywhere near the northwest Hawaiian islands, am I right, Commander, you did say that, didn't you?

CAPTAIN CUDNOHOFSKY: You said Ni`ihau.

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PUANANI ROGERS: Not over Ni`ihau, you said? Oh, then you didn't answer my question. So I want to know if you are going to get anywhere close to the northwest Hawaiian islands, in particular, Nihoa and Necker, and if so, what's going to happen, if anything?

I also wanted to remind you that the northwest Hawaiian islands is covered by a Coastal Zone Management Act, and that prohibits, or that protects mauka to makai, like all the ahupua`a on our islands, mauka to makai.

VIDA MOSSMAN: Puanani?

PUANANI ROGERS: Yes.

VIDA MOSSMAN: Mahalo. Thank you very much. Your time is up.

2 PUANANI ROGERS: One sentence. Oceans are part of a system that runs mauka to makai, so we need to limit Navy activities that may be harming our ocean shores.

VIDA MOSSMAN: Thank you. Mahalo.

3 PUANANI ROGERS: My last question is, do you still pay one-dollar-a-year rent?

VIDA MOSSMAN: Nani? Nani? If you want to provide more oral comment, please, go seek Kunani right down the hall.

PUANANI ROGERS: Still pay one-dollar rent?

VIDA MOSSMAN: Thank you very much.

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PUANANI ROGERS: You're very welcome, Vida.

VIDA MOSSMAN: Dr. Carl Stepath.

S-T-0007 DR. CARL STEPATH: Yes. Thank you.

Yeah, I'm sorry, I just heard about this hearing just a few hours ago, so I'm not really prepared to speak. But I have lived on Kauai for many years and recently received my Ph.D. in marine science, and I have done a little bit of reading about some of the research papers associated with this project, and I feel there are significant questions, as some of them have been raised today.

1 And I feel that, as some of the other speakers have brought up, is that when one group of people is doing the research or sponsoring the research, if can be very questionable whether or not this research is actually accurate. And I'm not saying it's not accurate, but I really feel that we really need to look at this and investigate this matter further because whenever we're in a situation where we're putting these very questionable sonar impulses into the marine environment, it does have effects on other living beings, and I really feel that -- I agree with what Nani said, is that we really have to be very careful that we make our utmost effort to protect other living beings here on the planet, especially in the

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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ocean, which is where I spend a lot of my time.

I also teach oceanography here on the island, and I have a great deal of love for the ocean, so I really feel it's important that, Commander, that you really do everything that you can to try to minimize any type of risk to any other living being, and I implore you to do that. Thank you very much. Aloha. 2

VIDA MOSSMAN: Thank you. We've got one more speaker. It's either Ray or Roy. Ray?

RAY CATANIA: Yes.

VIDA MOSSMAN: Catania?

RAY CATANIA: Yes. Just say what you like. S-T-0008

How's it everybody, you guys can hear? Okay. From what I understand, we supposed to be talking in particular about sonar, but for me, it's much bigger than sonar. It's a question of militarism. I going tell you, point-blank, I no care for the military. Okay? I think what we gotta do is spend all this money that we spending on missiles and bombs, and spend 'em on the needs of the people, like medical care, housing, education. It's about time that we start looking at these kinds of things and start reorienting our economy towards the needs of the people, 'cause as far as I concerned, the Navy has done a lousy job, environmentally. 1

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I was born and raised on Oahu, and I seen what the Navy did to Pearl Harbor, no can even fish over dea anymore. I seen what the Navy or the military had done to Makua, destroyed much of that valley with bombing, and we know what the military done to Kaho`olawe. I think what we gotta do is stop this testing altogether. Aunty Nani is right. We no need screw up our islands anymore. Mahalo. 2

VIDA MOSSMAN: Okay. We're going to take a recess.

Are you ready, okay? Mr. Craig Davis.

CRAIG DAVIS: Yeah, I just wanted to expound on the last two speakers. I think the northwest Hawaiian islands are really the crux of this, this issue here. I seem to recall not too long ago, President Bush mandating them as a sanctuary. Is that true? S-T-0009 1

PUANANI ROGERS: There's two of them. It's a national monument.

CRAIG DAVIS: Bush just did something. Wasn't Bush? It was Bush. It was Bush.

PUANANI ROGERS: Clinton was national sanctuary.

CRAIG DAVIS: The first was a conservation zone, all of the northwest Hawaiian islands to be protected.

PUANANI ROGERS: That's right.

CRAIG DAVIS: And what the military has done to

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

Kaho`olawe, Makua Valley, Kwajalein, and now, but Bush just proclaimed as protected lands, you're going to start bombing on them. Things seem all mixed up. I don't understand. I don't get it, why you give Kaho`olawe back, with a ten-year grace period for cleanup, and it's still not done. Kanaka still getting arrested, when you go to Kaho`olawe.

Kwajalein, we all know that. Maybe we all might know what happened there, but military messed that place, just total disrespect for islands of people, and it seems like it's going that way, here, too. I think there's much more that meets the eye, much more to the story. And the most perplexed thing that I can say is please explain to me how Bush, one minute, proclaims conservation zone and the next minute you're saying you're bombing. That's all I have to say.

VIDA MOSSMAN: We have no more speakers at this time signed up, so we're going to take a recess.

-oOo-

COMMENT NUMBER

STATE OF HAWAII)
) ss.
COUNTY OF HONOLULU)

I, Elsie Terada, Certified Shorthand Reporter, Certificate No. 437, for the State of Hawaii, hereby certify:

I am the person that stenographically recorded the proceedings.

The foregoing transcript is a true record of said proceedings.

Dated this 19th day of March, 2008, in Honolulu, Hawaii.

____

ELSIE TERADA, CSR NO. 437
Notary Public, State of Hawaii
My Commission Expires: 4-07-2010

COMMENT NUMBER

COMMENT NUMBER

HAWAII RANGE COMPLEX

DRAFT ENVIRONMENTAL IMPACT STATEMENT/

OVERSEAS ENVIRONMENTAL IMPACT

STATEMENT (EIS/OEIS)

SUPPLEMENT TO THE DRAFT EIS

March 14, 2008

Maui Waena Intermediate School

795 Onehee Ave, Kahului, Hawaii

BEFORE: SANDRA J. GRAN, CSR NO. 424
Registered Professional Reporter

COMMENT NUMBER

Speaker List:

Vida Mossman
Captain Aaron Cudnohufsky
Mike Moran
Bruce Douglas
Cedar Povier
Barbara Kranichfeld
Richard Morris
Summer Starr

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Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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P R O C E E D I N G S:

MS. MOSSMAN: Aloha and thank you for coming tonight. I'm Vida Mossman and I will be the moderator for tonight's hearing on the Navy's Supplement to the Draft Hawaii Range Complex Environmental Impact Statement.

The poster stations will remain open until 9:00 p.m. to enable you to engage with the members of the team.

Here to receive your comments are Captain Aaron Cudnohufsky, Hawaii Range Complex Coordinator and the officer in charge for the Hawaii Range Complex; Ms. Julie Harrison, in Silver Springs, Maryland; and Mr. Lewis Michaelson, who will assist me in moderating this hearing.

The panel is here to hear your comments and will not engage in dialogue with speakers. If you have questions, our team is ready to address your questions at the poster stations.

To ensure that we get an accurate record of what is said, please help me respect the following ground rules:

First, please start by stating your name and any organization you represent.

Second, each person will have three minutes to speak.

Third, if you have a written statement, you may turn it in at the registration table and/or you may read it out

COMMENT NUMBER

loud within the time limit. You may also provide additional comments for three minutes at the oral comment station located back there.

Four, please honor any request that I make for you stop speaking if you reach the three-minute time limit. To aid you in knowing when your time is almost up, my assistant will hold up a card when you have 30 seconds left. This should allow you to find a comfortable place to wrap up your comments.

Before we start calling the speakers, Captain Cudnohufsky would like to say a few words before we begin.

CAPTAIN CUDNOHUFSKY: Thank you, Vida.

Aloha and good evening to all of you. I'm Captain Aaron Cudnohufsky, Commanding Officer of the Pacific Missile Range Facility and the Hawaii Range Complex Coordinator.

Welcome to tonight's public hearing on our Supplemental Draft Environmental Impact Statement for the Hawaii Range Complex. I have just a couple of things to say, but I will keep my comments short so that we can maximize your time for comment.

As most of you know, we went through the EIS process and associated public hearings last fall. This effort, the Supplemental EIS, is not a revisit of all the EIS issues. It is specifically focused on the employment of mid-frequency active sonar here in the Hawaii Range Complex. We ask that

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you keep your comments focused on the mid-frequency active sonar issue only, as that is what the focus of this hearing is about.

As we all learned in grade school, 70 percent of the earth is covered by water. What you may not realize is that 80 percent of the world's population lives on or near the coastline and 90 percent of the world's trade is carried by the maritime shipping industry. $1.1 trillion worth of goods are imported to and exported from the US through maritime shipping. Any disruption to the global system caused by instability has a direct impact on our economy and quality of life.

The training we do here on the Hawaii Range Complex is of vital importance to not only our own military forces, but that of our allies. PMRF is home to the largest underwater instrumented range in the world. Here we train US and allied personnel to operate in the ocean environment in order to ultimately protect our nation. Our services operate on a full spectrum of operations, to include humanitarian ops, training and engagement with other nations' militaries, protecting the sea lanes and many others. Preventing wars is as important as winning wars; and to do this we need a strong, well-trained and well-equipped navy.

The greatest threat to our navy today is the quiet diesel submarine. Over 50 nations have submarines in their

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inventory and that number is expected to grow as the diesel submarine is relatively inexpensive. They are extremely difficult to detect, virtually invisible to passive sonar, and that is why we need to have well-trained sailors.

Consider the investment in training in a sonar operator: A Special Warfare SEAL requires two years of training, a Sonar Operator requires three years of training, and an Aviator requires about three and a half years. That provides some insight into the skill level required to achieve that capability, but it doesn't end there as it is a perishable skill and requires constant training.

These sonar operators not only protect their own ships from the torpedoes of our enemies, they are charged with protecting the entire fleet as well as any merchant ships that may be transiting hazardous waters. PMRF provides vital training for these sonar operators and they depend on the vital training to hone their skills before going into harm's way. They also deserve the best technology our country can provide them, and that is the medium frequency active sonar.

18:08:50 But what we do is not just about training, testing
18:08:50 and technology. We recognize our responsibilities as stewards of a very special place, our oceans and the marine environment. The navy is sensitive to the need to protect the environment and is proud of its record of environmental stewardship.

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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S-T-0023

Hopefully you had a chance to visit our poster 18:08:51 station as you entered where we have people ready to answer 18:08:51 all your questions about how we protect the marine resources. 18:08:51 If you have not had an opportunity, they'll be open all night.

I can't stress enough how important your involvement is in this process. You have taken time from your busy lives to participate in this democratic process and we appreciate this. Let's make this a time to share not only our views, but our respect for one another.

18:08:51 Mahalo.

18:08:51 MS. MOSSMAN: Okay. The speakers are in this order: 18:08:51 Mike Moran, Bruce Douglas, Cedar Povier, Barbara Kranichfeld, 18:08:51 Richard Morris and Summer Starr.

18:08:51 Mike.

18:08:51 MR. MORAN: Aloha. My name is Mike Moran from Kihei, Hawaii. Thanks for the opportunity to comment on this topic.

Once again, the navy is failing to offer reasonable protection to our aquatic environment in Hawaii with this Draft EIS, nor offer reasonable explanation why these practice 18:08:51 sessions must be held in near shore Hawaiian waters. In spite of overwhelming evidence of injury and death to whales and other marine mammals caused by mid-frequency active sonar use, the navy persists in doing so in the areas of Hawaiian Islands Humpback Whale National Marine Sanctuary where mother whales

18:08:52 are birthing on a regular recurring basis.

1 Unfortunately, this February 2008 version of the Draft EIS in the exhausting 116 pages is an inadequate 18:08:52 analysis by the navy, as was the prior 2005 draft. The navy insists on using selective science to form assumptions that neither do, nor apply in the real world marine environment, and chooses to ignore scientific evidences of injury and death to marine mammals which occur in regions where active sonar use occurs. 2 Further, the navy refuses to make available after action reports to the public, thus hiding specifically where the sonar use occurs to make it impossible to verify cause and effect relationships between sonar use and marine mammals injury and death, including, but not limited to strandings.

3 There are numerous ways active sonar can injure or kill marine mammals: Ear and other tissue damage caused by the sonic waves; induced panic from the sonic waves causing strandings on shore; induced panic on deep diving whales to ascend too quickly, causing the bends; and even naturally occurring fairly rapid ascent combined with the sonic wave also causing the bends or decompression sickness.

The navy acknowledges that, quote, "Sonar exposure has been identified as a contributing cause or factor in five specific mass strandings: Greece in 1996; the Bahamas in March 2000; Madeira, Portugal in 2000; the Canary Islands in 2002; and Spain in 2006." This is you, the navy, stating

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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4

this, but you then choose to ignore this problem. Also ignored is Hawaii's own July 11, 2004, mass strandings of 200 melon-headed whales in the Hanalei Bay area of Kauai during naval exercises in that area. Since again the navy refuses to offer after action reports of sonar use relating to date, time or location, scientists are prohibited from being able to prove the likely cause and effect relationship there.

As objective federal judges in courts in California and just 2/29/2008 right here in Hawaii are issuing rulings calling for further mitigations by the navy in use of active

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sonar, the navy chooses to ignore the court rulings. Judge David Ezra ruled that the navy cannot conduct exercises within 12 nautical miles of Hawaii's shorelines, which is where marine mammals that are particularly sensitive to sonar are found.

MS. MOSSMAN: Mr. Moran, your time is up.

Bruce Douglas.

S-T-0025

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MR. DOUGLAS: A couple of ideas. One is: What about using sounds in an area of, you know, non-harmful sounds to scare animals away from the area before any testing is done? Playing head-jammer music or something in the water to send them away and scare the animals off. That's one idea and comment.

The other is the use of sonar, low-frequency sonar or low-power sonar to look for animals in the water

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beforehand. I have seen no mention of this in any of the statements or anything else. Actually, so far all I've seen is looking with binoculars seeing if any animals are in the area. We have this incredible sonar, we should be able to use low power levels and ping and listen in the area and see if there's any animals in the water. We should be able to use lesser sounds in order to scare those animals away and drive whales and other fishes away from the area.

Those are my two suggestions. That's all. Thank you.

MS. MOSSMAN: Thank you very much.

Cedar Povier.

S-T-0024

MS. POVIER: Hello. I have traveled here today 6,000 miles from Newport, Rhode Island, to help lend a voice to those cannot speak on their own behalf, the whales.

We as individuals and Americans have come forth to protect the rights of our environment and the species within. I would like to believe some day we can look to our government for not only our own protection, but also the protection and best interests of all our species, as that is beneficial to our entire nation. We look to you now to set an example by doing what's right by ending the suffering of whales from the harmful effects of sonar testing.

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Furthermore, I feel that if the navy truly believed they were doing all they could do to protect the whales, they

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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would not be appealing a lawsuit that held against them requiring keep them to keep 12 nautical miles offshore.

Thank you.

MS. MOSSMAN: Thank you very much.

Please state your name before you provide your testimony.

Barbara Kranichfeld.

S-T-0026

MS. KRANICHFELD: My name is Barbara Kranichfeld and I'm from Haiku, Hawaii. I'm going to finish what Mike Moran started speaking about. Okay.

1

There are numerous ways active sonar can injure or kill marine mammals: Ear and other tissue damage caused by the sonic waves; induced panic from the sonic waves causing strandings on shore; induced panic on deep diving whales to ascend too quickly, causing the bends; and even naturally occurring fairly rapid ascent combined with the sonic wave also causing the bends or decompression sickness.

2

The navy acknowledges that, quote, "Sonar exposure has been identified as a contributing cause or factor in five specific mass strandings: Greece in 1996; the Bahamas in March 2000; Madeira, Portugal in 2000; the Canary Islands in 2002; and Spain in 2006." This is you, the navy, stating this, but you then choose to ignore this problem. Also ignored is Hawaii's own July 11, 2004, mass strandings of 200 melon-headed whales in the Hanalei Bay area of Kauai during

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naval exercises in that area.

Use of sonar in this area of Kauai during naval exercises in that area is unconscionable. These whales were so freaked out they had to go into a bay to try to escape this noise. They -- It was horrific to see these whales trying to find a place of sanctuary.

Since again the navy refuses to offer after action reports of sonar use relating to date, time or location, scientists are prohibited from being able to prove the likely cause and effect relationship there.

3

As objective federal judges in courts in California and just in February 29, '08, right here in Hawaii are issuing rulings calling for further mitigations by the navy in use of active sonar, the navy chooses to ignore the court rulings. Judge David Ezra ruled that the navy cannot conduct exercises within 12 nautical miles of Hawaii's shorelines, which is where marine mammals that are particularly sensitive to sonar are found.

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He also ruled that the navy must look for marine mammals for one hour each day before using sonar, and employ three lookouts exclusively to spot the animals before sonar use. However, it was just reported by the Associated Press on March 12, "The navy says it will go ahead with the planned anti-submarine warfare exercises this month, and then determine whether to seek additional clarifications and modifications from the judge." Let's just do it first and

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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then ask if this is what the ruling meant.

So the bottom line is I don't feel as if the navy is really considering our environment or what's right or has consciousness about protecting the oceans and the whales and is thinking about control and power. And I think we need to be -- we need to all work together to try to save the oceans and the marine environment. Mahalo.

MS. MOSSMAN: Thank you, Barbara.

Richard Morris.

S-T-0027

MR. MORRIS: Aloha. My name is Richard Morris. And I'm here, I guess, as a representative of the brothers and sisters that I consider to be -- the whales and the dolphins, who I consider to be kin to me, to my heart. And, also, I'm here as a representative of the peoples of Hawaii, although I am not Hawaiian myself.

I have had a very deep -- I wasn't intending to speak today, but listening to this gentleman in white over here speaking about all the war exercises that are going on in Hawaii, the stolen land that was stolen -- And even the president of the United States issued an apology for this land being stolen. Not only is the land being stolen, but now excessive war games are happening all around. This area just from being educated in these past couple minutes is being used as a quadrant for some of the most intensive war games that are going on in the world. And those war games are affecting

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my brothers and my sisters to the point that they can kill them. It can murder them.

Now, I don't know if you, sir, in the white uniform have ever swam with the dolphins and looked a dolphin eye to eye or if you've ever swum with a humpback whale and looked into their eye, which is about -- bigger than this, as big as a softball. When you have that communication, you transcend time. It's like coming into contact with a dinosaur. The whales are the record keepers for this land, for this world. Everyone knows the joy of the dolphin.

I can't imagine you going into the ocean with sounds that can actually rupture their hearing, that can actually just send them into panic to have them ascend too quickly to get the bends, to die on beaches. You know, we're all here -- I understand your concern for defending this country and defending the ocean ways, but like Bruce said, how about -- We have really exquisite sonars, old-time sonars that have been used. How about using those to check if whales are around? Because you can't -- Whales are under the surface for 20 minutes, 25 minutes. You might see them on the surface and then they go under and you may think they're not there, but they're there under the water. And you're blasting them and their babies in our waters. 1

I strongly encourage you having to do these cautions -- precautionary not only -- Sighting is really not

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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S-T-0028

enough. They're mainly underwater and especially if they hear sounds.

MS. MOSSMAN: Mr. Morris, your time is up. Thank you.

MR. MORRIS: Like I say, I congratulate you for your efforts. And I see you have a sincere job and your dedication to protecting this country. Thank you for your work, sir.

MS. MOSSMAN: Thank you, Mr. Morris.

Summer Starr.

MS. STARR: Summer Starr from Olinda. Aloha, everyone. Thank you for coming out on your Aloha Friday. I know there's lots of traffic.

I commemorate you folks yet again for coming out and having a public forum and volunteering to be the object of great frustration, dissent and quite often insults. Must be hard.

On that note, what more can we as a community do to make ourselves more clear? It is assumed that we, the people, don't have the resources, the amount of resources the US military has to do the extensive propaganda equal to what we have here tonight. We do not have the money the decision-makers do. With full-time jobs and mouths to feed, we do not have the time or an entire office of individuals dedicated to generating propaganda to convince the public that our opinion is what's just. With that in mind, how do you

suggest that we the community get our voices heard in a fair arena where we are guaranteed that our voices will not be in vein?

With a World War II ace pilot grandfather, another served as a Representative Republican in the Territorial Government of Hawaii, and a father who served in the National Guard; I am still a true believer that our United States military -- paid with my hard-earned taxes -- isn't an entity able to protect our well being. Honestly. We have been warned by our own great leader, "Beware the military industrial complex." We all know this. 1

What is happening here is colonialism. We in Hawaii have suffered from such arrogance for too long. This is salt in a fresh wound. (Statement in Hawaiian.) The list goes on. With the community in such opposition to this project, is it truly worth it to extend this imperialist arm of the United States military at the expense of our trust and corporation? 2

Please keep us in your best interests. That means the entire ao from the heavens all the way down to the bottom of the oceans. They are vital to the success and survival of this island state, this island nation. Mahalo.

MS. MOSSMAN: Mahalo, Summer.

We will now take a recess. We have no more speakers signed up. Thank you very much.

(Pause in Proceedings: 6:09-9:01)

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

COMMENT NUMBER

C E R T I F I C A T E

STATE OF HAWAII)
) SS.
CITY AND COUNTY OF MAUI)

I, Sandra J. Gran, Certified Shorthand Reporter for the State of Hawaii, hereby certify that the proceedings were taken down by me in machine shorthand and was thereafter reduced to typewritten form under my supervision; that the foregoing represents to the best of my ability, a true and correct transcript of the proceedings had in the foregoing matter.

I further certify that I am not attorney for any of the parties hereto, nor in any way concerned with the cause.

DATED this 21st day of March, 2008, in Maui, Hawaii.

____

Sandra J. Gran
Hawaii CSR 424
Notary Public for Hawaii
My Commission Expires: 5/14/08

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

Public Hearing on the
Navy's Supplement to the Draft
Hawaii Complex Environmental Impact Statement

Held at the Disabled American Veterans Hall
2685 North Nimitz Highway
Honolulu, Hawaii
On March 17, 2008
5:00 - 9:00 p.m.

COMMENT NUMBER

MS. MOSSMAN: Aloha, and thank you for coming tonight. I am Vida Mossman, and I will be the moderator for tonight's hearing on the Navy's Supplement to the Draft Hawaii Complex Environmental Impact Statement. Poster stations will remain open until 9:00 p.m. to enable you to engage with members of the team. Here to receive your comments are Captain Cudnohufsky, who is both the commanding officer of the Pacific Missile Range Facility and the officer in charge for the Hawaii Range Complex; Ms. Jolie Harrison of the National Marine Fisheries Service in Silver Springs, Maryland; and Mr. Louis Michaelson, who will assist me in moderating this hearing.

The panel is here to hear your comments and will not engage in dialogue with speakers. To ensure that we get an accurate record of what is said, please help me respect the following rules: First, please speak clearly and slowly into the microphone starting with your name and any organization you represent. Second, you will have three minutes to speak. Third, if you have a written statement, you may turn it in at the registration table and/or you may read it out loud within the time limit. You may also provide additional comments for three minutes at

COMMENT NUMBER

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

the oral comment station. Fourth, please honor any requests that I make for you to stop speaking if you reach the three-minute time limit. To aid you in knowing when your time is almost up, my assistant will hold up a card when you have 30 seconds left. This should allow you to find a comfortable place to wrap up.

We have one speaker signed up this evening, and that's Mr. Neal Frasier.

COMMENT NUMBER

S-T-0021

MR. FRASIER: Thank you. Am I live here? Can you hear me? Okay. So three minutes, I guess I will just make some general remarks, and my first

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general remark will be that from everything I know about Navy sonars, I would say they're a very, very old technology. The second thing I would say is that that technology is probably not going to be improved until we hold the Navy's feet to the fire a little bit, which has started to happen recently.

And when I say they're a very old technology, I mean that they use source wave forms that are very unnatural sounding, and they're high power, kind of a compressed wave form, so it's kind of like a kid beating a drum. There are better ways to do this. But like I say, progress in this area only happens when we require an agency to make less noise

in the water. So even though I've been a Navy contractor for the last 30 years and working with whales and underwater sounds and stuff like that, I've noticed that in the last few years we've made enormous strides in knowing more about whales, and the only reason for that is we said, hey, stop making so much noise. So I'd like to say we have to keep doing that.

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2

For example, just so you understand that I'm not making this up. 20 to 30 years ago we could have done good playback experiments, and what I mean by a good playback experiment is where you take a sound of biological significance and play it back to the animal at very low volume or great distance and keep reducing your distance or increasing your volume until you see a behavioral change that indicates the animal has heard you.

Now, if you do this with a sound that has no biological significance, you have to get pretty near the pain level before you get a reaction. Just like with human beings, if there was a construction site near your home, you don't sell your home and move away because you know eventually they're going to finish the building.

So the kind of thing you want to do -- thank you -- is use a predator sound, for example, an

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

orca sound. If you want to know whether a whale is hearing you, play him an orca sound. When you do that, you find that there's like a 28 to 30 dB difference between the levels that you start to get a reaction.

What my point is, and I'll wrap up here because I'm out of time, is that we don't know anything about how whales hear. We could have been doing these experiments 30 years ago. We're just starting to do them now. And the reason we're starting to do them now is because we've started to say to the Navy and the oil industry, cut it out. So my suggestion is we should continue to say that.

In this case, what I would like to say to the Navy is, how about putting out a passive array? How about giving us some better sonars? I don't have a security clearance and I know I can design a better sonar than what's going to be used in these exercises. Thank you.

COMMENT NUMBER: 3

MS. MOSSMAN: Thank you, sir. We have no more speakers at this time. We'll take a recess. Thank you.

(End of proceedings.)

C E R T I F I C A T E

STATE OF HAWAII)
) SS.
CITY AND COUNTY OF HONOLULU)

I, Jessica R. Perry, Certified Shorthand Reporter for the State of Hawaii, hereby certify that the proceedings were taken down by me in machine shorthand and was thereafter reduced to typewritten form under my supervision; that the foregoing represents to the best of my ability, a true and correct transcript of the proceedings had in the foregoing matter.

I further certify that I am not attorney for any of the parties hereto, nor in any way concerned with the cause.

DATED this 25th day of March, 2008, in Honolulu, Hawaii.

____

Jessica R. Perry
Hawaii CSR 404
Notary Public for Hawaii
My Commission Expires: 5/11/09

COMMENT NUMBER

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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INFORMATION AND ORAL COMMENT SESSION

HAWAII RANGE COMPLEX

SUPPLEMENT TO THE DRAFT EIS/OEIS

Held on Tuesday, March 18th, 2008
5:00 to 9:00 p.m.
At the Hilo Hawaiian Hotel
Hilo, Hawaii

Before:
Vida Mossman, Moderator
Captain Aaron Cudnohufsky, PMRF
Lewis Michaelson, Hearing Assistant
Jolie Harrison, National Marine Fisheries Service

REPORTED BY: Kathy Pearson, RPR, CRR, CSR No. 313
Notary Public, State of Hawaii

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VIDA MOSSMAN: We're ready to take oral comments at this time. So we're looking at Mr. Duane Erway, Mr. Lee Tepley, Dr. Michael Hyson, and Cory Harden.

Aloha, and thank you for coming tonight. I'm Vida Mossman, and I will be the moderator for tonight's hearing on the Navy's supplement to the draft Hawaii Range Complex environmental impact statement. Poster stations will remain open until nine p.m. to enable you to engage with members of the team.

Here to receive your comments are Captain Cudnohufsky, who is both the commanding officer of the Pacific Missile Range Facility and the officer in charge for the Hawaii Range Complex; Ms. Jolie Harrison of the National Marine Fisheries Service in Silver Springs, Maryland; and Mr. Lewis Michaelson, who will assist me in moderating this hearing.

The panel is here to hear your comments, and will not engage in dialogue with speakers. To ensure that we get an accurate record of what is said, please help me respect the following ground rules.

First, speak clearly and slowly into the microphone, starting with your name and any organization you represent.

Second, you will have three minutes to speak.

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Third, if you have a written statement, you may turn it in at the registration table and/or you may read it out loud within a time limit. You may also provide additional comments for three minutes at the oral comments station.

Fourth, please honor any request that I make for you to stop speaking if you reach the three minute time limit. To aid you in knowing when your time is almost up, my assistant will hold up a card when you have thirty seconds left. This should allow you to find a comfortable place to wrap up your comments.

We are now ready to begin. Our first speaker -- excuse me. Captain Cudnohufsky would like to say a few words.

CAPTAIN CUDNOHUFSKY: Aloha and good evening to you all. Just as a reminder, just like I had, please turn off your cell phones so we don't disrupt this meeting.

I'm Captain Aaron Cudnohufsky. I am the commanding officer of the Pacific Missile Range Facility as well as the Hawaii Range Complex coordinator.

Welcome to tonight's public hearing on our supplement to the draft environmental impact statement for Hawaii Range Complex.

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As most of you know, we went through the draft EIS process associated with public hearings this past August. This current effort, the supplement to the draft EIS, is not a revisiting of all the EIS issues. It is specifically focused on the use of mid-frequency active sonar here in the Hawaii Range Complex. We ask that you keep your comments focused on the mid-frequency active sonar issues only tonight.

As we all learned in grade school, seventy percent of the earth is covered by water. What you may not realize is that eighty percent of the world's population lives on or near the coastline, and ninety percent of the world's trade is carried by the maritime shipping industry. 1.1 trillion dollars' worth of goods are imported to and exported from the United States through maritime shipping. Any disruption to the global shipping system caused by instability has a direct impact on our nation and the quality of our life.

The training we do here at the Hawaii Range Complex is of vital importance to not only our own military forces, but that of our allies. PMRF is home to the largest underwater instrumented range in the world. Here we train U.S. and allied personnel to operate in the ocean environment in order to,

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ultimately, protect our nation. Our services support a full spectrum of operations, including humanitarian assistance, training, and coordination with other nations' militaries in protecting the sea lanes.

The greatest threat to our Navy today is the quiet diesel submarine. Over fifty nations currently have these submarines, and that number is expected to grow dramatically, especially given that diesel submarines are relatively inexpensive and very, very capable. These submarines are extremely difficult to detect and virtually invisible to the passive sonar, and that is why we need to have sailors who are well trained in operating mid-frequency active sonar.

Consider the investment in training a sonar operator. A sonar operator requires three years of training. An aviator requires three and a half years of training. That provides some insight into the skill level required to achieve that capability, but it doesn't end there. It's a perishable skill and requires constant training.

These sonar operators not only protect their own ships from the torpedoes of our enemies; they are charged with protecting the entire fleet, as well as any merchant ships that may be transiting hazardous waters. PMRF provides vital training for these sonar

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operators, and they depend on this vital training to hone their skills before going into harm's way. They also deserve the best technology our country can provide them, and that is the mid-frequency active sonar.

What we do is not just about training, testing, and technology. We recognize our responsibilities as stewards of a very special place -- our oceans and the marine environment. The Navy is sensitive to the need to protect the environment, and is proud of its record of environmental stewardship.

Hopefully, you had a chance to visit our poster stations in the back here when you entered, and we have plenty of people ready to answer any of your questions. And if you didn't get to get to the poster stations, they'll be open all night, until nine p.m., and I highly encourage you to go visit.

I can't stress enough how important your involvement in this process is. You have taken time from your busy lives to participate in this democratic process, and we appreciate that. Let's make this time a time to share not only our views, but our respect for one another. Mahalo.

VIDA MOSSMAN: Okay, our first four speakers are Duane Erway, followed by Lee Tepley, Dr. Michael

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Hyson, and Cory Harden. LEE TEPLEY: My name is Lee Tepley, and I have a Ph.D. in physics. Almost ten years ago I got heavily involved in the protest movement against LFA sonar. I did a lot of research on both LFA and mid-frequency sonar, and in 1992, I even got invited to give a paper at a National Marine Fisheries meeting near Washington, D.C. It turned out to be a rather important meeting. I participated in an informal debate on different ways that sonar could harm deep diving whales, and especially beaked whales. The concept of whales getting decompression sickness, which is the same as the bends, from sonar had been proposed many years earlier, but was advanced at this meeting, especially by Dr. John Potter, who is a brilliant scientist. And John came up with a new approach that is now pretty well accepted.	S-T-0010	In an earlier version of the draft EIS, it was stated that deep diving whales are more likely to be killed by sonar than other cetaceans, and that the Navy was considering adding a one percent increase in mortality to its complex dose function in circumstances that might increase the probability of beaked whale stranding. Later the dose function apparently changed into the risk function. But anyhow, in the earlier version of the draft EIS, that didn't mention the possibility that stranding could result from the bends either. In the current version of the EIS, the Navy changed its mind and did not even mention this one percent increased mortality due to sonar, and of course did not mention beaked whales dying from the bends. So the Navy seems to hate the fact that there's a possibility of beaked whales getting the bends. They just won't own up to that possibility at all.	2
In fact, the last section of the draft EIS we're talking about tonight had three references to beaked whales getting the bends, probably from sonar. But in the main part of the EIS, this fact is not even considered, and I think this is the greatest single defect of the EIS. It doesn't consider the possibility of whales getting bends from sonar at all.	1	Realistically, if deep diving whales do get the bends from sonar, they will die, maybe every time. The circumstances which lead to stranding will also lead to death. So this one percent increase in mortality that the Navy no longer even considered should initially be a very much larger percentage,	

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maybe even approaching a hundred percent.

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The Navy also ignored beaked whales getting the bends in an EIS on LFA sonar in 2006. This is LFA sonar. Mid-frequency and LFA sonar are not all that much different. In comments on this earlier EIS, Joel Reynolds, an attorney for NRDC, commented that this happen, but his comments were, of course, ignored. So the Navy continues to ignore this.

And I'll make a few more quick comments here.

The complex 110 page draft EIS is based on data from sonar tests of a few beluga whales and bottlenose dolphins in a tank and on right whales and killer whales in the ocean, and the results are extrapolated to all the whales and dolphins in Hawaiian waters. But in the draft EIS that we're talking about tonight, the Navy admits that none of this data is reliable and --

VIDA MOSSMAN: Mr. Tepley, your time is up. Mr. Tepley, sir, you can turn your comments in at the written comments. Sir, your time is up.

Duane Erway?

S-T-0011

DUANE ERWAY: Aloha, and thank you for listening to my comments this evening.

I'm generally, in fact quite supportive of Lee Tepley and his work. I first encountered some of

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the work when on the May 1996 stranding of twelve beaked whales in Greece. I read about that and was interested at the time in what was the probable cause. And the hearing was thought of, but they dismissed because they didn't hear very well at the -- the beaked whales don't hear all that well at the frequency of the sonars.

In March 2000, seventeen cetaceans stranded in the Bahamas, and that, they ended up looking at the ears and examining the ears for damage, and found blood, but didn't, didn't look for possible decompression sickness.

The April 2002 workshop that Dr. Tepley mentioned was where Dr. Potter advanced a theory of decompression sickness for whales based on, expanding on the work of Kromenhau (phonetic) and others. But so far no one has ever seen any evidence of that.

But then -- that was in April 2002. But then in May 2005, solid experimental evidence of DCS in whales, and there's an excellent report by a veterinarian, especially dealing with marine mammals, in the UK; Acute and Chronic Gas Bubble Lesions in Cetaceans Stranded in the United Kingdom. There were ten authors, and their very excellent work, I'd commend to you.

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I would close -- and I guess there's a number of strandings, of course, with beaked whales, and I'd close with the strandings that are all too familiar, including 111 beaked whales in Japan.

But I guess I'd close with a question, and that is, given that the decompression sickness is real and occurs at a lower received level than level B harassment, how many beaked whales will be injured or killed in each of the alternatives described in the draft EIS. That's my question. 1

VIDA MOSSMAN: Thank you, sir.

Dr. Michael Hyson?

MICHAEL HYSON: Aloha. My name is Dr. Michael Hyson. I'm here on behalf of the Sirius Institute and the Cetacean Commonwealth, which is the commonwealth of cetacean nations and the humans that support them. S-T-0012

It is Navy policy to steward environmental and cultural aspects of their operations, and when possible, to preserve cultural values and environmental values. The Cetacea as a whole, as individuals, are a cultural treasure. They've aided humans for millennia. They have language, cultural transmission, the largest brains on the planet. And when we establish communication, which the Navy may have already done,

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they could tell us some thirty million years of our own history.

On this basis, they're entitled to rights under human law, which we have yet to accord them, and they're definitely entitled to our full protection. The current EIS, as far as I can tell, pretty much ignores this. I mean, with something like 47,000 to 67,000 possible harassments per year, plus an unknown number of deaths caused by bubble formation, which has been ignored, as has already been covered.

It seems to me, the main thing I would like to say is, can we go back to square one? The people that we have interacted with at Barking Sands have been very kind and honorable people, and we're proud to have them as personal relationship. But somewhere between that and the policy in the Navy, there's a disconnect that has to be remedied, because we as a people, as a species, have to have a functioning planet. And to ignore and harm the oldest, biggest brains on the planet that can benefit us so much in terms of birth, therapy, communication, and knowledge, is just -- we have to stop this.

It seems to me we could use look-down radars, magnetic detection, passive sonar, something else, you know, something that's safe for everybody, so that

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everybody can reach their goals while making the Cetacea safe.

1 The main thing then is I would like to pursue a policy or get a policy in place where the whales are part of the cultural treasures that are protected, just like you would protect Seattle or San Francisco or Honolulu. They're part of what must be protected. They're part of why the Navy exists, you know, to protect those things that need to be protected.

2 So I would like to call for the conference that was suggested by the PMRF of all concerned parties to come together and talk about all these issues in a straightforward way, because the EIS is a somewhat flawed document and needs to be reworked seriously. Thank you.

VIDA MOSSMAN: Thank you.

Cory Harden.

S-T-0013

CORY HARDEN: Aloha, and thanks for coming to listen. I'm speaking for Sierra Club Mokolua group.

I'm disappointed by two things in this meeting. One, it's kind of a rolling public meeting, so you can't, everyone cannot really hear the comments of others. The other is, I did not get a separate three minutes to read comments from a UH professor, whose schedule changed at the last minute and cannot

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come. There needs to be a public participation, by law, and that's real important.

Comments from the professor, Jason Turner with marine science, associate professor at UH:

He says that Robin Baird, who's been studying toothed whales for the past six years, is not even mentioned in the EIS, and most of what we know about the toothed whales comes from him. 1

Jason said he did not see anything about pre and post monitoring and subsequent safeguards. 2

He also asks how many animals need to be injured or harassed before operations are halted, modified, or shut down permanently. 3

He asks about expertise of folks preparing the EIS. One seems to be, is a marine mammal biologist, seems to have good credentials. All others appear to be consultants with limited experience with marine mammals, and there's no leading experts from the marine mammal biology field. 4

Comments from Sierra Club:

Evidence appears overwhelming linking sonar to a series of whale strandings recently, and many scientists believe that the animals seen stranded is only a small part of the actual toll, since a lot of the animals don't come to shore.

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Also, courts have repeatedly struck down Navy plans for sonar. The federal ruling this month in California says sonar used in the Navy plan could harm endangered whales. The mitigation measures the Navy did not want to take would not compromise the Navy's ability to train.	5	is a defense for those on land, but if you live under the sea, it's more of an attack and --	
The court also said President Bush's January 15th order to except sonar use from environmental laws claimed an emergency that did not exist, and may have been an unconstitutional use of power.		VIDA MOSSMAN: Cory, your time is up. Ms. Harden, thank you very much. We have two more speakers.	
There's also a federal ruling this month in Hawaii. The Navy's harm threshold, the ruling said, contradicts the best available science, and casts into serious doubt the Navy's assertion that marine mammals will not be jeopardized. The court also said the Navy did not analyze reasonable alternatives.	6	Mr. Dwight Vicente.	
As far as the supplement, I'm not a scientist, because the basic formula used doesn't seem to be based on a lot of data or very good data. There's three data sets based on responses from only four species, not based on experiments designed for behavioral observation, and there's a lot of variables that are not taken into account.	7	DWIGHT VICENTE: Good evening. My name is Dwight Vicente, and I'm here to object to the Navy being here in the Hawaiian islands because of the history.	S-T-0014 1
Bottom line, I hope that the Navy will find ways to protect, not only those who live on land, sonar		If you look at the history dealing with the kingdom, they were here by way of treaty. The Bayonet Treaty, or Bayonet Constitution, the 1877 Bayonet Constitution, which most people refer to, was a reciprocity treaty where they had Pearl Harbor, which is in violation of the United States Constitution, Article 1, Section 8, Clause 17. Harbors is only in the United States. They got to use Pearl Harbor up until 1897.	
		But prior to that happening, what did happen was the queen signed the lottery bill into law, which would eliminate the foreign voters, which mostly were Americans. And because she did that on January 13th, 1893, that caused Americans to use, to take up arms, to include the United States Navy with the illegal land	

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forces attached to the Navy, the blue coats, and that became the overthrow. She signed them on the 13th January. The 17th, they took actual action. Sanford B. Dole, U.S. citizen, resigned his chief justice position in the Supreme Court of the Hawaiian Kingdom on the 13th of January.

So you can see the history of the United States Navy. It's not a good one here. They acted illegally.

And in 1897, the treaties that were signed in 1887 by Kalakaua ended, and they had to do something. The Americans that took over couldn't sign treaties. They were Americans. So what they did was carry over the, by way of agreement with the treaty nations, that the provisionary republic would continue the treaties, which they were not signature party to the treaty.

Now, since the treaties ended, United States Navy has no business here. Being that they have no business here in the islands, they have no need for an EIS, because they can't be here. They're trespassing. It's all because of their illegal acts. So what they need to do is to leave, until the kingdom is reestablished and treaties are established again.

So the Navy is not here for a good purpose. They're here for illegal purposes.

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And by way of the U.S. Constitution, the Navy is only here, their creation was only to prosecute piracy on the high seas. Nothing else. Not to invade another country, not bombing another country. Only to prosecute piracy. And piracy is limited.

So they need to leave. They have no title to the land.

In fact, the queen mentioned about Pearl Harbor in Section 8 of the lottery law she signed on January 13th. And you won't find them in the 1893 session laws. It's in the 1892 on page 334. She mentioned about Pearl Harbor. If the reciprocity treaty was to discontinue, they would use the monies from the lottery to fix up Pearl Harbor for a regular port.

Until today we have no lottery, because the U.S. Navy had stopped the lottery from happening, and that lottery was to end the sale of crown and government lands.

VIDA MOSSMAN: Thank you, Dwight. Thank you very much.

DWIGHT VICENTE: It's under protest. I reserve all my rights.

VIDA MOSSMAN: Thank you.

Roberta Goodman.

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S-T-0015 ROBERTA GOODMAN: My name is Roberta Goodman. I'm cofounder of Cetacea Nation with Dr. John C. Lilly. I'd like to reiterate some of the comments made by Dr. Lee Tepley, as I think they're very important, and he didn't get to finish his comment.

1 In the draft EIS there are three references to beaked whales getting bends from the sonar. In the main part of the EIS, this fact is not even considered. This is the greatest single defect of the EIS.

2 The earlier version of the draft EIS did not mention the possibility that strandings could result from the bends. Realistically, if deep diving whales get the bends from sonar, they will die almost every time. Circumstances which lead to stranding also will lead to death. The Navy's ignored beaked whales getting the bends in this EIS on LFA sonar in 2006. LFA sonar and mid-frequency sonar are not that much different.

3 The complex 110 page draft EIS is based on data from sonar tests of a few beluga whales and bottlenose dolphins in a tank, probably less than twenty feet deep, and on right whales and killer whales in the ocean, which do not occur in Hawaiian waters, because rarely do killer whales ever come here.

The results are extrapolated to all whales

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and dolphins in the Hawaiian waters, but in the draft EIS the Navy admits that none of this data is reliable. Still, the Navy says that it's the best available data, and it leads to this incredibly complex 110 page draft EIS.

Based on such unreliable data, the DEIS should not even have been written. The Navy should start over. Thank you very much.

Lee Tepley has a wonderful page on sonar up on his web site. He's a doctor of physics. And I'd be glad to read this out if that's important for the record.

And you can click on a "Link to Sonar HRC DEIS page," on his web page, web.mac.com/leetepley/Site/Introduction.html. Thank you.

VIDA MOSSMAN: Thank you.

Star Newland.

STAR NEWLAND: Welcome back. Aloha. Okay. Thank you. I've had a very intense, full day here, so I finally got to this. S-T-0016

While reading the document draft HRC EIS, tears came to my eyes. As I read the numbers listed so casually with regard to how many takes or harassment incidents, the situation per exercise per species, and

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the alternatives, one, two, three, zero change, et cetera. This is done with numbers on paper except for those very limited studies reported, like Roberta spoke of, or simulations on computers with zero apparent regard for the true effects on living beings, the largest, most ancient of mammals, our forebears and record keepers for the planet.

In a recent article this was said. A three day meeting called by the International Whaling Commission, IWC, came to an end this weekend. Although no country changed its mind, there is a willingness of various governments to at least talk about the issues and, quote, We are seeing the willingness of governments to say, just a minute, can we work this out.

In my prior encounters with the Navy and the people at PMRF through this government process, there has always been an intention and desire to seek common ground, that which we can agree upon, a willingness to say can we work this out.

1

This day we seek, on behalf of ourselves and the Cetacean Commonwealth, a further commitment to come to common ground on the issue of this new request for further testing and readiness for troop training.

Further to that, I'm enclosing a progress

report for the Hawaii state sustainability 2050 submitted 2007, from the committee on the cetacean human species sustainable community, and which can be found at www.planetpuna.com -- pardon me, I am a little bit nervous. Excuse me. Anyway, I submit that.

And then the dolphins, the dolphins helped America and Russia get past the Cold War. It would be a worthy outcome of this project to accomplish the same for modern times and help restore harmony to the planet, and it is this to which we aspire on behalf of Cetacea and humans. We ask for commitment to do more than mitigate, but to find ways to stop this perceived need to keep going with this kind of war-based world and come to another, a world in harmony.

As we seek to protect and enhance the well-being of Cetacea, what we learn can help us to live better with each other. It is this to which we are dedicated.

1

Now, in Section 3.52, line 16, how is it the monk seals are exposed to up to 224 decibels or DBs and the other species are listed as being exposed to up to only 115. I wonder how they can have another level of exposure beyond all the others. And then I realize what's in place to respond to incidents.

Lastly, imagine one of the new acoustic

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weapons brought into your personal home environment, into your neighborhood and home itself. Wherever you are, the sound would be there intimately, perhaps at random times blasting you from your efforts, like feeding or playing or suckling your new babe, certainly rattling badly your home and windows. Imagine there's no way to get away.

VIDA MOSSMAN: Star? Thank you, Star.

We have no more speakers signed up, so we will take a recess at this time. Thank you.

(Recess)

VIDA MOSSMAN: Aloha, and thank you for coming tonight. I'm Vida Mossman, and I will be the moderator for tonight's hearing on the Navy supplement to the draft Hawaii Range Complex environmental statement. Poster stations will remain open until nine p.m. to enable you to engage with members of the team.

Here to receive your comments are Captain Cudnohufsky, who is both a commanding officer of the Pacific Missile Range Facility and the officer in charge for the Hawaii Range Complex; Ms. Jolie Harrison of the National Marine Fisheries Service in Silver Springs, Maryland; and Mr. Lewis Michaelson, who will assist me in moderating this hearing.

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Our first speaker -- well, actually our eighth speaker will be Mr. Jim Albertini.

JIM ALBERTINI: Aloha. I'm Jim Albertini of, president of Maloaina Center for Nonviolent Education in Action, a nonprofit peace farm located in Kurtistown, where we work for justice, peace in the environment, and grow food to share with people in S-T-0017

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need.

One comment on the process of this, the rolling public testimony. It seems the Navy goes to great ends to try and segment and divide the community from hearing one another. First you tried to do away with a public hearing where the community can hear one another. Not only the Navy; it's equal opportunity within the military. The Army as well tried to do that.

But I think the community here needs a time frame when it can come together and hear the comments of the community. I don't know what the first seven speakers had to say. I wasn't informed of when the hearing portion was going to be.

So I dislike that, and I think it's a deliberate effort to segment and divide the community.

Another comment. The Kona side of this island, which is three hours away, is a very important marine resource area. Why is there no hearing on that side of the island?

Another failure, as I look through the preparers of this EIS, is that there's no direct involvement from the marine science programs of the University of Hawaii, Manoa or Hilo. It's a great resource we have here. The people who have a vested

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interest from the studying standpoint ought to be involved in this process. All these people in from Alabama and Arkansas and other areas. Involve the local universities.

One of the points that hits me is that apparently there is no level of killing of marine animals that will result in the permanent shutdown of the Navy sonar. Why is that so? Why is the Navy God? Why is it above all life on land and sea? Why is there no level in which you will not shut down permanently that sonar system?

VIDA MOSSMAN: Thank you, sir. We'll now recess. We have no more speakers at this time. Thank you. Poster stations are now open.

(Recess)

VIDA MOSSMAN: The public comment period is officially over, and the hearing on the Navy supplement of the draft Hawaii Range Complex environmental impact statement is adjourned. Thank you for coming.

(Hearing concluded at 9:00 p.m.)

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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C E R T I F I C A T E

STATE OF HAWAII)
)
COUNTY OF HAWAII)

I, Kathy Pearson, CSR, a Notary Public in and for the State of Hawaii, do hereby certify:

That on Tuesday, the 18th of March, 2008, commencing at 5:00 p.m., that the above proceedings were taken by me in machine shorthand and thereafter reduced to print under my supervision; that the foregoing represents, to the best of my ability, a true and correct transcript of the proceedings had in the foregoing matter.

I further certify that I am not an attorney for any of the parties hereto, nor in any way interested in the outcome of the cause named in the caption.

DATED: ___________________

____

Kathy Pearson, CSR No. 313
Notary Public, State of Hawaii

My commission expires:
July 12, 2010

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RECORDED COMMENT – Star Newland
Recorded at Island of Hawaii Public Hearing

HAWAII RANGE COMPLEX
SUPPLEMENT TO THE DRAFT EIS/OEIS
TRANSCRIPT OF COMMENT RECORDED BY STAR NEWLAND
HILO HAWAIIAN HOTEL, ISLAND OF HAWAII, HILO, HAWAII
RECORDED MARCH 18, 2008

This is a progress report for the Hawaii State Sustainability 2050 Plan of 2007 and the committee on cetacean interspecies sustainable community which can be found at www.planetpuna.com.

December 17, 2007. I think we'd be comfortable in saying "where are the special - - - - "that it's OK, Tom Clements" looking back from 2050 and what we have to do today to achieve that future that we have called the PAO, Tom Clements about at PMRC regarding a motion picture. Here is the future we envision and are working toward to our contribution to the State of Hawaii 2050 Sustainability Plan of 2007. We are expecting to enter into agreements, needing help along with Cetacean Commonwealth, that will enable us to proceed with a few projects, like the R and R, or retirement plan for veteran dolphins, retiring from their tours of duty and able to work with rehabilitating [veterans] and to participate with our interspecies cohorts - - - - - - - - and part of dolphin life developing

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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RECORDED COMMENT – Star Newland
Recorded at Island of Hawaii Public Hearing

intercommunication [breakthrough]. - - - - this kind of research develops consistent communications between our species and a whole new kind of world view and reality becomes possible. We have, especially in the last year since this committee has formed, made contact and are working with a number of partners, associates, and helpers with parts to play in the design and running of such a place. A global sense of harmony comes about through our deepening relation relationship with cetacean and the waters which we regenerate and repopulate, as well as keep clean and quiet and, except for some people who are now being [birthed gently in a] human and dolphin pod environment and the ain'a which is - - - - sustainable with ample fresh water provided by our own technology, renewable energy - - - - and other needed advances. We are looking at more potential customers on the island to break ground in creating this community. We are working with - - - - of the Hawaiian culture to perpetuate this - - - - and be more connected to the water - - - -. Much ground work has already been laid, funds are coming together to acquire land and to create the community. A major picture now in pre-production depicting this progression is a perfect way to create the program, accomplish what we can, and educate the world of this connection between our people, human and [cetaceans]. All of this can come about and be facilitated through this new level of cooperation and collaboration

2

COMMENT NUMBER

RECORDED COMMENT – Star Newland
Recorded at Island of Hawaii Public Hearing

between us and the Navy. - - - - in people's minds - - - - . Somewhere along the way, we would be able to ultimately put an end to the sonar issue and maybe even war. What could make us more sustainable than that of - - - - resources could be turned to good use, or people living well and thriving because they are raised - - - - - - - - the dolphins help America and us to get past the Cold War. It would be a worthy outcome of this project to accomplish the same for modern times and help restore harmony to the - - - -. In the spirit of Aloha - - - - and on behalf of the Cetacean Commonwealth, Puna, Hawaii, September 21, 2007.

- - - on behalf of cetacea and humans, we ask for commitment to be more than mitigate, but to find ways to stop - - - - the kind of war-based world and come to another, a world in harmony. As we seek to protect and enhance the well-being of cetacea, what we learn can help us to live better with each other and the - - - - we are dedicated. Thank you very much.

Transcript of Recorded Comment from
Star Newland

Pahoa, Hawaii

3

COMMENT NUMBER

S-T-0018

RECORDED COMMENT – Raydiance Gonare
Recorded at Island of Hawaii Public Hearing

HAWAII RANGE COMPLEX
SUPPLEMENT TO THE DRAFT EIS/OEIS
TRANSCRIPT OF COMMENT RECORDED BY
RAYDIANCE GONARE
HILO HAWAIIAN HOTEL, ISLAND OF HAWAII, HILO, HAWAII
RECORDED MARCH 18, 2008

1

I've read a little bit of research you've done to determine whether, how much and whether this sonar technology will, ah, damage the dolphins in the wild, and I don't think that you've even begun to do what's necessary, I don't even know if it's possible without really damaging the dolphins and whales to find out the extent of this kind of sonar on a creature whose perceptions are so sound oriented. And I don't, my basic stance on the dolphins and whales is that they are as intelligent, intelligent as we are, they have, they are, there is at least one other intelligent being on the planet and it is the dolphins and whales and maybe more, ah, and that killing them and harming them is just like killing and harming human beings and we don't have a right to do it. Ah, I don't feel that this whole military build-up is where the human race needs to go any more. I feel like that we need to stop and back off now, that it's not worth it, ah, and that our energy should be in educating and enlightening and making peace and de-arming.

1

COMMENT NUMBER

RECORDED COMMENT – Raydiance Gonare
Recorded at Island of Hawaii Public Hearing

2

Ah, this whole process is difficult because, in truth, I've come to the point that I don't have any confidence in the military and the government and what you have to say and what you say about what you do. I basically don't, no longer trust you. And so this makes this whole process difficult for me, ah, and I don't know how to re-establish that trust. But I still haven't given up and I still, I mean we can't give up, but I think that what you're doing is too dangerous to be worth anything that you think that you're going to accomplish by it and it's time to stop where we are and turn in a different direction, ah, and I hope that you'll do that.

Transcript of Recorded Comment from
Raydiance Gonare

2

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

Hilo, Hawaii

COMMENT NUMBER

S-T-0019

RECORDED COMMENT – Harriet Smith
Recorded at Island of Hawaii Public Hearing

HAWAII RANGE COMPLEX

SUPPLEMENT TO THE DRAFT EIS/OEIS

TRANSCRIPT OF COMMENT RECORDED BY HARRIET SMITH

HILO HAWAIIAN HOTEL, ISLAND OF HAWAII, HILO, HAWAII

RECORDED MARCH 18, 2008

I've, ah, been a resident of, ah, the Big Island for 15 years and I have swum with dolphins and whales here and also Maui and I have a special reverence to the animals and I know how sensitive they are and just being in the water with them or being on a boat close to them and I'm concerned because, ah, there's many conflicting stories about sonar hurting the animals and not hurting the animals and I may not passionately be able to give you a definition, but intuitively I think any loud noises even though there's already loud noises in the ocean, adding additional loud noises, ah, to the extent of electronic loud noises that they have no research on really, they're just trying to use them, ah, I think would affect the animals. I know how sensitive I am to loud electronic noises in my own home and environment, or any noises for that matter of fact, but particularly ah sonar, I mean, excuse me, particularly electronic noises, so are you showing concern for all the animals in the fact that introducing something that we really don't know that much about, there hasn't been a lot of tests done

1

COMMENT NUMBER

RECORDED COMMENT – Harriet Smith
Recorded at Island of Hawaii Public Hearing

on it, there's conflicting opinions about what it's doing or not doing, who you believe - - - -it's not a good thing, and I would like to protect our animals in the ocean as much as I possibly can. So I would like to put it out there, that I personally, ah, there has to be another strategy for the Navy, ah, and, other military, ah, organizations to train their troops other than dangerous loud noises that are disturbing our plant and life forms because again they don't really have any long term, ah, research on it and until we know exactly what it's doing, so it's all kind of guesswork actually, and again, depending on who you read, you'll hear one - - - - and then you know you think of course the Navy's not going to say they're hurting anything, so, um, I just would, I think that I would like us to - - - - the Navy not doing sonar testing until they can actually 100 percent prove to all sides that there's no harm, they're not hurting any animals or plant life in the ocean. 1

Transcript of Recorded Comment from
Harriet Smith

Pahoa, Hawaii

2

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-T-0022

ORAL COMMENT – Elizabeth Stone
Voicemail Box at Phone Number (866) 767-3347

HAWAII RANGE COMPLEX

SUPPLEMENT TO THE DRAFT EIS/OEIS

TRANSCRIPT OF ORAL COMMENT BY ELIZABETH STONE

RECEIVED MARCH 19, 2008 – 12:40AM

My name is Elizabeth Stone, General Delivery Naalehu and I was missed, I was unable to attend the hearing tonight so I was asking if besides finding oil spills, if they could find atomic, legal atomics that's destroying all our marine life in the ocean. And some of the civilians are attacking everyone and taking their skulls…arms and legs and skulls…and even the police have been, been, ah, injured. Mahalo. 1

COMMENT NUMBER

Exhibit 14.4.3-1. Copy of Public Hearing Documents - Supplement to the Draft EIS/OEIS (Continued)

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Table 14.4.3-2. Responses to Public Hearing Comments - Supplement to the Draft EIS/OEIS

Commentor	Comment #	Resource	EIS Section	Response Text
JoAnn Yukimura Kauai County Council	S-T-0001-1	Alternatives	4.1.2.4	Section 4.1.2.4 of the EIS/OEIS discusses the potential effects on marine mammals from Navy mid-frequency active (MFA) sonar training in the HRC. This training has been going on for the past 60 years. There has been no significant change in the sonar equipment in the last 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Though the Navy works to minimize impacts on marine mammals to the greatest extent practicable, they are not mandated by any statute to alleviate all risk to marine mammals. Over the past 30 years, the numbers of humpback whales around Hawaii appear to be increasing and the Navy believes that sonar has not significantly affected marine mammals in general.
	S-T-0001-2	Mitigation Measures	4.1.2.4, 6.0	The full analysis of effects in the EIS/OEIS indicates that there should be no mortality from Navy training activities. Range clearance procedures and mitigations are intended reduce the possibility of serious injury and mortality. The LOA issued by NMFS will place limits on the number and types of allowable takes (e.g. harassments) for all activities conducted within the HRC (see Sections 4.1.2.4 and 6.0).
	S-T-0001-3	Mitigation Measures	6.2.1	Avoidance of the seasonal presence of migrating marine mammals fails to take into account the fact that the Navy's current mitigation measures apply to all detected marine mammals no matter the season. Advance planning to avoid the seasonal presence of migrating marine mammals is not possible given the start of any "season" is variable (dependent on largely unknown environmental factors). To the degree possible, however, Navy already has taken a proactive step in this regard by specifically informing all naval vessels to increase vigilance when the first humpback whales have been sighted around the Hawaiian Islands. Otherwise, limiting training operations to the remaining six months of the year would not only concentrate all annual training and testing activities into a shorter six-month time period, but would also not meet the readiness requirements of the Navy's to deploy trained forces.
	S-T-0001-4	Alternatives	4.1.2.4, 6.0	The full analysis of effects in the EIS/OEIS indicates that there should be no mortality from Navy training activities. Range clearance procedures and mitigations are intended reduce the possibility of serious injury and mortality. The LOA issued by NMFS will place limits on the number and types of allowable takes (e.g. harassments) for all activities conducted within the HRC (see Sections 4.1.2.4 and 6.0).
Chris Bane	S-T-0002-1	Alternatives	4.1.2.4, 6.0	The full analysis of effects in the EIS/OEIS indicates that there should be no mortality from Navy training activities. Range clearance procedures and mitigations are intended reduce the possibility of serious injury and mortality. The LOA issued by NMFS will place limits on the number and types of allowable takes (e.g. harassments) for all activities conducted within the HRC (see Sections 4.1.2.4 and 6.0).

Table 14.4.3-2. Responses to Public Hearing Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Chris Bane	S-T-0002-2	Alternatives	4.1.2.4, 4.1.2.4.7	Section 4.1.2.4.7 of the EIS/OEIS contains a discussion of the "bends-like" issue raised in your comment. It has not been demonstrated that sonar causes the effects noted. Also, see response to comment S-T-0001-1.
	S-T-0002-3	Biological Resources - Marine	4.1.2.4, 4.1.2.4.10	See response to comment S-T-0001-1. In addition, the Navy believes that years of site fidelity by individual toothed whales is an indicator that the species has coexisted with sonar operations without long term detriment to populations. Residency demonstrates that the animals are remaining in the area despite sonar exercises (see EIS/OEIS Sections 4.1.2.4 and 4.1.2.4.10).
Laurel Brier	S-T-0003-1	Biological Resources - Marine	4.1.2, 6.0	The Navy cannot determine the reference to which the commenter refers. The Navy's assessment of potential impacts on marine mammals reflects the use of the best available science and the requirements of the Navy to train. Information concerning the scientific data used is provided in EIS/OEIS Sections 4.1.2 and 6.0.
Sharon Goodwin Kauai Alliance for Peace and Social Justice	S-T-0004-1	Biological Resources - Marine	4.1.2.4; 4.1.2.5.4	The Navy is in coordination with Hawaii's Office of Planning as it relates to CZMA compliance. Section 4.1.2.4 of the EIS/OEIS discusses the potential effects on marine mammals from Navy mid-frequency active (MFA) sonar training in the HRC. This training has been going on for the past 60 years. There has been no significant change in the sonar equipment in the last 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Though the Navy works to minimize impacts on marine mammals to the greatest extent practicable, they are not mandated by any statute to alleviate all risk to marine mammals. Over the past 30 years, the numbers of humpback whales around Hawaii appear to be increasing and the Navy believes that sonar has not significantly affected marine mammals in general.

Table 14.4.3-2. Responses to Public Hearing Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Sharon Goodwin Kauai Alliance for Peace and Social Justice	S-T-0004-2	Program	3.3.2.1.8, 4.1.4, 4.8	The Navy has determined that in light of the applicable enforceable policies in the State of Hawaiiǿs Coastal Zone Management Program (CZMP), there are no adverse direct or indirect (cumulative or secondary) effects on coastal uses or resources and the Proposed Action and its Alternatives are consistent to the maximum extent practicable with the enforceable policies of Hawaiiǿs Coastal Zone Management Program. Inert bombs are used for land-based bombing exercises; these exercises would increase from 165 (current training, or the No-action Alternative) to 250 (Alternatives 2 and 3) events per year. Bombing exercise at sea use non -explosive rounds and inert bombs; these exercises would increase from 35 (No-action Alternative or current training) to 38 (Alternatives 2 and 3) annual events. Mid-frequency sonar hours for the preferred alternative, Alternative 3, would be at the same level as identified for the No-action Alternative (current training). The SDEIS presented the refined methodology as applied to the adjusted sonar-use hours. Some current flight trajectories could result in missiles such as the Terminal High Altitude Area Defense (THAAD) flying over portions of the PapahŪnaumokuŪkea Marine National Monument, but the EIS/OEIS noted that twelve or less potential annual missile flight trajectories may cross Monument airspace. Preliminary results of debris analysis indicate that debris is not expected to severely harm threatened, endangered, migratory, or other endemic species on or offshore of Nihoa and Necker Islands. The probability for debris to hit birds, seals, or other wildlife will be extremely low. Quantities of falling debris will be very low and widely scattered so as not to present a toxicity issue. Falling debris will also have cooled down sufficiently so as not to present a fire hazard for vegetation and habitat. If feasible, consideration will be given to alterations in the missile flight trajectory, to further minimize the potential for debris impacts.
	S-T-0004-3	Alternatives		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
Nina Monasevitch	S-T-0005-1	Alternatives	4.1.2.4, 4.1.2.4.7	Section 4.1.2.4.7 of the EIS/OEIS contains a discussion of the "bends-like" issue raised in your comment. It has not been demonstrated that sonar causes the effects noted. Also, see response to comment S-T-0001-1.
	S-T-0005-2	Alternatives	4.1.2, 6.0	The Navy cannot determine the reference to which the commenter refers. The Navy's assessment of potential impacts on marine mammals reflects the use of the best available science and the requirements of the Navy to train. Information concerning the scientific data used is provided in EIS/OEIS Sections 4.1.2 and 6.0.

Table 14.4.3-2. Responses to Public Hearing Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Puanani Rogers	S-T-0006-1	Program	3.2, 4.2	Sections 3.2 and 4.2 of the EIS/OEIS reviewed the NWHI Marine National Monument. These activities were first analyzed in the Pacific Missile Range Facility Environmental Impact Statement finalized in 1998. Missile defense testing activities predate the existence of the of NWHI Marine National Monument. The impact of these activities is captured in Sections 4.2
	S-T-0006-2	Biological Resources - Marine		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
	S-T-0006-3	Miscellaneous		The commenter's reference to the amount of rent paid is unclear; however, the amount paid for rent would be outside the scope of this EIS/OEIS.
Carl Stepath	S-T-0007-1	Alternatives	4.1.2, 6.0	See response to Comment S-T-0003-1.
	S-T-0007-2	Biological Resources - Marine		Thank you for your comment.
Ray Catania	S-T-0008-1	Policy/NEPA Process		Thank you for your comment.
	S-T-0008-2	Program		Thank you for your comment.
Craig Davies	S-T-0009-1	Program	3.2, 4.2	Sections 3.2 and 4.2 of the EIS/OEIS reviewed the NWHI Marine National Monument. These activities were first analyzed in the Pacific Missile Range Facility Environmental Impact Statement finalized in 1998. Missile defense testing activities predate the existence of the of NWHI Marine National Monument. The impact of these activities is captured in Sections 4.2.
Lee Tepley	S-T-0010-1	Alternatives	4.1.2.4, 4.1.2.4.7	See response to Comment S-T-0005-1.
	S-T-0010-2	Alternatives	4.1.2.4, 4.1.2.4.7	See response to Comment S-T-0005-1.
	S-T-0010-3	Alternatives	4.1.2.4, 4.1.2.4.7	See response to Comment S-T-0005-1.
Duane Erway	S-T-0011-1	Alternatives	4.1.2.4, 4.1.2.4.7	See response to Comment S-T-0005-1.
Michael Hyson Sirius Institute and Cetacean Commonwealth	S-T-0012-1	Policy/NEPA Process		The Navy realizes that many marine mammals are significant to the cultural heritage of the Hawaiian people; however, establishing a new policy about whales as cultural treasures is outside the scope of this EIS/OEIS.
	S-T-0012-2	Policy/NEPA Process		Thank you for your comment.
Cory Harden Sierra Club	S-T-0013-1	Biological Resources - Marine	4.1.2.4.7, 4.1.2.4.9.8, 4.1.2.4.10.1, 9.0	Robin Baird is cited in several sections of the EIS/OEIS, including, but not limited to Sections 4.1.2.4.7, 4.1.2.4.9.8, and 4.1.2.4.10.1. Numerous documents and reports prepared by Mr. Baird are cited in Section 9.0 (references).

Table 14.4.3-2. Responses to Public Hearing Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Cory Harden Sierra Club	S-T-0013-2	Mitigation Measures	6.0	As described in Section 6.0, the Navy is developing an Integrated Comprehensive Monitoring Plan (ICMP) to determine behavioral and population level changes to marine mammals within Navy ranges. This Plan will also continue or initiate studies of abundance, distribution, habitat utilization, etc. for sensitive species of concern using visual surveys, passive and acoustic monitoring, radar and data logging tags (satellite or radio linked to record data on acoustics, diving and foraging behavior, and movements). The Plan will include the evaluation of Navy lookouts that observe for all objects in or on the water including debris, periscopes, other vessels, and marine animals. As of this EIS/OEIS, the Navy and NMFS are developing an HRC-specific monitoring plan which may include third party monitoring efforts by qualified entities as a component of the ICMP for unit-level exercises. Observations of marine mammals and sea turtles during unit-level training exercises will also be recorded to add to a larger database.
	S-T-0013-4	Biological Resources - Marine	1.7.1, 13,0, 14.0	NEPA requires an interdisciplinary approach to analysis. EISs are therefore prepared using a wide range of subject matter experts. Although they may be currently residing in other areas of the United States, the professionals preparing this EIS/OEIS have either lived and worked as environmental scientists in Hawaii or have been conducting environmental projects in Hawaii for many years. The Navy solicited comments and encouraged input from all Agencies, organizations, and individuals in Hawaii throughout the environmental impact analysis process (see Sections 1.7.1, 13.0 and 14.0 of the EIS/OEIS).
	S-T-0013-5	Alternatives		Thank you for your comment.
	S-T-0013-6	Alternatives		Thank you for your comment.
	S-T-0013-7	Alternatives		The Navy in Hawaii takes its commitment to environmental stewardship seriously, providing funds, efforts, and professional staff dedicated to this important matter. The Navy complies with all applicable environmental laws and has established procedures to ensure that programs are protective of Hawaii's environment.
Dwight Vincente	S-T-0014-1	Policy/NEPA Process		Thank you for your comment.
Roberta Goodman Cetacea Nation	S-T-0015-1	Alternatives	4.1.2.4, 4.1.2.4.7	See response to Comment S-T-0005-1.
	S-T-0015-2	Alternatives	4.1.2.4, 4.1.2.4.7	See response to Comment S-T-0005-1.
	S-T-0015-3	Alternatives		Thank you for your comment.

Table 14.4.3-2. Responses to Public Hearing Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Star Newland	S-T-0016-1	Alternatives	4.1.2.4.6	Navy used the northern elephant seal threshold because taxonomically, the elephant seal is more closely related to the Hawaiian monk seal than any other seal. A northern elephant seal and the Hawaiian monk seal are in the same sub-family. In addition, the audiogram of the northern elephant seal more closely approximates that of the Hawaiian monk seal.
Jim Albertini Maloaina Center for Nonviolent Education in Action	S-T-0017-1	Policy/NEPA Process	1.7.1, 13,0, 14.0	NEPA requires an interdisciplinary approach to analysis. EISs are therefore prepared using a wide range of subject matter experts. Although they may be currently residing in other areas of the United States, the professionals preparing this EIS/OEIS have either lived and worked as environmental scientists in Hawaii or have been conducting environmental projects in Hawaii for many years. The Navy solicited comments and encouraged input from all Agencies, organizations, and individuals in Hawaii throughout the environmental impact analysis process (see Sections 1.7.1, 13.0 and 14.0 of the EIS/OEIS).
	S-T-0017-2	Policy/NEPA Process	4.1.2.4, 6.0	The full analysis of effects in the EIS/OEIS indicates that there should be no mortality from Navy training activities. Range clearance procedures and mitigations are intended reduce the possibility of serious injury and mortality. The LOA issued by NMFS will place limits on the number and types of allowable takes (e.g. harassments) for all activities conducted within the HRC (see Sections 4.1.2.4 and 6.0).
Raydiance Gonare	S-T-0018-1	Biological Resources - Marine		Thank you for your comment.
	S-T-0018-2	Policy/NEPA Process		Thank you for your comment.
Harriet Smith	S-T-0019-1	Alternatives	4.1.2.4	Section 4.1.2.4 of the EIS/OEIS explains the potential effects on marine mammals from Navy mid-frequency active (MFA) sonar in the HRC. MFA sonar use analyzed in the EIS/OEIS has occurred in the HRC using the same basic sonar equipment and output for over 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. The current modeling methodology was developed in extensive consultation with NMFS and does not account for the Navy's mitigation measures to reduce the effects of MFA/HFA sonar on marine mammals. Consequently, the modeling and threshold levels developed for analysis of impacts on marine mammals universally erred on overestimating the number of takes.

Table 14.4.3-2. Responses to Public Hearing Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Peggy Ledoux	S-T-0020-1	Alternatives	1.0	As discussed in Chapter 1.0 of the EIS/OEIS, Navy does not consider alternate locations because this analysis would not be consistent with the purpose and need of this EIS/OEIS. Although Navy does do some simulated training, it does not fully develop the skills and capabilities necessary to attain appropriate military readiness. Navy training in the HRC has been going on for the past 60 years. There has been no significant change in the sonar equipment in the last 30 years. Given this history and the scientific evidence, the Navy believes that risk to marine mammals from sonar training is low. Though the Navy works to minimize impacts on marine mammals to the greatest extent practicable, they are not mandated by any statute to alleviate all risk to marine mammals. Over the past 30 years, the numbers of humpback whales around Hawaii appear to be increasing and the Navy believes that sonar has not significantly affected marine mammals in general. Navy's current mitigation measures and their use of the best available science balanced with the requirements of the Navy to train, results in Navy meeting its mission while being protective of the environment.
Neil Frazer	S-T-0021-1	Alternatives		Thank you for your comment.
	S-T-0021-2	Biological Resources - Marine		Thank you for your comment.
	S-T-0021-3	Alternatives		Passive arrays are used to the extent they are appropriate in Navy training.
Elizabeth Stone	S-T-0022-1	Miscellaneous	2.0	The proposed activities covered by this EIS/OEIS are described in Chapter 2.0. These activities do not include searches for oil spills or atomic materials. Criminal activities such as those mentioned in your comment are also outside the scope of this EIS/OEIS.
Mike Moran	S-T-0023-1	Alternatives	4.1.2.4.9.4	The risk function presented in EIS/OEIS Section 4.1.2.4.9.4 is based on three data sets that NMFS and Navy have determined are the best available and applicable science at this time. Until additional data are available, NMFS and the Navy have determined that these datasets are the most applicable for the direct use in the development of risk function parameters to describe what portion of a population exposed to specific levels of MFA sonar will respond in a manner that NMFS would classify as harassment.
	S-T-0023-2	Mitigation Measures	Appendix F	The Navy does prepare and release After Action Reports. An After Action Report prepared for the 2006 RIMPAC exercises, providing an analysis detailing the reasons for adoption, modification, or rejection of mitigation measures, is provided in Appendix F of the EIS/OEIS.
	S-T-0023-3	Alternatives	4.1.2.4, 4.1.2.4.7	Section 4.1.2.4.7 of the EIS/OEIS contains a discussion of the "bends-like" issue raised in your comment. It has not been demonstrated that sonar causes the effects noted. Also, see response to comment S-T-0001-1.

Table 14.4.3-2. Responses to Public Hearing Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Mike Moran	S-T-0023-4	Alternatives	Appendix F	The Navy does prepare and release After Action Reports. An After Action Report prepared for the 2006 RIMPAC exercises, providing an analysis detailing the reasons for adoption, modification, or rejection of mitigation measures, is provided in Appendix F of the EIS/OEIS.
	S-T-0023-5	Mitigation Measures	6.0	As discussed in Section 6.0, avoiding active sonar use within 12 nm from shore or 15.5 mi from the 200-m isobaths was made part of the RIMPAC 2006 authorization by NMFS and was based on the assumption that avoidance of the North American continental shelf was a prudent mitigation measure given the presence of beaked whales in the Gulf of Mexico. NMFS modified the measure for Hawaii because they had received a public comment during rulemaking for a proposed action taking place elsewhere. This measure lacks any scientific basis when applied to conditions in Hawaii. There is no scientific basis for requiring this mitigation measure in the Pacific and no known basis for the specific metrics. During RIMPAC 2006, this mitigation measure precluded active ASW training in the littoral region, which significantly impacted realism and training effectiveness. This procedure had no observable effect on the protection of marine mammals during RIMPAC 2006 and its value is unclear (there is a lengthy history of sonar use in the Hawaiian Islands without any strandings or apparent effect on marine mammals). However, its effect on realistic training is significant
Cedar Poivier	S-T-0024-1	Mitigation Measures	6.0	See response to comment S-T-0023-5
Bruce Douglas	S-T-0025-1	Mitigation Measures	6.2.1	Section 6.0 presents the range of Navy protective measures that would be implemented to protect marine mammals and federally listed species during training events. Among these is the use of passive detection capabilities to alert exercise participants to the presence of marine mammals in an event location. An alert signal for marine mammals would not meet ASW training requirements as it defeats the purpose of the training.
Barbara Kranichfeld	S-T-0026-1	Alternatives	4.1.2	See response to Comment S-T-0023-3
	S-T-0026-2	Alternatives	Appendix F	See response to Comment S-T-0023-4.
	S-T-0026-3	Mitigation Measures	6.0	See response to comment S-T-0023-5
	S-T-0026-4	Mitigation Measures	6.1.3	As stated in Section 6.1.3 of the EIS/OEIS, Navy shipboard lookout(s) are highly qualified and experienced observers of the marine environment. Their duties require that they report all objects sighted in the water to the Officer of the Deck (e.g., trash, a periscope, a marine mammal) and all disturbances (e.g., surface disturbance, discoloration) that may be indicative of a threat to the vessel and its crew. There are personnel serving as lookouts on station at all times (day and night) when a ship or surfaced submarine is moving through the water.
Richard Morris	S-T-0027-1	Mitigation Measures		Thank you for your comment.
Summer Star	S-T-0028-1	Policy/NEPA Process		Thank you for your comment.

Table 14.4.3-2. Responses to Public Hearing Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Summer Star	S-T-0028-2	Program		Thank you for your comment.

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14.4.4 WEBMAIL PUBLIC COMMENTS

Nine people commented via the public HRC EIS/OEIS website.

Table 14.4.4-1 presents individuals who commented using the website, with their respective commenter identification number. This number can be used to find the written document that was submitted and to locate the corresponding table on which responses to each comment are provided.

Exhibit 14.4.4-1 presents reproductions of the webmails that were received commenting on the Supplement to the Draft EIS/OEIS. Webmails are identified by commenter ID number, and each statement or question that was categorized as addressing a separate environmental issue is designated with a sequential comment number.

Table 14.4.4-2 presents the responses to webmail comments on the Supplement to the Draft EIS/OEIS. Responses to specific comments can be found by locating the corresponding commenter ID number and sequential comment number identifiers.

Table 14.4.4-1. Commenters on the Supplement to the Draft EIS/OEIS (Webmail)

Commenter	Comment ID	Commenter	Comment ID
Brendan Cummings on behalf of the Center for Biological Diversity	S-N-0007	Joy Perfetti	S-N-0002
Marsha Green on behalf of the North American Ocean Noise Coalition	S-N-0006	Brooke Porter on behalf of the Pacific Whale Foundation	S-N-0009
Ian Jenss	S-N-0004	Stephen Skogman	S-N-0003
Reynolds Kamakawiwoole on behalf of Twin Flames for God	S-N-0005	Judy Walker	S-N-0008
Brooke Lerch	S-N-0001		

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First Name:	Brooke
Last Name:	Lerch
Organization:	
City:	
State:	
Date Submitted:	2/19/2008
Comment:	

COMMENT NUMBER: S-N-0001

1 Your comments about passive sonar are seriously out of date. I worked on an operational passive sonar ranging system (AN/BQG-4 and AN/BQG-2A) in the mid sixties at Pearl Harbor. Mostly on diesel subs but also on the Barb - a nuclear attack sub.

2 Also, I don't believe the US NAvy uses diesel-electrics anymore.

First Name:	Joy
Last Name:	Perfetti
Organization:	
City:	haiku
State:	hi
Date Submitted:	3/8/2008
Comment:	

COMMENT NUMBER: S-N-0002

1 please , protect the hawaiian marine life - no more sonar ! mahalo.

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS

COMMENT NUMBER S-N-0003

First Name: Stephen
Last Name: Skogman
Organization: none
City: Haiku
State: HI
Date Submitted: 3/8/2008
Comment:

1 I realize the concern for national security. Defending our country is very important. I also think our country needs to focus less on destructive activity and more on constructive thinking. I am a Texas born American and believe Hawaii is a very valuable natural resource which needs to be handled delicately. Its time for a change in thinking, "Green not Bomb."

COMMENT NUMBER S-N-0004

First Name: Ian
Last Name: Jenss
Organization: United States Citizen
City: Lahaina
State: HI
Date Submitted: 3/11/2008
Comment:

1 To our proud and mighty U. S. Navy,
Please Have the common sense and environmental decency to have these upcoming sonar tests when our beloved Humpback Whales are not in the Hawaiian waters. I believe in a strong military with the best technology to defend our nation, however, let's do it in a logical and
respectful manner concerning our ocean mammals that inhabit these waters. Mahalo, Ian Jenss

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-N-0005

First Name: Reynolds
Last Name: Kamakawiwoole
Organization: Twin Flames for God
City: Honokaa
State: Hi
Date Submitted: 3/20/2008
Comment:

1 I am a Native Hawaiian and am against any kind of activity which causes any injury or harrasses our animals in the sea.

They are our guardians, and we do not have to harass or injure them in any fashion.

It is wrong for the Navy to continue any sonic or military active which endangers their lives. They
carry the knowledge for mankind when we injure them we injure ourselves..

We must send Love and not Force..

Any questions, i will be willing to answer,

Aloha Ke Akua,

Reynolds Kamakawiwoole

COMMENT NUMBER
S-N-0006

First Name: Marsha
Last Name: Green
Organization:
City:
State:
Date Submitted: 4/7/2008
Comment:
April 6, 2008

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128, Kekaha, Kauai,
Hawaii 96752-0128

ATTN: HRC EIS/OEIS

Re: Supplement to the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS/OEIS)
Federal Register Notice January 17, 2008 (Volume 73, Number 12) Pages 3242-3243

On behalf of the International Ocean Noise Coalition and its affiliate the Hawaii Ocean Noise Coalition, we submit the following comments on the Supplement to the Draft Environmental impact Statement/Overseas Environmental Impact Statement (Supplement) for the Hawaii Range Complex (HRC). These comments are in addition to our previous comments dated September 17, 2007.

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER S-N-0006 (cont.)

The Supplement introduces modifications to the analytical methodology used to evaluate the effects of mid-frequency active sonar on marine mammals with regard to behavioral impacts and the use of a proposed risk function methodology; changes to the amount and types of sonar allocated to each of the alternatives; and development of a new alternative.

Risk Function Methodology

Wild animals display wide variety in terms of the five senses, including their capacity to hear. Just like humans, different individuals for the same species can display different reactions to a stimulus. Hearing capabilities among different individuals of different sexes or varying ages in the same species can differ considerably. Among different species the hearing capability may be even more pronounced. The Navy acknowledges these differences in the Supplement, and is therefore looking towards developing a dose-response or risk continuum function to determine the potential behavioral impacts of MFA sonar on marine mammals.

1 However the data set used in the Navy's dose-response function as described in the Supplement is very small – a few studies on a few captive toothed whales, one survey on wild baleen whales and one modeled prediction of the levels of MFA sonar received by a pod of orcas in the USS Shoup incident of 2003. Apart from being not representative of all marine mammals in the wild, the captive animals were accustomed to noise and responding to it, and the wild animals likely also had some degree of habituation, the North Atlantic right whales living in the congested Eastern Seaboard of the U.S. and the orcas of North West Washington State being accustomed to ship and whale-watching boat noise.
The Navy and NMFS acknowledge this limitation and thus the risk functions are described as an "interim approach." As in our letter of September 17, 2007, we again point out the United States' obligations under Principle 15 of the United Nations Rio Declaration of 1992 to which the U.S. is a signatory that states "In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."

The Navy should not be using a lack of data as reason to press ahead with its preferred noise levels justifying it as the "best available science." Precaution should prevail, especially given the vastness of the Hawaii Range Complex, the uniqueness of the marine biodiversity in the area and the planned almost 2,000 hours of active sonar use (plus the dipping sonar, sonar buoys and MK-48 runs).

COMMENT NUMBER S-N-0006 (cont.)

Apart from the limited data set, the risk continuum function approach does not account for non-auditory noise impacts, the impacts of masking or cumulative and synergistic effects of several noise sources. It does not account for long-term impacts on marine mammals. It also does not take into account impacts to individual animals, but populations of animals. This is troublesome given that in any population there could be key individuals which, if negatively impacted by MFA sonar exposure, could result in the population being adversely affected, for example, by following the key individual into a hazardous situation. 2

Given the limitations of the dose response methodology, once applied the Navy predicts that 50% of marine mammals will be behaviorally impacted at received levels of 165 dB re: 1μPa rms with the other 50% being behaviorally impacted at levels from

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-N-0006 (cont.)

120 to 195 dB re: 1μPa rms.

We still maintain, as stated in our September 17, 2007 letter, that the whales in the Bahamas stranding died when exposed to levels of MFA sonar between 150 and 160 dB – which is still much lower than the levels at which the Supplement says 50% of animals will behaviorally respond.

The fact that the Navy predicts any animals being behaviorally impacted at 120 dB re: 1μPa rms, again should bring in application of a precautionary approach since those animals could be critical to the survival of a marine mammal population.

Reduced Modeled Number of MFA Sonar Hours and the New Alternative

4 In the Supplement, the Navy has reduced the predicted number of events or hours of active sonar use for the different alternatives presented in the DEIS/OEIS and introduced a new alternative which includes the maximum actions of alternative two, but results in the same number of events or hours of active sonar use as the 'no action alternative'.

1. The 'No action alternative' is a misnomer because it does not mean that the navy will not use MFA sonar or other noise generating sources, but that it will not increase its noise producing activities.

While we are pleased that the Navy's planned active sonar usage is decreased overall, we maintain that the number of hours of active sonar use is still too high and the levels of sonar too intense.

We appreciate the opportunity to submit these comments and look forward to them being addressed in full.

Sincerely,
(signed)
Marsha Green
North American Representative

(signed)
Marti Townsend
Hawaiian Ocean Noise Coalition

COMMENT NUMBER

S-N-0006 (cont.)

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-N-0007

First Name: Brendan
Last Name: Cummings
Organization: Center for Biological Diversity
City: Joshua Tree
State: CA
Date Submitted: 4/7/2008
Comment:
April 7, 2008

Public Affairs Officer
Pacific Missile Range Facility
P.O. Box 128, Kekaha, Kauai,
Hawaii 96752-0128

ATTN: HRC EIS/OEIS

Re: Supplement to the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (DEIS/OEIS) (73 Fed. Reg. 3242, January 17, 2008).

The Center for Biological Diversity submits the following comments on the Supplement to the Draft Environmental impact Statement/Overseas Environmental Impact Statement (SDEIS) for the Hawaii Range Complex (HRC). The SDEIS introduces modifications to the analytical methodology used to evaluate the effects of mid-frequency active sonar on marine mammals with regard to behavioral impacts and the use of a proposed risk function methodology; changes to the amount and types of sonar allocated to each of the alternatives, and includes a new 1

COMMENT NUMBER

S-N-0007 (cont.)

alternative. However, the SDEIS fails to correct the numerous deficiencies of the original DEIS as pointed out in the comments by numerous organizations and individuals. Of particular importance, the SDEIS fails to address the issues raised by the Marine Mammal Commission in its letter of October 2, 2007. We incorporate and adopt by reference as part of these comments, the issues raised by the Marine Mammal Commission as well as in the comment letters of the International Ocean Noise Coalition. Specific additional concerns with the SDEIS follow.

Alternatives

NEPA requires federal agencies to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources." 42 U.S.C. §4332(2)(E). The analysis of alternatives is the "heart" of the environmental review process; the EIS must "rigorously explore and objectively evaluate all reasonable alternatives," in order to "provid[e] a clear basis for choice among options by the decisionmaker and the public." 40 C.F.R. § 1502.14(a). A "reasonable range" of alternatives must be considered, and this must include consideration of full protection of all the resources involved. Because the consideration of an appropriate range of alternatives is so important to the NEPA process, "[t]he existence of a viable but unexamined alternative renders an environmental impact statement inadequate." Resources Limited Inc. v. Robertson, 35 F.3d 1300, 1307 (9th Cir. 1993).

In the SDEIS, the Navy has introduced a new alternative which includes the maximum actions of alternative 2, but results in the same number of events or hours of active sonar use as the "no action alternative." This alternative is now the "preferred" alternative. While the new preferred alternative is a step in the 1

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-N-0007 (cont.)

right direction as the Navy is apparently no longer proposing to increase the amount of mid-frequency active sonar used in the Hawaii Range Complex, the addition of this alternative still fails to meet NEPA's mandates.

3

The “no action” alternative in the SDEIS still proposes the use of mid-frequency active sonar at current levels, levels that will harass tens of thousands of marine mammals and likely result in the injury or death of scores of beaked whales and other sensitive species. The Navy must analyze a true “no action” alternative in which mid-frequency active sonar is not used at all. Doing so is the only way to accurately analyze the full environmental effects of the proposed action. Additionally, beyond the flaws with the “no action” alternative, the SDEIS fails to analyze any alternative that involves a reduction of mid-frequency active sonar from current levels.

4

Finally, the SDEIS (as well as in the original DEIS) fails to consider alternatives to avoid impacts on the most sensitive species in the action area. For example, the SDEIS should have included an alternative allowing for mid-frequency active sonar only during the portion of the year when humpback whales are absent from Hawaiian waters. Similarly, the SDEIS should have analyzed alternatives that avoid any impacts on the critically endangered Hawaiian monk seal. This unlawful limiting of the scope of alternatives in the SDEIS (as well as in the original DEIS) renders the entire NEPA process inadequate and unlawful.

Mitigation

5

The SDEIS fails to discuss mitigation entirely. As such it fails to remedy any of the numerous deficiencies in the DEIS with regard to both the actual mitigations proposed, as well as the analysis of the effectiveness (or likely lack thereof) of these

COMMENT NUMBER

S-N-0007 (cont.)

mitigations. The Marine Mammal Commission's critique of the mitigation measures in the DEIS has apparently be completely ignored by the Navy, thereby violating both NEPA and the MMPA.

Estimation of Sonar Exposure

6

Without proposing any changes in Naval operational in the Hawaii Range Complex, the SDEIS nevertheless substantially reduces the estimated number of hours of mid-frequency active sonar used in each alternative. We obviously support an actual reduction in the number of hours of mid-frequency active sonar used by the Navy in the action area. And we also support the use of the most accurate information in the environmental analysis. However, the SDEIS is so cursory in its explanation of how the new estimates were produced, that it provides no basis for review as to whether these changes are in fact more accurate than the previous estimates. We hope the new estimates do actually reflect a significant reduction in the number of hours of mid-frequency active sonar use, but the SDEIS needs to provide further information to support this conclusion. In any event, as described below, even the new, reduced hours of mid-frequency active sonar proposed are far too high and provide an unacceptably high risk to marine mammals in the Hawaii Range Complex.

Risk Estimation

7

The core of the SDEIS is the Navy's use of a new risk function to calculate the numbers of marine mammals that will be subjected to harassment. The SDEIS does a poor job of explaining how this function was derived and the reasons for its use. Moreover, the results produced by such a function are only as good as the information plugged into it. Yet in deriving the variables to employ in this new equation, the Navy seems to be selectively choosing data sources that result in the least

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-N-0007 (cont.)

precautionary conclusions. This is contrary to the spirit and letter of the MMPA. In enacting the MMPA, Congress clearly intended to place the burden on someone seeking to take a marine mammal to demonstrate that the activity would not have a negative impact. In cases, such as this, where, as the SDEIS acknowledges, "there are significant limitations and challenges to any risk function derived to estimate the probability of marine mammal behavioral responses; these are largely attributable to sparse data," (SDEIS 3-8) a precautionary approach is particularly important.

17 As the House committee report explained, the Act was deliberately designed to permit takings of marine mammals only when it was known that that taking would not be to the disadvantage of the species:

In the teeth of this lack of knowledge of specific causes, and of the certain knowledge that these animals are almost all threatened in some way, it seems elementary common sense to the Committee that legislation should be adopted to require that we act conservatively -- that no steps should be taken regarding these animals that might prove to be adverse or even irreversible in their effects until more is known. As far as could be done, we have endeavored to build such a conservative bias into the legislation here presented.

H.R. Rep. No. 92-707, supra, at 15.

Committee for Humane Legislation, 540 F.2d at 1150, citing H.R. Rep. No. 92-707. (Emphasis in original). Here, where the information on the effects on marine mammals is admittedly "sparse", the Navy must heed this guidance and choose the most precautionary variables to plug into its risk function. Instead the Navy appears to have done the exact opposite.

8 In choosing the baseline value for risk, the B Parameter, the Navy has chosen 120 dB. This is too high. Numerous studies

COMMENT NUMBER
S-N-0007 (cont.)

and reports document impacts to marine mammals from sounds lower than 120 dB. For example, a study of Canadian belugas showed flight responses from ships at received sound levels as low as 94 dB.

Presumed alarm vocalizations of belugas indicated that they were aware of an approaching ship over 80 km away and they showed strong avoidance reactions to ships approaching at distances of 35-50 km when received noise levels ranged from 94 to 105 dB re 1 uPa in the 20-1000 Hz band. The "flee" response of the beluga involved large herds undertaking long dives close to or beneath the ice edge; pod integrity broke down and diving appeared asynchronous. Belugas were displaced along ice edges by as much as 80 km.

Finley, K. J., G.W. Miller, R.A. Davis, and C.R. Greene. 1990. Reactions of belugas, Delphinapterus leucas, and narwhals, Monodon monoceros, to ice-breaking ships in the Canadian High Arctic, p. 97-117. In T.G. Smith, D.J. St. Aubin, and J.R. Geraci [ed.] Advances in research on the beluga whale, Delphinapterus leucas. Can. Bull. Fish. Aquat. Sci. 224. While beluga whales are obviously not likely to be in the action area here, the Navy relied upon captive studies of beluga showing behavioral thresholds of 180-196 dB in setting the K Parameter. If the beluga is a suitable subject to set such thresholds for one portion of the function, the Navy must consider studies of the beluga that are relevant in other elements of the function as well. A 120 db threshold for the B Parameter is arbitrary. A 94 dB or lower threshold would be more appropriate, both in terms of using the best available science and in keeping with MMPA mandates.

The setting of 165 dB for the K Parameter is similarly set too high. While studies in addition to the three chosen by the Navy in setting the K Parameter exist (see beluga example above), 9

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-N-0007 (cont.)

even if the Navy were limited to the three cited studies, it should have chosen the most precautionary number from those studies (133 dB for right whales) rather than the mean of the three studies.

Finally, the setting of the A Parameter is also poorly explained or justified and does not apparently incorporate the precautionary approach embodied in the MMPA. 10

An overriding problem with the risk function is that the data set used by the Navy is very small – a couple studies on captive bottlenose dolphins and beluga whales, one survey on right whales and one modeled prediction of the levels of MFA sonar received by a pod of orcas in the USS Shoup incident of 2003. Apart from being not representative of all marine mammals in the wild, the captive animals were accustomed to noise and responding to it, and the wild animals likely also had some degree of habituation, the North Atlantic right whales living in the congested Eastern Seaboard of the U.S. and the orcas of North West Washington State being accustomed to ship and whale-watching boat noise. We believe that a larger dataset would have produced lower thresholds for impacts to marine mammals and consequently different and more precautionary inputs into the risk function. 11

Apart from the limited data set, the risk continuum function approach does not account for non-auditory noise impacts, the impacts of masking or cumulative and synergistic effects of several noise sources. It also does not account for long-term impacts on marine mammals. It also does not take into account impacts to individual animals, but only populations of animals. This is troublesome given that in any population there could be key individuals which, if negatively impacted by MFA sonar exposure, could result in the population being adversely affected, for example, by following the key individual into a 12

COMMENT NUMBER
S-N-0007 (cont.)

hazardous situation. Given the MMPA is designed to protect not just populations, but individual marine mammals, this approach is particularly problematic See 16 U.S.C. § 1362 (18)(A) (definition of "harassment" expressly applies to acts that affect "a marine mammal or marine mammal stock in the wild.") (emphasis added); see also Natural Resources Defense Council v. Evans, 279 F.Supp.2d 1129, 1157 (N.D. Cal. 2002) ("In expressing concern about harassment to 'a marine mammal,' Congress was concerned about harassment to individual animals.").

Given the above deficiencies with the risk function the Navy's estimates that "only" 39,863 marine mammals will be taken is likely a severe underestimate. This underestimate is compounded by the rather absurd assertion that a marine mammal can be taken only once in a 24 hour period. While perhaps convenient for modeling purposes no rational explanation for how this could comport with reality or biological relevance is given in the SDEIS.

Even accepting the Navy's estimates, the estimated take is unacceptably high and cannot possibly be reconciled with the purposes of the MMPA. Moreover, even if close to 40 thousand episodes of harassment could somehow be determined to have a "negligible impact" on the affected stocks, the number of exposures to sound levels likely to cause physical injury or death are clearly unacceptable. 13

For example, the SDEIS predicts 228 humpbacks will be exposed to noise between 195 dB and 215 dB. This number in and of itself is unacceptably high. Because the threshold used by the Navy here is well above the 180 dB threshold NMFS has previously determined to injure whales, 228 is likely a gross underestimate. Similar underestimates of the true impacts of the proposed action occur for numerous other species.

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER
S-N-0007 (cont.)

Additionally, nowhere in the SDEIS is there an estimate of how many animals will be exposed to acoustic energy levels higher than 180 dB. There is no way for the reader to compare the results of the risk function with NMFS's previous methodology if there is not a take estimate generated under both methodologies. This violates both the review provisions of NEPA as well as the substantive provisions of the MMPA.

14 Another glaring omission in the SDEIS is any treatment of whether and how the new risk function should be applied to beaked whales. Given mid-frequency active sonar can be fatal to beaked whales at levels below the 165 dB mid-point of the risk function curve, the function obviously does not adequately address impacts to these particularly sensitive species. Similarly, there is no acknowledgement, much less analysis, of the impacts (potentially injurious or fatal) to other species of marine mammals from sound levels far below those that would cause TTS (such as the near-stranding of melon headed whales associated with previous MFA exercises).

15 Finally, the SDEIS is woefully deficient in its treatment of the critically endangered Hawaiian monk seal. The SDEIS, using studies on other species of pinnepeds, sets an obscenely high threshold for injury to the monk seal of 224 dB and a TTS threshold of 204 dB. The SDEIS concludes that 161 monk seals would be harassed (well over 10% of the population) and three would be subject to exposures between 204 and 224 dB. Given the injury of a single monk seal would not be negligible and would equate to jeopardy under the ESA, the exposure of this number of seals to such sounds levels in wholly unsupportable.

16 In sum, the SDEIS fails to correct any of the significant deficiencies of the DEIS. The Navy should publish a new DEIS that considers true alternatives and that properly incorporates the precautionary mandates of the MMPA and ESA into its analysis. Thank you for the opportunity to comment.

COMMENT NUMBER
S-N-0007 (cont.)

Sincerely,
/s/
Brendan Cummings
Center for Biological Diversity
P.O. Box 549
Joshua Tree, CA 92252

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS (Continued)

COMMENT NUMBER

S-N-0008

First Name: Judy
Last Name: Walker
Organization:
City: Hilo
State: HI
Date Submitted: 4/7/2008
Comment:

1 The research and references used to prepare this SEIS are inadequate. Only one paper specifically addresses Hawaii, and that is a survey of Hawaiian cetaceans (Barlow 2005) from one single time period (summer/fall 2002). Surely there must be more information available about the distribution, habits, etc. of marine mammals in Hawaii.

2 The humpback populations wintering in Hawaii have been the focus of much study, but none of this research was consulted in preparing the SEIS. There are ongoing studies of cetacean populations on the west side of Hawaii, but I see no evidence that any of the researchers were consulted. As a comparison, there are only 4 pages of references for the 116-page document Navy SEIS, versus 8 pages of references for a 28-page paper prepared for NATO Military Oceanography Group in October of 2005 on Marine Mammals and Active Sonar. (The United States did not participate in preparing that report.)

3 The contracted preparers from KAYA Associates, Inc., and SRS Technologies have no expertise in marine mammals, much less marine mammals in Hawaii, and there is no evidence they consulted anyone who does have the requisite experience. The characterization of the contracted preparers' experience (years of experience apparently equals the number of years spent doing anything outside of attending undergraduate or graduate school) is misleading if not downright deceptive. Further KAYA and SRS both advertise their close relationship with the U.S. government, particularly the U.S. military, on their websites. For example, in its own environmental brochure, KAYA describes its "environmental services" as follows:
KAYA personnel have mobilized to support military actions that demand unique solutions from the environmental scientist. We excel at providing the highly specialized services required for complex weapon system acquisition as well as other military actions in remote locations.

Clearly the preparers have a conflict of interest—any results that may inconvenience the Navy could mean the loss of the majority of their contracts, government and private, and the financial collapse of their respective businesses.

COMMENT NUMBER

S-N-0008 (cont.)

4 From Appendix A, "Consequently, the Feller-adapted risk functions described in this document should be clearly identified by both NMFS and Navy as an interim approach (using the best available science) for Navy MMPA authorizations for major MFAS exercise and operating areas designated to be completed before the end of 2009." The word "interim" does not appear in the Navy SEIS, and I was unable to find any reference, explicit or otherwise, to this NMFS caveat. The implication is that the Navy does not intend to do the additional research to ensure that marine mammals are not harmed, but rather is content to implement what it knows to be a shoddy model in order to push forward its operations.

5 Also from Appendix A, comments on a curve for pinnipeds were not solicited for this study, with the recommendation from NMFS (absent any provided substantive basis) being to use the odontocete curve. (It appears that the Navy has chosen to use elephant seal TTS data instead, and there is not discussion of this differing from the NMFS recommendation.) Monachus

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS (Continued)

schauinslandi is only found within Hawaii, and almost exclusively within the HRC. It is critically endangered, with an estimated population of 1100-1200 and declining at a rate of 4% per year. Such a deliberate oversight—not even attempting to create a valid model for a critically endangered species—is unconscionable and likely illegal.

COMMENT NUMBER: S-N-0008 (cont.)

COMMENT NUMBER: S-N-0009

First Name: Brooke
Last Name: Porter
Organization: Pacific Whale Foundation
City: Wailuku
State: HI
Date Submitted: 4/7/2008
Comment:

1 We are concerned about the need for a take authorization. The draft EIS/OEIS states the need for a "take" authorization based on the current frequency of strandings. This action, in and of itself, readily admits the direct link of sonar to marine mammal strandings.

2 Previous Hawaii research on the effects of sonar, demonstrated that humpback whales off the Kona coast ceased their song during sonar transmissions. Song resumed in "tens of minutes." Such summaries are vague, non-descript and completely void of necessary quantification.

4 In addition, the majority of the quoted research concerning effects of underwater noise on marine mammals is based on effects seen in humans. Results of long-term exposure to underwater noise pollution on humans can in no way be applied to marine mammals. We are all aware that a deaf whale is a dead whale.

3 The Navy states that the use of sonar during training is invaluable. Active sonar transmissions give away the position of the transmitting vessel. However, it seems in many cases location information is too important to divulge in all "real-time" exercises.

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS (Continued)

	COMMENT NUMBER
We at Pacific Whale Foundation believe additional research is necessary and are against the destructive use of our oceans for the purposes of military sonar and military training.	S-N-0009 (cont.)

	COMMENT NUMBER

Exhibit 14.4.4-1. Copy of Webmail Documents - Supplement to the Draft EIS/OEIS (Continued)

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Table 14.4.4-2. Responses to Webmail Comments - Supplement to the Draft EIS/OEIS

Commentor	Comment #	Resource	EIS Section	Response Text
Brooke Lerch	S-N-0001-1	Alternatives	1.3.2, 1.3.3	As discussed in Sections 1.3.2 and 1.3.3, the Navy must use passive and active sonar.
	S-N-0001-2	Miscellaneous		Thank you for your comment.
Joy Perfetti	S-N-0002-1	Alternatives		Thank you for your comment.
Stephen Skogman	S-N-0003-1	Program		Thank you for your comment.
Ian Jenss	S-N-0004-1	Program	4.1.5.1.1, 6.2.1	As discussed in Section 6.2.1, seasonal avoidance, as a mitigation measure, is based on speculative findings from other areas of the world that do not have direct application to the unique environment present in Hawaii. Lacking any scientific basis for seasonal avoidance in Hawaii and lacking any evidence in Hawaii that there has ever been an impact resulting from the lack of these measures, there is no evidence that this mitigation measure would increase the protection of marine mammals. Because year-round deployment is critical for Navy operations, implementation of seasonal avoidance would, however, unacceptably impact the effectiveness of the training. Regarding divers, As stated in Section 4.1.5.1.1, research was conducted for mid-frequency active (MFA) sonar at the Naval Submarine Medical Research Laboratory and the Navy Experimental Diving Unit to determine permissible limits of exposure to MFA sonar. Based on this research, an unprotected diver could safely operate for over 1 hour at a distance of 1,000 yards from the Navy's most powerful sonar. At this distance, the sound pressure level will be approximately 190 dB. At 2,000 yards or approximately 1 nm, this same unprotected diver could operate for over 3 hours.
Reynolds Kamakawiwoole Twin Flames for God	S-N-0005-1	Program		Thank you for your comment.
Marsha Green North American Ocean Noise Coalition	S-N-0006-1	Alternatives		See Response to Comment S-W-0025-1.
	S-N-0006-2	Alternatives		See Response to Comment S-W-0025-2.
	S-N-0006-3	Alternatives		See Response to Comment S-W-0025-3.
	S-N-0006-4	Alternatives		Thank you for your comment.
Brendan Cummings Center for Biological Diversity	S-N-0007-1	Alternatives	13	All public comments received by the Navy during the Draft EIS/OEIS public comment period are considered by the Navy.

Table 14.4.4-2. Responses to Webmail Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Brendan Cummings Center for Biological Diversity	S-N-0007-2	Alternatives	2	Under NEPA, the choice of alternatives is bounded by some notion of feasibility. Agencies are not required to consider alternatives that are infeasible, ineffective, or inconsistent with its basic policy objectives.
	S-N-0007-3	Policy/NEPA Process		The choice of alternatives is bounded by some notion of feasibility. Agencies are not required to consider alternatives that are infeasible, ineffective, or inconsistent with its basic policy objectives. ASW personnel must practice using sensors, including electro-optical devices, radar, magnetic anomaly detectors, sonar (including helicopter dipping sonar and both active and passive sonobuoys) in both deep and shallow water environments. This training is not new and has taken place in the HRC over the past 60 years. There has been no significant change in the sonar equipment output being used in the last 30 years. An alternative that would entirely eliminate the use of mid-frequency sonar for training would jeopardize the security of the Nation, and would not be considered a reasonable alternative.
	S-N-0007-4	Alternatives	1.0, 2.0, 6.0	The Supplement to the DEIS was not written to address these alternatives, does not propose to change the Fleet Response Training Plan (FRTP), and was not prepared to assess mitigation. To the extent that a response is required, the Navy considered the DEIS public comments in the preparation of the Supplement to the DEIS, where applicable. As discussed in Chapters 1.0 and 2.0 of the EIS/OEIS, Navy considers but rejects a reduction in training; does not consider alternate locations because this analysis would not be consistent with the purpose and need of this EIS/OEIS. Although Navy does do some simulated training, it does not fully develop the skills and capabilities necessary to attain appropriate military readiness. Navy's current mitigation measures and their use of the best available science balanced with the requirements of the Navy to train, results in Navy meeting its mission while being protective of the environment. Discussion of Mitigation measures has been revised in Chapter 6.0.
	S-N-0007-5	Mitigation Measures	6.0	See response to comment S-W-0020-2.
	S-N-0007-6	Alternatives	2.2.2.4, 4.1.2	The original analysis was based on data prepared as part of the program described in Section 1.3 of the final EIS, which predates the Sonar Positional Reporting System (SPORTS) database. In early 2008, the Navy concluded that SPORTS provided enough information after only eighteen months that it could be used as a partial basis for calculating sonar hours when combined with additional extrapolation for the sonar effects analysis. More information on SPORTS has been provided in sections 2.2.2.4 and 4.1.2 of the EIS/OEIS. The SPORTS database will continue being refined and populated with data and used as the basis for future analysis on sonar use on range complexes.

Table 14.4.4-2. Responses to Webmail Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Brendan Cummings Center for Biological Diversity	S-N-0007-7	Alternatives	4.1.2	The Navy does predict that 50% of animals exposed to 165 dB will respond in a manner that NMFS classifies as Level B harassment; however, it is not correct to state that the other 50% are being behaviorally impacted at levels from 120 to 195 dB re: 1µPa rms. Please see Section 4.1.2, Figure 4.1.2.4.9.7-1. Navy and NMFS have used a science-based approach using the best available and most applicable science in assessing exposure effects. Regarding the commenter's concern for the application of the approach, see response to comment S-W-0025-1.
	S-N-0007-8	Alternatives	4.1.2	Behavioral responses of marine mammals to sounds is known to be highly context-specific. As such, when the context of sound exposure is such that a strong response is elicited upon simple detection of sounds that may represent specific danger then the avoidance levels are clearly expected to be quite low. The case of ice-breaker noise in the high Arctic is a very specific condition where such sounds are almost exclusively associated with the sounds of humans, who hunt marine mammals (including beluga) in these areas. The response threshold levels there were almost certainly a function of detection; had the background noise levels been lower, the response levels would have concomitantly likely been lower as well. There is no evidence that beluga exhibit such pronounced reactions at detection levels for military sonars and thus it was deemed inappropriate to use this very specific context of a likely anti-predator response to ice-breaking sounds in assessing their responsivity to MFA sonar.
	S-N-0007-9	Alternatives	4.1.2	The Navy does predict that 50% of animals exposed to 165 dB will respond in a manner that NMFS classifies as Level B harassment; however, it is not correct to state that the other 50% are being behaviorally impacted at levels from 120 to 195 dB re: 1µPa rms. Please see Section 4.1.2, Figure 4.1.2.4.9.7-1. Navy and NMFS have used a science-based approach using the best available and most applicable science in assessing exposure effects. Regarding the commenter's concern for the application of the approach, see response to comment S-W-0025-1.
	S-N-0007-10	Alternatives	4.2.4.9.6.3	See response to Comment S-N-0007-9. Refer to Section 4.2.4.9.6.3 for an expanded explanation of the A Parameter.

Table 14.4.4-2. Responses to Webmail Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Brendan Cummings Center for Biological Diversity	S-N-0007-11	Alternatives	1.3.2, 4.1.2	The analytical methodology used in this EIS/OEIS was developed in close coordination with NMFS. This represents the best available and most applicable science with regard to analysis of effects to marine mammals from MFA/HFA sound sources. While recognizing there is incomplete and unavailable information with regard to behavioral impacts on marine mammals (see Section 4.1.2), the risk function curve extends to 120 dB SPL specifically to encompass uncertainty and the potential for behavioral reactions in marine mammal species that may be affected by sounds perceived at levels just above ambient in some areas during some parts of the year in Hawaiian waters. Section 1.3.2 describes why the Navy must train and why Hawaii is the most appropriate place to undertake the proposed actions.
	S-N-0007-12	Alternatives	4.1.2.4	See Section 4.1.2.4 for a qualitative analysis of non-auditory noise impacts. NMFS and the Navy do not believe that the risk continuum function results in an underestimate. Please see comment S-W-0025-2. Many marine mammals perform vital functions, such as feeding, resting, traveling, or socializing, on a diel (24-hr) cycle. Consequently, marine mammal responses to noise lasting less than 24 hours and not repeated on subsequent days are not regarded as particularly severe unless they could directly effect survival or reproduction. Accordingly, in the Navy's particular post-modeling calculation intended to better allow for consideration of the maximum number of individuals of a species that could potentially physically be in the vicinity of an exercise to be exposed to a discreet continuous sonar event (which takes into consideration the density of animals, the maximum area that the sonar event could cover and the distance marine mammals can travel in a day), NMFS recommended the Navy utilize a daily restart (or exercise restart – if the exercise is less than 24 hours). NMFS is not suggesting that an animal will never be exposed to levels associated with harassment more than once per day. Rather, we are defining a "take" as something that can only happen to an individual once per day. We acknowledge that in a minority of those "takes", the animal may have been exposed to a level of sound associated with harassment more than once, but because it is within one diel cycle (above), we will only count it as one "take".

Table 14.4.4-2. Responses to Webmail Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Brendan Cummings Center for Biological Diversity	S-N-0007-13	Alternatives	4.1.2, 4.1.2.5.4, 4.1.2.9	Please refer to Section 4.1.2 (population level effects discussion). NMFS has never applied a 180 dB injury threshold to tactical mid-frequency or high frequency active sources used in training exercises. Please see Section 4.1.2. for a definition of sound levels that might result in physical injury. The referenced 228 humpback whale exposures to levels between 195 dB and 215 dB, are associated with TTS, which is considered Level B harassment, not injury. Once the mitigation measures are implemented, the Navy anticipates mitigation will significantly reduce this number (see Section 4.1.2.5.4). As described in 4.1.2.5.4, the Navy estimates that no more than three animals total will be exposed to sound levels resulting in physical injury; however, these takes are not anticipated to occur when mitigation measures are implemented. NMFS does not anticipate mortality as a result of the MFA sonar use. Please see Section 4.1.2.9 for a discussion of mortality authorization.
	S-N-0007-14	Alternatives	4.1.2.4.10.2, 4.1.2.9	A quantitative analysis that addressed all species has been provided. In addition, Section 4.1.2.4.10.2 specifically provides a qualitative assessment of MFA sonar and its potential effects on beaked whales. For a discussion for the rationale for requesting marine mammal mortality takes, please see Section 4.1.2.9.
	S-N-0007-15	Alternatives	4.1.2.4.6	Additional information regarding the Hawaiian Monk Seal has been added to Section 4.1.2.4.6.
	S-N-0007-16	Policy/NEPA Process		The primary purpose of the Supplement to the Draft EIS/OEIS was to provide additional information regarding the analytical methodology used to evaluate the effects of MFA sonar on marine mammals. A Final EIS/OEIS has been prepared that incorporates comments on both the Supplement to the Draft EIS/OEIS and the Draft EIS/OEIS. The Final EIS/OEIS contains substantial changes.
	S-N-0007-17	Alternatives	4.1.2	In 2004, Congress amended MMPA concerning the kinds of behavioral impacts that should be regulated as harassments. These amendments do not require that the NMFS choose the most precautionary variables. Navy and NMFS are currently applying these requirements regarding Military Readiness Activities and biologically significant impacts to marine mammals, a science-based approach. The federal case cited in the comment, Committee for Humane Legislation, Inc. v. Richardson, 510 F.2d 1141, 1150 (D.C. Cir. 1976), is not applicable for the reasons discussed above and because the Richardson case involved a regulatory framework for the commercial fishing industry, not military readiness activities.
Judy Walker	S-N-0008-1	Biological Resources - Marine	9.0	A comprehensive list of references is provided in Chapter 9.0 of the EIS/OEIS. The entire list of references was not reproduced in the Supplement to the Draft EIS/OEIS.

Table 14.4.4-2. Responses to Webmail Comments - Supplement to the Draft EIS/OEIS (Continued)

Commentor	Comment #	Resource	EIS Section	Response Text
Judy Walker	S-N-0008-2	Biological Resources - Marine	3.0, 4.0	Information regarding the humpback whale and the Hawaiian Islands Humpback Whale National Marine Sanctuary was provided in Sections 3.0 and 4.0 of the Draft EIS/OEIS and expanded in the Final EIS/OEIS. See response to Comment S-N-0008-1 regarding references in the Supplement to the Draft EIS/OEIS.
	S-N-0008-3	Policy/NEPA Process	1.7.1, 13.0, 14.0	NEPA requires an interdisciplinary approach to analysis. EISs are therefore prepared using a wide range of subject matter experts whose expertise may have been acquired either through formal education or years of experience. The professionals preparing this EIS/OEIS (including the marine mammal sections) have either lived and worked as environmental scientists in Hawaii or have been conducting environmental projects in Hawaii for many years. The Navy solicited comments, encouraged input, and sought advice from Agencies, organizations, and individuals in Hawaii, throughout the environmental impact analysis process (see Sections 1.7.1, 13.0 and 14.0 of the EIS/OEIS). Most consultants provide multiple services to their DOD clients. Given the rigorous environment of government contracting, NEPA does not view this as a conflict of interest.
	S-N-0008-4	Alternatives	4.1.2, 6.0	Details on the development of the model are provided in Section 4.1.2. As described in Section 6, Navy will continue to fund research in regards to further developing and enhancing marine mammal modeling.
	S-N-0008-5	Alternatives	4.1.2	Not enough applicable behavioral response data exists to develop a risk function specifically for pinnipeds and MFA sonar. However, based on the overall body of behavioral data for other sources that do exist and data relating to the received levels associated with pinniped threshold shifts, NMFS believes that pinnipeds will likely behaviorally respond to MFA sonar in a manner NMFS would classify as harassment at slightly higher levels than odontocetes. Therefore, in the absence of representative data, the application of the odontocete curve to pinnipeds is considered a conservative interim approach that is appropriate until more representative data becomes available. The Navy and NMFS developed the Hawaiian Monk Seal data as best available.
Brooke Porter Pacific Whale Foundation	S-N-0009-1	Alternatives		Takes may be authorized as long as negligible impact occurs.
	S-N-0009-2	Alternatives	5	The study referenced was in regard to Low Frequency Active (LFA) sonar, which is not part of Proposed Action. LFA sonar is, however, discussed in Chapter 5.0, Cumulative Impacts.
	S-N-0009-3	Program		Thank you for your comment.
	S-N-0009-4	Alternatives		Thank you for your comment.

Hawaii Range Complex

Final Environmental Impact Statement/ Overseas Environmental Impact Statement (EIS/OEIS)

Volume 5 of 5: Appendices

May 2008

Coordinator
Hawaii Range Complex
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kauai, Hawaii 96752-0128

HAWAII RANGE COMPLEX
FINAL ENVIRONMENTAL IMPACT STATEMENT/
OVERSEAS ENVIRONMENTAL IMPACT STATEMENT

Volume 5 of 5

MAY 2008

Coordinator
Hawaii Range Complex
Pacific Missile Range Facility
P.O. Box 128
Kekaha, Kauai, Hawaii 96752-0128

COVER SHEET
FINAL ENVIRONMENTAL IMPACT STATEMENT/
OVERSEAS ENVIRONMENTAL IMPACT STATEMENT
HAWAII RANGE COMPLEX (HRC)

Lead Agency for the EIS:	U.S. Department of the Navy
Title of the Proposed Action:	Hawaii Range Complex
Affected Jurisdiction:	Kauai, Honolulu, Maui, and Hawaii Counties
Designation:	Final Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS)

Abstract

This Final EIS/OEIS has been prepared by the U.S. Department of the Navy (Navy) in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code § 4321 et seq.); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] §§ 1500-1508); Navy Procedures for Implementing NEPA (32 CFR § 775); and Executive Order 12114 (EO 12114), *Environmental Effects Abroad of Major Federal Actions*. The Navy has identified the need to support and conduct current, emerging, and future training and research, development, test, and evaluation (RDT&E) activities in the Hawaii Range Complex (HRC). The alternatives—the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3—are analyzed in this Final EIS/OEIS. All alternatives include an analysis of potential environmental impacts associated with the use of mid-frequency active (MFA) and high-frequency active (HFA) sonar. The No-action Alternative stands as no change from current levels of HRC usage and includes HRC training, support, and RDT&E activities, Major Exercises, and maintenance of the technical and logistical facilities that support these activities and exercises. Alternative 1 includes all ongoing training associated with the No-action Alternative, an increased tempo and frequency of such training (including increases in MFA and HFA sonar use), a new training event (Field Carrier Landing Practice), enhanced and future RDT&E activities, enhancements to optimize HRC capabilities, and an increased number of Major Exercises. Alternative 2 includes all of the training associated with Alternative 1 plus additional increases in the tempo and frequency of training (including additional increases in MFA and HFA sonar use), enhanced RDT&E activities, future RDT&E activities, and additional Major Exercises, such as supporting three Strike Groups training at the same time. Alternative 3 would include all of the training and RDT&E activities associated with Alternative 2. The difference between Alternative 2 and Alternative 3 is the amount of MFA/HFA sonar usage. As described under Alternative 2, Alternative 3 would provide increased flexibility in training activities by increasing the tempo and frequency of training events, future and enhanced RDT&E activities, and the addition of Major Exercises. Alternative 3 would consist of the MFA/HFA sonar usage as analyzed under the No-action Alternative. Alternative 3 is the Navy's preferred alternative.

This Final EIS/OEIS addresses potential environmental impacts that result from activities that occur under the No-action Alternative and proposed activities that would occur under Alternatives 1, 2, and 3. This EIS/OEIS also addresses changes and associated environmental analyses that were presented in the Supplement to the Draft EIS/OEIS. Environmental resource topics evaluated include air quality, airspace, biological resources (open ocean, offshore, and onshore), cultural resources, geology and soils, hazardous materials and waste, health and safety, land use, noise, socioeconomics, transportation, utilities, and water resources.

Prepared by:	U.S. Department of Defense, Department of the Navy
Point of Contact:	Pacific Missile Range Facility Public Affairs Officer
	P.O. Box 128, Kekaha, Hawaii, 96752, (866) 767-3347

May 2008

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Cooperating Agencies Request and Acceptance Letters

APPENDIX A
COOPERATING AGENCIES REQUEST AND ACCEPTANCE LETTERS

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, DC 20350-2000

IN REPLY REFER TO

5090
Ser
3 October 2006

Dr. William T. Hogarth
Assistant Administrator
National Oceanic and Atmospheric
Administration (NOAA) Fisheries
1315 East West Highway
Silver Springs, MD 20910

Dear Dr. Hogarth:

The Navy is initiating an Environmental Impact Statement (EIS) to study the environmental effects of increasing usage and enhancing the capability of the Hawaii Range Complex to achieve and maintain Fleet readiness, and to conduct current, emerging, and future training and research, development, test, and evaluation (RDT&E) operations. Under the No Action Alternative, the Navy would continue current levels of training operations, RDT&E activities, ongoing base operations and maintenance of the technical and logistical facilities that support these operations and activities, and the monitoring of marine mammals in the Hawaii Range Complex. The No Action Alternative also includes the biennial Rim of Pacific exercises.

Two action Alternatives are proposed. Alternative 1 includes the activities described in the No Action Alternative plus increased training necessary to support the Fleet Response Training Plan, Hawaii Range Complex improvements and modernization, planned RDT&E activities, and necessary force structure changes. Alternative 2 includes the activities described in Alternative 1 plus major events such as supporting three carrier strike groups training at the same time, increasing the tempo of training exercises, and additional RDT&E programs at Pacific Missile Range Facility (PMRF). Future RDT&E programs proposed as part of Alternative 2 would include directed energy programs involving lasers.

In order to adequately evaluate the potential environmental effects of this proposed action, the Navy and NMFS would need to work together on assessing acoustic effects to marine species protected under the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). As well, resources protected by the Hawaiian Islands Humpback Whale National Marine Sanctuary and marine areas of the Northwest Hawaiian Islands Marine National Monument will need to be considered. It is Navy's desire to formalize this relationship as outlined in the CEQ guidelines (40 CFR Part 1501).

As defined in 40 CFR 1501.5, the Navy is the lead agency for the Hawaii Range Complex EIS. As NOAA Fisheries has jurisdiction by law and special expertise over the protected marine species that will potentially be affected by the proposed action, the Navy is requesting that NOAA Fisheries be a cooperating agency as defined in 40 CFR 1501.6.

As the lead agency, the Navy will be responsible for the following:

- Preparing the environmental analysis, background information and all necessary permit applications associated with acoustic issues on the underwater ranges.
- Working with NMFS personnel to develop and refine the method of estimating potential effects to protected marine species, including threatened and endangered species.
- Determining the scope of the EIS/OEIS, including the alternatives evaluated.
- Circulating the appropriate NEPA documentation to the general public and any other interested parties.
- Scheduling and supervising public meetings held in support of the NEPA process. This shall include without limitation, compiling and responding to comments received at these meetings.
- Participating, as appropriate, in public meetings hosted by the NOAA Fisheries for receipt of public comment on protected species permit applications. This shall also include assistance in NOAA Fisheries' response to comments.
- Maintaining an administrative record and responding to any Freedom of Information Act (FOIA) requests relating to the EIS.

As the cooperating agency, the NOAA Fisheries would be asked to support the Navy in the following manner:

- Providing timely comments after the Agency Information Meeting (which will be held at the onset of the NEPA process) and on working drafts of the EIS documents. The Navy requests that comments on draft EIS documents be provided within 21 calendar days.

2

- Coordinating, to the maximum extent practicable, any public comment periods necessary in the MMPA permitting process with the Navy's NEPA public comment periods.
- Participating, as appropriate, in public meetings hosted by the Navy for receipt of public comment on the NEPA document and environmental analysis.
- Scheduling meetings requested by Navy in a timely manner.
- Adhering to the overall schedule as set forth by the Navy.

The Navy views this agreement as important to the successful completion of the NEPA process for the Hawaii Islands Complex EIS. It is the Navy's goal to complete the analysis as expeditiously as possible, while using the best scientific information available. NOAA Fisheries assistance will be invaluable in that endeavor.

My point of contact for this action is Ms. Karen M. Foskey, (703) 602-2859, email: Karen.foskey@navy.mil.

Sincerely,

J. A. SYMONDS
Director, Environmental
Readiness Division (OPNAV N45)

Copy to:
ASN (I&E)
DASN (E), (I&F)
OAGC (I&E)
Commander, Naval Installations Command
Commander, Navy Region Hawaii
Commander, Pacific Missile Range Facility
COMPACFLT N01CE
COMPACFLT, N7 (Mr. Long)

3

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, DC 20350-2000

IN REPLY REFER TO

5090
Ser N456C/6U838240
3 October 2006

Honorable Keith E. Eastin
Office of the Assistant Secretary of the Army
(Installation and Environment)
110 Army Pentagon, Room 3E464
Washington, D.C. 20310-0110

Dear Mr. Eastin:

The Navy is initiating an Environmental Impact Statement (EIS) to study the environmental effects of increasing usage and enhancing the capability of the Hawaii Range Complex to achieve and maintain Fleet readiness, and to conduct current, emerging, and future training and research, development, test, and evaluation (RDT&E) operations. Under the No Action Alternative, the Navy would continue current levels of training operations, RDT&E activities, ongoing base operations and maintenance of the technical and logistical facilities that support these operations and activities, and the monitoring of marine mammals in the Hawaii Range Complex. The No Action Alternative also includes biennial Rim of Pacific exercises.

Two action Alternatives are proposed. Alternative 1 includes the activities described in the No Action Alternative plus increased training necessary to support the Fleet Response Training Plan, Hawaii Range Complex improvements and modernization, planned RDT&E activities, and necessary force structure changes. Alternative 2 includes the activities described in Alternative 1 plus major events such as supporting three carrier strike groups training at the same time, increasing the tempo of training exercises, and additional RDT&E programs at Pacific Missile Range Facility (PMRF). Future RDT&E programs proposed as part of Alternative 2 would include directed energy programs involving lasers.

Your agency's special expertise is needed to adequately evaluate the potential environmental effects from the RDT&E and training activities in which Army would be involved at PMRF as proposed under this action. It is Navy's desire to formalize this relationship as outlined in the CEQ guidelines (40 CFR Part 1501).

As the lead agency, the Navy will be responsible for overseeing preparation of the EIS/OEIS that includes but is not limited to the following:

- Gathering all necessary background information and preparing the EIS.

- Determining the scope of the EIS, including the alternatives evaluated.

- Working with appropriate Army personnel to evaluate potential impacts of Army RDT&E system elements and training operations.

- Circulating the appropriate NEPA documentation to the general public and any other interested parties.

- Scheduling and supervising public meetings held in support of the NEPA process. This shall include without limitation, compiling and responding to comments received at these meetings.

- Maintaining an administrative record and responding to any Freedom of Information Act (FOIA) requests relating to the EIS.

As the cooperating agency, the Navy requests U.S. Army support the Navy in the following manner:

- Providing timely comments after the Agency Information Meeting (which will be held at the onset of the NEPA process) and on working drafts of the EIS documents. The Navy requests that comments on draft EIS documents be provided within 21 calendar days.

- Responding to Navy requests for information. Timely input will be critical to ensure a successful NEPA process.

- Participating, as appropriate, in public meetings hosted by the Navy for receipt of public comment on the NEPA document and environmental analysis.

- Scheduling meetings requested by Navy in a timely manner.

2

- Adhering to the overall schedule as set forth by the Navy.

The Navy views this agreement as important to the successful completion of the NEPA process for the Hawaii Islands Complex EIS. It is the Navy's goal to complete the analysis as expeditiously as possible, while using the best scientific information available. The assistance of the U.S. Army will be invaluable in that endeavor.

My point of contact for this action is Ms. Karen M. Foskey, (703) 602-2859, email: Karen.foskey@navy.mil.

Sincerely,

J. A. Symmonds

J. A. SYMONDS
Rear Admiral, U.S. Navy
Director, Environmental Readiness
Division (OPNAV N45)

Copy to:
ASN (I&E)
DASN (E), (I&F)
OAGC (I&E)
Commander, Naval Installations Command
Commander, Naval Region Hawaii
Commander, Pacific Missile Range Facility
COMPACFLT (N01CE)
COMPACFLT, N7 (Mr. Long)

3

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON, DC 20350-2000

IN REPLY REFER TO

5090
Ser N456C/6U838238
03 October 2006

Mr. Crate Spears
Missile Defense Agency
Federal Office Building #2
ATTN: MDA-TER
7100 Defense Pentagon
Washington, DC 20301-7100

Dear Mr. Spears:

The Navy is initiating an Environmental Impact Statement (EIS) to study the environmental effects of increasing usage and enhancing the capability of the Hawaii Range Complex to achieve and maintain Fleet readiness, and to conduct current, emerging, and future training and research, development, test, and evaluation (RDT&E) operations. Under the No Action Alternative, the Navy would continue current levels of training operations, RDT&E activities, ongoing base operations and maintenance of the technical and logistical facilities that support these operations and activities, and the monitoring of marine mammals in the Hawaii Range Complex. The No Action Alternative also includes biennial Rim of Pacific exercises.

Two action Alternatives are proposed. Alternative 1 includes the activities described in the No Action Alternative plus increased training necessary to support the Fleet Response Training Plan, Hawaii Range Complex improvements and modernization, planned RDT&E activities, and necessary force structure changes. Alternative 2 includes the activities described in Alternative 1 plus major events such as supporting three carrier strike groups training at the same time, increasing the tempo of training exercises, and additional RDT&E programs at Pacific Missile Range Facility (PMRF). Future RDT&E programs proposed as part of Alternative 2 would include directed energy programs involving lasers.

Your agency's special expertise is needed to adequately evaluate the potential environmental effects from the RDT&E activities involving various system elements of the Ballistic Missile Defense System, including the Flexible Target Family, as proposed under this action. It is Navy's desire to formalize this relationship as outlined in the CEQ guidelines by requesting that the Missile Defense Agency be a cooperating agency as defined in 40 CFR 1501.6.

As defined in 40 CFR 1501.5, the Navy is the lead agency for the Hawaii Range Complex EIS. As the lead agency, the Navy will be responsible for the following:

- Gathering all necessary background information and preparing the EIS.

- Determining the scope of the EIS, including the alternatives evaluated.

- Working with Missile Defense Agency personnel to evaluate potential impacts of RDT&E of system elements of the Ballistic Missile Defense System.

- Circulating the appropriate NEPA documentation to the general public and any other interested parties.

- Scheduling and supervising public meetings held in support of the NEPA process. This shall include without limitation, compiling and responding to comments received at these meetings.

- Maintaining an administrative record and responding to any Freedom of Information Act (FOIA) requests relating to the EIS.

As the cooperating agency, the Navy requests the Missile Defense Agency support the Navy in the following manner:

- Providing timely comments after the Agency Information Meeting (which will be held at the onset of the NEPA process) and on working drafts of the EIS documents. The Navy requests that comments on draft EIS documents be provided within 21 calendar days.

- Responding to Navy requests for information. Timely input will be critical to ensure a successful NEPA process.

- Participating, as appropriate, in public meetings hosted by the Navy for receipt of public comment on the NEPA document and environmental analysis.
- Scheduling meetings requested by Navy in a timely manner.

2

- Adhering to the overall schedule as set forth by the Navy.

The Navy views this agreement as important to the successful completion of the NEPA process for the Hawaii Islands Complex EIS. It is the Navy's goal to complete the analysis as expeditiously as possible, while using the best scientific information available. The assistance of the Missile Defense Agency will be invaluable in that endeavor.

My point of contact for this action is Ms. Karen M. Foskey, (703) 602-2859, email: karen.foskey@navy.mil.

Sincerely,

J. A. SYMONDS
Rear Admiral, U.S. Navy
Director, Environmental Readiness
Division (OPNAV N45)

Copy to:
ASN (I&E)
DASN (E), (I&F)
OAGC (I&E)
Commander, Naval Installations Command
Commander, Navy Region Hawaii
Commander, Pacific Missile Range Facility
COMPACFLT N01CE
COMPACFLT, N7 (Mr. Long)

3

DEPARTMENT OF THE NAVY
PACIFIC MISSILE RANGE FACILITY
P.O. BOX 128
KEKAHA, HI 96752-0128

IN REPLY REFER TO

5090
Ser 00/ 0956

OCT 13 2005

Ms. Susan Lacy
US Department of Energy
National Nuclear Security Administration
Sandia Site Office
Albuquerque, NM 87185

Dear Ms. Lacy:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT (EIS)/OVERSEAS EIS (OEIS)

In accordance with the National Environmental Policy Act (NEPA), the Department of the Navy (Navy) is initiating the preparation of an Environmental Impact Statement (EIS)/Overseas EIS (OEIS) to support decisions by the U.S. Navy concerning potential range enhancements at the Hawaii Range Complex. Your agency's assistance in adequately evaluating the potential environmental effects from potential enhancements to the Department of Energy (DOE) Kauai Test Facility at PMRF is needed to complete the EIS/OEIS. Therefore, in accordance with 40 CFR Part 1501 and the Council on Environmental Quality Cooperating Agency guidance issued on January 30, 2002, the Navy requests the DOE serve as a cooperating agency for the development of the EIS/OEIS.

The No-Action Alternative is the continuation of training operations, Research, Development, Test and Evaluation (RDT&E) activities, the ongoing base operations and maintenance of the technical and logistical facilities that support these operations and activities, and the monitoring of marine mammals in the Hawaii Range Complex.

The Proposed Action includes two action Alternatives. Alternative 1 includes the activities described in the No-Action Alternative with the addition of increased training necessary to support the Fleet Response Training Plan, Hawaii Range Complex improvements and modernization, planned RDT&E activities, and necessary force structure changes. Alternative 2 includes all of the activities described in Alternative 1 with the addition of major events, such as supporting three transient carrier strike group training exercises at the same time, increasing the tempo of training exercises, and additional RDT&E programs at Pacific Missile Range Facility (PMRF).

The purpose of the Proposed Action is to provide the Hawaii Range Complex with sufficient capabilities to support Fleet and DoD training, major exercises based on current and evolving world situations, and the development, testing, and evaluation of existing, upgraded and newly developed DoD and other federal agency systems. The Proposed Action will also provide additional range capabilities and support facilities at the Hawaii Range Complex, to include

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT (EIS)/OVERSEAS EIS (OEIS)

PMRF, to fully integrate range services in a modern, multi-threat, multi-dimensional environment, ensuring safe conduct and evaluation of training and RDT&E missions. The purpose of the Proposed Action is also to fulfill Navy commitment to update analyses on marine mammal impacts caused by noise in the water.

The EIS/OEIS will address measurably foreseeable activities in the particular geographical areas affected by the No-Action Alternative and action alternatives. Impacts could result from construction at launch and other support locations, sensor test preparations, launch preparation, missile flight tests, and intercept tests. The EIS/OEIS will also analyze the potential impacts of additional training missions and additional testing facilities. This EIS/OEIS will analyze the effects of sound in the water on marine mammals in the areas where Hawaii Range Complex activities occur. This analysis will be based on the initial results of Navy long-term research plans, which have studied the quantification of exposure of marine mammal species to acoustic emissions with differing experimental approaches and detailed observations of effects. In addition, other environmental resource areas that will be addressed as applicable in the EIS/OEIS include air quality; airspace; biological resources, including threatened and endangered species; cultural resources; geology and soils; hazardous materials and waste; health and safety; land use; noise; socioeconomics; transportation; utilities; visual and aesthetic resources; and water resources.

As the lead agency, the Navy will be responsible for overseeing preparation of the EIS/OEIS that includes but is not limited to the following:

• Gathering all necessary background information and preparing the EIS/OEIS.
• Working with DOE personnel to evaluate potential impacts of changes and enhancements to the DOE's Kauai Test Facility at PMRF.
• Determining the scope of the EIS/OEIS, including the alternatives evaluated.
• Circulating the appropriate NEPA documentation to the general public and any other interested parties.
• Scheduling and supervising meetings held in support of the NEPA process, and compiling any comments received.
• Maintaining an administrative record and responding to any Freedom of Information Act requests relating to the EIS/OEIS.

As the cooperating agency, the Navy requests DOE support the Navy in the following manner:

• Providing timely comments throughout the EIS process, to include, on working drafts of the EIS/OEIS documents. The Navy requests that comments on draft EIS/OEIS documents be provided within 21 calendar days.
• Responding to Navy requests for information. Timely DOE input will be critical to ensure a successful NEPA process.
• Participating, as necessary, in meetings hosted by the Navy for discussion of EIS/OEIS related issues.

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT (EIS)/OVERSEAS EIS (OEIS)

• Adhering to the overall schedule as set forth by the Navy.
• Providing a formal, written response to this request.

My point of contact for this is Neil Sheehan, (808) 471-7836, email: neil.a.sheehan.ctr@navy.mil.

Sincerely,

M. W. DARRAH
CAPT, U.S. NAVY
Commander, Hawaii Range Complex

Copy to:
Chief of Naval Operations (N45)
Commander, Naval Installations Command
Commander, Navy Region Hawaii
COMPACFLT, N01CE
COMPACFLT, N7 (Mr. Long)

DEPARTMENT OF THE NAVY
PACIFIC MISSILE RANGE FACILITY
P.O. BOX 128
KEKAHA, HI 96752-0128

IN REPLY REFER TO

5090
Ser 00/ 0957

OCT 13 2006

Mr. Patrick Leonard
Field Supervisor
US Fish and Wildlife Service
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, HI 96850

Dear Mr. Leonard:

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT (EIS)/OVERSEAS EIS (OEIS)

In accordance with the National Environmental Policy Act (NEPA), the Department of the Navy (Navy) is initiating the preparation of an Environmental Impact Statement (EIS)/Overseas EIS (OEIS) to support decisions by the U.S. Navy concerning potential range enhancements at the Hawaii Range Complex. To assist in this effort, and in accordance with 40 CFR Part 1501 and the Council on Environmental Quality Cooperating Agency guidance issued on January 30, 2002, the Navy requests US Fish and Wildlife Service serve as a cooperating agency for the development of the EIS/OEIS.

The No-Action Alternative is the continuation of training operations, Research, Development, Test and Evaluation (RDT&E) activities, the ongoing base operations and maintenance of the technical and logistical facilities that support these operations and activities, and the monitoring of marine mammals in the Hawaii Range Complex.

The Proposed Action includes two action Alternatives. Alternative 1 includes the activities described in the No-Action Alternative with the addition of increased training necessary to support the Fleet Response Training Plan, Hawaii Range Complex improvements and modernization, planned RDT&E activities, and necessary force structure changes. Alternative 2 includes all of the activities described in Alternative 1 with the addition of major events, such as supporting three transient carrier strike group training exercises at the same time, increasing the tempo of training exercises, and additional RDT&E programs at Pacific Missile Range Facility (PMRF).

The purpose of the Proposed Action is to provide the Hawaii Range Complex with sufficient capabilities to support Fleet and DoD training, major exercises based on current and evolving world situations, and the development, testing, and evaluation of existing, upgraded and newly developed DoD and other federal agency systems. The Proposed Action will also provide additional range capabilities and support facilities at the Hawaii Range Complex, to include PMRF, to fully integrate range services in a modern, multi-threat, multi-dimensional environment, ensuring safe conduct and evaluation of training and RDT&E missions. The

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT (EIS)/OVERSEAS EIS (OEIS)

purpose of the Proposed Action is also to fulfill Navy commitment to update analyses on marine mammal impacts caused by noise in the water.

The EIS/OEIS will address measurably foreseeable activities in the particular geographical areas affected by the No-Action Alternative and action alternatives. Impacts could result from construction at launch and other support locations, sensor test preparations, launch preparation, missile flight tests, and intercept tests. The EIS/OEIS will also analyze the potential impacts of additional training missions and additional testing facilities. This EIS/OEIS will analyze the effects of sound in the water on marine mammals in the areas where Hawaii Range Complex activities occur. This analysis will be based on the initial results of Navy long-term research plans, which have studied the quantification of exposure of marine mammal species to acoustic emissions with differing experimental approaches and detailed observations of effects. In addition, other environmental resource areas that will be addressed as applicable in the EIS/OEIS include air quality; airspace; biological resources, including threatened and endangered species; cultural resources; geology and soils; hazardous materials and waste; health and safety; land use; noise; socioeconomics; transportation; utilities; visual and aesthetic resources; and water resources.

As the lead agency, the Navy will be responsible for overseeing preparation of the EIS/OEIS that includes but is not limited to the following:

• Gathering all necessary background information and preparing the EIS/OEIS.
• Working with USF&WS personnel to evaluate potential impacts on wildlife refuges, critical habitat, and wildlife resources including threatened and endangered species.
• Determining the scope of the EIS/OEIS, including the alternatives evaluated.
• Circulating the appropriate NEPA documentation to the general public and any other interested parties.
• Scheduling and supervising meetings held in support of the NEPA process, and compiling any comments received.
• Maintaining an administrative record and responding to any Freedom of Information Act requests relating to the EIS/OEIS.

As the cooperating agency, the Navy requests USF&WS support the Navy in the following manner:

• Providing timely comments throughout the EIS process, to include, on working drafts of the EIS/OEIS documents. The Navy requests that comments on draft EIS/OEIS documents be provided within 21 calendar days.
• Responding to Navy requests for information. Timely USF&WS input will be critical to ensure a successful NEPA process.
• Participating, as necessary, in meetings hosted by the Navy for discussion of EIS/OEIS related issues.
• Adhering to the overall schedule as set forth by the Navy.
• Providing a formal, written response to this request.

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT (EIS)/OVERSEAS EIS (OEIS)

My point of contact for this is Neil Sheehan, (808) 471-7836, email: neil.a.sheehan.ctr@navy.mil.

Sincerely,

M. W. DARRAH
CAPT, U. S. Navy
Commander, Hawaii Range Complex

Copy to:
Chief of Naval Operations (N45)
Commander, Naval Installations Command
Commander, Navy Region Hawaii
COMPACFLT, N01CE
COMPACFLT, N7 (Mr. Long)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
1315 East-West Highway
Silver Spring, Maryland 20910
THE DIRECTOR

NOV 16 2006

Admiral J.A. Symonds
Director, Environmental Readiness Division
Department of the Navy
2000 Navy Pentagon
Washington, DC 20350-2000

Dear Admiral Symonds:

Thank you for your letter requesting that NOAA's National Marine Fisheries Service (NMFS) be a cooperating agency in the preparation of an Environmental Impact Statement (EIS) on the Department of the Navy's plan to increase usage and enhance capability of the Hawaii Range Complex.

NMFS supports the Navy's decision to prepare an EIS on this activity and agrees to be a cooperating agency, due, in part, to our responsibilities under section 101(a)(5)(A) of the Marine Mammal Protection Act (MMPA) and section 7 of the Endangered Species Act. We will make every effort to support the Navy in the specific ways described in your October 3, 2006, letter. However, due to staffing constraints in Headquarters and the fact that comments will need to be compiled from multiple Offices (including NMFS' Pacific Islands Regional Office and the Hawaiian Islands Humpback Whale National Marine Sanctuary), we cannot guarantee that we will be able to provide comments on draft EIS documents within 21 calendar days. We ask that the Navy work with us to allow reasonable extensions to our comment periods when necessary. Additionally, to ensure that NMFS will be able to adopt the Navy's EIS to cover, pursuant to NEPA, our subsequent issuance of MMPA authorizations to the Navy for these activities, we request that the Navy include us as early as possible in the development of the EIS (specifically, the range of alternatives and the identification and analysis of potential mitigation measures).

If you need any additional information, please contact Ms. Jolie Harrison, at (301) 713-2289, ext. 166.

Sincerely,

William T. Hogarth, Ph.D.

THE ASSISTANT ADMINISTRATOR
FOR FISHERIES

Printed on Recycled Paper

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
INSTALLATIONS AND ENVIRONMENT
110 ARMY PENTAGON
WASHINGTON, DC 20310-0110

DEC 1 2 2006

SAIE-ESOH

MEMORANDUM FOR DIRECTOR, ENVIRONMENTAL READINESS DIVISION (OPNAV N45), OFFICE OF THE CHIEF OF NAVAL OPERATIONS

SUBJECT: Environmental Impact Statement (EIS)--Hawaii Range Complex

1. In response to your letter dated, 3 October 2006, to Assistant Secretary Eastin regarding the Navy's proposal to prepare an EIS to study environmental effects of increased usage and enhancement of the capability of the Hawaii Range Complex.

2. The Army agrees to become a cooperating agency and will provide information and comments on EIS documents, participate in public meetings, and provide additional assistance as appropriate.

3. The points of contact for this action are Mr. Mike Harada, U.S. Army Installation Management Command, Pacific Region, and Mr. Randy Gallien, U.S. Army Space and Missile Defense Command. Mr. Harada can be reached at (808) 438-9333 or email at michael.a.harada@us.army.mil, and Mr. Gallien can be reached at (256) 955-5027 or email at randy.gallien@us.army.mil.

Tad Davis

Addison D. Davis, IV
Deputy Assistant Secretary of the Army
(Environment, Safety and Occupational Health)

CF:
COMMANDING GENERAL, IMCOM
COMMANDING GENERAL, SMDC/ARSTRAT
DIRECTOR, ENVIRONMENTAL PROGRAMS, OACSIM

DEPARTMENT OF DEFENSE
MISSILE DEFENSE AGENCY
7100 DEFENSE PENTAGON
WASHINGTON, DC 20301-7100

DT

JAN 0 9 2007

MEMORANDUM FOR DIRECTOR, ENVIRONMENTAL READINESS DIVISION, (OPNAV N45), U.S. NAVY
ATTN: MS. KAREN FOSKEY

SUBJECT: Hawaii Range Complex Environmental Impact Statement (EIS)

In response to your request (Ser N456C/6U838238) dated October 3, 2006, the Missile Defense Agency (MDA) hereby agrees to participate as a cooperating agency in the Hawaii Range Complex EIS process. As defined in 40 CFR 1501.6, MDA agrees to support the Navy by reviewing and submitting comments on working drafts of EIS documents, by responding to Navy requests for information about MDA test activities, and by participating, as appropriate, in public meetings hosted by the Navy. My points of contact for this issue are Mr. Steven Lopes, (703) 697-4747, email: steven.lopes@mda.mil, and Mr. Howard Finkel (SETAC), (703) 697-4403, email: howard.finkel.ctr@mda.mil.

CHRIS T. ANZALONE
Major General, USAF
Deputy for Test, Integration, and Fielding

National Nuclear Security Administration

National Nuclear Security Administration
Sandia Site Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

MAY 0 4 2007

Aaron Cudnohufsky
Capt, U S. Navy
Commander, Hawaii Range Complex
Pacifica Missile Range Facility
Kekaha, HI 96752-0128

Dear Capt Cudnohufsky:

This letter is to inform you that the Department of Energy (DOE), National Nuclear Security Administration, Sandia Site Office is agreeing to participate as a cooperating agency in the preparation of the Hawaii Range Complex Environmental Impact Statement (EIS)/Overseas EIS. In accordance with DOE National Environmental Policy Act Implementing Regulations, 10 CFR 1021 Section 342, Interagency Cooperation; and the Council on Environmental Quality Regulations 40 CFR 1501.6, Cooperating agencies; the DOE will provide support to the U.S. Navy. DOE will provide information to the Navy as requested, will participate in the evaluation of potential impacts from DOE's Kauai Test Facility, and will participate as necessary in public meetings in support of the EIS/OEIS. The DOE point of contact for this effort is Ms. Susan Lacy of my staff. Ms. Lacy can be reached at (505) 845-5542. Thank you for the opportunity to participate in this effort. Your continued assistance is appreciated.

Sincerely,

Dan Pellegrino
for Patty Wagner
Manager

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Appendix B
Federal Register Notices

APPENDIX B
FEDERAL REGISTER NOTICES

51188 **Federal Register** / Vol. 71, No. 167 / Tuesday, August 29, 2006 / Notices

Background

Title V of the Trade and Development Act of 2000 (the Act) created two tariff rate quotas (TRQs), providing for temporary reductions in the import duties on limited quantities of two categories of worsted wool fabrics suitable for use in making suits, suit-type jackets, or trousers: (1) for worsted wool fabric with average fiber diameters greater than 18.5 microns (Harmonized Tariff Schedule of the United States (HTS) heading 9902.51.11); and (2) for worsted wool fabric with average fiber diameters of 18.5 microns or less (HTS heading 9902.51.12). On August 6, 2002, President Bush signed into law the Trade Act of 2002, which includes several amendments to Title V of the Act. On December 3, 2004, the Act was further amended pursuant to the Miscellaneous Trade Act of 2004, Public Law 108-429. The 2004 amendment included authority for the Department to allocate a TRQ for new HTS category, HTS 9902.51.16. This HTS category refers to worsted wool fabric with average fiber diameter of 18.5 microns or less. The amendment provided that HTS 9902.51.16 is for the benefit of persons (including firms, corporations, or other legal entities) who weave such worsted wool fabric in the United States that is suitable for making men's and boys' suits. The TRQ for HTS 9902.51.16 provided for temporary reductions in the import duties on 2,000,000 square meters annually for 2005 and 2006. The amendment requires that the TRQ be allocated to persons who weave worsted wool fabric with average fiber diameter of 18.5 microns or less, which is suitable for use in making men's and boys' suits, in the United States. On August 17, 2006, the Act was further amended pursuant to the Pension Protection Act of 2006, Public Law 109-280, which extended the TRQ for HTS 9902.51.16 through 2009.

On May 16, 2005, the Department published regulations establishing procedures for allocating the TRQ. 70 FR 25774, 15 CFR 335. In order to be eligible for an allocation, an applicant must submit an application on the form provided at *http://web.ita.doc.gov/tacgi/wooltrq.nsf/TRQApp/fabric* to the address listed above by 5 p.m. on September 28, 2006 in compliance with the requirements of 15 CFR 335. Any business confidential information that is marked business confidential will be kept confidential and protected from disclosure to the full extent permitted by law.

Dated: August 23, 2006.

Philip J. Martello,

Acting Deputy Assistant Secretary for Textiles and Apparel.

[FR Doc. E6–14333 Filed 8–28–06; 8:45 am]

BILLING CODE 3510–DS–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 082306E]

North Pacific Fishery Management Council; Public Meeting

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of a public committee meeting.

SUMMARY: The North Pacific Fishery Management Council's (Council) Steller Sea Lion Mitigation Committee (SSLMC) will meet in Seattle, WA.

DATES: The meeting will be held on September 12–14, 2006, from 8:30 a.m. to 5 p.m.

ADDRESSES: The meeting will be held at the Alaska Fishery Science Center, 7600 Sand Point Way NE, Building 4, Seattle, WA.

Council address: North Pacific Fishery Management Council, 605 W. 4th Ave., Suite 306, Anchorage, AK 99501–2252.

FOR FURTHER INFORMATION CONTACT: Bill Wilson, North Pacific Fishery Management Council; telephone: (907) 271–2809.

SUPPLEMENTARY INFORMATION: The main issues to be discussed by the SSLMC are the proposal ranking tool and the first chapters of the draft Biological Opinion. The Committee will complete work on development of the ranking tool and prepare a report for the Scientific and Statistical Committee (SSC).

Although non-emergency issues not contained in this agenda may come before this group for discussion, those issues may not be the subject of formal action during this meeting. Action will be restricted to those issues specifically identified in this notice and any issues arising after publication of this notice that require emergency action under section 305(c) of the Magnuson-Stevens Fishery Conservation and Management Act, provided the public has been notified of the Council's intent to take final action to address the emergency.

Special Accommodations

These meetings are physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to Gail Bendixen, (907) 271–2809, at least 5 working days prior to the meeting date.

Dated: August 24, 2006.

James P. Burgess,

Acting Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. E6–14311 Filed 8–28–06; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Intent To Prepare an Environmental Impact Statement (EIS)/Overseas Environmental Impact Statement (OEIS) for a Proposal To Enhance Training, Testing, and Operational Capability Within the Hawaii Range Complex and To Announce Public Scoping Meetings

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: Pursuant to Section 102(2)(C) of the National Environmental Policy Act of 1969, as implemented by the Council on Environmental Quality regulations (40 CFR parts 1500–1508), and Executive Order 12114 (Environmental Effects Abroad of Major Federal Actions), the Department of the Navy (DoN) announces its intent to prepare an EIS/OEIS. This EIS/OEIS will evaluate the potential environmental effects of increasing usage and enhancing the capability of the Hawaii Range Complex to achieve and maintain Fleet readiness and to conduct current, emerging, and future training and research, development, test, and evaluation (RDT&E) operations. The EIS/OEIS will consider two action Alternatives to accomplish these objectives, in addition to the No Action Alternative.

The following will be invited to be cooperating agencies: Department of Energy, Missile Defense Agency, U.S. Army, U.S. Fish and Wildlife Service, and National Marine Fisheries Service.

DATES: Public scoping meetings will be held in Hawaii to receive oral and/or written comments on environmental concerns that should be addressed in the EIS/OEIS. The public scoping meetings will be held on:

1. Wednesday, September 13, 2006, 4 p.m.–8 p.m., Maui Arts and Cultural Center, One Cameron Way, Kahului, Maui, Hawaii.
2. Thursday, September 14, 2006, 4 p.m.–8 p.m., Disabled American

Exhibit B-1. Notice of Intent, August 29, 2006

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Veterans Hall, 2685 North Nimitz Highway, Honolulu, Oahu, Hawaii.

3. Saturday, September 16, 2006, 4 p.m.–8 p.m., Hilo Hawaiian Hotel, 71 Banyan Drive, Hilo, Hawaii, Hawaii.

4. Monday, September 18, 2006, 4 p.m.–8 p.m., Kauai Civil Defense Agency, Suite 100, 3990 Kaana Street, Kauai, Lihue, Hawaii.

Each of the four scoping meetings will consist of an informal, open house session with information stations staffed by DoN representatives. Additional information concerning the meetings will be available on the EIS/OEIS Web page located at: *http://www.govsupport.us/navynepahawaii.*

FOR FURTHER INFORMATION CONTACT: Mr. Tom Clements, Pacific Missile Range Facility, P.O. Box 128, Kekaha, Kauai, Hawaii 96752–0128, telephone 1–866–767–3347.

SUPPLEMENTARY INFORMATION: The Hawaii Range Complex geographically encompasses offshore, nearshore, and onshore areas located on or around the major islands of the Hawaiian Island chain. The geographic scope of this EIS/OEIS (Study Area) includes the Hawaii Offshore Operation Areas, consisting of 170,000 square nautical miles of ocean, generally from 17 to 26 degrees north latitude and from 154 to 162 degrees west longitude, land areas used by the DoN within these Operation Areas, and the Pacific Missile Range Facility (PMRF) Temporary Operating Area, consisting of 2.1 million square nautical miles to the north and west of Kauai. These ranges and Operation Areas are used to conduct operations and training involving military hardware, personnel, tactics, munitions, explosives, and electronic combat systems. Several of the areas are also used for RDT&E, including missile defense testing.

The purpose of the Proposed Action is to: (1) Provide the Hawaii Range Complex with sufficient capabilities to support Fleet and DoD training, major exercises based on training requirements identified to support the U.S. Unified Commanders, and the development, testing, and evaluation of existing, upgraded, and newly developed DoD and other federal agency systems; (2) provide additional range capabilities and support facilities at the Hawaii Range Complex, to include the PMRF, to fully integrate range services in a modern, multi-threat, multi-dimensional environment, ensuring safe conduct and evaluation of training and RDT&E missions; and (3) fulfill DoN commitment to update analyses on marine mammal exposures to noise in the water.

The need for the Proposed Action is to: (1) Ensure a robust training, testing, and operational capability within the Hawaii Range Complex operating areas and to take advantage of Hawaii's location to not only provide training for local assets, but also provide capability for short notice and surge deployments from the West Coast; (2) support the acquisition and integration into the Fleet of advanced military technology and accommodate future increases in operational training tempo; and (3) maintain the long-term viability of the range complex while protecting human health and the environment.

The No Action Alternative is the continuation of training operations, RDT&E activities, ongoing base operations, and maintenance of the technical and logistical facilities that support these operations and activities, and the monitoring of marine mammals. The No Action Alternative includes the current level of training and test activities, including the biennial Rim of the Pacific exercises. Alternative 1 includes the activities described in the No Action Alternative with the addition of increased training necessary to support the Fleet Response Training Plan, Hawaii Range Complex improvements and modernizations, planned RDT&E activities, and necessary force structure changes. Alternative 2 would include all of the activities described in Alternative 1 with the addition of major events, such as supporting three carrier strike groups training at the same time, increasing the tempo of training exercises, and additional RDT&E programs at PMRF. Future RDT&E programs proposed as part of Alternative 2 would include directed energy programs involving lasers.

Key environmental issues that will be addressed in the EIS/OEIS, as applicable, include: biological resources (marine mammals and threatened and endangered species), cultural resources, environmental justice, health and safety, and noise. The DoN has been involved in long-term research plans studying the quantification of exposure of marine mammal species to acoustic emissions with differing experimental approaches and detailed observations of effects. Now that initial findings are available, this EIS/OEIS will include acoustic exposure modeling and effects-analysis for marine mammals within the defined study area.

The DoN is initiating the scoping process to identify community concerns and local issues that will be addressed in the EIS/OEIS. Federal, state, and local agencies, the public, and interested persons are encouraged to provide oral and/or written comments to the DoN to identify specific environmental issues or topics of environmental concern that the commenter believes the DoN should consider. All comments, written or provided orally at the scoping meetings, will receive the same consideration during EIS/OEIS preparation.

Written comments on the scope of the EIS/OEIS should be postmarked no later than October 13, 2006. Comments may be mailed to Mr. Tom Clements, Pacific Missile Range Facility, P.O. Box 128, Kekaha, Kauai, Hawaii 96752–0128.

Dated: August 24, 2006.

Saundra K. Melancon,

Paralegal Specialist, Alternate Federal Register Liaison Officer.

[FR Doc. E6–14324 Filed 8–28–06; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF EDUCATION

Notice of Proposed Information Collection Requests

AGENCY: Department of Education.

SUMMARY: The IC Clearance Official, Regulatory Information Management Services, Office of Management, invites comments on the proposed information collection requests as required by the Paperwork Reduction Act of 1995.

DATES: Interested persons are invited to submit comments on or before October 30, 2006.

SUPPLEMENTARY INFORMATION: Section 3506 of the Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires that the Office of Management and Budget (OMB) provide interested Federal agencies and the public an early opportunity to comment on information collection requests. OMB may amend or waive the requirement for public consultation to the extent that public participation in the approval process would defeat the purpose of the information collection, violate State or Federal law, or substantially interfere with any agency's ability to perform its statutory obligations. The IC Clearance Official, Regulatory Information Management Services, Office of Management, publishes that notice containing proposed information collection requests prior to submission of these requests to OMB. Each proposed information collection, grouped by office, contains the following: (1) Type of review requested, e.g. new, revision, extension, existing or reinstatement; (2) Title; (3) Summary of the collection; (4) Description of the need for, and proposed use of, the information; (5) Respondents and frequency of collection; and (6)

Exhibit B-1. Notice of Intent, August 29, 2006 (Continued)

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the further reduction of designated ATV and OHV trails, and review the decision to retain road and trail miles that would have been eliminated under Alternative B. Also, we recommend giving consideration to the commitment of resources in Alternative E and its consistency with existing planning direction in the 2003 Forest Plan, and interagency agreements such as the Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters.

EIS No. 20070199, ERP No. F–FHW–E40771–NC, Wilmington Bypass Transportation Improvements, U.S. 17 to U.S. 421, Funding, COE Section 10 and 404 Permits and U.S. Coast Guard Bridge Permit Issuance, Brunswick and New Hanover Counties, NC.

Summary: EPA continues to have environmental concerns about stream and wetland impacts, indirect and cumulative air quality impacts from Mobile Source Air Toxics and impacts to Significant Natural Heritage Areas. EPA requested additional avoidance and minimization measures be considered to lessen these impacts.

EIS No. 20070220, ERP No. F–BLM–J65468–WY, Casper Field Office Planning Area Resource Management Plan, Implementation, Natrona, Converse, Goshen, and Platte Counties, WY.

Summary: EPA continues to have environmental concerns about air quality impacts and the need to do a quantitative analysis based on dispersion modeling. In addition, there is potential for adverse impacts to wetlands from OHV use.

EIS No. 20070228, ERP No. F–AFS–G65102–NM, Canadian River Tamarisk Control, Proposes to Control the Nonnative Invasive Species Tamarisk (also known as salt cedar) Cibola National Forest, Canadian River, Harding and Mora Counties, New Mexico.

Summary: No formal comment letter was sent to the preparing agency.

EIS No. 20070242, ERP No. F–COE–F36167–OH, Dover Dam Safety Assurance Program Project, Modifications and Upgrades, Funding, Muskingum River Basin, Tuscarawas County, OH.

Summary: EPA's previous issues have been resolved; therefore, EPA does not object to the proposed action.

EIS No. 20070245, ERP No. F–FHW–C40336–NY, Long Island Expressway (LIE) Rest Area Upgrade Project, Upgrading the Existing Rest Area from Route 1–495/Long Island Expressway between Exits 51 and 52, Funding, Town of Huntington, Suffolk County, NY.

Summary: No formal comment letter was sent to the preparing agency.

EIS No. 20070246, ERP No. F–MMS–L02033–AK, Chukchi Sea Planning Area Oil and Gas Lease Sale 193 and Seismic Surveying Activities, Offshore Marine Environment, Chukchi Sea Coastal Plain, and the North Slope Borough of Alaska.

Summary: EPA's previous concerns have been resolved; therefore, EPA does not object to the action as proposed.

EIS No. 20070223, ERP No. FA–AFS–K65283–CA, Empire Vegetation Management Project, Reducing Fire Hazards, Harvesting of Trees Using Group Selection (GS) and Individual Trees Selection (ITS) Methods, Mt. Hough Ranger District, Plumas National Forest, Plumas County, CA.

Summary: No formal comment letter was sent to the preparing agency.

EIS No. 20070225, ERP No. FD–AFS–L65155–00, Northern Spotted Owl Management Plan, Removal or the Modification to the Survey and Manage Mitigation Measures, Standards and Guidelines (to the Northwest Forest Plan) New Information to Address Three Deficiencies Final Supplemental EIS (2004), Northwest Forest Plan, OR, WA, and CA.

Summary: The analysis in FEIS supports both the utilization of the Special Status Species Programs and previous determinations made as a part of the Annual Species Review Process. Given the importance of the current network of late successional forests in late-successional species' persistence and viability, EPA continues to encourage the Agencies to consider any reasonably foreseeable reserve network or management changes when predicting habitat outcomes.

EIS No. 20070226, ERP No. FS–AFS–J65417–MT, Frenchtown Face Ecosystem Restoration Project, Additional Information Maintenance and Improvement of Forest Health, Risk Reduction of Damage Insects and Disease, Lolo National Forest, Ninemile Ranger District, Missoula County, MT.

Summary: The final supplement addressed EPA's concerns about the preferred alternative. EPA believes watershed restoration activities included in the project will likely result in overall water quality improvement in the long-term.

Dated: July 24, 2007.

Robert W. Hargrove,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. E7–14569 Filed 7–26–07; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–6689–3]

Environmental Impacts Statements; Notice of Availability

Responsible Agency: Office of Federal Activities; General Information (202) 564–7167 or *http://www.epa.gov/compliance/nepa/.*

Weekly receipt of Environmental Impact Statements

Filed 07/16/2007 through 07/20/2007

Pursuant to 40 CFR 1506.9.

EIS No. 20070308, Draft EIS, AFS, MT, Marten Creek Project, Proposed Timber Harvest, Prescribed Fire Burning, Watershed Restoration, and Associated Activities Cabinet Ranger District, Kootenai National Forest, Sanders County, MT, *Comment Period Ends:* 09/10/2007. *Contact:* Dave Clay, 406–827–0717.

EIS No. 20070309, Final EIS, FRC, 00, Spokane River and Post Falls Hydroelectric Project, Applications for two New Licenses for Existing 14.75 (mw) Post Falls No. 12606 and 122.9 (mw) Spokane River No. 2545, Kootenai and Benewah Counties, ID and Spokane, Lincoln and Stevens Counties WA, *Wait Period Ends:* 08/27/2007. *Contact:* Andy Black, 1–866–208–3372.

EIS No. 20070310, Draft EIS, AFS, WA, Old Curlew Ranger Station Facilities Disposal Project, Proposal to Sell 3-Acre Parcel Including Buildings, Republic Ranger District, Colville National Forest, South Side of Curlew, Ferry County, WA, *Comment Period Ends:* 09/10/2007. *Contact:* James L. Parker, 509–775–7462.

EIS No. 20070311, Draft Supplement, COE, CO, Rueter-Hess Reservoir Expansion Project, Enlarges Reservoir to Provide Storage of Denver Basin Groundwater for Meeting Peak Municipal Water Supply, U.S. Army COE Section 404 Permit, Town of Parker, Douglas County, CO. *Comment Period Ends:* 09/10/2007. *Contact:* Rodney J. Schwartz, 402–221–4939.

EIS No. 20070312, Draft EIS, USN, HI, Hawaii Range Complex (HRC) Project, To Support and Maintain Navy Pacific Fleet Training, and Research, Development, Test, and Evaluation

Exhibit B-2. Notice of Availability, Draft EIS/OEIS, July 27, 2007

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(RDT&E) Operations, Kauai, Honolulu, Maui and Hawaii Counties, HI. *Comment Period Ends:* 09/10/2007. *Contact:* Tom Clements, 866–767–3347.

EIS No. 20070313, Draft EIS, NOA, 00, Amendment 2 to the Consolidated Atlantic Highly Migratory Species Fishery Management Plan, To Implement Management Measures that Prevent Overfishing and Rebuild Overfished Stocks Implementation, Exclusive Economic Zone (EEZ) of the Atlantic Ocean, Gulf of Mexico and Caribbean Sea. *Comment Period Ends:* 10/10/2007. *Contact:* Margo Schulze-Haugen, 301–713–2347.

EIS No. 20070314, Final EIS, FTA, UT, Mid-Jordan Transit Corridor Project, Proposed Light Rail Transit Service, Funding, Salt Lake County, UT. *Wait Period Ends:* 08/27/2007. *Contact:* Charmaine Knighton, 720–963–3327.

Amended Notices

EIS No. 20070144, Final EIS, AFS, CA, VOID—REPORT—Brown Project, Proposal to Improve Forest Health by Reducing Overcrowded Forest Stand Conditions, Trinity River Management Unit, Shasta-Trinity National Forest, Weaverville Ranger District, Trinity County, CA, *Wait Period Ends:* 05/21/2007. *Contact:* Joyce Andersen 530–623–2121. This FEIS was inadvertently refilled and published in 04/20/2007. FR. The Correct FEIS #20060252 was published in 06/16/2006 FR.

Dated: July 23, 2007.

Robert W. Hargrove,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. E7–14568 Filed 7–26–07; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[EPA–HQ–2006–0735; FRL–8446–7]

Draft Risk Assessment Report for Lead

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of a draft for public review and comment.

SUMMARY: On or about July 31, 2007, the Office of Air Quality Planning and Standards (OAQPS) of EPA will make available for public review and comment a draft technical support document in EPA's review of the national ambient air quality standards (NAAQS) for lead, Lead Human Exposure and Health Risk Assessments for Selected Case Studies (Draft Risk Assessment Report). The purpose of the Draft Risk Assessment Report is to describe the design, methodology and results of the human exposure and health risk assessments for lead.

DATES: Comments on the Draft Risk Assessment Report must be received on or before August 29, 2007.

ADDRESSEES: Submit your comments, identified by Docket ID No. EPA–HQ–OAR–2006–0735, by one of the following methods:

- *www.regulations.gov:* follow the on-line instructions for submitting comments.
- *E-mail:* Comments may be sent by electronic mail (e-mail) to *a-and-r-Docket@epa.gov,* Attention Docket ID No. EPA–HQ–OAR–2006–0735.
- *Fax:* Fax your comments to: 202–566–9744, Attention Docket ID. No. EPA–HQ–OAR–2006–0735.
- *Mail:* Send your comments to: Air and Radiation Docket and Information Center, Environmental Protection Agency, Mail Code: 6102T, 1200 Pennsylvania Ave., NW., Washington, DC, 20460, Attention Docket ID No. EPA–HQ–OAR–2006–0735.
- *Hand Delivery or Courier:* Deliver your comments to: EPA Docket Center, 1301 Constitution Ave., NW., Room 3334, Washington, DC. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

Instructions: Direct your comments to Docket ID No. EPA–HQ–OAR–2006–0735. The EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *www.regulations.gov* (including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute). Do not submit information that you consider to be CBI or otherwise protected through *www.regulations.gov,* or e-mail. The *www.regulations.gov* is an "anonymous access" system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through *www.regulations.gov,* your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket visit the EPA Docket Center homepage at *http://www.epa.gov/epahome/dockets.htm.*

Docket: All documents in the docket are listed in the *www.regulations.gov* index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in *www.regulations.gov* or in hard copy at the Air Docket in the EPA Docket Center, (EPA/DC) EPA West, Room 3334, 1301 Constitution Ave., NW., Washington, DC. This Docket Facility is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The Docket telephone number is (202) 566–1742; fax (202) 566–9744.

FOR FURTHER INFORMATION CONTACT: Dr. Zachary Pekar, Office of Air Quality Planning and Standards (mail code C504–06), U.S. Environmental Protection Agency, Research Triangle Park, NC 27711; e-mail: *pekar.zachary@epa.gov;* telephone: (919) 541–3704; fax: (919) 541–0237.

General Information

A. What Should I Consider as I Prepare My Comments for EPA?

1. Submitting CBI. Do not submit this information to EPA through *www.regulations.gov* or e-mail. Clearly mark the part or all of the information that you claim to be CBI. For CBI information in a disk or CD ROM that you mail to EPA, mark the outside of the disk or CD ROM as CBI and then identify electronically within the disk or CD ROM the specific information that is claimed as CBI. In addition to one complete version of the comment that includes information claimed as CBI, a copy of the comment that does not contain the information claimed as CBI must be submitted for inclusion in the public docket. Information so marked will not be disclosed except in accordance with procedures set forth in 40 CFR part 2.

2. Tips for Preparing Your Comments. When submitting comments, remember to:

Exhibit B-2. Notice of Availability, Draft EIS/OEIS, July 27, 2007 (Continued)

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DEPARTMENT OF DEFENSE

Department of the Army; Corps of Engineers

Intent To Prepare an Environmental Impact Statement for Improvements to the Freeport Harbor Navigation Project, Brazoria County, TX

AGENCY: Department of the Army, U.S. Army Corps of Engineers, DoD.

ACTION: Notice of Intent.

SUMMARY: The U.S. Army Corps of Engineers, Galveston District, is issuing this notice to announce its intent to prepare a Draft Environmental Impact Statement (DEIS), for the proposed deepening and widening of the deep-draft Freeport Harbor Navigation Project, connecting port facilities in Freeport to the Gulf of Mexico. The District will conduct a study to evaluate deepening and widening alternatives, and dredged material disposal options, which will include both upland confined disposal and ocean disposal at designated sites in the Gulf of Mexico.

The Freeport Harbor Navigation Project study area is located on the mid to upper Texas coast in Brazoria County, TX, extending from approximately 3 miles offshore at the 60-foot depth contour in the Gulf of Mexico, through the jettied Freeport Harbor entrance channel upstream to the Stauffer Channel Turing Basin. Depths and widths of up to 60-feet and 600-feet respectively are being considered from seaward, along with varying dimensions for upstream reaches and basins. The non-federal sponsor is the Brazos River Harbor Navigation District.

ADDRESSES: U.S. Army Corps of Engineers, Galveston District, P.O. Box 1229, Galveston, TX 77553–1229.

FOR FURTHER INFORMATION CONTACT: Mr. Mike Bragg, Project Manager—Project Management Branch, (409) 766–3979; or Mr. George Dabney, Environmental Lead—Planning and Environmental Branch, (409) 766–6345.

SUPPLEMENTARY INFORMATION: The existing navigation project, completed in 1996, is approximately 8.6 miles in length. The project's primary reaches and basins include a 47-foot deep, 400-foot wide entrance channel; a 45-foot deep, 400-foot wide main channel; 45-foot deep turning basins (with 750, 1,000 and 1,200-foot diameters); and a 36-foot deep, 750-foot diameter Brazos Harbor Turning Basin. The existing project encompasses numerous industrial and shipping facilities, located in or adjacent to the Port of Freeport, TX. The non-federal sponsor, the Brazos River Harbor Navigation District, seeks to increase navigation safety and efficiency, and to enhance its competitiveness by improving the existing project to attract larger, deeper draft vessels including LNG tankers, crude carriers and container ships.

To explore the feasibility of proposed project improvements, the non-federal sponsor has partnered with the U.S. Army Corps of Engineers, Galveston District, to conduct a feasibility study for determining optimum depths and widths necessary to safely accommodate current and projected navigation needs. Section 216 of the Flood Control Act of 1970, Public Law 91–611, authorizes the proposed deepening and widening improvements of the existing navigation project.

Project alternatives under evaluation include maintaining primary channel reaches at their existing dimensions (No Action Alternative), or, deepening and widening reaches to either 60 x 540 feet or 55 x 600 feet respectively. The remaining project reaches and basins will be deepened, widened or expanded to compatible dimensions.

The scoping process for public input will involve Federal, State, and local agencies, along with other interested parties and entities. Coordination with natural resources and environmental agencies will be conducted under the Fish and Wildlife Coordination Act, Endangered Species Act, Clear Water Act, Clean Air Act, National Historic Preservation Act, Magnuson-Stevens Fishery Conservation and Management Act, and the Coastal Zone Management Act. Public scoping meetings will also be held to discuss environmental issues associated with proposed channel improvements.

Issues to be considered during the public review and input process include: water and sediment quality, air and noise quality, hazardous, toxic and radiological waste, dredged material disposal, economics, threatened and endangered species, wetlands, historic properties, aesthetics, recreation, cumulative impacts, impact mitigation for natural resources, and other issues affecting public health and welfare. Any person or organization wishing to provide information on issues or concerns should contact the Galveston District Corps of Engineers at (see **ADDRESSES**).

It is estimated the DEIS will be available for public review and comment in April 2008.

Richard Medina,

Chief, Planning and Environmental Branch.

[FR Doc. 07–3817 Filed 8–2–07; 8:45 am]

BILLING CODE 3710–52–M

DEPARTMENT OF DEFENSE

Department of the Navy

Public Hearings for the Draft Environmental Impact Statement/Overseas Environmental Impact Statement for the Hawaii Range Complex, HI

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: Pursuant to section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969 and regulations implemented by the Council on Environmental Quality (40 CFR parts 1500–1508), and Presidential Executive Order 12114, the Department of the Navy (Navy) has prepared and filed with the U.S. Environmental Protection Agency a Draft Environmental Impact Statement (EIS)/Overseas EIS on July 19, 2007, to evaluate the potential environmental effects of conducting current and emerging Navy Pacific Fleet training and defense-related research, development, test, and evaluation (RDT&E) operations within the Hawaii Range Complex (HRC) and to upgrade or modernize range complex capabilities (including hardware and infrastructure). A Notice of Intent for this DEIS/OEIS was published in the **Federal Register**, 71 FR 51188, on August 29, 2006.

The Draft EIS/OEIS was distributed to Federal, State, and Local agencies, elected officials, as well as other interested individuals and organizations on July 20, 2007. On July 27, 2007, Navy issued a revision to the Draft EIS/OEIS that was filed with the U.S. Environmental Protection Agency on July 19, 2007. Errata sheets and a corrected Draft EIS/OEIS were distributed to all Federal, State, and local agencies, elected officials, and other interested individuals and organizations on Navy's distribution list. To allow for the full 45-day review of the Draft EIS/OEIS, the public comment period has been extended from September 10, 2007 to September 17, 2007.

The Navy will conduct four public hearings to receive oral and written comments on the Draft EIS/OEIS. Federal agencies, state agencies, and local agencies and interested individuals are invited to be present or represented at the public hearings. This notice announces the dates and locations of the public hearings for this Draft EIS/OEIS.

Dates and Addresses: An open house session will precede the scheduled public hearing at each of the locations listed below and will allow individuals

Exhibit B-3. Notice of Public Hearings, Draft EIS/OEIS, August 3, 2007

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to review the information presented in the Draft EIS/OEIS. Navy representatives will be available during the open house sessions to clarify information related to the Draft EIS/OEIS. In addition, the National Marine Fisheries Service (NMFS), which is participating as a cooperating agency in the development of the EIS, will be represented at the public hearings. All meetings will start with an open house from 5 p.m. to 6 p.m. Presentations and public comment will be held from 6 p.m. to 9 p.m. Public hearings will be held on the following dates and at the following locations: August 21, 2007, at Kauai War Memorial Convention Hall, 4191 Hardy Street, Lihue, Hawaii; August 23, 2007, at McKinley High School, 1039 South King Street, Honolulu, Hawaii; August 27, 2007, at Baldwin High School, 1650 Kaahumanu Avenue, Wailuku, Hawaii; August 29, 2007, at Waiakea High School, 155 West Kawili Street, Hilo, Hawaii.

FOR FURTHER INFORMATION CONTACT: Public Affairs Officer, *Pacific Missile Range Facility Attention:* HRC EIS/OEIS, P.O. Box 128, Kekaha, Kauai, Hawaii 96752–0128. Voice mail 1–866–767–3347 or facsimile 808–335–4520.

SUPPLEMENTARY INFORMATION: The HRC consists of open ocean areas (outside 12 nautical miles (nm)), offshore areas (within 12 nm from land), and onshore areas geographically situated on and around the Hawaiian Islands. The complex covers 235,000 square nm around the main Hawaiian Islands chain and a 2.1 million square nm Temporary Operating Area (TOA) of sea and airspace. The study area is a complex consisting of instrumented ocean areas, airspace, ocean surface operation areas, targets, and land range facilities.

Navy proposes to support and conduct current and emerging training and RDT&E operations in the HRC and to upgrade or modernize range complex capabilities to enhance and sustain Navy training and defense-related testing. This would be accomplished by increasing training operations and implementing necessary force structure changes; supporting three transient Strike Group training exercises at the same time and an additional aircraft carrier during Rim of the Pacific Exercises; operating a Portable Undersea Tracking Range; constructing and operating an Acoustic Test Facility; enhancing RDT&E and training operations at the Pacific Missile Range Facility (PMRF); and using the TOA as required.

The Draft EIS/OEIS evaluates the potential environmental impacts of three alternatives, including two action alternatives (Alternatives 1 and 2) and the No-action Alternative. The No-action Alternative stands as no change from current levels of training usage. Alternatives 1 and 2 analyze an increased tempo and frequency of training exercises in the HRC. Alternative 2 is the Navy's preferred alternative.

No significant adverse impacts are identified for any resource area in any geographic location within the HRC that cannot be mitigated, with the exception of exposure of marine mammals to underwater sound. NMFS has received an application from the Navy for a Marine Mammal Protection Act Letter of Authorization (LOA) and governing regulations to authorize incidental take of marine mammals that may result from the implementation of the activities analyzed in the Draft EIS/OEIS. NMFS is participating as a cooperating agency in the development of this Draft EIS/OEIS. NMFS staff will be present at the scheduled open house and public hearings and available to discuss both the MMPA incidental take authorization process and NMFS' participation in the development of the EIS.

The Draft EIS/OEIS was distributed to Federal, State, and local agencies, elected officials, as well as other interested individuals and organizations on July 20, 2007. On July 27, 2007, Navy issued a revision to the Draft EIS/OEIS that was filed with the U.S. Environmental Protection Agency on July 19, 2007. Errata sheets and a corrected Draft EIS/OEIS were distributed to all Federal, State, and local agencies, elected officials, and other interested individuals and organizations on Navy's distribution list. To allow for the full 45-day review of the Draft EIS/OEIS, the public comment period has been extended from September 10, 2007 to September 17, 2007.

Copies of the Draft EIS/OEIS are available for public review at the following libraries: Kahului Public Library, 90 School Street, Kahului, Maui, Hawaii 96732; Wailuku Public Library, 251 High Street, Wailuku, Maui Hawaii 96793; Hilo Public Library, 300 Waianuenue Avenue, Hilo, Hawaii, HI 96720; Hawaii State Library, Hawaii and Pacific Section Document Unit, 478 South King Street, Honolulu, Oahu, Hawaii 96813–2994; Lihue Public Library, 4344 Hardy Street, Lihue, Kauai, Hawaii 96766; Waimea Public Library, P.O. Box 397, Waimea, Kauai Hawaii 96766; and Princeville Public Library, 4343 Emmalani Drive, Princeville, Kauai, Hawaii 96722. The Draft EIS/OEIS is also available for electronic public viewing at *http://www.govsupport.us/hrc.* Single copies of the Draft EIS/OEIS and the Executive Summary will be made available upon request by contacting Public Affairs Officer, Pacific Missile Range Facility, P.O. Box 128, Kekaha, Kauai, Hawaii 96752–0128, *Attention:* HRC EIS/OEIS, voice mail 1–866–767–3347 or facsimile 808–335–4520.

Federal, State, and local agencies and interested parties are invited to be present or represented at the public hearing. Written comments can also be submitted during the open house sessions preceding the public hearings. Oral statements will be heard and transcribed by a stenographer; however, to ensure the accuracy of the record, all statements should be submitted in writing. All statements, both oral and written, will become part of the public record on the Draft EIS/OEIS and will be responded to in the Final EIS/OEIS. Equal weight will be given to both oral and written statements.

In the interest of available time, and to ensure all who wish to give an oral statement have the opportunity to do so, each speaker's comments will be limited to three (3) minutes. If a long statement is to be presented, it should be summarized at the public hearing and the full text submitted in writing at the hearing, mailed to Public Affairs Officer, Pacific Missile Range Facility, P.O. Box 128, Kekaha, Kauai, Hawaii 96752–0128, ATTN: HRC EIS/OEIS, facsimile 808–335–4520; or submitted via e-mail to *deis_hrc@govsupport.us* or via the project Web site at *http://www.govsupport.us/hrc.*

All written comments must be postmarked or received by September 17, 2007, to ensure they become part of the official record. All comments will be responded to in the Final EIS/OEIS.

Dated: July 30, 2007.

M.C. Holley,

Lieutenant Commander, Office of the Judge Advocate General, U.S. Navy, Administrative Law Division, Alternate Federal Register Liaison Officer.

[FR Doc. E7–15127 Filed 8–2–07; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Availability of Finding

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: Pursuant to Executive Order (EO) 12114, Environmental Effects Abroad of Major Federal Actions, the

Exhibit B-3. Notice of Public Hearings, Draft EIS/OEIS, August 3, 2007 (Continued)

Speed or Course Alteration – If a marine mammal is detected outside the EZ but is likely to enter it based on relative movement of the vessel and the animal, then if safety and scientific objectives allow, the vessel speed and/or direct course will be adjusted to minimize the likelihood of the animal entering the EZ. Major course and speed adjustments are often impractical when towing long seismic streamers and large source arrays, but are possible in this case because only one GI gun and a short (300–m, 984–ft) streamer will be used. If the animal appears likely to enter the EZ, further mitigative actions will be taken, i.e. either further course alterations or shut down of the airgun.

Shut-down Procedures – If a marine mammal is within or about to enter the EZ for the single GI gun, it will be shut down immediately. Following a shut down, GI gun activity will not resume until the marine mammal is outside the EZ for the full array. The animal will be considered to have cleared the EZ if it: (1) visually observed to have left the EZ; (2) has not been seen within the EZ for 15 minutes in the case of small odontocetes and pinnipeds; or (3) has not been seen within the EZ for 30 minutes in the case of mysticetes and large odontocetes, including sperm, pygmy sperm, dwarf sperm, and beaked whales.

Minimize Approach to Slopes and Submarine Canyons – Although sensitivity of beaked whales to airguns is not known, they appear to be sensitive to other sound sources (mid-frequency sonar; see section IV of SIO's application). Beaked whales tend to concentrate in continental slope areas and in areas where there are submarine canyons. Avoidance of airgun operations over or near submarine canyons has become a standard mitigation measure, but there are none within or near the study area. Four of the 16 OBS locations are on the continental slope, but the GI gun is low volume (45 in^3), and it will operate only a short time (approximately 2 hours) at each location.

Reporting

A report will be submitted to NMFS within 90 days after the end of the cruise. The report will describe the operations that were conducted and the marine mammals that were detected near the operations. The report will be submitted to NMFS, providing full documentation of methods, results, and interpretation pertaining to all monitoring. The 90–day report will summarize the dates and locations of seismic operations, all marine mammal sightings (dates, times, locations, activities, associated seismic survey activities), and estimates of the amount and nature of potential "take" of marine mammals by harassment or in other ways.

ESA

Under section 7 of the ESA, the NSF has begun informal consultation on this proposed seismic survey. NMFS will also consult informally on the issuance of an IHA under section 101(a)(5)(D) of the MMPA for this activity. Consultation will be concluded prior to a determination on the issuance of the IHA.

National Environmental Policy Act (NEPA)

NSF prepared an Environmental Assessment of a Planned Low-Energy Marine Seismic Survey by the Scripps Institution of Oceanography in the Northeast Pacific Ocean, September 2007. NMFS will either adopt NSF's EA or conduct a separate NEPA analysis, as necessary, prior to making a determination on the issuance of the IHA.

Preliminary Determinations

NMFS has preliminarily determined that the impact of conducting the seismic survey in the northeast Pacific Ocean may result, at worst, in a temporary modification in behavior (Level B Harassment) of small numbers of eight species of marine mammals. Further, this activity is expected to result in a negligible impact on the affected species or stocks. The provision requiring that the activity not have an unmitigable adverse impact on the availability of the affected species or stock for subsistence uses does not apply for this proposed action.

For reasons stated previously in this document, this determination is supported by: (1) the likelihood that, given sufficient notice through relatively slow ship speed, marine mammals are expected to move away from a noise source that is annoying prior to its becoming potentially injurious; (2) the fact that marine mammals would have to be closer than either 35 m (115 ft) in intermediate depths or 23 m (75.5 ft) in deep water from the vessel to be exposed to levels of sound (180 dB) believed to have even a minimal chance of causing TTS; and (3) the likelihood that marine mammal detection ability by trained observers is high at that short distance from the vessel. As a result, no take by injury or death is anticipated and the potential for temporary or permanent hearing impairment is very low and will be avoided through the incorporation of the proposed mitigation measures.

While the number of potential incidental harassment takes will depend on the distribution and abundance of marine mammals in the vicinity of the survey activity, the number of potential harassment takings is estimated to be small, less than a few percent of any of the estimated population sizes, and has been mitigated to the lowest level practicable through incorporation of the measures mentioned previously in this document.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to SIO for conducting a low-energy seismic survey in the Pacific Ocean during September, 2007, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: July 26, 2007.

James H. Lecky,

Director, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. E7–14883 Filed 7–31–07; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[I.D. 050107N]

Taking and Importing Marine Mammals; Increasing Usage and Enhancing Capability of the U.S. Navy's Hawaii Range Complex

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; receipt of application for letter of authorization; request for comments and information.

SUMMARY: NMFS has received a request from the U.S. Navy (Navy) for authorization for the take of marine mammals incidental to the training events conducted within the Hawaii Range Complex (HRC) for the period of July 2008 through July 2013. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is announcing our receipt of the Navy's request for the development and implementation of regulations governing the incidental taking of marine mammals and inviting information, suggestions, and comments on the Navy's application and request.

DATES: Comments and information must be received no later than August 31, 2007.

Exhibit B-4. Notice of Receipt of Application for Letter of Authorization, August 1, 2007

ADDRESSES: Comments on the application should be addressed to Michael Payne, Chief, Permits, Conservation and Education Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910–3225. The mailbox address for providing email comments is *PR1.050107N@noaa.gov*. NMFS is not responsible for e-mail comments sent to addresses other than the one provided here. Comments sent via e-mail, including all attachments, must not exceed a 10–megabyte file size.

FOR FURTHER INFORMATION CONTACT: Jolie Harrison, Office of Protected Resources, NMFS, (301) 713–2289, ext. 166.

SUPPLEMENTARY INFORMATION:

Availability

A copy of the Navy's application may be obtained by writing to the address specified above

(See ADDRESSES), telephoning the contact listed above (see **FOR FURTHER INFORMATION CONTACT**), or visiting the internet at: *http://www.nmfs.noaa.gov/pr/permits/incidental.htm*. The Navy's Draft Environmental Impact Statement (DEIS) for the Hawaii Range Complex was made available to the public on July 27th, 2007, and may be viewed at *http://www.govsupport.us/hrc*. Because NMFS is participating as a cooperating agency in the development of the Navy's DEIS for the Hawaii Range Complex, NMFS staff will be present at the associated public meetings and prepared to discuss NMFS' participation in the development of the EIS as well as the MMPA process for the issuance of incidental take authorizations. The dates and times of the public meetings may be viewed at: *http://www.govsupport.us/hrc*.

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (Secretary) to allow, upon request, the incidental, but not intentional taking of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) if certain findings are made and regulations are issued or, if the taking is limited to harassment, notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings may be granted if NMFS finds that the taking will have no more than a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses, and that the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such taking are set forth.

NMFS has defined "negligible impact" in 50 CFR 216.103 as:

an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

With respect to military readiness activities, the MMPA defines "harassment" as:

(i) any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or (ii) any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered [Level B Harassment].

Summary of Request

On June 25, 2007, NMFS received an application from the Navy requesting authorization for the take of 26 species of marine mammals incidental to upcoming Navy training activities to be conducted within the HRC, which covers 235,000 nm^2 around the Main Hawaiian Islands (see page 17 of the application), over the course of 5 years. These training activities are classified as military readiness activities. The Navy states that these training activities may expose some of the marine mammals present within the HRC to sound from hull-mounted mid-frequency active tactical sonar or to underwater detonations. The Navy requests authorization to take 26 species of marine mammals by Level B Harassment. Further, the Navy requests authorization to take 20 individual marine mammals per year by serious injury or mortality (2 each of the following: bottlenose dolphin, Kogia spp., melon-headed whale, pantropical spotted dolphin, pygmy killer whale, short-finned pilot whale, striped dolphin, and Cuvier's, Longman's, and Blainesville's beaked whale).

Specified Activities

The Navy has prepared a Draft Environmental Impact Statement analyzing the effects on the human environment of implementing their preferred alternative (among other alternatives), which includes conducting current and emerging training and research, development, test, and evaluation (RDT&E) operations in the HRC. The HRC complex consists of targets and instrumented areas, airspace, surface operational areas (OPAREAS), and land range facilities. The activities described in the EIS include current and future proposed Navy training and RDT&E operations within Navy-controlled OPAREAs, airspace, and ranges, and Navy-funded range capabilities enhancements (including infrastructure improvement).

In the application submitted to NMFS, the Navy requests authorization for take of marine mammals incidental to conducting a subset of the activities analyzed in the EIS. Table 1–1 in the application lists the categories of Navy training operations and RDT&E operations and indicates those that the Navy believes: (1) could potentially result in harassment of marine mammals through exposure to underwater detonations; (2) could potentially result in harassment of marine mammals through exposure to tactical mid-frequency sonar; and, (3) do not have the potential to harass marine mammals. The Navy is requesting authorization for take incidental to the following categories of Navy training operations: (1) Naval Surface Fire Support Exercises, (2) Surface-to-Surface Gunnery Exercises, (3) Surface-to-Surface Missile Exercises, (4) Air-to-Surface Missile Exercises, (5) Bombing Exercises, (6) Sink Exercises, (7) Mine Neutralization, (8) Anti-submarine Warfare (ASW) Tracking Exercises, (9) ASW Torpedo Exercises, and (10) Major Integrated ASW Training Exercises (such as RIMPAC, USWEX, and Multiple Strike Group Exercises).

Information Solicited

Interested persons may submit information, suggestions, and comments concerning the Navy's request (see **ADDRESSES**). All information, suggestions, and comments related to the Navy's HRC request and NMFS' potential development and implementation of regulations governing the incidental taking of marine mammals by the Navy in the HRC will be considered by NMFS in developing, if appropriate, the most effective regulations governing the issuance of letters of authorization.

Dated: July 26, 2007.

James H. Lecky,

Director, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. E7–14891 Filed 7–31–07; 8:45 am]

BILLING CODE 3510–22–S

Exhibit B-4. Notice of Receipt of Application for Letter of Authorization, August 1, 2007 (Continued)

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generator unit at a site adjacent to the existing Nelson Dewey Generating Station (NED) Units 1 and 2 on the Mississippi River at River Mile 607.7. In addition to the new power generating unit, the following associated facilities would be constructed and operated: A new lateral collector well to supply cooling water; additional barge unloading capacity including three additional barge moorings in the Mississippi River, a new barge unloading tower foundation, and a temporary equipment barge unloading ramp; a new storm water detention pond and pipe outfall structure; 1.7-mile-long off-site parallel industrial railroad tracks, including a sheet pile retaining wall, adjacent to the existing BNSF railroad mainline tracks; new railroad bridges over two creeks for the off-site parallel industrial railroad tracks; and two new coal pile runoff ponds to replace the existing coal pile runoff pond adjacent to the railroad tracks.

The project would require the discharge of dredged or fill material into the Mississippi River and two creeks that are tributaries to the Mississippi River. The Mississippi River is a navigable water of the U.S. The discharge of dredged or fill material into waters of the U.S. requires a permit issued by the Corps under Section 404 of the Clean Water Act. Construction work conducted below the ordinary high water mark of a navigable water of the U.S. requires a permit issued by the Corps under Section 10 of the Rivers and Harbors Act. The final environmental impact statement will be used as a basis for the permit decision and to ensure compliance with the National Environmental Policy Act (NEPA).

ADDRESSES: Questions concerning the Draft Environmental Impact Statement (DEIS) can be addressed to Mr. Jon K. Ahlness, Regulatory Branch by letter at U.S. Army Corps of Engineers, 190 Fifth Street East, Suite 401, St. Paul, MN 55101–1638, by telephone or by e-mail at *jon.k.ahlness@usace.army.mil.*

FOR FURTHER INFORMATION CONTACT: Mr. Jon K. Ahlness, (651) 290–5381.

SUPPLEMENTARY INFORMATION: The Corps and the Public Service Commission of Wisconsin (PSCW) will jointly prepare the federal/state DEIS. The Corps is the lead federal agency and the PSCW is the lead state agency. The Wisconsin Department of Natural Resources (WDNR) is participating in the preparation of the DEIS. The Corps and the PSCW will jointly conduct two public scoping meetings to identify issues that will be addressed in the DEIS. The first public scoping meeting will be held at the Cassville Elementary School Gym, 412 Crawford St., Cassville, Wisconsin on January 30, 2008 from 6:30 p.m. to 9 p.m. The second public scoping meeting will be held at the City of Portage Municipal Building Community Room, 115 West Pleasant St., Portage, Wisconsin, on February 11, 2008 from 6:30 p.m. to 9 p.m.

We anticipate that the DEIS will be made available to the public in April of 2008. The DEIS will assess impacts of the proposed action and reasonable alternatives, identify and evaluate mitigation alternatives, and discuss potential environmental monitoring. Significant issues and resources to be identified in the DEIS will be determined through coordination with responsible federal, state, and local agencies; the general public; interested private organizations and parties; and affected Native American Tribes. Anyone who has an interest in participating in the development of the DEIS is invited to contact the St. Paul District, Corps of Engineers. Significant issues that will be addressed in the DEIS include:

1. Fish, wildlife, and ecologically sensitive resources.

2. Water resources, including: Surface water hydrology; groundwater hydrology; and waters of the U.S., including wetlands.

3. Water quality, including: Surface water runoff; and storm water management.

4. Air quality, including: Mercury emissions; and carbon dioxide emissions.

5. Cumulative impacts, including: Wildlife habitat loss; water quality; and air quality.

Additional issues of interest may be identified through the public scoping process.

Our environmental review will be conducted to meet the requirements of the National Environmental Policy Act of 1969, National Historic Preservation Act of 1966, Endangered Species Act of 1973, Section 404 of the Clean Water Act, and other applicable laws and regulations.

Dated: January 10, 2008.

Jon L. Christensen,

Colonel, Corps of Engineers District Engineer.

[FR Doc. E8–819 Filed 1–16–08; 8:45 am]

BILLING CODE 3710–CY–P

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Intent To Prepare a Supplement to the Hawaii Range Complex Draft Environmental Impact Statement/Overseas Environmental Impact Statement (SDEIS/OEIS) for a Proposal To Enhance Training, Testing, and Operational Capability Within the Hawaii Range Complex (HRC)

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: The Department of the Navy (DON) announces its intent to prepare a Supplement to the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (SDEIS/OEIS) for the Hawaii Range Complex (HRC). This SDEIS/OEIS will be focused on the methodology used to analyze potential marine mammal behavioral effects related to mid-frequency active sonar exposure. In addition, DON may make adjustments to the alternatives.

SUPPLEMENTARY INFORMATION: On August 29, 2006, pursuant to section 102(2)(c) of the National Environmental Policy Act of 1969 as implemented by the Council on Environmental Quality regulations (40 CFR parts 1500–1508), and Executive Order 12114 (Environmental Effects Abroad of Major Federal Actions), the DON announced its intent to prepare an EIS/OEIS for the HRC and invited the public to comment on the scope of the EIS/OEIS (71 FR 51188). A DEIS/OEIS was subsequently released on July 27, 2007, (72 FR 41324), which evaluated the potential environmental effects of increasing usage and enhancing the capabilities of the HRC to achieve and maintain Fleet readiness and to conduct current, emerging, and future training and research, development, test, and evaluation (RDT&E) activities. As described in the DEIS/OEIS at section 4.1.2.4.9, a dose function approach was used to evaluate potential behavioral harassment of marine mammals incidental to the use of mid-frequency active sonar during Navy training and testing within the HRC. Since the release of the DEIS/OEIS in July 2007, the DON, in cooperation with NMFS, has further refined the dose function approach. Given the nature of these refinements, the Navy has decided to prepare a SDEIS/OEIS to provide opportunity for public review of the methodology. In addition, DON may make adjustments to the alternatives.

Exhibit B-5. Notice of Intent, Supplement to the Draft EIS/OEIS, January 17, 2008

All public comments previously received during the July through September 2007 DEIS/OEIS public review period on the dose function approach and the marine mammals effects analysis are still valid and will be considered in the SDEIS/OEIS and Final EIS/OEIS for this action. Previously submitted comments need not be resubmitted. A notice of availability of the SDEIS/OEIS and dates of the public hearings will be published in the **Federal Register** at a later date. No decision will be made to implement any alternative in the HRC until the EIS/OEIS process is completed and a Record of Decision is signed by the DON.

FOR FURTHER INFORMATION CONTACT: Public Affairs Officer, Pacific Missile Range Facility, *Attention*: HRC EIS/OEIS, P.O. Box 128, Kekaha, Kauai, Hawaii 96752–0128. Voice mail 1–866–767–3347 or facsimile at 808–335–4520.

Dated: January 14, 2008.

T.M. Cruz,

Lieutenant, Office of the Judge Advocate General, U.S. Navy, Federal Register Liaison Officer.

[FR Doc. E8–796 Filed 1–16–08; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF ENERGY

Environmental Management Site-Specific Advisory Board, Oak Ridge Reservation

AGENCY: Department of Energy.

ACTION: Notice of Open Meeting.

SUMMARY: This notice announces a meeting of the Environmental Management Site-Specific Advisory Board (EM SSAB), Oak Ridge Reservation. The Federal Advisory Committee Act (Pub. L. No. 92–463, 86 Stat. 770) requires that public notice of this meeting be announced in the **Federal Register**.

DATES: Wednesday, February 13, 2008, 6 p.m.

ADDRESSES: DOE Information Center, 475 Oak Ridge Turnpike, Oak Ridge, Tennessee.

FOR FURTHER INFORMATION CONTACT: Pat Halsey, Federal Coordinator, Department of Energy Oak Ridge Operations Office, P.O. Box 2001, EM–90, Oak Ridge, TN 37831. Phone (865) 576–4025; Fax (865) 576–2347 or e-mail: *halseypj@oro.doe.gov* or check the Web site at *http://www.oakridge.doe.gov/em/ssab*.

SUPPLEMENTARY INFORMATION:

Purpose of the Board: The purpose of the Board is to make recommendations to DOE in the areas of environmental restoration, waste management, and related activities.

Tentative Agenda: The presentation topic will be "EM Budget and Prioritization Review."

Public Participation: The meeting is open to the public. Written statements may be filed with the Board either before or after the meeting. Individuals who wish to make oral statements pertaining to the agenda item should contact Pat Halsey at the address or telephone number listed above. Requests must be received five days prior to the meeting and reasonable provision will be made to include the presentation in the agenda. The Deputy Designated Federal Officer is empowered to conduct the meeting in a fashion that will facilitate the orderly conduct of business. Individuals wishing to make public comment will be provided a maximum of five minutes to present their comments.

Minutes: Minutes will be available by writing or calling Pat Halsey at the address and phone number listed above. Minutes will also be available at the following Web site *http://www.oakridge.doe.gov/em/ssab/minutes.htm*.

Issued at Washington, DC on January 14, 2008.

Rachel Samuel,

Deputy Committee Management Officer.

[FR Doc. E8–811 Filed 1–16–08; 8:45 am]

BILLING CODE 6450–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket No. EL08–32–000]

Central Minnesota Municipal Power Agency, Midwest Municipal Transmission Group; Notice of Filing

January 9, 2008.

Take notice that on December 31, 2007, the Central Minnesota Municipal Power Agency and the Midwest Municipal Transmission Group tendered for filing a Petition for Declaratory Order and Request for Waivers.

Any person desiring to intervene or to protest this filing must file in accordance with Rules 211 and 214 of the Commission's Rules of Practice and Procedure (18 CFR 385.211, 385.214). Protests will be considered by the Commission in determining the appropriate action to be taken, but will not serve to make protestants parties to the proceeding. Any person wishing to become a party must file a notice of intervention or motion to intervene, as appropriate. Such notices, motions, or protests must be filed on or before the comment date. On or before the comment date, it is not necessary to serve motions to intervene or protests on persons other than the Applicant.

The Commission encourages electronic submission of protests and interventions in lieu of paper using the "eFiling" link at *http://www.ferc.gov*. Persons unable to file electronically should submit an original and 14 copies of the protest or intervention to the Federal Energy Regulatory Commission, 888 First Street, NE., Washington, DC 20426.

This filing is accessible on-line at *http://www.ferc.gov*, using the "eLibrary" link and is available for review in the Commission's Public Reference Room in Washington, DC. There is an "eSubscription" link on the Web site that enables subscribers to receive e-mail notification when a document is added to a subscribed docket(s). For assistance with any FERC Online service, please e-mail *FERCOnlineSupport@ferc.gov*, or call (866) 208–3676 (toll free). For TTY, call (202) 502–8659.

Comment Date: 5 p.m. Eastern Time on January 30, 2008.

Kimberly D. Bose,

Secretary.

[FR Doc. E8–716 Filed 1–16–08; 8:45 am]

BILLING CODE 6717–01–P

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

[Docket No. ER08–148–000]

Central Power & Lime, Inc.; Notice of Issuance of Order

January 9, 2008.

Central Power & Lime, Inc. (Central Power) filed an application for market-based rate authority, with an accompanying rate schedule. The proposed market-based rate schedule provides for the sale of energy, capacity and ancillary services at market-based rates. Central Power also requested waivers of various Commission regulations. In particular, Central Power requested that the Commission grant blanket approval under 18 CFR part 34 of all future issuances of securities and assumptions of liability by Central Power.

On December 19, 2007, pursuant to delegated authority, the Director, Division of Tariffs and Market

Exhibit B-5. Notice of Intent, Supplement to the Draft EIS/OEIS, January 17, 2008 (Continued)

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the National Primary Drinking Water Regulations in 40 CFR part 142.

Dated: December 21, 2007.

J.I. Palmer, Jr.,

Regional Administrator, Region 4.

[FR Doc. E8–3342 Filed 2–21–08; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[Docket# EPA–RO4–SFUND–2008–0098; FRL–8531–7]

Ecusta Mill Site Pisgah Forest, Transylvania County, NC; Notice of Settlement

AGENCY: Environmental Protection Agency.

ACTION: Notice of settlement.

SUMMARY: Under sections 104, 106, 107 and 122(h)(1) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the United States Environmental Protection Agency has entered into an Agreement and Order on Consent for Removal Action by Bona Fide Prospective Purchaser concerning the Ecusta Mill Site located in Pisgah Forest, Transylvania County, North Carolina.

DATES: The Agency will consider public comments on the settlement until March 24, 2008. The Agency will consider all comments received and may modify or withdraw its consent to the settlement if comments received disclose facts or considerations which indicate that the settlement is inappropriate, improper, or inadequate.

ADDRESSES: Copies of the settlement are available from Ms. Paula V. Batchelor. Submit your comments, identified by Docket ID No. EPA–RO4–SFUND–2008–0098 or Site name Ecusta Mill Superfund Site by one of the following methods:

- *http://www.regulations.gov:* Follow the on-line instructions for submitting comments.
- *E-mail: Batchelor.Paula@epa.gov.*
- *Fax:* 404/562–8842/Attn Paula V. Batchelor.

Mail: Ms. Paula V. Batchelor, U.S. EPA Region 4, SD–SEIMB, 61 Forsyth Street, SW., Atlanta, Georgia 30303. "In addition, please mail a copy of your comments on the information collection provisions to the Office of Information and Regulatory Affairs, Office of Management and Budget (OMB), Attn: Desk Officer for EPA, 725 17th St., NW., Washington, DC 20503."

Instructions: Direct your comments to Docket ID No. EPA–R04–SFUND–2008–0098. EPA's policy is that all comments received will be included in the public docket without change and may be made available online at *http://www.regulations.gov*, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through *http://www.regulations.gov* or e-mail. The *http://www.regulations.gov* Web site is an "anonymous access" system, which means EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to EPA without going through *http://www.regulations.gov* your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD–ROM you submit. If EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, any form of encryption, and be free of any defects or viruses. For additional information about EPA's public docket visit the EPA Docket Center homepage at *http://www.epa.gov/epahome/dockets.htm.*

Docket: All documents in the docket are listed in the *http://www.regulations.gov* index. Although listed in the index, some information is not publicly available, e.g., CBI or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, will be publicly available only in hard copy. Publicly available docket materials are available either electronically in *http://www.regulations.gov* or in hard copy at the U.S. EPA Region 4 office located at 61 Forsyth Street, SW., Atlanta, Georgia 30303. Regional office is open from 7 a.m. until 6:30 p.m. Monday through Friday, excluding legal holidays.

Written comments may be submitted to Ms. Batchelor within 30 calendar days of the date of this publication.

FOR FURTHER INFORMATION CONTACT: Paula V. Batchelor at 404/562–8887.

Dated: February 1, 2008.

De'Lyntoneus Moore,

Acting Chief, Superfund Enforcement & Information Management Branch, Superfund Division.

[FR Doc. E8–3337 Filed 2–21–08; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–6696–2]

Environmental Impacts Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7167 or *http://www.epa.gov/compliance/neap/*. Weekly receipt of Environmental Impact Statements Filed 02/11/2008 Through 02/15/2008 Pursuant to 40 CFR 1506.9.

EIS No. 20080057, Draft EIS, AFS, MT, Young Doge Project, Proposed Timber Harvest and Associate Activities, Prescribed Burning, Road and Recreation Management, Kootenai National Forest, Rexford Ranger District, Lincoln County, MT, Comment Period Ends: 04/07/2008, Contact: Pat Price 406–296–2536.

EIS No. 20080058, Final EIS, BOP, AL, Aliceville, Alabama Area, Proposed Federal Correctional Complex, To Address the Growing Federal Inmate Population, Pickens County, AL, Wait Period Ends: 03/24/2008, Contact: Pamela J. Chandler 202–514–6470.

EIS No. 20080059, Draft EIS, AFS, UT, Uinta National Forest Oil and Gas Leasing, Implementation, Identify National Forest Systems Land with Federal Mineral Rights, Wasatch, Utah, Juab, Tooele, and Sanpete Counties, UT, Comment Period Ends: 05/22/2008, Contact: Kim Martin 801–342–5100.

EIS No. 20080060, Draft EIS, AFS, SD, Upper Spring Creek Project, Proposes to Implement Multiple Resource Management Actions, Mystic Ranger District, Black Hills National Forest, Pennington County, SD, Comment Period Ends: 04/07/2008, Contact: Katie Van Alstyne 605–343–1567.

EIS No. 20080061, Final EIS, AFS, OR, Thorn Fire Salvage Recovery Project, Salvaging Dead and Dying Timber, Shake Table Fire Complex, Malheur National Forest, Grant County, OR, Wait Period Ends: 03/24/2008, Contact: Carole Holly 541–575–5300.

EIS No. 20080062, Final EIS, USA, 00, Permanent Home Stationing of the 2/25th Stryker Brigade Combat Team (SBCT), To Address a Full Range of Alternatives for Permanently Stationing the 2/25th SBCT, Hawaii and Honolulu

Exhibit B-6. Notice of Availability, Supplement to the Draft EIS/OEIS, February 22, 2008

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Counties, HI; Anchorage and Southeast Fairbanks Boroughs, AK; El Paso, Pueblo, and Fremont Counties, CO, Wait Period Ends: 03/24/2008, Contact: Michael Ackerman 410–436–2522.

EIS No. 20080063, Draft Supplement, USN, HI, Hawaii Range Complex (HRC) Project, Additional Information, To Support and Maintain Navy Pacific Fleet Training, and Research, Development, Test, and Evaluation (RDT&E) Operations, Kauai, Honolulu, Maui and Hawaii Counties, HI, Comment Period Ends: 04/07/2008, Contact: Tom Clements 866–767–3347.

EIS No. 20080064, Final EIS, BIA, NY, Oneida Nation of New York Conveyance of Lands into Trust, Proposes to Transfer 17,370 Acre of Fee Land into Federal Trust Status, Oneida, Madison and New York Counties, NY , Wait Period Ends: 03/24/2008, Contact: Kurt G. Chandler 615–564–6832.

Amended Notices

EIS No. 20080021, Draft EIS, SFW, AK, Yukon Flats National Wildlife Refuge Project, Proposed Federal and Public Land Exchange, Right-of-Way Grant, Anchorage, AK, Comment Period Ends: 03/25/2008, Contact: Cyndie Wolfe 907–786–3463.

Revision of FR Notice Published 01/25/2008: Extending Comment Period from 03/11/2008 to 03/25/2008.

EIS No. 20080051, Final EIS, AFS, MT, Beaverhead-Deerlodge National Forest Draft Revised Land and Resource Management Plan, Implementation, Beaverhead, Butte-Silver Bow, Deerlodge, Granite, Jefferson, Madison Counties, MT, Comment Period Ends: 03/31/2008, Contact: Leaf Magnuson 406–683–3950.

Revision to FR Notice Published 02/15/2008: Change the Wait Period Ends from 03/17/2008 to Comment Period Ends 03/31/2008.

Dated: February 19, 2008.

Ken Mittelholtz,

Environmental Protection Specialist, Office of Federal Activities.

[FR Doc. E8–3423 Filed 2–21–08; 8:45 am]

BILLING CODE 6560–50–P

FARM CREDIT ADMINISTRATION

[BM–14–FEB–08–02]

Consideration and Referral of Supervisory Strategies and Enforcement Actions

AGENCY: Farm Credit Administration.

ACTION: Policy statement.

SUMMARY: The Farm Credit Administration (FCA or Agency) Board recently adopted a policy statement that identifies conditions that warrant referrals to the Agency's Regulatory Enforcement Committee (REC) to consider appropriate supervisory strategies and recommend to the FCA Board the use of the enforcement authorities conferred on the Agency under part C, title V of the Farm Credit Act of 1971, as amended, or other statutes.

DATES: *Effective Date:* February 14, 2008.

FOR FURTHER INFORMATION CONTACT: Roger Paulsen, Office of Examination, Farm Credit Administration, McLean, VA 22102–5090, (703) 883–4265, TTY (703) 883–4483,

or

Jane Virga, Senior Counsel, Office of General Counsel, Farm Credit Administration, McLean, VA 22102–5090, (703) 883–4020, TTY (703) 883–4020.

SUPPLEMENTARY INFORMATION: The FCA Board adopted a policy statement identifying conditions that require referrals to the Agency's Regulatory Enforcement Committee. The policy statement, in its entirety, follows:

Consideration and Referral of Supervisory Strategies and Enforcement Actions

FCA–PS–79 [BM–14–FEB–08–02]

Effective Date: February 14, 2008.

Effect on Previous Action: None.

Source of Authority: Sections 5.19, 5.25–5.35 of the Farm Credit Act of 1971, as amended.

The FCA Board Hereby Adopts the Following Policy Statement:

The Farm Credit Administration (FCA or Agency) Board provides for the regulation and examination of Farm Credit System (System or FCS) institutions, which includes the Federal Agricultural Mortgage Corporation (Farmer Mac), in accordance with the Farm Credit Act of 1971, as amended (the "Act"). This policy addresses conditions that warrant referrals to the Agency's Regulatory Enforcement Committee (REC) to consider appropriate supervisory strategies and recommend to the FCA Board the use of the enforcement authorities conferred on the Agency under Part C, Title V of the Act or other statutes. Enforcement actions include formal agreements, orders to cease and desist, temporary orders to cease and desist, civil money penalties, suspensions or removals of directors or officers, and conditions imposed in writing to address unsafe or unsound practices or violations of law, rule or regulation (Enforcement Document). Taking these actions, in an appropriate and timely manner, is critical to maintaining shareholder, investor, and public confidence in the financial strength and future viability of the System.

This policy provides only internal FCA guidance. It is not intended to create any rights, substantive or procedural, enforceable at law or in any administrative proceeding.

Composition of the REC

The Chairman of the FCA Board will designate the office directors of the Office of Examination, Office of General Counsel, and Office of Regulatory Policy, or the directors of successor offices, as voting members of the REC. A representative from the Farm Credit System Insurance Corporation will be invited to participate in REC activities as a non-voting member. The Chairman of the FCA Board will also designate one of the voting REC members as Chairman of the REC.

Due to the statutory independence of the Office of Secondary Market Oversight (OSMO), there will be different REC membership when considering issues related to Farmer Mac.

Referrals to the REC

Recommended supervisory strategies or enforcement actions concerning an FCS institution or person will be referred to the REC when any of the conditions exist, as specified below, or when a specified condition does not exist, but consideration of an enforcement action or review by the REC is appropriate. The REC will review the proposed actions and draft enforcement documents and assess the recommendations for pursuing any such actions. The REC may revise the recommendations and will document its concurrence or nonconcurrence with the supervisory strategy or enforcement action.

Conditions Warranting Referral to the REC

Any one of the following conditions requires a referral to the REC for its consideration of supervisory strategies or enforcement actions.

1. A "4" or "5" composite FIRS rating is assigned to an FCS institution;

2. The institution or person is deemed unable or unwilling to address a material: (a) Unsafe or unsound condition or practice; or (b) violation or ongoing violation of law or regulation;

3. The institution or person is about to engage in a material unsafe or unsound practice or is about to commit a willful or material violation of law or

Exhibit B-6. Notice of Availability, Supplement to the Draft EIS/OEIS, February 22, 2008 (Continued)

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primary or secondary education. Council members appointed by the Secretary of Defense, who are not federal officers or employees, shall serve as Special Government Employees under the authority of 5 U.S.C. 3109. Council members shall be appointed on an annual basis by the Secretary of Defense. In addition, the Secretary of Defense and the Secretary of Education or their designated representative shall serve as the Council's co-chair.

Individuals appointed to the Council from professional employee organizations shall be individuals designated by those organizations. Council members and consultants, if required, shall be entitled to compensation at the daily equivalent of the rate specified at the time of such service for level IV of the Executive Services under 5 U.S.C. 5315. Council members shall be entitled to compensation for travel and per diem for official travel.

The Council shall be authorized to establish subcommittees, as necessary and consistent with its mission, and these subcommittees or working groups shall operate under the provisions of the Federal Advisory Committee Act of 1972, the Government in the Sunshine Act of 1976, and other appropriate federal regulations.

Such subcommittees or workgroups shall not work independently of the chartered Council, and shall report all their recommendations and advice to the Council for full deliberation and discussion. Subcommittees or workgroups have no authority to make decisions on behalf of the chartered Council nor can they report directly to the Department of Defense or any federal officers or employees who are not Council members.

SUPPLEMENTARY INFORMATION: The Council shall meet at the call of the Council's Designated Federal Officer, in consultation with the Council's chairperson. The Designated Federal Officer, pursuant to DoD policy, shall be a full-time or permanent part-time DoD employee, and shall be appointed in accordance with established DoD policies and procedures. The Designated Federal Officer or duly appointed Alternate Designated Federal Officer shall attend all committee meetings and subcommittee meetings.

Pursuant to 41 CFR 102–3.105(j) and 102–3.140, the public or interested organizations may submit written statements to the Advisory Council on Dependents' Education membership about the Council's mission and functions. Written statements may be submitted at any time or in response to the stated agenda of planned meeting of the Advisory Council on Dependents' Education.

All written statements shall be submitted to the Designated Federal Officer for the Advisory Council on Dependents' Education, and this individual will ensure that the written statements are provided to the membership for their consideration. Contact information for the Advisory Council on Dependents' Education's Designated Federal Officer can be obtained from the GSA's FACA Database—*https://www.fido.gov/facadatabase/public.asp.*

The Designated Federal Officer, pursuant to 41 CFR 102–3.150, will announce planned meetings of the Advisory Council on Dependents' Education. The Designated Federal Officer, at that time, may provide additional guidance on the submission of written statements that are in response to the stated agenda for the planned meeting in question.

FOR FURTHER INFORMATION CONTACT: Jim Freeman, Deputy Committee Management Officer for the Department of Defense, 703–601–2554, extension 128.

Dated: February 19, 2008.

L.M. Bynum,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. E8–3485 Filed 2–25–08; 8:45 am]

BILLING CODE 5001–06–P

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Public Meetings for the Supplement to the Draft Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) for a Proposal To Enhance Training, Testing, and Operational Capability Within the Hawaii Range Complex (HRC)

AGENCY: Department of the Navy, DoD.

ACTION: Notice.

SUMMARY: Pursuant to section 102(2)(c) of the National Environmental Policy Act (NEPA) of 1969 and regulations implemented by the Council on Environmental Quality (40 CFR Parts 1500–1508), and Presidential Executive Order 12114, the Department of the Navy (Navy) prepared and filed with the U.S. Environmental Protection Agency on February 15, 2008, a Supplement to the Draft EIS/OEIS for a Proposal to Enhance Training, Testing, and Operational Capability within the HRC. The Supplement to the Draft EIS/OEIS evaluates the potential for behavioral harassment of marine mammals incidental to the use of mid-frequency active sonar during Navy training and testing within the HRC. The methodology used in the Supplement is a modification of the methodology previously used in the Draft EIS/OEIS. The Supplement to the Draft EIS/OEIS also addresses a change in the number of sonar hours for each of the alternatives and the potential effects of an additional alternative. A Notice of Intent for the Supplement to the Draft EIS/OEIS was published in the **Federal Register** on January 17, 2008 (73 FR 3242).

The Navy will conduct four public meetings to received oral and written comments on the Supplement to the Draft EIS/OEIS. Federal agencies, State agencies, and interested individuals are invited to be present or represented at the public meetings. This notice announces the dates and locations of public meetings for the Supplement to the Draft EIS/OEIS.

Dates and Addresses: Information sessions and receipt of public comments will be held at each of the locations listed below between 5 p.m. to 9 p.m. The information sessions will allow individuals to review the Supplement to the Draft EIS/OEIS in an open house format. Navy and NMFS representatives will be available during the information sessions to clarify information related to the Supplement to the Draft EIS/OEIS. Oral comments from the public will also be taken during the session. Public meetings will be held on the following dates and at the following locations in Hawaii:

1. March 13, 2008 at the Kauai Community College Cafeteria, 3–1901 Kaumualii Highway, Lihue, Kauai;
2. March 14, 2008 at Maui Waena Intermediate School 795 Onehee Avenue, Kahului, Maui;
3. March 17, 2008 at Disabled American Veterans Hall 2685 North Nimitz Highway, Honolulu, Oahu;
4. March 18, 2008, Hilo Hawaiian Hotel, 71 Banyan Drive, Hilo, Hawaii.

FOR FURTHER INFORMATION CONTACT: Public Affairs Officer, Pacific Missile Range Facility, P.O. Box 128, Kekaha, Kauai, Hawaii, 96752–0128, ATTN: HRC EIS/OEIS, voice mail 1–866–767–3347, facsimile 808–335–4520.

SUPPLEMENTARY INFORMATION: The Navy previously conducted public hearings on the Draft EIS/OEIS in August 2007 following publication of the Notice of Availability in the **Federal Register** on July 27, 2007 (72 FR 41324). Since the publication of the Draft EIS/OEIS, Navy, in coordination with NMFS, has

Exhibit B-7. Notice of Public Meetings for the Supplement to the Draft EIS/OEIS, February 26, 2008

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conducted a re-evaluation of the analysis concerning the analytical methodology used in the July 2007 document to assess the potential for behavioral harassment of marine mammals incidental to the use of mid-frequency active sonar during Navy training and testing. Modifications to this analytical methodology have led Navy to determine that the preparation of a Supplement to the Draft EIS/OEIS is appropriate. Besides the modifications to the analytical methodology, the Supplement to the Draft EIS/OEIS incorporates changes in sonar hours for each alternative. The Supplement also includes the evaluation of the potential effects of a new alternative. Alternative 3 (which is also identified as the Navy's preferred alternative) includes all of the training and testing activities identified for Alternative 2, but with reduced mid-frequency sonar hours (the same number of sonar hours identified for the No-action Alternative).

The Proposed Action assessed in the Supplement to the Draft EIS/OEIS is unchanged from the Draft EIS/OEIS and involves increasing the usage and enhancing the capabilities of the HRC with the purpose of achieving and maintaining Fleet readiness and to conduct current, emerging, and future training and research, development, test, and evaluation (RDT&E) operations. This action is consistent with U.S. Code Title 10, section 5062.

The Supplement to the Draft EIS/OEIS has been distributed to various Federal, State, and local agencies, as well as other interested individuals and organizations. Additionally, copies of the Supplement to the Draft EIS/OEIS have been distributed to the following libraries in Hawaii for public review: Kahului Public Library, 90 School Street, Kahului, Maui, Hawaii 96732; Wailuku Public Library, 251 High Street, Wailuku, Maui, Hawaii 96793; Hilo Public Library, 300 Waianuenue Avenue, Hilo, Hawaii, Hawaii 96720; Hawaii State Library, Hawaii and Pacific Section Document Unit, 478 South King Street, Honolulu, Oahu, Hawaii 96813–2994; Lihue Public Library, 4344 Hardy Street, Lihue, Kauai, Hawaii 96766; Waimea Public Library, P.O. Box 397, Waimea, Kauai, Hawaii 96766; Princeville Public Library, 4343 Emmalani Drive, Princeville, Kauai, Hawaii 96722.

An electronic copy of both the Supplement and the Draft EIS/OEIS are also available for public viewing at: *http://www.govsupport.us/hrc.* Single copies of the Supplement to the Draft EIS/OEIS are available upon written request by contacting Public Affairs Officer, Pacific Missile Range Facility, P.O. Box 128, Kekaha, Kauai, Hawaii, 96752–0128, ATTN: HRC EIS/OEIS, voice mail 1–866–767–3347, facsimile 808–335–4520.

Federal, State, and local agencies and interested parties are invited to be present or represented at the public meetings. Written comments can also be submitted during these meetings. Oral statements will either recorded or be heard and transcribed by a stenographer. All statements, both oral and written, will become part of the public record on the Supplement to the Draft EIS/OEIS and will be addressed in the Final EIS/OEIS. Equal weight will be given to both oral and written statements.

In the interest of available time, and to ensure all who wish to give an oral statement at the public meetings have the opportunity to do so, each speaker's comments will be limited to three (3) minutes. If a long statement is to be presented, it should be summarized at the public meeting and the full text submitted in writing either at the meeting or mailed to Public Affairs Officer, Pacific Missile Range Facility, P.O. Box 128, Kekaha, Kauai, Hawaii, 96752–0128, ATTN: HRC EIS/OEIS, faxed to 808–335–4520, or submitted via e-mail to *deis_hrc@govsupport.us.*

All written comments must be post marked or received by April 7, 2008, to ensure they become part of the official record. All comments will be addressed in the Final EIS/OEIS.

Dated: February 20, 2008.

T.M. Cruz,

Lieutenant, Office of the Judge Advocate General, U.S. Navy, Federal Register Liaison Officer.

[FR Doc. E8–3633 Filed 2–25–08; 8:45 am]

BILLING CODE 3810–FF–P

DEPARTMENT OF DEFENSE

Department of the Navy

Privacy Act of 1974; System of Records

AGENCY: Department of the Navy, DoD.

ACTION: Notice to delete two Systems of Records.

SUMMARY: The Department of the Navy is deleting two system of records in its existing inventory of record systems subject to the Privacy Act of 1974 (5 U.S.C. 552a), as amended.

DATES: This proposed action will be effective without further notice on March 27, 2008 unless comments are received which result in a contrary determination.

ADDRESSES: Send comments to the Department of the Navy, PA/FOIA Policy Branch, Chief of Naval Operations (DNS–36), 2000 Navy Pentagon, Washington, DC 20350–2000.

FOR FURTHER INFORMATION CONTACT: Mrs. Doris Lama at (202) 685–6545.

SUPPLEMENTARY INFORMATION: The Department of the Navy systems of records notices subject to the Privacy Act of 1974 (5 U.S.C. 552a), as amended, have been published in the **Federal Register** and are available from the address above.

The Department of the Navy proposes to delete two system of records notices from its inventory of record systems subject to the Privacy Act of 1974 (5 U.S.C. 552a), as amended. The proposed deletion is not within the purview of subsection (r) of the Privacy Act of 1974 (5 U.S.C. 552a), as amended, which requires the submission of new or altered systems reports.

Dated: February 19, 2008.

L.M. Bynum,

Alternate, OSD Federal Register Liaison Officer, Department of Defense.

N11101–2

SYSTEM NAME:

Family Housing Requirements Survey Records System (June 8, 1999, 64 FR 30501).

REASON:

Program discontinued and all records have been destroyed.

N11103–01

SYSTEM NAME:

Housing Referral Services Record System (February 22, 1993, 58 FR 10817).

REASON:

Program discontinued and all records have been destroyed.

[FR Doc. E8–3600 Filed 2–25–08; 8:45 am]

BILLING CODE 5001–06–P

DEPARTMENT OF EDUCATION

The Federal Student Aid Programs Under Title IV of the Higher Education Act of 1965, as Amended

AGENCY: Department of Education.

ACTION: Notice inviting letters of application for participation in the Quality Assurance Program.

SUMMARY: The Secretary of Education invites institutions of higher education that may wish to participate in the Quality Assurance Program, under

Exhibit B-7. Notice of Public Meetings for the Supplement to the Draft EIS/OEIS, February 26, 2008 (Continued)

Appendix C
Resource Descriptions Including Laws and Regulations Considered

APPENDIX C RESOURCE DESCRIPTIONS INCLUDING LAWS AND REGULATIONS CONSIDERED

This appendix provides a general description of each resource and addresses the Federal, State, and local environmental review programs that do, or may, apply to the No-action Alternative, Alternative 1, Alternative 2, and Alternative 3. Project facilities and activities will be implemented in accordance with applicable Federal laws and regulations and with State and local laws, regulations, programs, plans, and policies as applicable.

This Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS) has been prepared and provided for public review in accordance with the Council on Environmental Quality regulations implementing the National Environmental Policy Act (NEPA) (40 Code of Federal Regulations [CFR] Part 1500-1508).

C.1 Air Quality

The Federal **Clean Air Act** (CAA) (42 United States Code [U.S.C.] 7401) requires the adoption of national ambient air quality standards (NAAQS) to protect the public health, safety, and welfare from known or anticipated effects of air pollution. Six air pollutants have been identified by U.S. Environmental Protection Agency (USEPA) as being a nationwide concern: carbon monoxide; ozone; nitrogen dioxide; particulate matter equal to or less than 10 microns in size (PM-10) and fine particulate matter equal to or less than 2.5 microns in size (PM-2.5); sulfur dioxide; and lead. USEPA has established NAAQS for these pollutants, which are collectively referred to as criteria pollutants, as shown in Table C-1. Air quality in Hawaii is defined by the State ambient air quality standards (AAQS). Table C-1 compares the NAAQS and the Hawaii AAQS.

According to USEPA guidelines, an area with air quality equal to or better than the NAAQS is designated as being in attainment; areas with worse air quality are classified as nonattainment areas. A nonattainment designation, for a particular pollutant, is given to a region if the primary NAAQS for that criteria pollutant is exceeded at any point in the region for more than 3 days during a 3-year period. An air basin may be designated as unclassified when there is insufficient data for USEPA to determine attainment status.

Clean Air Act Conformity and Applicability

The CAA contains the legislation that mandates the General Conformity Rule to ensure that Federal actions in designated nonattainment and maintenance areas do not interfere with a State's timely attainment of the NAAQS. The General Conformity Rule divides the air conformity process into two distinct areas: applicability analysis and conformity determination. The applicability analysis process requires Federal agencies to determine if their proposed action(s) would increase emissions of criteria pollutants above preset threshold levels (40 CFR 51.853). These threshold levels vary depending on severity of the nonattainment and geographic location. Because no areas of Hawaii are classified as nonattainment or maintenance areas, conformity analysis procedures do not apply to Navy actions in Hawaii.

Table C-1. Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Hawaii State Standard	National Primary Standard	National Secondary Standard
Carbon Monoxide	8-hour	5 mg/m^3 (4.5 ppm)	10 mg/m^3 (9 ppm)	None
	1-Hour	10 mg/m^3 (9 ppm)	40 mg/m^3 (35 ppm)	None
Nitrogen Dioxide	Annual (1)	70 mg/m^3 (0.037 ppm)	100 µg/m^3 (0.053 ppm)	Same as Primary
Ozone	8-hour (2)	None	157 µg/m^3 (0.075 ppm) (1)	Same as Primary
	1-Hour	157 µg/m^3	235 µg/m^3 (0.12 ppm) (7)	Same as Primary
Lead	Quarterly (1)	1.5 mg/m^3	1.5 µg/m^3	Same as Primary
PM-2.5	Annual (3)	None	15 µg/m^3	Same as Primary
	24-hour (4)	None	65 µg/m^3	Same as Primary
PM-10	Annual (arithmetic mean)	50 mg/m^3	Revoked (8)	
	24-hour (5)	150 mg/m^3	150 µg/m^3	Same as Primary
Sulfur Dioxide (6)	Annual (1)	80 µg/m^3 (0.03 ppm)	80 µg/m^3 (0.03 ppm)	None
	24-hour	365 µg/m^3 (0.14 ppm)	365 µg/m^3 (0.14 ppm)	None
	3-hour	1,300 µg/m^3 (0.5 ppm)	None	1,300 µg/m^3 (0.5 ppm)
Hydrogen Sulfide	1-hour	35 µg/m^3 (0.025 ppm)	None	None

Source: Hawaii Administrative Rules, Chapter 59; 40 CFR §50
Notes:
(1) Calculated as the arithmetic mean
(2) Calculated as the 3-year average of the fourth highest daily maximum 8-hour ozone concentration
(3) Calculated as the 3-year average of the arithmetic means
(4) Calculated as the 98th percentile of 24-hour PM-2.5 concentration in a year (averaged over 3 years) at the population oriented monitoring site with the highest measured values in the area (effective December 17, 2006).
(5) Calculated as the 99th percentile of 24-hour PM-10 concentrations in a year (averaged over 3 years).
(6) Measured as sulfur dioxide
(7) As of June 15, 2005 USEPA revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone nonattainment Early Action Compact Areas
(8) USEPA revoked the annual PM-10 standard in 2006 (effective December 17, 2006)
mg/m^3 = milligrams per cubic meter
µg/m^3 = micrograms per cubic meter
PM-2.5 = fine particulate matter equal to or less than 2.5 microns in size
PM-10 = particulate matter equal to or less than 10 microns in size (also called respirable particulate and suspended particulate)
ppm = parts per million

De Minimis Emissions and Applicability Thresholds

De minimis emissions are total direct and indirect emissions of a criteria pollutant caused by a Federal action in a nonattainment or maintenance area at levels less than specified applicability thresholds. The six criteria pollutants are PM-10 and PM-2.5, sulfur dioxide, carbon monoxide, nitrogen oxides, 8-hour ozone, and lead. Ozone is measured by emissions of volatile organic compounds (VOC) and nitrogen oxides.

Federal regulations designate the State of Hawaii as an attainment area for all six criteria pollutants. Therefore, in Hawaii there are no applicable thresholds for air emissions (Table C-2).

Table C-2. General Conformity Applicability Thresholds for Nonattainment Areas

Criteria Pollutants	Tons Per Year
Ozone (VOC or Nitrogen Oxides)	
Serious Non-attainment Areas (NAAs)	50
Severe NAAs	25
Extreme NAAs	10
Other ozone NAAs outside an ozone transport region	100
Other ozone NAAs inside an ozone transport region	50 (VOC) 100 (nitrogen oxides)
VOC	**50**
Nitrogen Oxides	**100**
Carbon Monoxide—All NAAs and maintenance areas	100
Sulfur Dioxide or Nitrogen Oxides—All NAAs	100
PM-10	
Moderate NAAs and maintenance areas	100
Serious NAAs	70
PM-2.5 (direct PM-2.5 , Nitrogen Oxides, VOC, Sulfur Dioxide)	**100**
Lead—All NAAs	25

Source: 40 CFR §51.853
Notes:
PM-10 = particulate matter equal to or less than 10 microns in size
PM-2.5 = particulate matter equal to or less than 2.5 microns in size
VOC = Volatile organic compounds

Regionally Significant

The conformity regulation defines “regionally significant” emissions as the total direct and indirect emissions of a Federal action that represents 10 percent or more of an area's total emissions for a criteria pollutant. A general conformity determination would be required if emissions were regionally significant, even if they were *de minimis*. Ten percent of Kauai County’s annual air emission budget for each criteria pollutant would apply in the case of the construction at the Pacific Missile Range Facility (PMRF). However, because Hawaii is in attainment for all six criteria pollutants, regionally significant emissions are not applied.

Emissions Calculations

Although Hawaii is in attainment for all criteria pollutants under the CAA, applicability analysis is a useful tool to estimate and compare major Navy air emissions. The Air Conformity Applicability Model (ACAM) was developed by the Air Force to screen for compliance with the General Conformity Rule requirements (U.S. Air Force, 2005). The computer model estimates air pollutant emissions associated with proposed aircraft and personnel realignment, construction projects, and operation of various facilities. Emissions for each year are calculated separately. ACAM was used for the emissions estimates that follow.

Construction Emissions Estimates

Below is a description of the inputs used to complete the air emissions analysis for the construction of an 85,196 square-foot (ft^2), two-story, steel-framed Range Operations Control Building and a 4,198 ft^2 Dehumidified Warehouse at PMRF/Main Base. A 25,000 ft^2 building proposed as the Direct Energy Laser Facility is not included in the construction emissions calculations. Demolition of 13 buildings with a combined floor area of over 55,000 ft^2 could start in the second quarter of 2008. Site grading was assumed to be 3.03 acres. Construction starting in the third quarter of 2008 would require 2 years to complete. (Naval Facilities Engineering Command, 2004)

The full list of inputs and the detailed list of construction emissions are provided in the tables that follow. Post-construction air emissions (related to heating/cooling, added personal etc.) were not calculated for the Proposed Action because it was assumed that these sources would not vary significantly from the current activities at PMRF. In addition, because many emission factors for PM-2.5 have not been developed to-date, PM-10 emission factors are used as a conservative substitute.

VOC and PM-10 emissions will occur directly from the construction of facilities. Emission-causing activities that are included in this calculation include demolition of existing facilities, grading, and contraction activities including architectural coating, construction equipment, commuting emissions, and asphalt paving. It was assumed that there would not be enough asphalt paving to require analysis. These activities are described in more detail below and summarized in Table C-3:

- Demolition Emissions: The primary air pollutant from building demolition is PM-10. Demolition emissions are based on total volume of building being demolished and the number of days required for demolishing the buildings. The Proposed Action includes the demolition of Buildings 105, 106, 160, 161, 135, 136, 156, 157, 301, 305, 926, 964, and 967. These 13 buildings have a combined floor area of approximately 55,000 ft^2. Given the lack of project detail to-date, it was assumed that demolition could take 30 days, beginning in the second quarter of 2008.

- Grading Emissions: The primary air pollutant from grading is PM-10 from particles becoming airborne during grading, and nitrogen oxides, sulfur dioxide, PM-10, carbon monoxide, and VOCs from grading equipment. Grading emissions are based on the total number of days in a calendar year that will be required for grading and the total number of acres to be graded. Given the lack of project detail to-date, it was assumed that that grading will take 90 days and 3.03 acres would be graded, starting in the third quarter of 2008. Emissions are based on one storage pile on 0.2 acre per 10 acres graded, and three pieces of heavy equipment used 6 hours per day per 10 acres graded. No dust controls were assumed to be in place. All equipment is assumed to be diesel powered.

- Building Construction Emissions: Construction air emissions are spread out over 2 calendar years, starting in the third quarter of 2008. These activities are described in more detail below and summarized in Table C-3:

  – Asphalt Paving: The primary air pollutant from asphalt paving is VOCs. Asphalt paving emissions are based on the total land area to be paved spread over the number of days required for paving. It was assumed that the asphalt area being proposed for roads and parking was not significant enough to add to the model.

– Non-Residential Architectural Coatings: The primary air pollutant from paints, varnishes, primers, and other surface coatings is VOCs released through the evaporation of solvents. These emissions are based on gross square footage of facilities built. Project documentation estimates 89,394 gross square feet of facilities will be added at PMRF.

– Construction Equipment and Commuting Emissions: Emissions occurring from construction equipment and commuting include nitrogen oxides, sulfur dioxide, PM-10, carbon monoxide, and VOCs. There will be emissions from the exhaust gases of the following equipment:

- Worker Trips (privately owned vehicles of the construction workers who commute to and from the site): The number of construction worker trips during construction is based on the square feet of construction and the length of construction (excluding grading). Total daily trips for the Warehouse and the Range Operations Control Building were calculated to be 73 trips per day for 2 years.
- Stationary equipment: These emissions are based on gasoline powered equipment (e.g., generators, saws, etc.) used at the construction site and depend on the gross square feet to be constructed. Project documentation estimates 89,394 ft^2 of facilities will be added at PMRF/Main Base.
- Mobile equipment: These emissions are based on forklifts, dump trucks, etc., used during construction. It is assumed that there are two pieces of diesel powered equipment per 10,000 ft^2; and the equipment is used 6 hours per day. Project documentation estimates 89,394 ft^2 of facilities will be added at PMRF/Main Base.

Table C-3. Proposed Construction Inputs into ACAM

Structure	Space (ft^2)	Yr/Qtr Built	Duration (days)
Warehouse	4,189	2008/3	185
Range Operations Control Building	85,196	2008/3	545
TOTAL Construction	**89,394**		**730**
TOTAL Asphalt Pavement	**1.0 acres**	**2008/3**	
TOTAL Graded	**3.03 acres**	**2008/3**	**90**
TOTAL Demolition	**55,000**	**2008/2**	**1-9 mo**

Table C-4 shows the estimated emission levels for proposed construction at PMRF/Main Base. None of the emissions generated by the construction of the new facilities would exceed the *de minimis* or “conformity threshold” found in Table C-2.

Table C-4. Proposed Construction Air Emissions Summary Information by Source

Year	Source Type	Carbon Monoxide (Tons)	Nitrogen Oxides (Tons)	Sulfur Dioxide (Tons)	VOC (Tons)	PM-10 (Tons)
2008	Demolition	0.00	0.00	0.00	0.00	0.11
2008	Construction—Grading Equipment	0.04	0.16	0.02	0.02	0.01
2008	Construction—Grading Ops.	0.00	0.00	0.00	0.00	4.64
2008	Construction—Mobile Equipment	2.63	6.27	0.77	0.57	0.51
2008	Construction—Non-Res. Arch. Ctgs.	0.00	0.00	0.00	0.10	0.00
2008	Construction—Stationary Equipment	17.82	0.46	0.02	0.67	0.01
2008	Construction—Workers Trips	0.60	0.03	0.00	0.04	0.01
	TOTAL FOR 2008	**21.09**	**6.92**	**0.81**	**1.39**	**5.28**
2009	Construction—Mobile Equip.	7.17	17.10	2.11	1.56	1.38
2009	Construction—Non-Res. Arch. Ctgs.	0.00	0.00	0.00	0.17	0.00
2009	Construction—Stationary Equipment	48.64	1.26	0.06	1.82	0.04
2009	Construction—Workers Trips	1.72	0.10	0.00	0.10	0.01
	TOTAL FOR 2009	**57.53**	**18.46**	**2.18**	**3.66**	**1.43**
2010	Construction—Mobile Equipment	1.13	2.70	0.33	0.25	0.22
2010	Construction—Non-Res. Arch. Ctgs.	0.00	0.00	0.00	0.03	0.00
2010	Construction—Stationary Equipment	7.67	0.20	0.01	0.29	0.01
2010	Construction—Workers Trips	0.27	0.01	0.00	0.01	0.00
	TOTAL FOR 2010	**9.07**	**2.91**	**0.34**	**0.57**	**0.23**

Notes:

PM-10 = particulate matter equal to or less than 10 microns in size
VOC = Volatile organic compounds

Aircraft Operations Emissions Estimates

Military aircraft flight operations (mostly helicopters) represent the major Navy emission sources among the actions proposed. Aircraft flying operations include both Landing and Takeoff (LTO) and Touch-and-Go (T/G) cycles. Emissions from engine exhaust occur for each operation during idle/taxi-out, takeoff, climb out, approach, and taxi/idle-in. Only those portions of the flying operation that take place below the atmospheric mixing height are considered (these are the only emissions presumed to affect ground level concentrations). Aerospace Ground Equipment includes such aircraft support equipment as air compressors, air conditioners (coolers), aircraft tug narrows, bomb lifts, cargo loaders, cargo leaders, fuel trucks, generators, ground heaters, hydraulic test stands, jacking manifolds and miscellaneous carts. Trim tests are engine tests performed with the engines on the aircraft. All engines on the aircraft are assumed to be tested the same number of times each year.

ACAM (U.S. Air Force, 2005) was used to calculate the air emissions. Air emissions were calculated for the following Proposed Actions. The activities described below are also summarized in Table C-5:

- Continued aircraft training and support at PMRF Airfield on Kauai. Operational records show that existing PMRF aircraft operations in fiscal year (FY) 2004 consisted of 13,395 aircraft operations (defined as a takeoff or landing of one aircraft) of which 8,129 were Navy activities. The C-26 "Metroliner" aircraft and UH-3H "Sea King" helicopter accounted for 67 percent of all Navy flights at PMRF. Transient Navy H-60, C-20, and NP-3D aircraft combined for the remaining 33 percent of Navy flights at PMRF. Given the limited number of Navy aircraft in ACAM, only the UH-3H and the C-26 were modeled, making up 2,602 and 2,926 flights respectively. In ACAM, the C-26 aircraft was modeled using the C-20A aircraft and the UH-3H helicopter was modeled using the CH-3A helicopter. The operations were divided between LTO and T/G as shown on Table C-4. (U.S. Department of the Navy, Engineering Field Activity Chesapeake, 2006)
- The proposed introduction of F/A-18 aircraft for Field Carrier Landing Practice (FCLP) conducted at PMRF Airfield on Kauai or at Marine Corps Base Hawaii Kaneohe Bay, Oahu (Alternative 1) starting in the first quarter of 2009. In ACAM, the F/A-18 fighter was substituted with the F/18 fighter. Twelve FCLP training events are planned with six to eight T/G landings in each event. Therefore, it is assumed that Alternative 1 has a total of 96 new T/G landings. No AGE or ground activities were included.
- The proposed increase of F/A-18 aircraft for FCLP at PMRF Airfield or at Marine Corps Base Hawaii on Oahu (Alternatives 2 and 3) starting in the first quarter of 2009. In ACAM, the F/A-18 fighter was substituted with the F/18 fighter. Sixteen FCLP training events are planned with 6 to 8 touch-and go landings in each event. Therefore, it is assumed that Alternatives 2 and 3 have a total of 128 new T/G landings. No AGE or ground activities were included.

The estimated annual aircraft emission levels, including aerospace ground support activities and engine testing are in Table C-6. None of the emissions generated by the aircraft would exceed the *de minimis* or "conformity threshold" found in Table C-1. Since estimated emission levels for the Proposed Action Alternative would be *de minimis* and would not be regionally significant, no further analysis is needed.

Table C-5. Proposed Aircraft Inputs into ACAM

AIRCRAFT				OPERATIONS						TIME SPENT IN OPERATION MODE (MIN)				
Aircraft Modeled	Aircraft Used by Navy	Engine	# of Engines	Annual LTO	Annual T/G	Run-up (per engine)	Annual Run-up	Annual Trim Test	Trim Test	Taxi/Idle Out	Takeoff	Climb	Approach	Taxi/ Idle In
PMRF Barking Sands Airfield (all Proposed Alternatives)														
CH-3E	UH-3H	T58-GE-5	2	768	1,066	1	60	24	25	8.00	0.00	6.50	6.50	7.00
C-20A	C-26	F113-RR-100	2	460	2,006	1	60	24	45	6.50	0.50	0.00	1.60	6.50
PMRF Airfield, Kauai or Marine Corps Base Hawaii Kaneohe Bay, Oahu (Alternative 1)														
F-18	F/A-18	F404-GE-400	2	0	96	0	90	0	60	6.50	0.50	0.50	1.60	6.50
PMRF Barking Sands Airfield, Kauai or Marine Corps Base Hawaii Kaneohe Bay, Oahu (Alternatives 2 and 3)														
F-18	F/A-18	F404-GE-400	2	0	128	0	90	0	60	6.50	0.50	0.50	1.60	6.50

Notes:
LTO = Landings and takeoffs
PMRF = Pacific Missile Range Facility
T/G = Touch-and-go landings

Table C-6. Proposed Aircraft Air Emissions Summary Information by Source

Proposed Action	Year	Source Type	Carbon Monoxide (tons)	Nitrogen Oxides (tons)	Sulfur Dioxide (tons)	VOC (tons)	PM-10 (tons)
PMRF Airfield Baseline	2007	Aerospace Ground Equipment	1.25	7.24	0.64	0.40	0.28
PMRF Airfield Baseline	2007	Aircraft Flying Operations—After Burn	1.39	2.63	0.12	0.01	0.00
PMRF Airfield Baseline	2007	Aircraft Flying Operations—Approach	0.38	1.04	0.15	0.03	0.00
PMRF Airfield Baseline	2007	Aircraft Flying Operations—Idle	7.90	0.42	0.13	2.60	0.04
PMRF Airfield Baseline	2007	Aircraft Flying Operations—Military	1.61	1.56	0.19	0.50	0.44
PMRF Airfield Baseline	2007	Aircraft Ground Activities (Trim Checks)—After Burn	0.08	0.14	0.01	0.00	0.00
PMRF Airfield Baseline	2007	Aircraft Ground Activities (Trim Checks)—Approach	0.05	0.13	0.02	0.00	0.00
PMRF Airfield Baseline	2007	Aircraft Ground Activities (Trim Checks)—Idle	0.17	0.01	0.00	0.04	0.00
PMRF Airfield Baseline	2007	Aircraft Ground Activities (Trim Checks)—Intermediate	0.01	0.01	0.00	0.00	0.00
PMRF Airfield Baseline	2007	Aircraft Ground Activities (Trim Checks)—Military	0.05	0.56	0.03	0.01	0.01
PMRF Airfield Baseline	2007	Aircraft Engine Test Cells—After Burn	0.00	0.01	0.00	0.00	0.00
PMRF Airfield Baseline	2007	Aircraft Engine Test Cells—Approach	0.00	0.01	0.00	0.00	0.00
PMRF Airfield Baseline	2007	Aircraft Engine Test Cells—Idle	0.01	0.00	0.00	0.00	0.00
PMRF Airfield Baseline	2007	Aircraft Engine Test Cells—Intermediate	0.00	0.00	0.00	0.00	0.00
PMRF Airfield Baseline	2007	Aircraft Engine Test Cells—Military	0.00	0.03	0.00	0.00	0.00
Total for 2007 and beyond			**12.92**	**13.79**	**1.30**	**3.60**	**0.78**
FCLP Alt 1	2009	Aircraft Flying Operations—Approach	0.03	0.06	0.01	0.01	0.01
FCLP Alt 1	2009	Aircraft Flying Operations—Idle	0.00	0.00	0.00	0.00	0.00
FCLP Alt 1	2009	Aircraft Flying Operations—Intermediate	0.01	0.08	0.01	0.00	0.01
FCLP Alt 1	2009	Aircraft Flying Operations—Military	0.01	0.14	0.01	0.00	0.01
Total for 2009 and beyond			**0.04**	**0.28**	**0.02**	**0.01**	**0.03**
FCLP Alt 2	2009	Aircraft Flying Operations—Approach	0.03	0.08	0.01	0.01	0.02
FCLP Alt 2	2009	Aircraft Flying Operations—Idle	0.00	0.00	0.00	0.00	0.00
FCLP Alt 2	2009	Aircraft Flying Operations—Intermediate	0.01	0.11	0.01	0.00	0.01
FCLP Alt 2	2009	Aircraft Flying Operations—Military	0.01	0.18	0.01	0.00	0.01
Total for 2009 and beyond			**0.05**	**0.37**	**0.03**	**0.01**	**0.04**

Notes: FCLP = Field Carrier Landing Practice
PMRF = Pacific Missile Range Facility
PM-10 = Particulate matter equal to or less than 10 microns in size
VOC = Volatile organic compounds

C.2 Airspace

Airspace, or that space which lies above a nation and comes under its jurisdiction, is generally viewed as being unlimited. However, it is a finite resource that can be defined vertically and horizontally, as well as temporally, when describing its use for aviation purposes.

Under Public Law 85-725, **Federal Aviation Act** of 1958, the Federal Aviation Administration (FAA) is charged with the safe and efficient use of our nation's airspace, and has established certain criteria for and limits to its use. The method used to provide this service is the National Airspace System. This system is "…a common network of U.S. airspace; air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information and manpower and material."

Areas beyond the territorial limit are defined as international airspace. Therefore, the procedures of the International Civil Aviation Organization (ICAO) outlined in ICAO Document 4444, *Rules of the Air and Air Traffic Services*, are followed (International Civil Aviation Organization, 1996; 1997). ICAO Document 4444 is the equivalent air traffic control manual to FAA Handbook 7110.65, *Air Traffic Control*. The ICAO is a specialized agency of the United Nations whose objective is to develop the principles and techniques of international air navigation and to foster planning and development of international civil air transport.

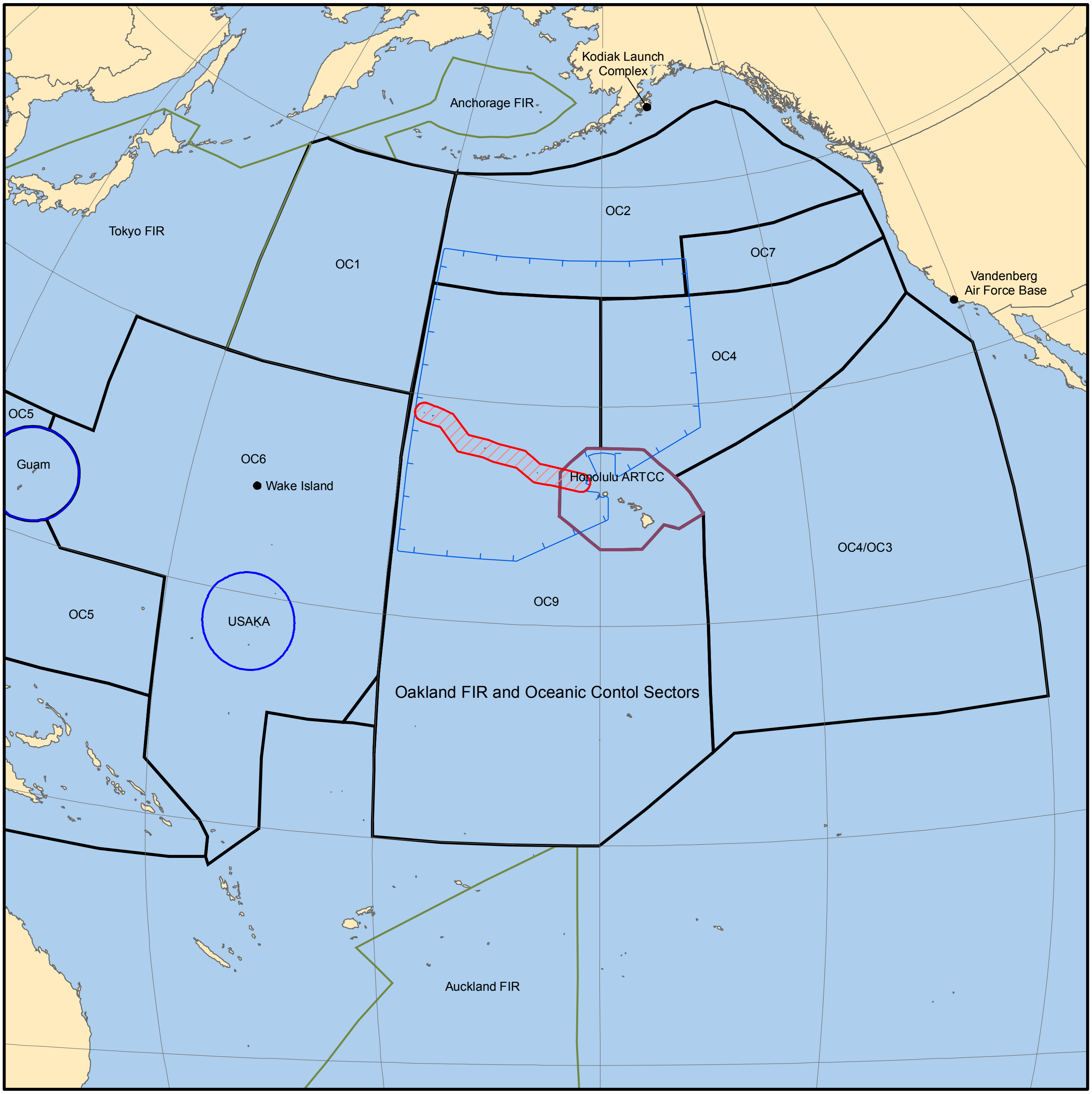
The FAA acts as the U.S. agent for aeronautical information to the ICAO, and air traffic in the Central Pacific is managed by the Oakland Air Route Traffic Control Center (ARTCC) within several Oceanic Control Sectors, the boundaries of which are shown in Figure C-1. The Honolulu Combined Radar Approach Control manages the Radar Control Area that surrounds the Hawaiian Islands.

Types of Airspace

Controlled and Uncontrolled Airspace

As part of the National Airspace System, controlled and uncontrolled airspace is divided into six classes, depending on location, use, and degree of control. Pilots are also subject to certain qualification requirements, operating rules, and equipment requirements. Figure C-2 depicts the six classes of non-military airspace. A brief description of each class follows:

- The Open Ocean Area does not include Class A airspace, which includes airspace overlying the waters within 12 nautical miles (nm) of the coast.
- Class B airspace is generally that airspace surrounding the nation's busiest airports in terms of Instrument Flight Rules (IFR) operations or passengers boarding an aircraft. An air traffic control clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace.
- Class C airspace is generally that airspace surrounding those airports that have an operational control tower, are serviced by a radar approach control, and that have a certain number of IFR operations or passenger boardings.



EXPLANATION

- Temporary Operating Area (TOA)
- Radar Control Area
- Flight Information Region (FIR)
- Papahānaumokuākea Marine National Monument
- Oakland FIR and Oceanic Control (OC) Sector
- Honolulu Air Route Traffic Control Center Area
- Land

Note:
USAKA = U.S. Army Kwajalein Atoll
ARTCC = Air Route Traffic Control Center

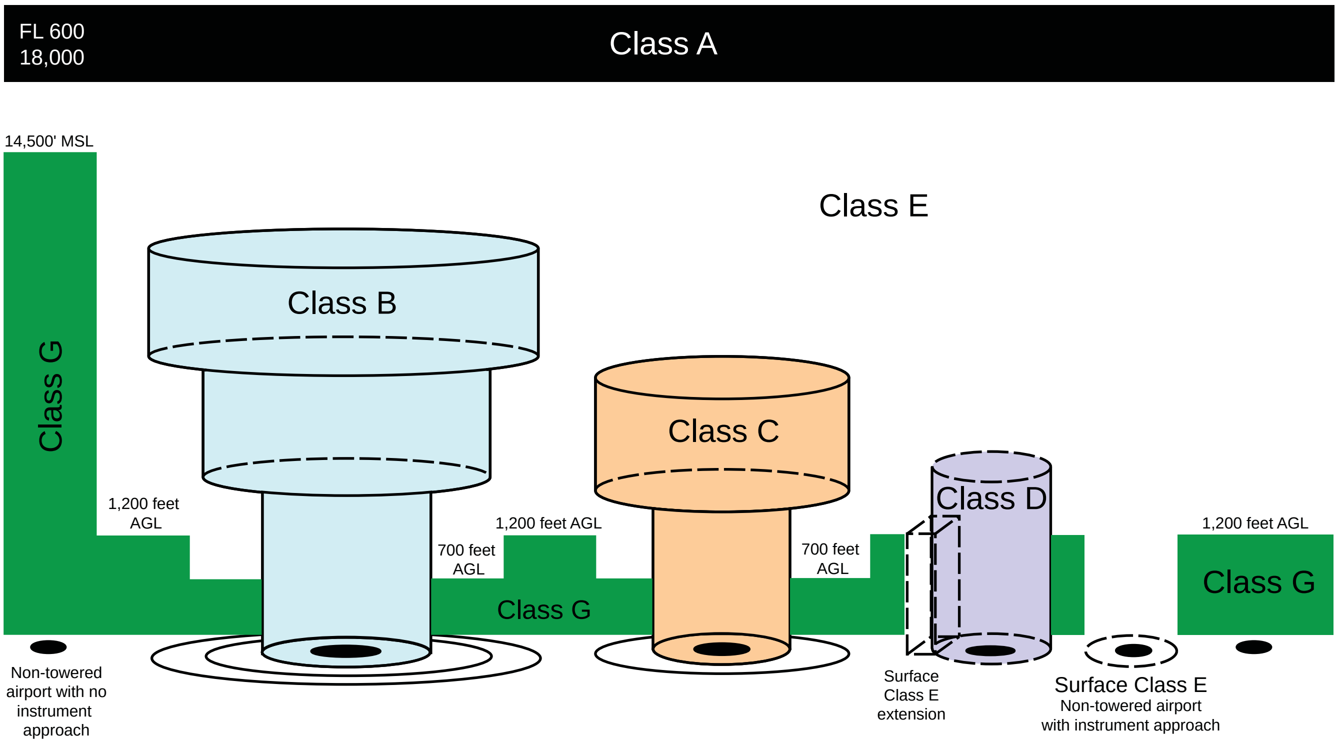
NORTH

0 300 600 1,200 Nautical Miles

Airspace Managed by Oakland and Honolulu Air Route Traffic Control Centers

Pacific Ocean

Figure C-1



Source: Federal Aviation Administration, 2002

EXPLANATION

AGL = Above Ground Level
FL = Flight Level
MSL = Above Mean Sea Level

The Six Classes of Non-Military Airspace

Figure C-2

- Class D airspace is generally that airspace surrounding those airports that have an operational control tower.
- Class E airspace is controlled airspace that is not Class A, Class B, Class C, or Class D airspace. Uncontrolled airspace, or Class G airspace, has no specific definition but generally refers to airspace not otherwise designated and operations below 1,200 ft above ground level. No air traffic control service to either IFR or Visual Flight Rules (VFR) aircraft is provided other than possible traffic advisories when the air traffic control workload permits and radio communications can be established.

Special Use Airspace

Complementing the classes of controlled and uncontrolled airspace are several types of special use airspace used by the military to meet its particular needs. Special use airspace consists of that airspace where activities must be confined because of their nature, or where limitations are imposed on aircraft operations that are not a part of these activities, or both. Except for controlled firing areas, special use airspace areas are depicted on aeronautical charts, IFR or visual charts, and include hours of operation, altitudes, and the controlling agency. Only the special use airspace found in the region of influence is described. For the open ocean area this includes Warning Areas, which are airspace that may contain hazards to non-participating aircraft in international airspace. Warning Areas are established beyond the 3-nm limit. Although the activities conducted within Warning Areas may be as hazardous as those in Restricted Areas, Warning Areas cannot be legally designated as Restricted Areas because they are over international waters (Aviation Supplies and Academics, Inc. 1996). For areas over and surrounding land and offshore areas this includes:

- Restricted Areas contain airspace identified by an area on the surface of the earth within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Activities within these areas must be confined, because of their nature, or limitations imposed upon aircraft operations that are not a part of these activities, or both. Restricted Areas denote the existence of unusual, often invisible, hazards to aircraft such as artillery firing, aerial gunnery, or guided missiles. Restricted Areas are published in the Federal Register and constitute Federal Aviation Regulation (FAR) Part 73.
- Warning Areas are airspace that may contain hazards to non-participating aircraft in international airspace. Warning Areas are established beyond the 3-nm limit. Although the activities conducted within Warning Areas may be as hazardous as those in Restricted Areas, Warning Areas cannot be legally designated as Restricted Areas because they are over international waters (Aviation Supplies and Academics, Inc., 1996). By Presidential Proclamation No. 5928, dated 27 December 1988, the U.S. territorial limit was extended from 3 to 12 nm. Special FAR 53 establishes certain regulatory warning areas within the new (3- to 12-nm) territorial airspace to allow continuation of military activities.

Other Airspace Areas

Other types of airspace include airport advisory areas, temporary flight restrictions areas, flight limitations and prohibitions areas, published VFR routes, and terminal radar service areas (National Aeronautical Charting Office, 2007).

Special Airspace Use Procedures

Other types of airspace, and special airspace use procedures used by the military to meet its particular needs, include air traffic control assigned airspace and altitude reservation (ALTRV) procedures. Both of these types of airspace are described below:

- Air Traffic Control Assigned Airspace (ATCAA), or airspace of defined vertical and lateral limits, is assigned by air traffic control to provide air traffic segregation between specified activities being conducted within the assigned airspace and other IFR air traffic. ATCAAs are usually established in conjunction with Military Operations Areas, and serve as an extension of Military Operations Area airspace to the higher altitudes required. These airspace areas support high altitude activities such as intercepts, certain flight test activities, and air refueling activities.
- ALTRV procedures are used as authorized by the Central Altitude Reservation Function, an air traffic service facility, or appropriate ARTCC, under certain circumstances, for airspace utilization under prescribed conditions. An ALTRV receives special handling from FAA facilities. According to FAA Handbook 7610.4H, Chapter 3, ALTRVs are classified as either moving or stationary, with the latter normally defining the fixed airspace area to be occupied as well as the specific altitude(s) and time period(s) the area will be in use. ALTRVs may encompass certain rocket and missile activities and other special activities as may be authorized by FAA approval procedures.

C.3 Biological Resources

Native or naturalized vegetation, wildlife, and the habitats in which they occur are collectively referred to as biological resources. Existing information on plant and animal species and habitat types in the vicinity of the proposed sites was reviewed, with special emphasis on the presence of any species listed as threatened or endangered by Federal or State agencies, to assess their sensitivity to the effects of the No-action Alternative, Alternative 1, Alternative 2, or Alternative 3.

OPNAVINST 5090.1B, Chapter 19, and the **Exercise RIMPAC Operations Order** advise commanding officers of requirements regarding the protection of Hawaii from the immigration of additional alien or invasive species.

- Wash downs: Surface ships shall routinely wash down anchors, chains, and appendages with seawater when retrieving them to prevent on board collection of sediment, mud and silt. When possible, following anchor retrieval, surface ships shall wash down chain lockers outside 12 nm from land to flush out sediment, mud, or silt.

  All equipment and unmanned vehicles to be placed in the ocean are to be clean and free of residual materials from prior use to avoid introduction of new species. For ships arriving from foreign ports, hulls of ships' small boats are to be cleaned of any marine growth (algae, barnacles, crustaceans, etc.) before placing them into ocean or harbor waters.

  Amphibious vessels launching and recovering amphibious vehicles shall ensure those vehicles, including their treads, are washed down after completion of operations. Ships shall dispose of wash water before entering 12 nm of the next operating area.

- Agricultural inspections: Inspection records may be provided upon arrival in Hawaii to Federal or State of Hawaii Department of Agriculture inspectors. Federal (U.S.) Department of Agriculture officials may inspect vessels pier side. State of Hawaii Department of Agriculture inspectors may be invited by the commanding officer to board U.S. flag vessels to assist with inspection of food stores, plants, and animals to ensure compliance with State animal quarantine laws.

  Foreign garbage is any food or food-related product, including containers, wrappers, plates, napkins, etc., from a foreign flag vessel or from a U.S. vessel for the first 24 hours after any U.S. Department of Agriculture boarding agents determine that all foreign stores have been expended. Foreign garbage is double-bagged in plastic bags, tied, and disposed in marked green dumpsters, separate from non-foreign garbage. The U.S. Department of Agriculture monitors foreign garbage dumpsters closely. Brown dumpsters are for non-foreign garbage.

- Brown tree snakes: No snakes are known to inhabit Hawaii. Commanding officers of all vessels and aircraft shall, prior to arrival in Hawaii, ensure that all stores originating from Australia and Guam are inspected for the brown tree snake. This inspection may be accomplished during on-loading of such stores or while underway. If any snake is sighted aboard a ship or aircraft entering Hawaii, the snake is to be restrained, contained, or killed and the snake retained until entry into Hawaii. Naval Station Pearl Harbor Security (911) is to be contacted, advised, and will take control of the snake for appropriate reporting to State Agriculture authorities.

- Ballast water: If it is necessary for a surface ship to load ballast water in an area that is either potentially polluted or within 3 nm from shore, the ship shall pump the ballast water out when outside 12 nm from shore and twice fill the tank(s) with clean sea water and pump prior to the next entry within 12 nm from shore. Surface ships will effect a ballast exchange twice in clean water, even if ballast water was pumped out before exiting the polluted waters or 3 nm limit, since residual water remaining in a tank after emptying it may still contain unwanted organisms that could be transferred during the next ballasting evolution. Ballast water exchange is not required during local operations or when reentering within 12 nm in the same locale as the ballast water was initially loaded.

The **Endangered Species Act** of 1973 (ESA) (16 U.S.C. 1531-1544, 87 Stat. 884, as amended) requires the U.S. Fish and Wildlife Service (USFWS) to identify plant and animal species that are threatened or endangered since "…various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation; other species of fish, wildlife, and plants have been so depleted in numbers that they are in danger of or threatened with extinction; these species of fish, wildlife, and plants are of aesthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people; the United States has pledged itself as a sovereign state in the international community to conserve to the extent practicable the various species of fish or wildlife and plants facing extinction…" Federal agencies are required to assess the effect of any project on threatened and endangered species under Section 7 of the ESA.

The **Migratory Bird Treaty Act** (16 U.S.C. 703-712) protects many species of migratory birds. Specifically, the act prohibits the pursuit, hunting, taking, capture, possession, or killing of such species or their nests and eggs. On December 2, 2003, the President signed the 2003 National Defense Authorization Act. The Act provides that the Secretary of the Interior shall exercise his/her authority under the Migratory Bird Treaty Act to prescribe regulations to exempt the Armed Forces from the incidental taking of migratory birds during military readiness activities authorized by the Secretary of Defense.

Congress defined military readiness activities as all training and activities of the Armed Forces that relate to combat and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Routine installation operation, industrial activities, and construction or demolition of facilities used for these purposes are not considered military readiness activities. Migratory bird conservation relative to non-military readiness activities is addressed in a Memorandum of Understanding (signed 31 July 2006) developed in accordance with Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (10 January 2001).

The final rule authorizing the Department of Defense to take migratory birds during military readiness activities (50 CFR Part 21) was published in the Federal Register on 28 February 2007. The rule states that the Armed Forces must confer and cooperate with the USFWS on the development and implementation of conservation measures to minimize or mitigate adverse effects of a military readiness activity if it determines that such activity may have a significant adverse effect on a population of a migratory bird species.

An activity will be determined to have a significant adverse effect when it is found within a reasonable period of time to diminish the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem.

The **Marine Mammal Protection Act** (16 U.S.C. 1361, et seq.) gives the USFWS and National Marine Fisheries Service (NMFS) co-authority and outlines prohibitions for the taking of marine mammals. A take means to attempt as well as to actually harass, hunt, capture, or kill any marine mammal. Subject to certain exceptions, the Act establishes a moratorium on the taking and importation of marine mammals. Exceptions to the taking prohibition allow USFWS and NMFS to authorize the incidental taking of small numbers of marine mammals in certain instances.

The **Magnuson-Stevens Fishery Conservation and Management Act** (Public Law 94-265) (16 U.S.C. 1801-1882, April 13, 1976, as amended) requires that Federal agencies consult with NMFS on activities that could harm Essential Fish Habitat (EFH) areas. EFH refers to “those waters and substrate (sediment, hard bottom) necessary to fish for spawning, breeding, feeding or growth to maturity.”

Executive Order (EO) 13089 Coral Reef Protection (63 FR 32701) and subsequent guidance documents from the Department of Defense (DoD) and the Navy were issued in 1998 “to preserve and protect the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems and the marine environment.” It is DoD policy to protect the U.S. and International coral reefs and to avoid impacting coral reefs to the maximum extent possible. No concise definition of coral reefs has been promulgated, with regard to regulatory compliance of EO 13089. In general, coral reefs consist of tropical reef building Scleractinian and Hydrozoan corals, as well as calcified Octocorals in the families Tubiporidae and Helioporidae, non-calcified

Octocorals (soft corals) and Gorgonian corals, all growing in the 0 to 300 feet (ft) depth range. Deep water (300 to 3,000 ft depth range) precious corals and other deep water coral communities will only be considered in the case of a Sinking Exercise, where a vessel might ultimately land on a deep water coral community.

The **National Marine Sanctuaries Act** (NMSA) 16 U.S.C. § 1431 et seq. authorizes the Secretary of Commerce to designate as National Marine Sanctuaries areas of the marine environment that possess conservation, recreational, ecological, historical, research, and educational, or aesthetic resources and qualities of national significance, and to provide a comprehensive management and protection of these areas. To protect the area designated, any Federal action that is likely to destroy, cause the loss of, or injure a sanctuary resource must consult with the Secretary of Commerce prior to commencement of the action and adhere to reasonable and prudent alternatives set by the Secretary of Commerce. To the extent practicable, consultation may be consolidated with other consultation efforts under other Federal laws, such as the Endangered Species Act.

The NMSA allows the Secretary to issue regulations for each sanctuary designated and the system as a whole that, among other things, specify the types of activities that can and cannot occur within the sanctuary. The Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) was signed into law in November 1992. The Final EIS/Management Plan was released in March 1997, and the final rule was published in November 1999. Activities allowed within the Sanctuary are all classes of military activities, internal or external to the Sanctuary, that are being or have been conducted before the effective date of the regulations, as identified in the Final EIS/Management Plan. The sanctuary includes specific areas from the coast of the Hawaiian Islands seaward to the 100-fathom isobath.

Under the HIHWNMS regulations, military activities are allowed within the sanctuary and are not subject to vessel/aircraft approach distances, discharge of materials prohibitions within the sanctuary, and consultation requirements if they are “classes of military activities, internal and external to the Sanctuary, that are being or have been conducted before the effective date of these regulations, as identified in the Final Environmental Impact Statement/Management Plan.” If the military activity is proposed after the official date of the regulations, then the activity is also an allowable activity but subject to prohibited activities provision under §922.184 (i.e., vessel/aircraft approach to humpback whale provisions, discharge of materials, etc.) unless the military activities are not likely to destroy, cause the loss of, or injure any sanctuary resource. Finally, any military activity that is subsequently modified in a way that causes the activity to be “likely to destroy, cause the loss of, or injure a Sanctuary resource in a manner significantly greater than was considered in previous consultation” is treated as a new military activity for which consultation may be necessary.

Exhibit C-1 is Appendix F of the 1997 HIHWNMS Final EIS/Management Plan. Exhibit C-2 is the “Report on Military Activities in Hawaiian Waters” provided by the Navy to the Department of Commerce. Exhibit C-3 is Navy/NOAA Memorandum of Understanding Concerning Military Activities and the HIHWNMS.

Hawaiian Islands Humpback Whale National Marine Sanctuary

Appendix F: Military Activities in Hawaii

Appendix F

LIST OF MILITARY ACTIVITIES IN HAWAII

This compilation of classes of military activities conducted in Hawaiian waters has been divided into "near-shore" and "open ocean" categories. Near-shore operations are those which are conducted within the 100-fathom isobath proposed for inclusion in the sanctuary. Open ocean operations are those additional types of operations which are normally (but not always) conducted outside the 100-fathom isobath. These operations have been included because they are at times conducted near or inside the 100-fathom isobath. Theses classes of military activities near Hawaii are conducted by all the military services of the United States and, during combined operations, by military units from cooperating foreign nations or the State of Hawaii Department of Defense/National Guard.

I. SURFACE OPERATIONS

A. Near shore operations include, but are not limited to:

1. Pierside training and maintenance.
2. Dry-docking operations at Pearl Harbor.
3. Harbor movements by ships, submarines, boats and auxiliary craft.
4. Anchoring
5. Transit operations between harbors and operating areas (OPAREAS).
6. Salvage and towing operations.
7. Anti-submarine warfare (ASW) operations involving the use of sonar and expendable bathythermographs. Recoverable torpedoes are sometime used.
8. Amphibious warfare operations including the blasting of amphibious ships and the movement to the beach of landing craft, landing craft air cushion (LCAC), amphibious assault vehicles (AAV), ship's boats, special United States Marine Corps (USMC) "Boston Whaler" or "Zodiac" type special operations craft, and helicopters. Can involve the landings and take off of Harrier jets from a variety of amphibious ships.
9. Anti-surface warfare operations against ships and small boats
10. Special operations training involving swimmers and small boats
11. Explosive Ordnance Disposal (EOD) operations and training involving the use of explosives for demolition.
12. Mine warfare and mine counter-measure (MCM) operations involving the use of sonar, towed mine sweeping devices, the implantation of drill moored and bottom mines, and the firing of machine guns and small arms at floating targets.
13. Equipment and personnel drops from fixed wing and helicopter aircraft associated with re-supply, insertion, search and rescue and training.

B. Open ocean operations include, but are not limited to:

1. Transit operations between OPAREAs
2. Engineering, navigation, seamanship, and general warfare-related training exercises.
3. Towing operations.
4. Anti-submarine warfare operations involving the use of sonar, expendable bathythermographs , towed arrays and training torpedoes.
5. Amphibious warfare operations involving the blasting of ships over the horizon launch, recovery, and movements of LCAC and USMC/Seal special operations craft and low-flying helicopter and Harrier jet operations.
6. Anti-surface warfare operations involving high-speed maneuvering, the actual firing of guns and missiles at targets, calibration firing of guns and the launching of self-protective chaff.

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Exhibit C-1. Appendix F of the 1997 Hawaiian Islands Humpback Whale National Marine Sanctuary Final EIS/Management Plan

7. Anti-air warfare operations involving the actual firing of guns and missiles at target craft and the launching of self -protective chaff and flares.
8. Replenishment operations to vessels underway involving the transfer of both supplies and fuel via wire and transfer of supplies by low-flying helicopters.
9. Supersonic flight above 5,000 feet and outside 25 miles from land.

II. <u>SUBSURFACE OPERATIONS</u>

A. <u>Near-shore operations</u> including, but are not limited to:

1. Transit operations to and from ports and OPAREAs.
2. Post maintenance shallow water divers.
3. Shallow water ASW and anti-ship operations, which include the expenditure of non-recoverable sonobuoys and smoke markers.
4. Torpedo exercises using retrievable non-explosive torpedoes.
5. Mine warfare training during which submarines traverse through a field of bottom-moored practice mines, using active sonar to detect and avoid mines.
6. ASW target services for ships and aircraft, which include the expenditure of non-recoverable sonobuoys and smoke markers and use of sonar and towed arrays.
7. Special operations involving swimmers operating from submerged submarines and supported by small boats.
8. Mine warfare training which includes the launching of recoverable exercise (inert) mines.

B. <u>Open ocean operations including, but not limited to:</u>

1. Transit operations at a variety of depths
2. Deep water dives and surfacing
3. Deep water ASW and anti-submarine/ship warfare operations involving the use of sonar, expendable bathythermographs, towed arrays, and training torpedoes.

III. <u>AIR OPERATIONS</u>

A. Near-shore operations including, but not limited to:

1. Landing and takeoffs by helicopters, fixed-wing aircraft and target drones from shore bases
2. Landings, takeoff and training flights at altitudes above 50 feet by helicopters from ships.
3. Training flights and transfers of personnel and equipment by helicopters and fixed-wing aircraft at altitudes above 50 feet. Low flying tactical helicopter and fixed-wing aircraft training flights (single and multi-ship, day, night unaided and Night Vision Goggle (NVG) training) often involve terrain-following and Nap Of the Earth (NOE) flight over or near the island and shorelines, as well as, flight in published FAA transitions below controlled airspace and flight traffic patters over water.
4. Air assaults by helicopters from amphibious ships at altitudes above 50 feet.
5. ASW operations from patrol (P-3) aircraft and helicopters, against actual submarines or mobile target at altitudes from 50 to 16,000 feet. Inert mines and missiles, non-retrievable sonobuoys and smoke markers and retrievable torpedoes are discharged into the water, Helicopters may use dipping sonar.
6. Bombing and missile firing exercises by fixed-wing aircraft of attack helicopters using surface target or Kaula rock.
7. Insertion/extraction of special forces/USMC Force Reconnaissance (RECON) troops from helicopters and fixed-wing aircraft into the water.

B. <u>Open ocean operations including:</u>

1. Aircraft carrier air operations.

Exhibit C-1. Appendix F of the 1997 Hawaiian Islands Humpback Whale National Marine Sanctuary Final EIS/Management Plan (Continued)

2. Air combat maneuvering.
3. Live missile firings by aircraft versus target drones.
4. Live bombing, gunnery, and missile firings versus surface targets.
5. Low flying tactical helicopter and fixed-wing aircraft flights (single and multi-ship day, night unaided and NVG) transiting between island training areas at altitudes between 200 and 500 feet.
6. Emergency fuel dumping above 5,000 feet.
7. Air to air warfare operations involving the actual firing of guns and missiles at target craft and the launching of self-protective chaff and flares.
8. Supersonic flight above 5,000 feet and outside 25 miles of land.

OPERATIONS BY LOCATION

I. AREAS WITHIN ORIGINAL SANCTUARY BOUNDARIES:

A. PENGUIN BANK. Located southeast of Oahu, and southwest of Molokai, in the Kaiwi Channel. This is the areas of primary concern within the original sanctuary boundaries. Submarines conduct post-overhaul shallow- water dives in the vicinity of Penguin Bank. The area is also used for shallow-water ASW operations.

1. All Submarines completing any major repair work are required to conduct initial submerged testing in shallow water. The loss of USS THRESHER on sea trials generated the requirement to conduct initial submerged testing in shallow water to ensure that if the submarine has a casualty during the testing, and sinks to the ocean floor, the crew can be rescued. It is necessary to conduct initial testing close to shipyards facilities in case an unscheduled return to port is required for repairs. Penguin Bank is the only shallow water areas in Hawaiian water suitable for these required test.

2. Shallow-water ASW exercises involving surface ships and submarine, using low power active sonar transmissions, are conducted in the area to take advantage of the unique characteristics of shallow water. These exercise last from two to five days and result in the use of sonobuoys, smoke floats, expendable bathythermographs, and submarine-launched exercise (inert) torpedoes. This training cannot be conducted in deep water.

3. Submarines conduct mine warfare training at Penguin Bank. These exercises involve the submarines and small craft. The submarines practice implanting inert mine shapes, which are later recovered by small craft. This training cannot be conducted in deep water.

B. KAHOOLAWE. Operational training no longer conducted on Kaho'olawe. Helicopter operations occur regularly to and from the Navy bases camp for logistic purposes in support of the impending unexplored ordnance clean up. In addition helicopter flights will occur throughout the island for required aeromedical evacuation purposes. Landing craft are occasionally used to introduce or remove supplies and heavy equipment. Construction a pier is planned. The waters surrounding the island are not suitable for use by the public due to the presence of undetermined amounts of unexplored ordnance.

C. MAUI, MOLOKAI AND LANAI. With increased emphasis on littoral warfare, and the need to conduct training in shallow water, the waters adjacent to Maui, Molokai, and Lanai are important training areas for Navy ship home ported in Pearl Harbor. The channel between, Maui, Lanai and Molokai is extensively used for the biennial RIM PAC exercise as an EOD/MCM exercise area as well as for shallow-water ASW. Port visits are frequently conducted in Lahaina, Maui. Salvage ship and diving operations are frequently conducted.

1. The areas inside the 100 fathom isobath surrounding Maui, Molokai, and Lanai, and specifically the channel between this island, is used for shallow water ASW operations. These operations include

Exhibit C-1. Appendix F of the 1997 Hawaiian Islands Humpback Whale National Marine Sanctuary Final EIS/Management Plan (Continued)

using low-power active sonar transmissions, sonobuoys, smoke floats, expendable bathythermographs, and exercise (inert) torpedoes.

2. This channel is also used for MCM training, including the use of bottom-moored practice (inert) mines, sonar, towed mine sweeping device and MCM surface ships.

3. The recent installation of the Hawaiian Area Tracking System (HATS) southeast of Lanai provides an excellent passive acoustic range for shallow water exercise torpedo firings. Exercise torpedo firings(non-explosive) are conducted with HATS range control utilizing a helicopter for range safety.

4. The waters surrounding Molokai are used by the Marines and the U.S. Army: USMC day/night helicopter operations focus predominantly in the area around Molokai, which is their only effective local night vision goggle (NVG) training area. These flights take place at altitudes above 50 feet. The U.S. Army also uses the Molokai training area (day, night unaided and NVG), and conducts flights in and around the shorelines of Maui and Molokai for low level training and for transit routes between Oahu and the major Army tactical training area on the island of Hawaii, Pohakuloa Training Area.

D. KAUAI. Few operations occur in the small area north of Kauai originally included in the sanctuary. Air operations sometime occur over this area, and transit operations sometime occur through it.

II. ADDITIONAL AREAS PROPOSED FOR INCLUSION:

A. KAUAI. A significant concern over the proposed inclusion of the remaining waters inside the 100- fathom isobaoth surrounding Kauai is the potential impact upon operations at the PMRF, located on Kauai. Operations below are subdivided by those occurring inside the 100-fathom isobath area proposed for inclusion, and those normally occurring outside it.

1. Operations inside the proposed sanctuary boundaries.

a. Airspace. The airspace above the 100-fathom isobath is frequently used by P-3 aircraft operating against actual submarines or mobile targets. Operations take place from 50 to 16,000 feet. Inert mines and missiles are discharged into the water. Other exercise material discharged includes non-retrievable smoke markers and sonbuoys, and retrievable torpedoes. Occasionally, due to equipment malfunction, retrievable torpedoes are lost at sea. Target drones are launched from PMRF through coastal airspace, Helicopter operations are conducted frequently in the near-shore area.

b. Surface. Amphibious exercises, involving landing craft, LCAC, and AMTRACs, are regularly conducted on the beaches at PMRF. Target recovery boasts pass through proposed sanctuary waters enroute to and from pick-ups. Missile and gun life firing exercises using air, subsurface and surface targets occur in area R-3101, a fully instrumented range which extends three nautical miles seaward from the western cost of Kauai, a portion of which is inside the 100-fathom isoboath. Area R-3101 also serves as an aerial target recovery area.

c. Subsurface. In addition to operations with P-3 aircraft, submarines conduct torpedo exercises using retrievable torpedoes, and mine warfare training. Submarine traverse through a field of bottom-moored mines, using active sonar to detect and avoid mines. During the course of these exercises, submarines discharge non-retrievable bathythermographs.

2. Operations adjacent to proposed sanctuary boundaries.

a. Airspace:

Exhibit C-1. Appendix F of the 1997 Hawaiian Islands Humpback Whale National Marine Sanctuary Final EIS/Management Plan (Continued)

(1) Warning Area W-186 Special use airspace over open ocean located westward to northeastward of Kauai, and commencing at the border of R-3101, three nautical miles west of Barking Sands. Airspace extends from the surface to 9000 feet. W-186 is used for live missile, bomb, rocket, gunnery and torpedo exercises.

(2) Warning Area W-188. Special use airspace over open ocean located westward to northeastward of Kauai, and commencing at the border of R-3101, three nautical miles west of Barking Sands. The airspace extends from the surface to unlimited altitude and encompasses an operating area of approximately 42,000 square miles. W-188 is used for missile, rocket, gunnery, and torpedo exercises in support of fleet training and PMRF activities. The M-2, M-3, and M-4 portions of W-188 are a fully instrumented missile firing range with command and control, surveillance, tracking and telemetry services and data reduction services provided by and located at PMRF.

b. Surface: The surface of areas W-186 and W-188 encompass 41,000 square nautical miles, and are subdivided into eight operating areas for surface ships. Air, surface and underwater exercises using conventional ordnance of all types are conducted.

c. Subsurface:

(1) Barking Sands Tactical Underwater Range (BARSTUR): This range provides 80 square nautical miles of underwater tracking coverage in M2 of W-188, commencing seven nautical miles west of Kauai. The rage extends from the ocean floor to the surface. BARSTUR is used to evaluate ASW and anti-surface (ASU) warfare exercises and tactics and to track torpedo firings and submarines. The underwater and shore-based instrumentation at BARSTUR provides the capability to conduct ASW and ASU warfare training in an instrumented environment, which permits evaluation of the effectiveness of the tactics employed and the performance of weapons systems.

(2) Barking Sands Underwater Ranges Expansion (BSURE): This range is adjacent to BARSTUR and underlies M-4 in W-188. The range expands the underwater tracking area to approximately 800 square nautical miles, and extends from the ocean floor to the surface, BSURE is used to evaluate ASW and ASU exercises and to track torpedo firing and submarines.

B. OAHU

1. Operations inside proposed sanctuary boundaries.

a. Airfields generally. Low level day/night helicopter operations are conducted in accordance with published Federal Aviation Administration (FAA) routes/procedures and Honolulu approach control instructions for the various controlled and uncontrolled military and civilian airfields an the island of Oahu and the outer islands. FAA transition routing and/or training requires flight in and around the shorelines of Oahu at or below 500 feet.

b. Pearl Harbor. Operations within and near Pearl Harbor are primarily limited to transit operations, anchorages, ammunition on/off loads, maintenance, dry-docking, and pierside training.

c. Bellows Air Force Station. USMC and Navy special forces frequently use beaches at Bellow and adjacent water for amphibious operations. These exercises involve landing craft, LCAC, AAV, submarines with associated swimmer delivery vehicles and support craft, and small boat landings, as well as low level overflights by helicopters. The AMTRACs transit Kailua and Waimanalo Bays enroute to Bellows.

Exhibit C-1. Appendix F of the 1997 Hawaiian Islands Humpback Whale National Marine Sanctuary Final EIS/Management Plan (Continued)

d. NAS Barbers Point. P-3 and other aircraft frequently overfly coastal water at low level on approach and takeoff. Helicopters and fixed wing aircraft overfly coastal waters at low level on approach and takeoff and during helicopter closed traffic operations south of the main runway.

e. Kaneohe Bay. Helicopters and fixed wing aircraft overfly coastal waters at low level on approach and take off. Small boats operate in the harbor.

f. Camp Smith Training Facility. Located in Ewa, just east of NAS Barbers point. Company-sized small boat raid exercises are conducted semiannually. These operations involve over the horizon launchings of small boats, which transit to and land on the beach.

g. Waianae Coast

(1) FORACS Range. Submarines conduct Fleet Operational Readiness Accuracy Check and Site (FORACS) operations off the Waianae coast to calibrate their sensors. These operations consist of slowly proceeding in a specified course and measuring sensor bearings to a sound source of known positions. The sound source is located within the 100-fathom isobath, as is a portion of the FORACS range.

(2) Dry-Deck Shelter (DDS) Operations. Submarines conduct dry-deck shelter operations in the leeward waters west of Oahu involving launching/retrieving of swimmers, swimmer delivery vehicles, and support craft from surfaced and submerged submarines.

(3) Pokai Bay. USMC parachute operations involving water landings are conducted on a quarterly basis at Pokai Bay, off Makua. These operations include personnel and small boat insertions, and include the dropping of non-recoverable smoke flares.

(4) Makua Valley Military Reservation. Army helicopter conduct frequent low level flights (200-500 feet) along the coast enroute from Wheeler AAF (from the north via Dillingham and Kaena Point or from the east via Kolekole Pass and NAVMAG Lualualel) and from NAS Barbers Point supporting air assault training and fire buckets operations. Makua Valley is inaccessible by air from the north, east and south due to the proximity of the Waianae mountains. It affords the only company level live fire training area on Oahu

h. Dillingham Airfield. Dillingham, the adjacent uncontrolled airspace on/off shore, and the published military helicopter training route are used extensively for night unaided and NVG training. Helicopters routinely overfly coastal water at low level during approach, takeoff, closed traffic operations, and air assault training at the Army training area abutting Dillingham.

i. A-311. Army helicopters frequently conduct day/night low level training flights between Wheeler AAF and the primary tactical training area on Oahu, alert area A-311. Adverse weather (low ceilings over the western edge of the Kahuku mountain range) often requires aircraft to divert, low level (200 to 500 feet) seaward of the North Shore enroute to A-311.

2. Operations adjacent to proposed sanctuary boundaries: The ocean areas and airspace north and south of the island of Oahu are divided onto a number of special operating areas in which live conventional ordnance firings are routinely conducted by surface ships and aircraft. Air tactics training is also routinely conducted at altitudes above 200 feet.

C. KAULA ROCK. An unattended/non instrumented target approximately 52 nautical miles southwest of Kauai. Kaula Rock is an island with an area of .7 by .5 nautical miles upon which inert ordnance may be expended on the first 1000 feet of the southeast tip. Air to ground training exercises expend inert conventional ordnance and night illumination devices. Oahu-based Army helicopters occasionally conduct

Exhibit C-1. Appendix F of the 1997 Hawaiian Islands Humpback Whale National Marine Sanctuary Final EIS/Management Plan (Continued)

aerial gunnery training at Kaula Rock (W-187/R-3107). Operations entail open ocean and near-shore, low level, tactical flight (200-500 feet) enroute, and the expenditure of inert air-to-ground missiles and rockets on site.

D. HAWAII (ISLAND). Few operations occur inside the 100-fathom isobath surrounding Hawaii. Army and USMC helicopter operations regularly occur over the island, primarily in support of military exercises at the Pohkuloa Training Area (PTA) in the center of the island between the volcanoes, and enroute to/from home bases on Oahu. Navy and Army landing craft frequently on/off load supplies and equipment at Kawaihae Bay (Kawaihae docks) in support of military training at PTA. Navy ships conduct periodic port visits at Hilo and Kona.

GLOSSARY

AAF .... Army airfield
AAV .... Amphibious assault vehicles
AMTRACs .... Amphibious-tracked landing vehicles
ASU .... Anti-surface
ASW............................ Anti-submarine warfare
BARSTUR.................... Barking Sands Tactical Underwater Range
BSURE .... Barking Sands Underwater Range Expansion
DDS .... Dry deck shelter
EOD .... Explosive ordnance disposal
FORACS...................... Fleet Operational Readiness Accuracy Check and Site
LCAC.......................... Landing craft, air cushion
HATS .... Hawaiian area tracking system
MCM........................... Mine counter-measure
NAS .... Naval air station
NAVMAG .... Naval Magazine
NVG............................ Night vision goggles
P-3 .... Patrol aircraft
RECON........................ Reconnaissance
RIMPAC...................... Rim of the Pacific (Specific multi-national exercise)
OPAREAs .... Operating areas
PMRF.......................... Pacific Missile Range Facility, Barking Sands, Kauai
USMC .... United States Marine Corps

Exhibit C-1. Appendix F of the 1997 Hawaiian Islands Humpback Whale National Marine Sanctuary Final EIS/Management Plan (Continued)

GENERAL COUNSEL OF THE NAVY
WASHINGTON, D.C. 20350-1000

April 21, 1995

Terry Garcia, Esq.
General Counsel
National Oceanic and Atmospheric
Administration
Herbert Hoover Office Building
14th and Constitution Avenue, N.W.
Washington, D.C. 20230

Dear Mr. Garcia:

I am pleased to provide you with the Department of the Navy's response to NOAA's request for additional information on military activities in and around Hawaii. These materials supplement the information that we previously have provided, both in Washington and in earlier discussions and briefings that have taken place in Hawaii. We are confident that your staff's review of these materials will confirm that the military services are conducting their existing classes of military activities in Hawaii in a manner that is consistent with the humpback whale sanctuary as proposed. We should be able to conclude the remaining issues on the MOU and minor revisions in the regulations in short order once we have agreement about existing classes of military activities. If you or your staff have any further questions, please do not hesitate to call me. I look forward to fully resolving this matter as soon as possible.

Sincerely,

Steven S. Honigman

Exhibit C-2. Report on Military Activities in Hawaiian Waters

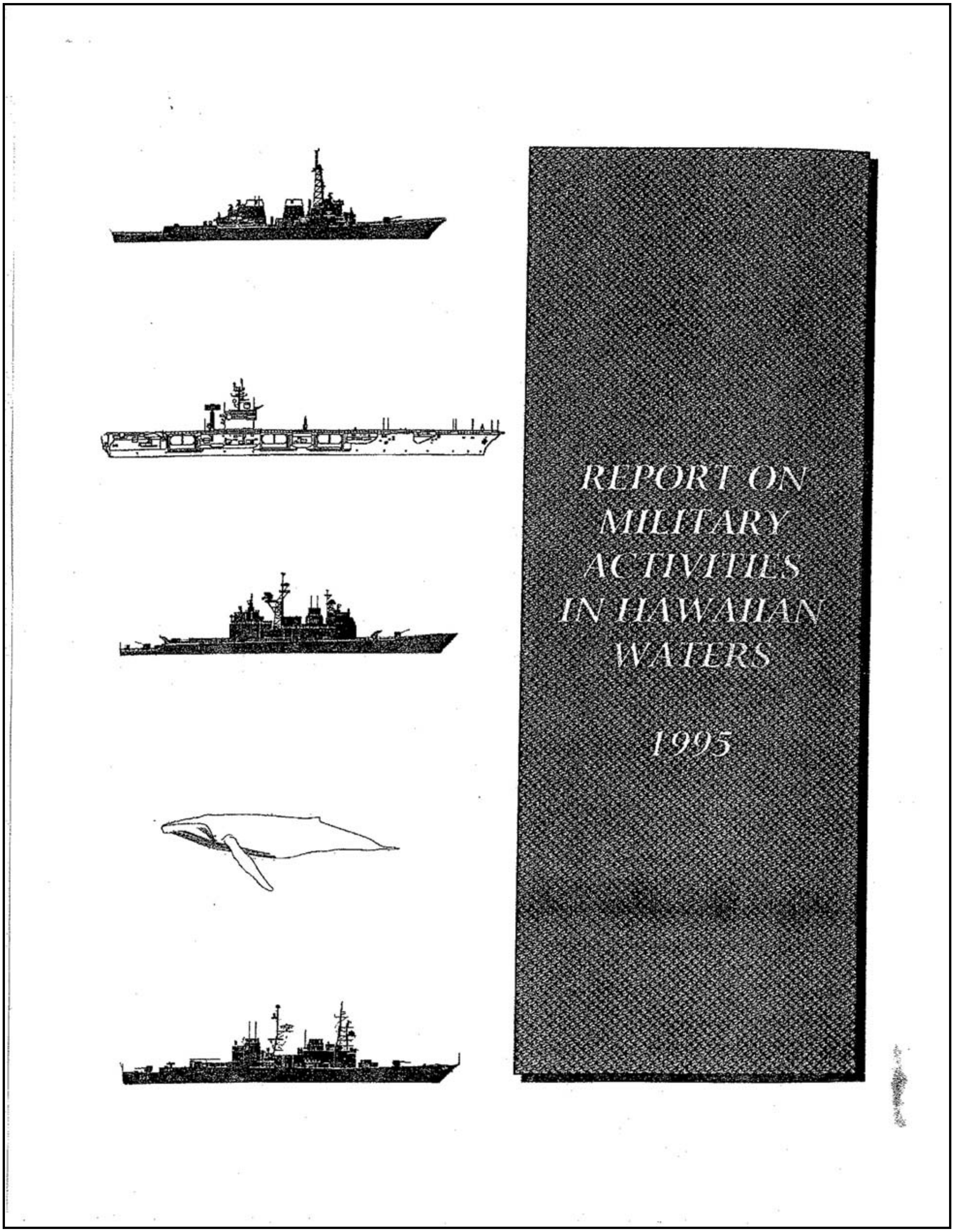

Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

Report on Military Activities in Hawaiian Waters

April 21, 1995

This information is provided at the request of NOAA to supplement the information on military activities currently undertaken in and around the Hawaiian Islands. It supplements the information on military activities previously provided either in writing or in a series of briefings and meetings between Department of the Navy and Department of Commerce officials in Hawaii and in Washington, D.C. beginning in early 1994 concerning establishment of the Hawaiian Islands Humpback Whale National Marine Sanctuary. As requested, for Categoy ! activities, a general description of potential effects on the humpback whale is provided. For Category II, a description of the activity, the location of the activity, the potential effects on the humpback whale and mitigative measures, are provided.

Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

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GENERAL SUMMARY OF THE POTENTIAL EFFECTS TO SANCTUARY RESOURCES OF CATEGORY I AND II MILITARY ACTIVITIES

SURFACE OPERATIONS - CATEGORY I

1. Pierside Training and Maintenance (Inside 100 Fathom Isobath). Pierside training and maintenance have few potential effects on humpback whales and the risk of their occurring is virtually nonexistent. Most such training and maintenance is conducted at Pearl Harbor and humpback whales have not been sighted within the harbor.

a. This class of activities results in very few effects of any kind in the harbor. The activities conducted by the Navy are generally no different than those conducted at the Honolulu Shipyard and the commercial piers at Sand Point Island. Vessel discharges are restricted or piped to treatment systems ashore and nothing likely to harm a humpback whale is discharged. Vessel movements occur at very slow speeds with extra watches set. The presence of a humpback whale in the harbor would be quickly detected and protective action taken.

b. The potential for harm from a fuel spill also poses no real risk to humpback whales. When vessels are pierside, they have oil spill booms surrounding them to keep any minor spills from spreading or from being flushed from Pearl Harbor. Naval personnel complete prescribed training to qualify to transfer fuel internally or to participate in external fueling operations. Additionally, Navy directives require naval activities to have spill prevention and emergency response plans for ships and shoreside activities. Plans for shoreside activities meet state standards applied to private activities. Commander Naval Base Pearl Harbor has a permanently assigned Navy On Scene Coordinator (NOSC) whose responsibility is to immediately respond to and clean up any spills that exceed the capacity of the individual vessel. NOSCs train closely with the U.S. Coast Guard to ensure that they meet the requirements of the Oil Pollution Act of 1990 and that a rapid, successful response is achievable. Finally, Navy fuel is a lighter, more highly refined fuel than used by most commercial vessels and would either evaporate or dissipate quickly even if it were spilled. Thus it is unforeseeable that a quantity of oil sufficient to harm a humpback would be released.

c. Additionally, all activities on or about the piers are conducted in accordance with Navy safety instructions and OSHA, as applicable, ensuring the safe handling of petroleum products and potentially hazardous materials.

2. Dry Docking Operations at Pearl Harbor. Dry dock operations at Pearl Harbor will have no harmful effects on humpback whales, direct, indirect or cumulative.

a. No whales have been observed in Pearl Harbor, the only location of Navy drydocks. The use of the drydocks at the Pearl Harbor Naval Shipyard involves placing a vessel inside the drydock and pumping the water from inside the dock back into Pearl Harbor. When maintenance is completed, to avoid contamination/pollution, the dry-docks are cleared of foreign materials before the dock is reflooded.

Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

b. The use of the floating drydock at SUBASE Pearl Harbor is very similar except that the drydock itself floats up to raise the vessel to be maintained out of the water. Foreign materials are cleared before the dock is sunk to refloat the vessel.

3. Harbor Movements by Ships, Submarines, Boats and Auxiliary Craft. Harbor movements at Pearl Harbor, MCAS Kaneohe and other Navy harbors will have no harmful effects on humpback whales, direct, indirect or cumulative.

a. No whales have been observed in Navy harbors in Hawaii. Movement of vessels in harbors is similar to that done by private and commercial vessels. The speed and maneuvering of vessels, however, is even more carefully controlled within the confines of the harbor since all traffic is under the control of the Navy.

b. For ships and submarines special watches are posted to ensure adequate lookouts are in position and the most experienced crews are maneuvering the vessels. Before qualifying as lookouts, individuals must receive special training regarding visual positioning reports and required reports to the maneuvering bridge to avoid collisions and other hazards to either the vessel or marine mammals. Boats and auxiliary vessels use trained coxswains and boatswain mates to ensure that only qualified individuals are permitted to maneuver these smaller craft.

4. Anchoring. Anchoring operations for Navy ships within the 100 fathom isobath will have no harmful effects on humpback whales, direct, indirect or cumulative. Despite having conducted anchoring in Hawaiian waters for many years, there have been no indications that such operations have had any effect on humpback whales.

a. With rare exception, naval vessels only anchor within designated anchorage areas. The only real potential risk to humpback whales is collision. Special "sea and anchor details" (watches) are posted to ensure additional lookouts are in position and the most experienced crews are maneuvering the ships. Before qualifying as lookouts, individuals must receive special training regarding visual positioning reports and required reports to the maneuvering bridge to avoid collisions and other hazards to either the vessel or marine mammals. During the actual anchoring, the vessels are operating at extremely slow speed to ensure accurate positioning during the evolution. Ships at anchor operate small boats and continue to operate ship's systems, but these pose few risks for humpback whales. There are no discharges from ships at anchor that pose any risk to humpback whales.

b. Additionally, commanding officers have been directed to avoid harming humpback whales and will take appropriate corrective action. Chief of Naval Operations Instructions, Operational Orders from the Third Fleet Commander and a handbook from Commander Naval Surface Group Middle Pacific (Hawaii area) reiterate the requirements of the Marine Mammal Protection Act (MMPA) not to harm, harass or threaten any marine mammal. The handbook goes further and provides guidance that reiterates the prohibitions in 50 CFR 222.31.

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Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

5. Transit Operations Between Harbors and Operating Areas (Within the 100 Fathom Isobath). Transit operations between harbors and operating areas pose a very low risk of potentially harmful effects on humpback whales, direct, indirect or cumulative. Despite having conducted countless ship transits from harbor to operations areas for many years, there have been no indications that such operations have had any effect on humpback whales in Hawaiian waters.

a. There have been no collisions or observable effects on whales. There is, however, a remote possibility of collision with a whale. Special "sea and anchor details" (watches) are posted to ensure adequate lookouts are in position and the most experienced crews are maneuvering the ships until the ship reaches either the operating area or the open ocean. Before qualifying as lookouts, individuals must receive special training regarding visual positioning reports and required reports to the maneuvering bridge to avoid collisions and other hazards to either the vessel or marine mammals.

b. Commanding officers have been directed to ensure their operations do not harm humpback whales. Chief of Naval Operations Instructions, Operational Orders from the Third Fleet Commander and a handbook from Commander Naval Surface Group Middle Pacific (Hawaii area) reiterate the requirements of the Marine Mammal Protection Act (MMPA) not to harm, harass or threaten any marine mammal. The handbook goes further and provides guidance that reiterates the prohibitions in 50 CFR 222.31.

6. Special Operations Involving Swimmers and Small Boats. (Within the 100 Fathom Isobath). Special operation involving swimmers and small boats pose a very low risk of potentially harmful effects on humpback whales, direct, indirect or cumulative. Similar operations have been conducted in Hawaiian waters for many years without any indication that such operations have had any effect on humpback whales.

a. Special operations involve open water swimming/diving with drop off and retrieval by Zodiacs, Boston Whalers or other small boats specially configured for the mission. The boats either transit from shore, another ship, an aircraft or a submarine to the mission location. Typically the mission location is ashore but it may be another ship. Most special operation craft are capable of both very quiet, stealthy operation and high speed operation. High speed is used to attain position and for escape in case of detection, but since high speed increases the risk of detection, most operations are at low or moderate speeds.

b. Small boat coxswains and special operations forces are acutely aware of the environment around them and avoid objects like humpback whales, which pose a more severe hazard to them than they pose to the whales. Although most operations are at night, special operations forces are specially trained for night operations and the use of night vision devices.

c. Chief of Naval Operations Instructions, Operational Orders from the Third Fleet Commander and a handbook from Commander Naval Surface Group Middle Pacific (Hawaii area) reiterate the requirements of the Marine Mammal Protection Act

Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

(MMPA) not to harm, harass or threaten any marine mammal. The handbook goes further and provides guidance that reiterates the prohibitions in 50 CFR 222.31.

d. For these reasons, the possibility of a collision with a whale is remote. The small boats are highly maneuverable and able to avoid any interaction with whales while operating in and around the Hawaiian Islands. To the extent that humpback whales detect special operations craft, the effect would be very minor and transitory.

7. Salvage Operations and Towing (Within the 100 Fathom Isobath). Operations involving salvage operations and towing pose a very low risk of potentially harmful effects on humpback whales, direct, indirect or cumulative. Navy towing and salvage operations have been conducted in Hawaiian waters for many years without any apparent effect on humpback whales.

a. Towing operations are similar to those conducted by commercial towing companies between the islands, but are undertaken far less frequently and rarely involve long tows. The primary potential for harming humpback whales during towing and salvage operations is from collision between the towing ship or the tow and a humpback whale. The chances of that occurring are very slight. The Navy conducts relatively few towing operations in Hawaiian waters. Virtually all surface vessels are required to be capable of taking another vessel under tow, but this is a secondary mission for all but tugs and salvage ships and typically is practiced on a fairly infrequent basis. Even during such practice exercises, once the towing rig is in place and the tow is underway, the exercise is essentially complete and is broken off. Navy salvage ships and tugs may also conduct towing for exercise or operational reasons, but this also is relatively infrequent.

b. During towing, there is only a very slight chance of collision with a humpback whale. Towing takes place at slow speeds, usually under ten knots. Although towing ships have reduced maneuverability, the low speed should allow humpback whales, which are capable of swimming at 20 knots for short distances, adequate opportunity to avoid the ship and the tow. Navy salvage ships and tugs are diesel-powered and should be easily detectable by a whale.

c. For most ships, towing is an unusual event and the bridge watch and lookout positions will be manned by the most experienced crew members.

d. Salvage operations and exercises are directed at saving life or equipment, or clearing an area of damaged equipment. This could include refloating a damaged ship or clearing it from a channel. This can include such things as refloating a grounded ship, raising a submerged aircraft, removing the crew from a sunken submarine or fighting a fire aboard another ship. Many of these operations are conducted at anchor, minimizing the potential for collision. Some salvage operations may have to be practiced in shallow water. While salvage operations are being actively prosecuted, there may be lines, cables, extra anchors and floats deployed. Portable pumps may be put aboard a stricken vessel. During firefighting drills, saltwater and firefighting agents may be used and then discharged. Salvage operations and exercises are very carefully

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Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

planned so that safety remains paramount. They are conducted in a careful, professional way because rarely are two exercises the same. If a humpback whale were to approach a salvage exercise, protective action as appropriate to the situation would be taken.

e. Additionally, commanding officers have been directed to avoid harming humpback whales and will take appropriate corrective action. Chief of Naval Operations Instructions, Operational Orders from the Third Fleet Commander and a handbook from Commander Naval Surface Group Middle Pacific (Hawaii area) reiterate the requirements of the Marine Mammal Protection Act (MMPA) not to harm, harass or threaten any marine mammal. The handbook goes further and provides guidance that reiterates the prohibitions in 50 CFR 222.31.

8. Transit Operations Between Operations Areas. (Outside 100 Fathom Isobath). The risk of harm to humpback whales during surface ship transits is very small. The greatest potential risk is that of collision. In the many years of Navy operations in Hawaiian waters, the Navy is unaware of any collision between a Navy ship and a humpback whale.

a. Depending on the angle of incidence, speed and depth, a collision with a ship could injure or kill a whale. The potential for such a collision with a Navy ship transiting between operations areas, however, is extremely remote for a number of reasons. First, surface ships conduct most operations at moderate speeds (ten to 15 knots) for reasons of fuel economy. Given the ability of humpbacks to attain speeds of twenty knots, whales are able to avoid collision. Second, the watch section for a surface ship, even during routine steaming, is robust compared with many commercial vessels. The Navy has specific training standards for both lookouts and bridge watchstanders. Personnel are specifically trained in the use of binoculars and specific techniques to maximize their ability to sight whales so that evasive action can be taken. Typically a surface ship will have three lookouts and two officers conducting visual searches. Additional lookouts are often posted in shallow water or proximity to the coast. Most Navy ships are also highly maneuverable and during most evolutions are able to maneuver, radically if necessary, to avoid collision.

b. A less serious potential effect involves disturbing or changing the behavior pattern of a humpback whale in a way that would harm a humpback whale. As addressed above, the lack of collisions between Navy ships and humpback whales may be due in part to the whales' decisions to detect and avoid surface ships - a reaction that does not harm the whale. Because Navy ships are not trying to approach or follow whales, these essentially random interactions are brief and unlikely to harm whales because of the small areas effected, the relatively short time frames involved and the relatively few surface ships at sea in the Hawaiian area at any one time - even during major exercises. During the last RIMPAC exercise, only one whale (of undetermined species) was even detected during the entire exercise.

c. Additionally, commanding officers have been directed to avoid harming humpback whales and will take appropriate corrective action. Chief of Naval Operations

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Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

Instructions, Operational Orders from the Third Fleet Commander and a handbook from Commander Naval Surface Group Middle Pacific (Hawaii area) reiterate the requirements of the Marine Mammal Protection Act (MMPA) not to harm, harass or threaten any marine mammal. The handbook goes further and provides guidance that reiterates the prohibitions in 50 CFR 222.31.

9. Towing Operations. (Outside 100 Fathom Isobath). Towing operations outside the 100 fathom isobath are essentially similar to towing within the 100 fathom isobath. As with inshore towing, towing further to sea poses a very low risk of potentially harmful effects on humpback whales, direct, indirect or cumulative. Navy towing and salvage operations have been conducted in Hawaiian waters for many years without any apparent effect on humpback whales.

a. Towing operations are similar to that done by commercial towing companies between the islands, but are undertaken far less frequently and rarely involve long tows. The primary potential for harming humpback whales during towing and salvage operations is from collision between the towing ship or the tow and a humpback whale. The chances of that occurring are very slight. The Navy conducts relatively few towing operations in Hawaiian waters. Virtually all surface vessels are required to be capable of taking another vessel under tow, but this is a secondary mission for all but tugs and salvage ships and typically is practiced on a fairly infrequent basis. Even during such practice exercises, once the towing rig is in place and the tow is underway, the exercise is essentially complete and is broken off. Navy salvage ships and tugs may also conduct towing for exercise or operational reasons, but this also is relatively infrequent.

b. During towing, there is only a very slight chance of collision with a humpback whale. Towing takes place at slow speeds, usually under ten knots. Although towing ships have reduced maneuverability, the low speed should allow humpback whales, which are capable of swimming at 20 knots for short distances, adequate opportunity to avoid the ship and the tow. Navy salvage ships and tugs are diesel-powered and should be easily detectable by a whale.

c. For most ships, towing is an unusual event and the bridge watch and lookout positions will be manned by the most experienced crew members. Additionally, commanding officers have been directed to avoid harming humpback whales and will take appropriate corrective action. Chief of Naval Operations Instructions, Operational Orders from the Third Fleet Commander and a handbook from Commander Naval Surface Group Middle Pacific (Hawaii area) reiterate the requirements of the Marine Mammal Protection Act (MMPA) not to harm, harass or threaten any marine mammal. The handbook goes further and provides guidance that reiterates the prohibitions in 50 CFR 222.31.

SURFACE OPERATIONS - CATEGORY II

1. Engineering, Navigation, Seamanship and General Warfare-Related Training Exercises (Outside 100 Fathom Isobath).

Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

a. General. Surface ships routinely conduct a variety of training exercises virtually whenever they are underway to train crewmembers how to operate assigned equipment, to work together as a team, to train ships to work together and to hone individual skills. These general exercises are often referred to as type training. Surface ships also conduct general warfare-related exercises involving groups of ships, submarines and aircraft in a simulated combat environment to train and test command and control, tactics, strategy and equipment. General warfare-related training exercises include phases devoted to particular warfare areas like anti-surface warfare (ASUW), anti-air warfare (AAW), amphibious warfare and minewarfare.

b. Training Conducted.

i. Proficiency training. Most type training involves drills that are internal to one ship while it is conducting other tasks. Engineering drills involve exercising the ship's propulsion and auxiliary systems in a variety of configurations to train personnel in casualty control procedures and test equipment. Engineering drills can result in changes to ship's course and speed and some engineering tests require the ship to maintain a particular speed for a specific period of time. Ships also conduct damage control drills in which they simulate controlling the effects of fire, flooding and explosive damage that could be received in combat. These drills normally have no effect outside the ship. Navigation and seamanship involve drills on fixing the position of the ship, maneuvering (including formation steaming), launch and recovery of boats, communications and launch and recovery of helicopters and aircraft. These drills require the ship to maneuver at various courses and speeds and during man-overboard drills, to put smoke markers into the water.

ii. Transiting Battle Groups and Surface Action Groups. Battle groups transiting the Hawaiian Islands conduct training in engineering, seamanship and general warfare-related tasks in the course of normal steaming. The presence of other ships enhances the opportunity for maneuvering and communications exercises. Battle groups deploying from the eastern Pacific to the Far East, numbering four to seven ships, pass the Hawaiian Islands area three to four times each year and likely will conduct this training.

iii. RIMPAC and Major Exercises. Ships conduct training in engineering, seamanship and general warfare-related tasks during major exercises. The increased number of ships and the presence of foreign navies enhances the opportunity for some aspects of this type of training, including formation steaming, communications and launch and recovery of aircraft. One example of a major exercise is RIMPAC, the major exercise conducted in the Hawaiian area on a regular basis. RIMPAC is conducted every two years in the summer months. RIMPAC is a significant military and international event. For example, RIMPAC 1994 involved over 25,000 soldiers, sailors, coastguardsmen, airmen and marines. Over fifty ships, nine submarines and 200 aircraft from five nations participated. It is designed to improve coordination and interoperability of combined, joint and bilateral forces in maritime, theater and littoral operations. RIMPAC can last up to 14 days, although much of that time is spent at distances considerably remote (i.e., over 150 miles) to the Hawaiian Islands. The amount of time spent within 150 miles of the Hawaiian islands depends on the exercise scenario. Because of the recent emphasis on littoral warfare and the threat of submarines adapted to coastal operations, recent scenarios

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Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

typically include amphibious operations and the ASW operations necessary to conduct them safely. During RIMPAC 1994, over 50 ships conducted engineering, seamanship and general warfare-related training virtually continuously during the exercise.

c. Location of Training. This training takes place virtually all around the Hawaiian Islands, although most type training occurs in the operations areas south of Pearl Harbor. Because of Hawaiian geography, most of this training occurs outside the proposed sanctuary boundaries and outside the 100 fathom isobath.

d. Potential Effects on Humpback Whales and Mitigation. There is almost no additional potential effects on humpback whales apart from the very low risk of collision with a ship. In the many years of Navy operations in Hawaiian waters, the Navy is unaware of any collision between a Navy ship and a humpback whale.

i. The most serious potential direct effect of surface ship operations, including training in engineering, seamanship and general warfare-related tasks, is collision of a ship and a whale. Depending on the angle of incidence, speed and depth, such a collision could injure or kill a whale. The potential for such a collision, however, is extremely remote for a number of reasons. First, surface ships conduct most operations at moderate speeds (ten to 15 knots) for reasons of fuel economy. Given the ability of humpbacks to attain speeds of twenty knots, whales are able to avoid collision. Second, the watch section for a surface ship, even during routine steaming, is robust compared with many commercial vessels. The Navy has specific training standards for both lookouts and bridge watch-standers that trains personnel in the use of binoculars and specific techniques to maximize their ability to sight whales so that evasive action can be taken. Typically a surface ship will have three lookouts and two officers conducting visual searches. Additional lookouts are often posted in shallow water or proximity to the coast. Most Navy ships are also highly maneuverable and during most evolutions are able to maneuver, radically if necessary, to avoid collision.

ii. A less serious potential effect involves disturbing or changing the behavior pattern of a humpback whale in a way that would harm a humpback whale. As addressed above, the lack of collisions between Navy ships and humpback whales may be due in part to the whales' decisions to detect and avoid surface ships - a reaction that does not harm the whale. Because Navy ships are not trying to approach or follow whales, these essentially random interactions are brief and unlikely to harm whales because of the small areas effected, the relatively short time frames involved and the relatively few surface ships at sea in the Hawaiian area at any one time - even during major exercises. During the last RIMPAC exercise, only one whale (of undetermined species) was even detected during the entire exercise.

2. Replenishment Operations Underway (Outside 100 Fathom Isobath).

a. General. To allow extended operations at sea, surface ships conduct underway replenishment. Fuel, food, weapons, and other supplies are transferred from logistic support ships to operating forces. Replenishment can be conducted as ships steam alongside or by means of vertical replenishment by helicopter. In normal replenishment

Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

alongside, the ships steam on parallel courses at the same speed and maintain a separation of 120 - 140 feet. This is a demanding evolution, requiring precise shiphandling and quick reaction in case of equipment casualties. Once in position, the ships pass lines and rig hoses or tensioned wires for transfer of fuel or palletized supplies. Personnel can also be exchanged by this means. In vertical replenishment, a helicopter is used to move pallets of cargo from the supply ship to the customer, usually by means of a sling underneath the helicopter. Both alongside and vertical replenishment can be conducted simultaneously and a supply ship can service two customers at once. While engaged in replenishment, the ships hold course and speed to facilitate station-keeping and have very reduced maneuverability. Replenishment is ordinarily conducted at between ten and fifteen knots. Underway replenishment involving the actual transfer of fuel is conducted at least 50 miles from land.

b. Training Conducted.

i. Proficiency Training. Because of the need for precise shiphandling and rapid handling of lines and rigging under considerable tension, surface ships practice underway replenishment on a regular basis, even when no actual supplies are exchanged.

ii. Transiting Battle Groups. Battle groups transiting the Hawaiian Islands may occasionally conduct underway replenishment within 150 miles of the Hawaiian Islands, but this would be rare.

iii. Major Exercises. Ships engaged in major exercises like RIMPAC routinely must conduct underway replenishment to complete the exercise. Destroyer-type ships refuel approximately every three days and conduct other replenishment every ten days. Even if not strictly required logistically, major exercises routinely include underway replenishment phases to allow training with ships of foreign navies. During RIMPAC 1994, over 50 ships conducted underway replenishment throughout the 14 days of the exercise.

c. Location of Training. This training takes place virtually all around the Hawaiian Islands, although most type training occurs in the operations areas south of Pearl Harbor. Because of the restricted maneuverability of ships during underway replenishment, these operations ordinarily take place in open water outside the 100 fathom isobath. Where fuel is transferred, the replenishment is at least 50 miles from land.

d. Potential Effects on Humpback Whales and Mitigation. There are almost no additional potential effects on humpback whales apart from the very low risk of collision with a ship. The overall risk of collision is described above on page 8.

i. The risk of collision with a humpback whale during underway replenishment is affected by several factors. The risk is somewhat increased because once alongside, the maneuverability of ships conducting underway replenishment is reduced. On the other hand, underway replenishment takes place at moderate speeds and steady courses, allowing a humpback whale to avoid collision. Lookouts are also increased during such evolutions because of the reduced maneuverability. Replenishment of fuel is also conducted 50 miles from land. Finally, the Navy has used active sonar at zero elevation

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and low power to alert a whale spotted ahead of a group of replenishing ships. The whale left the area. In the many years of Navy operations in Hawaiian waters, the Navy is unaware of any collision between a Navy ship and a humpback whale during underway replenishment.

ii. There is no real risk to the humpback whale from a fuel spill during underway replenishment. Equipment and procedures are designed to avoid any spill and in practice, spills are very rare. Even were spills do occur, Navy standard fuel is a fairly light petroleum product that quickly dissipates and evaporates.

iii. Helicopters involved in vertical replenishment shuttle between ships at low altitudes - under 200 feet. These flights, however, cover fairly short distances between ships that are underway. It is highly unlikely they would overfly an unalerted whale. Any effect would be very transitory.

3. Anti-Submarine Warfare (ASW) Operations (Within and Outside 100 Fathom Isobath).

a. General. Antisubmarine warfare remains one of the key roles for Navy surface forces, requiring constant crew training and equipment maintenance. Submarines pose some of the most pressing threats to the ability of Naval forces to carry out missions directed by the President anywhere in the world.

i. Surface ASW operations, while described separately here, are necessarily closely related to air and submarine ASW operations. Surface ASW ships, i.e., cruisers, destroyers and frigates, frequently carry embarked helicopters that work with the surface ship. Surface ships also work with medium and long range patrol aircraft in combined tactics to detect, track and attack submarines. ASW training by surface ships also involves submarines, usually as targets but also during coordinated surface/submarine ASW.

ii. Surface ships practice ASW by using a variety of sensors, but primarily active and passive sonars, to locate and track submarines or remotely controlled targets that simulate submarines. To optimize sonar performance, expendable bathythermographs (XBT) are deployed to measure water temperatures at various depths. XBTs are small canisters that are released from the ship and sink to the bottom, trailing a thin metal wire to transmit information on water conditions back to the ship. The information is used to predict sonar performance. XBTs are also used for environmental studies. Once the information is received (a few minutes), the wire is cut and sinks to the bottom. Once the submarine or target is tracked by passive or active sonar, the ship simulates or actually launches weapons to attack the target. Most surface ship sonars are hull-mounted, but some surface ships tow a long sonar passive array. Exercise weapons consist of ship-launched ASW torpedoes with inert warheads. Most exercise torpedoes are designed to be recovered upon completion of the exercise, either by the ship itself or a dedicated recovery craft.

iii. Surface ship ASW operations include a range of activities. Such operations include routine maintenance and basic operator training, single ship training with

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a target submarine under controlled conditions (the equivalent of a "scrimmage" in sports) and complex, free-ranging multi-ship exercises. In the Hawaiian area, surface ship ASW operations are conducted both inside and outside the 100 fathom isobath.

b. Training Conducted.

i. Proficiency Training. Basic proficiency training is conducted by individual ships or small groups of ships. Most proficiency training involves ships homeported in Pearl Harbor, although some proficiency training is also conducted by ships in transiting battle groups described below. Proficiency training is necessary to achieve satisfactory levels of equipment readiness, individual training and teamwork to allow more advanced training to take place and for ships to deploy to forward locations ready to perform their missions. Surface ships like cruisers, destroyers and frigates are engaged in ASW proficiency training in the Hawaiian Islands area year round. Surface ships stationed in Hawaii conduct approximately 20-25 days underway for training in local waters in each quarter, a significant portion of which is devoted to ASW training.

ii. Transiting Battle Groups. Battle groups deploying from the eastern Pacific to the Far East receive ASW training when they pass through the Hawaiian Islands area. Battle groups of four to seven ships pass through Hawaiian waters three to four times each year. Three to four of the ships will participate in ASW training while in Hawaiian waters, lasting several days.

iii. Major Exercises. Major exercises typically involve components from all the armed services and the armed forces of other nations. Major exercises can include over 50 ships and 10 submarines plus associated aviation units and Marine units. Many of the ships have an ASW mission and most exercise scenarios include at least some ASW training. Major exercises differ from proficiency training and more structured training in that they must emphasize significant free play where units are able to maneuver realistically over a broad area to achieve their mission, as would forces in the event of actual conflict. Major exercises are also used to evaluate the effectiveness of current tactics and to develop new tactics.

(1) RIMPAC. The extent and importance of RIMPAC has previously been explained on page 7. RIMPAC 1994 devoted considerable time and resources to anti-submarine warfare in light of the threat that submarines would pose to forces friendly to the United States in most foreseeable scenarios. RIMPAC 1994 involved 30 surface ships conducting ASW and nine submarines either conducting ASW or serving as opposing forces. A significant number of the aircraft involved were also devoted to ASW.

(2) Other Major Exercises. Other major exercises are conducted periodically with the armed forces of one or more nations. These have included exercises with the Japanese, Australian and Canadian navies and an exercise with the Russian Navy will take place this summer. ASW is typically included in such exercises, depending on the units involved.

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c. Location of Training. Surface ships often energize their sonar to conduct basic ASW training and equipment maintenance while underway. More formal ASW training is conducted on the various ranges and restricted areas around the Hawaiian Islands. Apart from PMRF and major exercises, surface ships conduct ASW training on approximately 50 - 70 days per year in designated warning areas and ranges around Hawaii. Of those exercises, approximately ten percent occur within the 100 fathom isobath. Approximately five percent occur in warning areas a small portion of which fall within the sanctuary. Most exercises involving the launch of an exercise torpedo occur on the BARSTUR range under range control of PMRF, outside the 100 fathom isobath and well clear of the proposed sanctuary boundaries. Surface units conduct ASW training at PMRF approximately 35 - 45 days each year and were scheduled to expend approximately 35 - 45 lightweight ASW torpedoes over the same period. Transiting battle groups also conduct ASW training along their track, which typically lies at least 25 miles north of Kauai while westbound. Eastbound battle groups often make a port call at Pearl Harbor and ASW operations may be conducted enroute to Pearl Harbor or upon departure. Major fleet exercises are typically conducted over 50 miles from any island, but include portions close to land to simulate passage through straits or amphibious operations. ASW training during these phases must include shallow water operations, and is conducted at Penguin Banks, off PMRF or at the HATS range near Kahoo'lawe. For example, during RIMPAC 1994, although most ASW training occurred outside the 100 fathom isobath, thirty surface ships conducted ASW training in Auau Channel between Maui and Lanai and again in the channel between Kaula Rock and Niihau for two days.

d. Potential Effects on Humpback Whales and Mitigation. The potential for adverse effects on humpback whales from surface ASW operations is very remote because of a combination of the nature and intensity of the operations themselves, the equipment and mitigation procedures.

i. The most serious potential direct effect of surface ship ASW training on humpback whales is collision of a ship and a whale. Depending on the angle of incidence, speed and depth, such a collision could injure or kill a whale. The potential for such a collision, however, is extremely remote for a number of reasons. First, surface ship ASW operations are generally conducted at low to moderate speeds (five to fifteen knots) because speed quickly degrades sonar performance, whether active or passive. Given the ability of humpbacks to attain speeds of twenty knots, whales are able to avoid collision. Second, during ASW operations surface ships stress an aggressive posture by lookouts to an even greater extent than usual because of the importance of being able to detect periscopes and other visual indications of submarines. Typically a surface ASW ship will have three lookouts and two officers conducting visual searches that would detect surface whale activity and allow maneuvering to avoid collision. Additional lookouts are often posted in shallow water or proximity to the coast. Some ASW ships supplement lookouts equipped with binoculars with electrically-enhanced optics (essentially sophisticated television cameras) that permit search and identification beyond normal visual ranges. ASW-capable ships are also highly maneuverable and during most evolutions are able to maneuver, radically if necessary, to avoid collision. Third, while conducting active sonar searches, surface ASW ships should be readily detectable by humpbacks. Fourth, while conducting passive sonar searches, and to a lesser degree during active sonar searches,

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surface ships can detect the presence of vocalizing humpbacks, allowing them to alert lookouts and the bridge watch and increase the ability to avoid collisions. As a result of these factors, despite having conducted surface ASW ship operations in Hawaiian waters for years, the Navy is unaware of any collisions between a Navy surface ship and a humpback whale.

ii. A less serious potential effect involves disturbing or changing the behavior pattern of a humpback whale in a way that would harm a humpback whale. As addressed above, the lack of collisions between Navy ships and humpback whales may be due in part to the whales' decisions to detect and avoid surface ships - a reaction that does not harm the whale. Because Navy ships are not trying to approach or follow whales, these essentially random interactions are brief and unlikely to harm whales because of the small areas effected, the relatively short time frames involved and the relatively few surface ships at sea in the Hawaiian area at any one time - even during major exercises. During the last RIMPAC exercise, only one whale (of undetermined species) was even detected during the entire exercise.

iii. The use of active sonar during surface ship ASW operations also could be detected by humpback whales but is unlikely to harm them directly or indirectly. Cruisers and destroyers typically employ the SQS-53 sonar for active searching. The SQS-53 transmits at between 3 and 4 kilohertz.. Frigates typically employ the SQS-56 sonar for active searching. The SQS-56 transmits at between 6.5 and 8.5 kilohertz and are of short duration. Sonar signals are pulsed, not continuous. The strength of the signal is attenuated quickly as the range from the ship increases so that even using extremely conservative standards, divers are permitted to work submerged, even in confined harbors, as long as they are more than 600 yards from the SQS-53 sonar. The SQS-56 sonar is considerably less powerful. Lower power levels are often used in shallow water (under 100 fathoms). The sonar beam can be focused in different directions rather than being omnidirectional. The area where sound levels exceed other naturally-occurring sounds is relatively small, the duration is limited and the speed of advance allows avoidance. Active sonars, directed straight ahead at zero depression and low power, have been successfully used as a "horn" to alert whales to an approaching ship. Passive sonars, including towed arrays, pose no risk to humpback whales.

iv. The potential for any harm to humpbacks from exercise torpedoes used during surface ASW training is also remote. Exercise torpedoes are fired under very controlled circumstances that involve range clearance procedures to ensure that whales are not present. These involve at a minimum a detailed visual search of the range from the ship, supplemented by passive sonar information. They are frequently supplemented by air reconnaissance flown by helicopters when available to further ensure the range is clear. Torpedoes are not fired until the range is clear. Most torpedo firings occur at PMRF outside the 100 fathom isobath. PMRF strictly controls weapons firings and does not permit an exercise to proceed until the range is declared "clear" after consideration of inputs from ships' sensors, visual surveillance of the range from aircraft and range safety boats, radar data, acoustic information from a comprehensive system of sensors and surveillance from shore. The exercise can be modified as necessary to obtain a clear range or is canceled.

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v. Even if humpback whales were on the range, the risk to them is very low. Torpedoes used by surface ships (or their embarked helicopters) do use active sonar to locate targets, but at frequencies that are even higher than surface ships and at less power. Exercise torpedoes are programmed to search within a fairly limited area for 6 - 8 minutes. After their fuel is expended, they are recovered. Exercise torpedoes carry only inert warheads and will not explode. Even though they are inert, exercise torpedoes are set to miss the target to avoid mechanical impacts. On rare occasions, less than one per year, torpedoes with explosive warheads (warshots) are fired for test and evaluation. Such test and evaluation exercises, are even more carefully controlled in order to ensure safety and obtain valid data. Given their tight control and the infrequent conduct of shots involving warshots, the risk to humpback whales is extraordinarily remote.

vi. In addition to the specific mitigation measures discussed above, a number of general mitigation measures help ensure that the risk of a harmful effect on humpbacks is extremely low. Since 1990, Commander Naval Surface Group, Middle Pacific (COMNAVSURFGRUMIDPAC), who is responsible for the operations of surface ships in the Hawaii area when they are not working directly for Commander Third Fleet, has published The Shipboard Environmental Coordinator's Guide to Environmental Compliance. That guide informs ships of the NMFS prohibition on approaching humpback whales. Also, all Navy ships calling on Hawaiian ports are advised of key natural resource issues, including precautions regarding whales, in the reply to their request for a berth. Because this anticipates the actual date of arrival by approximately two days, the ships are advised of humpback precautions well before they approach Hawaii. Commander, Third Fleet Operation Order 201 (COMTHIRDFLT OPORD 201), a basic reference for commands planning or conducting operations from just east of Guam to the West Coast of the United States, describes the sanctuary and the prohibition on taking marine mammals. This ensures that protection of the humpback whale is officially considered during the planning and conduct of operations, including surface ship ASW operations.

vii. Given the nature of ASW operations and the locations where they take place, even if there are minor direct effects, they are temporary, localized and unlikely to result in either indirect or cumulative effects.##

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Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

4. Amphibious Warfare Operations.

a. General. Amphibious warfare operations encompass activities or events that support power projection of naval forces in the littoral region. They include all activities necessary to conduct reconnaissance on a hostile beach, to insert troops, vehicles and necessary equipment and supplies over or onto a hostile beach and to support the landing force once it is ashore. Amphibious landings are recognized as one of the most complex of military operations because of the number of different units involved, the potential effect of natural conditions and the vulnerability (in war) of the landing force during its approach to the beach. Thus careful, intense training is required to maintain the ability to conduct these operations safely and effectively.

LCAC comes ashore

i. Amphibious operations necessarily include operations involving submarines, surface forces and air support. The potential effects of special operations involving swimmers and small boats, whether delivered by surface ships or submarine, are covered in the description of Category I activities at pages 3 and 32. Insertion of special forces or USMC Reconnaissance units from helicopters are covered in the Category II discussion of air activities at page 48. Amphibious operations also include extensive low level helicopter flights, which are principally discussed in the air operations section. This discussion focuses on the activities of the ships and associated aircraft involved with training to move forces ashore. Forces are transported ashore by means of Armored Amphibious Vehicles (AAV), Landing Craft Air Cushioned (LCAC) and small boats such as Zodiacs or Boston Whalers. Some Landing Craft Utility (LCU) or Lighter Amphibious Resupply Cargo (LARC) may also be used to move supplies to the beach. Attack helicopters or VSTOL aircraft like the AV-8B Harrier are launched from surface ships that make up the amphibious group to provide close air support for the troops on the beach and to provide additional security for the amphibious area of assault.

ii. Surface ships such as LHAs, LPDs, LHDs, LSTs and LSDs maneuver from the sea to a position three to five miles from the objective area and discharge the transport vehicles with personnel embarked. Most major surface amphibious ships have "well decks" that are normally dry but that can be flooded when the ship ballasts down. Well decks are flooded to make it easier to launch and recover the smaller amphibious craft that actually carry troops and equipment ashore. The ship pumps the water out of the ballast tanks to raise the well deck back out of the water. Landing craft are disembarked either while the

Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

ship is at anchor or while it is underway at slow speed. LSTs may beach themselves to permit equipment to drive directly onto the shore.

iii. Once launched, the landing craft proceed to the beach. LCACs and AAVs may proceed beyond the beach. In addition helicopters are used to transfer personnel and supplies from ship to shore and for fire support. Minesweeping is conducted to clear channels to the beach for the assault craft using a variety of systems. Some minesweepers tow mechanical and electromagnetic sweeping gear that cuts moored mines loose or detonates influence mines. Others minesweepers tow sonar transducers or operate remotely operated vehicles to locate and neutralize mines. Marine mammal systems may also be deployed from small boats to locate mines. Helicopters involved in these movements often fly at 500 feet or below. Fixed wing aircraft, including conventional aircraft and the vertical takeoff AV-8B conduct both reconnaissance operations and close air support. Close air support involving simulated strafing and weapons delivery or actual delivery of inert weapons is frequently conducted below 1000 feet.[1]

b. Training Conducted

i. Proficiency Training. Training at Bellows Air Force Station includes basic proficiency training where Marine Corps units conduct amphibious training to qualify equipment operators and work on tactics. AAVs transit from MCAS Kaneohe and conduct mock assaults on the beach. They may also be accompanied by Zodiacs or Boston Whalers and by helicopters if available. These exercises are fairly basic and are structured to focus on a few tasks at a time. In these exercises, specific tasks such as proceeding through the channel or navigating the surf may be repeated as necessary to develop the required skill levels. If an amphibious ship is available in the area, it may be used to practice embarking or disembarking landing craft before or after they run to the beach. Such training goes on year round. Training for AAVs and Zodiacs each occurs twelve to fifteen times per year, and lasts from one to five days. Training with LCACs occurs several times each year, can occur in any season and lasts from one to five days.

ii. Transiting Amphibious Readiness Groups. Occasionally Amphibious Readiness Groups transiting near the Hawaiian Islands on their way to deployment in the Western Pacific conduct mock assaults either at Bellows or PMRF. Such assaults are conducted in a more comprehensive, realistic matter and involve the coordinated use of aircraft, minesweepers and other units required for an actual amphibious assault. These can occur up to several times per year, depending upon deployment schedules.

iii. RIMPAC. The overall scheme of RIMPAC has been discussed previously at page 7. RIMPAC 1994 included an amphibious segment involving six major amphibious ships. Approximately four landings were made over a four day period at PMRF, MCAS Kaneohe and Bellows. For each day, approximately six LCACs would make approximately ten round trips from ship to shore. Conventional landing craft such as LCUs and LARCs

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[1]The potential impacts of low altitude flights by helicopters or fixed wing aircraft are discussed at greater length starting at page 40.

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Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

would make approximately four round trips each day. Approximately 30 AAVs would make two round trips each day. Between 15 and 40 Zodiacs or similar small boats would make two round trips each day.

iv. Major Exercises. Major exercises besides RIMPAC may also include an amphibious segment involving a mock assault on the beach. Major exercises include approximately two to six major amphibious ships (not including the supporting gunfire support ships, escorts, supply ships and supporting carriers). For major exercises, dummy minefields using inert shapes may be placed in shallow water. The exercise is conducted generally described as discussed above. The aviation portion is conducted as discussed in the aviation portion of Category II at page 40.

c. Location of training. Amphibious operations are conducted principally at MCAS Kaneohe and Bellows Air Force Station, and occasionally at PMRF. PMRF amphibious operations mainly occur during RIMPAC and major excercises. None of these areas are designated for the sanctuary. AAVs may also enter the water at MCAS Kaneohe and transit to Bellows, generally remaining approximately 1000 yards from shore. In addition, when an amphibious ship is available, mock assaults using LCACs and AAVs launched from the ship also land at Bellows. When Amphibious Ready Groups (ARGs) transit the Hawaiian Islands, they also conduct mock assaults at Bellows or PMRF. Ship-launched assaults are also conducted at PMRF. Because of local geography, amphibious operations in these waters typically involve movement from ships located outside the 100 fathom isobath to the beach. Thus the approach phase and the initial launching of landing craft occurs near or outside the 100 fathom line, but the transit to the beach necessarily enters the 100 fathom contour.

d. Potential Effects on Humpback Whales and Mitigation. The potential that amphibious operations could have harmful effects on humpback whales is extremely small. Despite having conducted amphibious operations in the Hawaiian Islands for decades, the Navy is unaware of any harmful effects on humpback whales.

i. The most serious potential direct effect of amphibious warfare operations on humpback whales is collision of a ship or landing craft and a whale. Depending on the angle of incidence, speed and depth, such a collision could injure or kill a whale. The potential for such a collision, however, is extremely remote for a number of reasons. First, amphibious ships generally conduct operations at low speeds or at anchor. Given the ability of humpbacks to attain speeds of twenty knots, whales are able to avoid collision. The risk of collision between one of the landing craft and a humpback whale is also very slight. Landing craft shuttle back and forth from ship to shore over a relatively short distance so that the area of concern is fairly limited. Even within the area, AAVs, LCUs and LARCs are very limited in speed. AAVs have a top speed under six knots in water and even LCUs are limited to eleven knots.

ii. Some of the other landing and support craft are faster. LCACs are capable of much faster speeds, up to 40 knots, but their hovercraft design minimizes the risk to a humpback if a collision occurs because the LCAC actually rides four feet above the water. LCACs are also highly maneuverable and can avoid whales if sighted. Zodiacs, Boston

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Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

Whalers and similar small boats can travel at high speed, but given their planing hulls and small size, pose little risk to a humpback whale. Given the risk to the crew of such craft posed by a collision with objects much smaller than a humpback whale, they maintain a close lookout and can avoid whales if they enter the amphibious assault area.

iii. The amphibious area of assault is a very highly controlled area because of the surface and air traffic. The presence of whales would be quickly detected and crews alerted to the hazard.

iv. A less serious potential effect involves disturbing or changing the whale behavior pattern in a way that would harm a humpback whale. As addressed above, the lack of collisions between Navy ships and humpback whales may be due in part to the whales' decisions to detect and avoid amphibious operations. Such operations are localized to a fairly small area, involve large numbers of diesel and turbine-powered small craft that are not optimized for noise reduction and which therefore allow humpback whales to avoid the area. The areas where the operations are conducted are outside the areas designated for the sanctuary, have no known special significance to humpback whales and are in use for only short periods. Even if there is an avoidance reaction, it is transitory. Once the operations are complete, humpback whales can reoccupy even the small area occupied by the exercise. Thus there are no indirect or cumulative effects.

v. In addition to the specific mitigation measures discussed above, a number of general mitigation measures help ensure that the risk of a harmful effect on humpbacks is extremely low. Since 1990, Commander Naval Surface Group, Middle Pacific (COMNAVSURFGRUMIDPAC), who is responsible for the operations of surface ships in the Hawaii area when they are not working directly for Commander Third Fleet has published The Shipboard Environmental Coordinator's Guide to Environmental Compliance. That guide informs ships of the NMFS restrictions on approaching humpback whales.[2] Also, all Navy ships calling on Hawaiian ports are advised of key natural resource issues, including precautions regarding whales, in the reply to their request for a berth. Because this anticipates the actual date of arrival by approximately two days, the ships are advised of humpback precautions well before they approach Hawaii. Commander, Third Fleet Operation Order 201 (COMTHIRDFLT OPORD 201), a basic reference for commands planning or conducting operations from Guam to the West Coast of the United States, describes the sanctuary and the prohibition on taking marine mammals. This ensures that protection of the humpback whale is officially considered during the planning and conducting of operations, including amphibious warfare operations.

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[2]The guide currently reflects approach distances before the recent amendments to the MMPA, but is in the process of being revised.

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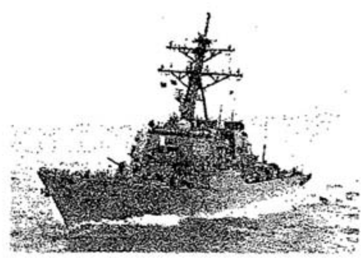
Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

5. Anti-Surface Warfare Operations (ASUW) (Within and Outside 100 Fathom Isobath).

a. General. Anti-Surface Warfare (ASUW) operations involve a variety of activities designed to allow surface ships to detect, track and destroy other surface vessels, including small boats. It involves equipment maintenance and calibration, ship maneuvering, deployment of countermeasures and firing guns and missiles against simulated targets. Guns used in ASUW range from small caliber machine guns firing solid projectiles up to 5 inch guns firing explosive projectiles. A variety of missiles may be used in an ASUW role, including missiles like Harpoon that is specifically designed for attacking ships. Missiles used for ASUW guide themselves to the target once launched. The simulated targets may be self-deployed inflatable targets, targets towed by other ships or remotely controlled target boats. Finally ships may activate electronic or mechanical equipment or deploy devices to decoy or deceive other surface ships or their weapons. One of those decoys used most frequently is chaff - metallic coated strips or particles that are dispersed in the air to decoy radar-guided missiles. During some exercises, ships will engage in evasive maneuvers at full speed (in excess of 30 knots) to enhance the effectiveness of decoys, avoid simulated incoming rounds and attain firing positions.



DDG-60, one of the Navy's newest destroyers, maneuvers at sea.

b. Training Conducted

i. Proficiency Training. Ships conduct basic drills to train the crew in the use and maintenance of their equipment. This starts at a basic level of familiarization with operation of equipment and proceeds through complex drills designed to train a crew to achieve combat readiness in a realistic environment. Gunnery and missile exercises are also conducted to calibrate, align and otherwise improve the performance of a weapons system. Most proficiency training is conducted in the vicinity of a ship's homeport. Approximately fifteen to eighteen ships are routinely homeported at Pearl Harbor. Three to six are deployed to the Western Pacific at any given time. In addition, surface ships from other nations periodically visit Pearl Harbor and frequently conduct ASUW training while in the area. Approximately five to ten foreign surface ships visit annually unrelated to a major exercise. Surface ships practice the detection and tracking portions of ASUW anytime they are at sea. Surface ships homeported in the Hawaii area typically spend approximately 20 to 25 days underway for training each quarter.

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Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

ii. Transiting Battle Groups. Transiting battle groups also conduct ASUW training along their track, which typically lies at least 25 miles north of Kauai while westbound. Eastbound battle groups often make a port call at Pearl Harbor and ASUW operations may be conducted enroute to Pearl Harbor or upon departure, depending upon the availability of services. Four to five ships visit Pearl Harbor every three months. Surface combatants deploying to the Middle East receive advanced ASUW training at PMRF and in the operations areas east of Hawaii three times a year.

iii. Major Exercises. Major exercises typically involve components from all the armed services and the armed forces of other nations. Major exercises can include over 50 ships and 10 submarines plus associated aviation units and Marine units. Virtually all surface ships have a ASUW mission and most exercise scenarios include at least some ASUW training. Major exercises differ from proficiency training and more structured training in that they must emphasize significant free play where units are able to maneuver realistically over a broad area to achieve there mission, as would forces in the event of actual conflict. Major exercises are also used to evaluate the effectiveness of current tactics and to develop new tactics. However even in major exercises, the conduct of actual gunnery or missile exercises is tightly controlled.

(1) RIMPAC. The general nature of RIMPAC has been previously described at page 7. RIMPAC typically includes portions devoted to ASUW. ASUW operations during RIMPAC can last the full length of the exercise (14 days). The ASUW portion includes detection phases where adversaries try to hide near or behind islands as well as gunnery and missile exercises. For example, during RIMPAC 1994, 38 surface ships conducted ASUW operations against mock surface adversaries ranging from cruisers to small boats.

(2) Other Major Exercises. Other major exercises also typically include a portion devoted to ASUW that makes use of the ranges, operations areas and target services available, particularly around Oahu and at PMRF.

c. Location of Training. Operations directed to tracking and detection of surface targets occur anytime a surface ship is at sea. Surface ships spend between twenty to twenty-five days at sea each quarter, but this tempo can increase depending on the international situation and funding.

i. Gunnery and missile exercises in the vicinity of the Hawaiian Islands must occur in one of the designated operating areas. Areas are assigned and the drills are conducted so that the fall of shot occurs within the assigned area. Surface gunnery, even involving small arms, very rarely occurs in an operation area that includes portions within the 100 fathom isobath. Where ship-towed targets are utilized, the time to tow the target to the operating area is a significant factor in selecting a suitable operating area. All training involving small arms, .50 caliber machine guns and the Phalanx Close-In Weapons System (CIWS) is conducted outside the proposed sanctuary boundaries, most frequently in Warning Area 191 or Warning Area 193, south of Pearl Harbor. These areas are all outside the 100 fathom isobath. Surface gunnery exercises using larger caliber guns are all conducted in operations areas outside the 100 fathom and outside areas proposed for the

Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

sanctuary. Excluding exercises at PMRF, most exercises take place in Warning Areas 191 or 192, south of Pearl Harbor. Such surface gunnery exercises occur approximately thirty-five to fifty days each year.

ii. All ASUW gunnery or missile exercises involving remotely controlled target boats occurs in operation areas near PMRF. PMRF is used for such ASUW exercises between 20 to 25 times each year.

d. Potential Effects on Humpback Whales and Mitigation. Gunnery and missile exercises pose few additional risks to whales beyond ordinary ship operations, which are themselves very slight. The risk of harmful effects on humpback whales is remote because of the safety procedures utilized and the very limited area where the weapons used could harm a whale. The Navy has not observed any harmful effects on humpback whales from ASUW operations nor does it anticipate any indirect or cumulative effects.

i. Exercises where ordnance is expended occur in a very controlled environment where safety is paramount. No firing is permitted until after it is determined that the range is clear. In the operating areas near Oahu, the range is visually cleared from the ship, which itself is at an increased level of readiness. Many surface ships have electrically-enhanced optics (essentially sophisticated television cameras) that permit search and identification beyond normal visual ranges. Embarked helicopters are also frequently used to further examine the range to ensure that no other surface craft or whales are present. Each small arms group or each gun (for larger weapons) has a safety observer who ensures that the range is clear before and during the exercise and who can halt the exercise if whales are observed.

ii. The range safety precautions at PMRF are even more rigorous because of the extra sensors available. Exercises involving missiles or target boats are all conducted at PMRF. PMRF strictly controls weapons firings and does not permit an exercise to proceed until the range is declared "clear" after consideration of inputs from ships' sensors, visual surveillance of the range from aircraft and range safety boats, radar data, acoustic information from a comprehensive system of sensors and surveillance from shore. The exercise can be modified as necessary to obtain a clear range or is canceled.

iii. The ordnance used in most gunnery exercises poses a risk to a whale only if the whale were to breach precisely at the point of impact. Small arms, .50 caliber machine guns and the CIWS exclusively fire non-explosive ammunition. Although some grenade launchers fire an explosive round, they have a very limited range (several hundred yards). Thus exercises using these weapons are of little risk. Even larger weapons generally fire inert or non-fragmenting ordnance for training exercises. These rounds pose a risk only at the point of impact. Even on those occasions when regular ammunition is used, rounds up to 5 inches pose a risk to marine mammals only within a very small area because of their size and fuzing.

Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

iv. When missiles are used for ASUW exercises, they are usually fitted with telemetry warheads instead of explosive warheads.[3] Some missiles used for ASUW exercises are primarily designed for use against aircraft and carry relatively small explosive charges. Harpoon missiles do carry warheads of 360 pounds, but burst at or above the surface of the water and pose much less risk to a submerged whale than a similar explosive charge at a greater depth. The area where a whale would be harmed is relatively small and given the elaborate range safety measures and the small number of such weapons used (generally less than ten per year), the risk is extremely small.

v. The risk to humpback whales from target boats at PMRF is very small. The boats themselves are fairly small (approximately fifteen to thirty feet long). They are remotely controlled, highly maneuverable and can be maneuvered to avoid any humpback whales that are detected on the range.

vi. Finally, none of the decoys deployed from ships pose any threat to humpback whales.

6. Anti-Air Warfare (AAW) Operations (Outside the 100 Fathom Isobath).

a. General. Anti-Air Warfare (AAW) operations involve a variety of activities designed to allow surface ships to detect, track and either evade or destroy hostile aircraft or missiles. AAW involves equipment maintenance and calibration, ship maneuvering, deployment of countermeasures, firing guns and missiles against simulated targets and deploying decoys. Guns used in AAW range from .50 caliber machine guns firing solid projectiles through 5 inch guns firing explosive projectiles. A variety of missiles may be used for AAW, including the Standard missile and the Sea Sparrow. Missiles used for AAW guide themselves to the target once launched. Countermeasures, both electronic and mechanical, are also deployed to decoy incoming aircraft or missiles. The most common decoy is chaff - metallic coated strips or particles that are dispersed in the

USS BARRY fires a Standard missile

[3]Telemetry warheads transmit flight characteristics, target detection and fuzing information back to the ground so that the success of the flight can be assessed.

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Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

air to decoy radar-guided missiles. Flares may also be used. The simulated targets may be sleeves towed by aircraft, drones launched from shore or in very rare cases, starshells fired by a ship.

i. Subsonic target drones are essentially unmanned small aircraft propelled by turbojet engines. Supersonic target drones, which are rocket propelled, are also used. Once the range is clear and declared "green," the drone is launched towards the general vicinity of the ship. For launch, drones may use boosters. The boosters burn out quickly and are jettisoned within moments of launch. The drone will fly a selected missile profile. Depending upon the needed training, the drone's flight path can include high altitude (20,000 to 50,000 feet), low altitude (under 200 feet) or both.

ii. Upon acquiring the target drone, the ship will launch its surface to air missile (SAM). Most but not all SAMs used at PMRF have telemetry warheads and do not explode. Relatively few missiles actually hit a drone. If a missile does hit a drone, the pieces of both fall into the sea. In the rare event that a live warhead is used, the warhead will detonate in close proximity to the target and small pieces of both will fall into the sea. Most missiles that do not strike the target or detonate are destroyed by command and fall in small pieces to the sea. Missiles that are not ordered destroyed assume a ballistic profile and fall into the sea, either intact or in pieces if the sea surface triggers the proximity fuse.

iii. Subsonic target drones are flown by remote control back to the waters nearby PMRF. When the drone runs out of fuel, it is glided onto the water where it floats until a recovery vessel retrieves the drone for reuse. Supersonic drones are not retrievable or reusable. Supersonic drones are lost at sea at the end of their missile profile.

b. Training Conducted

i. Proficiency Training. Ships conduct basic drills to train the crew in the use and maintenance of their equipment. This starts at a basic level of familiarization with operation of equipment and proceeds through complex drills designed to train a crew to achieve combat readiness in a realistic environment. Gunnery and missile exercises are also conducted to calibrate, align and otherwise improve the performance of a weapons system. Most proficiency training is conducted in the vicinity of a ship's homeport. Approximately fifteen to eighteen ships are routinely homeported at Pearl Harbor. Three to six are deployed to the Western Pacific at any given time. In addition, surface ships from other nations periodically visit Pearl Harbor and frequently conduct AAW training while in the area. Approximately five to ten foreign surface ships visit annually unrelated to a major exercise. The extent to which surface ships practice AAW depends on their mission. Many ships have only a limited self-defense capability using CIWS, decoys or Sea Sparrow or other short range missiles. Most cruisers, destroyer and frigates, on the other hand, have larger caliber guns and longer range missiles and will emphasize AAW to a much greater degree.

ii. Transiting Battle Groups. Transiting battle groups also conduct AAW training along their track, which typically lies at least 25 miles north of Kauai while westbound. Eastbound battle groups often make a port call at Pearl Harbor and AAW

Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

operations may be conducted enroute to Pearl Harbor or upon departure, depending upon the availability of services. Four to five ships visit Pearl Harbor every three months. Surface combatants deploying to the Middle East receive advanced AAW training at PMRF and in the operations areas east of Hawaii three times a year.

iii. Major Exercises. Major exercises typically involve components from all the armed services and the armed forces of other nations. Major exercises can include over 50 ships and 10 submarines plus associated aviation units and Marine units. Most surface ships have at least a self-defense AAW mission and most exercise scenarios include at least some AAW training. Major exercises differ from proficiency training and more structured training in that they must emphasize significant free play where units are able to maneuver realistically over a broad area to achieve there mission, as would forces in the event of actual conflict. Major exercises are also used to evaluate the effectiveness of current tactics and to develop new tactics. However even in major exercises, the conduct of actual gunnery or missile exercises is tightly controlled.

(1) RIMPAC. The general nature of RIMPAC has been previously described at page 7. RIMPAC typically includes portions devoted to AAW. AAW operations during RIMPAC can last the full length of the exercise (14 days). During RIMPAC 1994, 38 surface ships conducted AAW against aircraft from two carriers. Surface ships also engaged four surface-launched drones.

(2) Other Major Exercises. Other major exercises also typically include a portion devoted to AAW that makes use of the ranges, operations areas and target services available, particularly around Oahu and at PMRF.

c. Location of Training. Although the tracking and detection portion of basic AAW operations may be conducted at virtually any time, realistic training is limited by the availability of aircraft and target services. Surface ships spend between twenty to twenty-five days at sea each quarter, but this tempo can increase depending on the international situation and funding.

i. Gunnery and missile exercises in the vicinity of the Hawaiian Islands must occur in one of the designated operating areas. Areas are assigned and the drills are conducted so that the fall of shot occurs within the assigned area. All AAW gunnery is conducted outside areas proposed for the sanctuary and outside the 100 fathom isobath. Although Phalanx Close-In Weapons System CIWS test firing may occur in Operation Areas 196 and 191, most exercises occur further at sea. Surface ships utilize Operation Areas 192 and 193 approximately 12 - 20 times each year for AAW gunnery exercises.

ii. PMRF Barking Sands is one of only two locations in the entire Pacific and Middle East region that can provide realistic targets and target profiles to defend against real world threats from aircraft and missiles. All missile exercises and all gunnery exercises involving drones occur in operation areas near PMRF, usually operation areas 188 and 186. PMRF is used for such AAW exercises between 85 to 110 days each year. Include in these are approximately 35 to 40 days when drones are launched for AAW exercises. PMRF uses approximately 25 to 30 supersonic drones and 55 to 75 subsonic drones each year.

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Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

d. Potential Effects on Humpback Whales and Mitigation.

i. AAW exercises, even those involving gunnery and missiles, pose few additional risks to whales beyond ordinary ship operations, which are themselves very slight. The risk of harmful effects on humpback whales is remote because of the safety procedures utilized and the very limited area where the weapons used could harm a whale. The Navy has not observed any harmful effects on humpback whales from AAW operations nor does it anticipate any indirect or cumulative effects.

ii. Many of the AAW exercises conducted involve detection and tracking and do not involve the expenditure of weapons. These exercises are also used to test shipboard sensors and optimize their performance. The only potential for risk of harmful effects to humpback whales is from the drones or aircraft, which fly various profiles.

iii. Exercises where ordnance is expended occur in a very controlled environment where safety is paramount. No firing is permitted until after it is determined that the range is clear. In the operating areas near Oahu, the range is visually cleared from the ship, which itself is at an increased level of readiness. Many surface ships have electrically-enhanced optics (essentially sophisticated television cameras) that permit search and identification beyond normal visual ranges. Embarked helicopters are also frequently used to further examine the range to ensure that no other surface craft or whales are present. Each small arms group or each gun (for larger weapons) has a safety observer who ensures that the range is clear before and during the exercise and who can halt the exercise if whales are observed.

iv. The range safety precautions at PMRF are even more rigorous because of the extra sensors available. Exercises involving the use of drones or missiles are all conducted at PMRF. PMRF strictly controls weapons firings and does not permit an exercise to proceed until the range is declared "clear" after consideration of inputs from ships' sensors, visual surveillance of the range from aircraft and range safety boats, radar data, acoustic information from a comprehensive system of sensors and surveillance from shore. The exercise can be modified as necessary to obtain a clear range or is canceled.

v. The ordnance used in most AAW gunnery exercises poses a risk to a whale only if the whale were to breach precisely at the point of impact. Both .50 caliber machine guns and the CIWS exclusively fire non-explosive ammunition. Thus exercises using these weapons are of little risk. Even larger weapons generally fire inert or non-fragmenting ordnance for training exercises. These rounds pose a risk only at the point of impact. Even on those occasions when regular ammunition is used, rounds up to 5 inches pose a risk to marine mammals only within a very small area because of their size and fuzing. Even five inch rounds contain less than nine pounds of explosives. When missiles are used for AAW exercises, they are usually fitted with telemetry warheads instead of explosive warheads. Even when live warheads are used, the detonation is in the air, posing no risk to whales for most profiles and minimal risk even for very low altitude profiles because of the relatively small explosive charges involved. The only possible risk is in the area immediately beneath the point of detonation.

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Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

vi. The exacting range clearance procedures of PMRF makes it highly unlikely a whale could enter the range undetected. If, however, one did move onto the range, the effect of a drone passing overhead would be transitory. Given the frequency of drone launches there is no risk of cumulative impacts.

7. Explosive Ordnance Disposal (EOD) and Demolition Operations (Within 100 Fathom Isobath).

a. General. Navy Explosive Ordnance Disposal (EOD) teams conduct a variety of exercises to hone their ability to neutralize ordnance, including ordnance in the marine environment. This is necessary to safely dispose of unexploded ordnance and mines in a combat situation. It involves moving teams to the site of the ordnance by small boat and deploying divers into the water. Once the simulated ordnance is located, EOD teams set off relatively small charges to familiarize personnel with proper procedures and equipment. Although Underwater Demolition Teams (UDT) also use explosives to remove underwater obstacles, such operations occur in Hawaiian waters relatively infrequently.

b. Training Conducted

i. Proficiency Training. Although a variety of EOD training occurs in Hawaii, training involving the use of explosives is relatively rare. In one kind of training, a 20 pound explosive charge is placed on a buoy suspended three fathoms above the bottom in approximately 90 feet of water. A fuze is lit, the divers clear the area and the charge explodes approximately 30 minutes later. Approximately 20 - 30 such shots occur annually, distributed throughout the year. In another exercise, small charges (less than one-quarter pound explosive weight), are exploded to actuate cutters while attached to a quay wall at a depth of 1 fathom. Approximately 50 to 100 such shots occur annually, distributed throughout the year.

ii. Major Exercises. Major exercises often include phases that include explosive ordnance disposal. For example, RIMPAC 1994 included an event involving neutralization of a simulated piece of unexploded ordnance.

c. Location of Training. Although many aspects of EOD training can take place anywhere around the Hawaiian Islands, most training, and all explosive training, is conducted in relative proximity to the West Loch Branch of Naval Magazine Lualualei. An underwater range is located approximately one mile off the beach adjacent to the rifle range at Puulua. The underwater range is outside any area proposed for the sanctuary and well within the 100 fathom isobath.

d. Potential Effects on Humpback Whales and Mitigation. EOD operations pose very little risk of harm to humpback whales. The only training exercises that could pose any risk is the detonation of the 20 pound explosive packs. The precautions taken to ensure a clear range, the limited amount of explosives and the infrequency of the operations reduce this risk to an extremely low level. The range itself is in fairly shallow water. Before any explosive operation, the range is carefully screened visually to ensure that no humpback whales or other intruders are present. When the divers enter the water, they

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Exhibit C-2. Report on Military Activities in Hawaiian Waters (Continued)

MEMORANDUM OF UNDERSTANDING

CONCERNING MILITARY ACTIVITIES AND THE

HAWAIIAN ISLANDS HUMPBACK WHALE NATIONAL MARINE SANCTUARY

1. This memorandum of understanding between the Department of the Navy (DoN) and the National Oceanic and Atmospheric Administration (NOAA), acting on behalf of the Department of Commerce, (Parties) sets forth certain determinations and establishes supplementary procedures for dealing with military activities within or in the vicinity of the Hawaiian Islands Humpback Whale National Marine Sanctuary (Sanctuary). This memorandum is designed to address existing statutory requirements under the Hawaiian Islands National Marine Sanctuary Act, Pub.L. 102-587, §§ 2301-2307 (1992), the National Marine Sanctuaries Act, 16 U.S.C. 1431 et seq., (NMSA), 15 C.F.R. Part 922 and the final regulations for the Sanctuary when issued, and to facilitate implementation of the Sanctuary while protecting the ability of the Department of the Navy to meet its statutory obligations under 10 U.S.C. §§ 5062-63.

2. For several years the Parties have exchanged information on existing classes of military activities within or in the vicinity of the Sanctuary. The DoN has provided NOAA with a description of the classes of existing military activities presently being conducted, both internal and external to the Sanctuary, (Attachment A), which will be appended to the Final Environmental Impact Statement (FEIS) for the Sanctuary management plan. At NOAA's request, DoN has also provided NOAA with its evaluation of the potential that existing classes of military activities may destroy, cause the loss of, or injure any Sanctuary resources. (Attachment B). Pursuant to its responsibilities under the NMSA, NOAA has reviewed the information provided on existing classes of military activities and has determined that they are not likely to destroy, cause the loss of, or injure any Sanctuary resources within the Sanctuary.

3. If DoN learns that an existing military activity has destroyed, caused the loss of, or injured a humpback whale, the applicable DoN point of contact in paragraph 5 below will notify the NOAA point of contact identified in paragraph 5.iv. as soon as is reasonably possible.

4. By this agreement, NOAA and the DoN have completed the consultation required, if any, by NMSA § 304(d) on existing classes of military activities described in Attachments A and B. These existing classes of military activities, therefore, are not subject to further consultation under NMSA § 304(d), unless they are modified such that consultation is required under the final Sanctuary regulations.

5. The Parties agree to cooperate to make consultations as efficient as possible. To this end, they have designated the following principal points of contact for issues arising under this agreement:

i. For all Navy activities: Commander, Naval Base, Pearl Harbor, Hawaii.

Exhibit C-3. Navy/NOAA Memorandum of Understanding Concerning Military Activities and the Hawaiian Islands Humpback Whale National Marine Sanctuary

Memorandum of Understanding Re:
Military Activities and the HIHWNMSA
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ii. For all Marine Corps activities: Commander, Marine Forces Pacific.

iii. For NMSA § 304(d) consultations: Protected Species Program Manager, NMFS Southwest Region, Pacific Area Office, Honolulu, Hawaii.

iv. For Sanctuary management matters other than NMSA § 304(d) consultations: Hawaii Sanctuary Manager, Hawaii.

6. The Parties agree to take the steps necessary to expedite any consultation required under the final Sanctuary regulations, particularly those undertaken to address emergency conditions. Upon initiation of consultation by the DoN, the applicable principal points of contact will informally consult at the earliest practicable time, but in no circumstance later than ten working days, to establish a preliminary plan of action and milestones for completing the consultation in an efficient and timely manner, consistent with the requirements of NMSA § 304(d).

7. NOAA recognizes that some or all information regarding DoN activities may be classified in the interest of national security in accordance with applicable Executive Orders and Department of Defense directives. NOAA promptly will obtain cleared personnel and storage space to allow prompt completion of the NMSA § 304(d) consultation process.

8. The Parties agree that if the principal points of contact are unable to resolve differences on a consultation schedule, adoption of alternatives recommended by NOAA or other issues involving DoN military activities within or in the vicinity of the Sanctuary, either agency may seek additional consultation on the matter at a more senior level.

9. Each party understands that it must bear its own costs in connection with the implementation of NMSA § 304(d), applicable Sanctuary regulations and this memorandum.

10. This memorandum is effective upon signature. It may be amended by agreement of the Parties if the Parties determine an amendment is necessary to accomplish the objectives of this memorandum or to comply with applicable law or regulations. The Parties agree to review this memorandum at least every five years. The memorandum may be cancelled by either Party upon sixty days notice. Nothing in this agreement is intended to conflict with any applicable statutory or regulatory requirements. If any of the terms of this agreement are inconsistent with any statutory or regulatory requirements, then those portions of this agreement which are inconsistent shall be invalid; but the remaining provisions not affected by the inconsistency shall remain in full force and effect. Should either the NMSA or its implementing regulations be substantially altered, the Parties agree to revise this agreement as soon as possible to address the changed requirements.

Exhibit C-3. Navy/NOAA Memorandum of Understanding Concerning Military Activities and the Hawaiian Islands Humpback Whale National Marine Sanctuary (Continued)

Memorandum of Understanding Re:
Military Activities and the HIHWNMSA
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11. This is an interagency document designed to ensure expeditious, efficient cooperation among the Parties in the discharge of their responsibilities within the area of the Hawaiian Islands and does not create any independent right enforceable by any third party.

APPROVED

FOR THE DEPARTMENT OF COMMERCE:

Terry D. Garcia
NOAA General Counsel

10/10/95
DATE

Jeffrey R. Benoit
Director of the Office of Ocean and
Coastal Resources Management

10/10/95
DATE

FOR THE DEPARTMENT OF THE NAVY:

Steven S. Honigman
General Counsel

10/10/95
DATE

Attachments

Exhibit C-3. Navy/NOAA Memorandum of Understanding Concerning Military Activities and the Hawaiian Islands Humpback Whale National Marine Sanctuary (Continued)

C.4 Cultural Resources

Cultural resources include prehistoric and historic artifacts, archaeological sites (including underwater sites), historic buildings and structures, and traditional resources (such as Native American and Native Hawaiian religious sites). Cultural resources of particular concern include properties listed in or eligible for inclusion in the National Register of Historic Places (National Register). Section 106 of the **National Historic Preservation Act** (16 U.S.C. 470 et seq.) requires Federal agencies to take into consideration the effects of their actions on significant cultural properties. Implementing regulations (36 CFR 800) specify a process of consultation to assist in satisfying this requirement. To be considered significant, cultural resources must meet one or more of the criteria established by the National Park Service that would make that resource eligible for inclusion in the National Register. The term “eligible for inclusion in the National Register” includes all properties that meet the National Register listing criteria specified in Department of Interior regulations at 36 CFR 60.4. Resources not formally evaluated may also be considered potentially eligible and, as such, are afforded the same regulatory consideration as listed properties. Whether prehistoric, historic, or traditional, significant cultural resources are referred to as historic properties.

Numerous laws and regulations require that possible effects on important cultural resources be considered during the planning and execution of Federal undertakings. These laws and regulations stipulate a process of compliance, define the responsibilities of the Federal agency proposing the action, and prescribe the relationship among other involved agencies (e.g., State Historic Preservation Officer, the Advisory Council on Historic Preservation). In addition to the NEPA, the primary laws that pertain to the treatment of cultural resources during environmental analysis are the National Historic Preservation Act, especially Sections 106 and 110; the **Archaeological Resources Protection Act** of 1979 (16 U.S.C. 470aa-470mm), which prohibits the excavation or removal of items of archaeological interest from Federal lands without a permit; the **Antiquities Act** of 1906 (16 U.S.C. 431); and the **Native American Graves Protection and Repatriation Act** (25 U.S.C. 3001 et seq.), which requires that Federal agencies return “Native American cultural items” to the Federally recognized native groups with which they are associated, and specifies procedures to be followed if such items are discovered on Federal land.

C.5 Hazardous Materials and Waste

Hazardous Materials

The U.S. Department of Transportation defines a hazardous material as a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and that has been designated as hazardous under Section 5103 of the Federal hazardous materials transportation law (49 U.S.C. 5103). The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (see 49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions (49 CFR 173).

Hazardous Wastes

Solid waste materials are defined in 40 CFR 261.2 as any discarded material (i.e., abandoned, recycled, or "inherently waste-like") that is not specifically excluded from the regulatory definition. This waste can include materials that are solid, liquid, or gaseous (but contained). Hazardous waste is further defined as any solid waste not specifically excluded which contains specified concentrations of chemical constituents or has certain toxicity, ignitability, corrosivity, or reactivity characteristics.

Federal Regulations

The **Oil Pollution Act** of 1990 required oil storage facilities and vessels to submit to the Federal government plans detailing how they will respond to large discharges. In 2002, however, USEPA amended the Oil Pollution Prevention regulation. The Oil Pollution Prevention and Response; Non-Transportation-Related Onshore and Offshore Facilities; Final Rule (40 CFR 112) requires Spill Prevention, Control, and Countermeasure Plans and Facility Response Plans. These plans outline the requirements to plan for and respond to oil and hazardous substance releases. Chapter 10 (2003) of Chief of Naval Operations Instruction (OPNAVINST) 5090.1B also describes the Navy's requirements for oil and hazardous substance spills.

The **Clean Water Act** (CWA) prohibits discharges of harmful quantities of hazardous substances into or upon U.S. waters out to 200 nm. Environmental compliance policies and procedures applicable to shipboard operations afloat are defined in OPNAVINST 5090.1B (2002), Chapter 19. These instructions reinforce the CWA discharge prohibition. The Navy's Consolidated Hazardous Materials Reutilization and Inventory Management Program (CHRIMP) Manual also contains information to provide to the chain of command, afloat and ashore, to assist in developing and implementing hazardous materials management. Hazardous materials on Navy vessels afloat are procured, stored, used, and disposed in accordance with CHRIMP and related guidance.

In 1999, USEPA adopted a final rule intended to establish **Uniform National Discharge Standards** (UNDS) for 25 discharge sources on U.S. military vessels. The rule exempted 14 additional sources (40 CFR Part 1700). Pursuant to this legislation, State and local governments are prohibited from regulating the 14 discharges exempted from control, but may establish no-discharge zones for them. The UNDS legislation amended the CWA to exclude from the definition of "pollutant" a discharge incidental to the normal operation of a vessel of the Armed Forces.

The Environmental and Natural Resource Program Manual, **OPNAVINST 5090.1B** provides Navy policy, identifies key statutory and regulatory requirements, and assigns responsibility for Navy programs, including pollution prevention, clean up of waste disposal sites, and compliance with current laws and regulations for the protection of the environment and natural resources.

The **Nuclear Regulatory Commission** (Public Law [PL] 93-438, 42 U.S.C. 5801, et seq.) regulates radioactive materials, including depleted uranium; enforcement of this statute is conducted under 10 CFR 19, 20, 21, 30, and 40, Nuclear Regulatory Commission Standards for Protection Against Radiation. These health and safety standards were established as protection against ionizing radiation resulting from activities conducted under the licenses issued by the Nuclear Regulatory Commission. The handling, storage, transport, and disposal of radioactive materials; establishment of radiation protection programs; and record keeping are subject to Nuclear Regulatory Commission requirements.

"Pollution prevention," as defined by the **Pollution Prevention Act** of 1990 (PL 101-508, 42 U.S.C. 13101, et seq.) and EO 12856 (Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, August 3, 1993), is "any practice which reduces the amount of a hazardous substance, pollutant or contaminant entering any waste stream or otherwise released to the environment (including fugitive emissions) prior to recycling, treatment or disposal; and any practice that reduces the hazards to public health and the environment associated with the release of such substances, pollutants or contaminants." The Pollution Prevention Act of 1990 requires USEPA to develop standards for measuring waste reduction, serve as an information clearinghouse, and provide matching grants to state agencies to promote pollution prevention. Facilities with more than 10 employees that manufacture, import, process, or otherwise use any chemical listed in and meeting threshold requirements of Emergency Planning and Community Right-to-Know Act must file a toxic chemical source reduction and recycling report.

The **Toxic Substances Control Act** of 1976 (PL 94-469, 15 U.S.C. 2601, et seq.) establishes that USEPA has the authority to require the testing of new and existing chemical substances entering the environment, and, subsequently, has the authority to regulate these substances. The Toxic Substances Control Act also regulates polychlorinated biphenyls.

The **Emergency Planning and Community Right-to-Know Act** of 1986 (EPCRA) as part of the SARA Title III establishes the emergency planning efforts at State and local levels and provides the public with potential chemical hazards information. There are two key concepts to understanding EPCRA: (1) EPCRA's intent to inform the public, and (2) a facility has four reporting requirements, defined in part by hazardous substance lists and exemptions, for emergency planning, emergency notification, community right-to-know, and toxic chemical release inventory.

The **Federal Insecticide, Fungicide, and Rodenticide Act** of 1972 regulates the labeling requirement and disposal practices of pesticide usage.

The **Hazardous Materials Transportation Act** of 1975 gives the U.S. Department of Transportation authority to regulate shipments of hazardous substances by air, highway, or rail. These regulations, found at 49 CFR 171–180, may govern any safety aspect of transporting hazardous materials, including packing, repacking, handling, labeling, marking, placarding, and routing (other than with respect to pipelines).

In 1997 USEPA, in consultation with the DoD, developed and published the "**Military Munitions Rule**: Hazardous Waste Identification and Management; Explosives Emergencies; Manifest Exemption for Transport of Hazardous Waste on Right-of-Ways on Contiguous Properties." The rule defines when conventional and chemical military munitions become solid wastes potentially subject to hazardous waste regulations, and establishes procedures and management standards for waste military munitions. This rule establishes the regulatory definition of solid waste as it applies to three specific categories of military munitions:

- Unused munitions;

- Munitions being used for their intended purpose; and
- Used or fired munitions.

Under the Military Munitions Rule, military munitions are not a solid waste for regulatory purposes:

- When a munition is being used for its intended purpose, which includes when a munition is being used for the training of military personnel; when a munition is being used for research, development, testing, and evaluation; and when a munition is destroyed during range clearance operations at active and inactive ranges; and
- When a munition that has not been used or discharged, including components thereof, is repaired, reused, recycled, reclaimed, disassembled, reconfigured, or otherwise subjected to materials recovery activities.

State Regulations

In 2001, Hawaii was authorized by USEPA to administer the **Resource Conservation and Recovery Act** under the Hawaii's Hazardous Waste Rules. These rules apply to hazardous waste generators; transporters; owners, and operators of treatment, storage, and disposal facilities; handlers of universal wastes; and handlers of used oil. Hawaii's Hazardous Waste Rules are modeled after the Federal hazardous waste rules. Hawaii's Department of Health is responsible for hazardous waste management. Title 11 of the Hawaii Administrative Rules (HAR) describes the requirements for hazardous waste management.

Hawaii's Hazardous Waste Law (Hawaii Revised Statutes [HRS] 342J) authorizes the Department of Health to regulate hazardous waste. Under the Hawaii Hazardous Waste Management Act (HRS Title 19, Health, Chapter 342J), the State hazardous waste management program provides technical assistance to generators of hazardous waste to ensure safe and proper handling. The hazardous waste management program promotes hazardous waste minimization, reduction, recycling, exchange, and treatment as the preferred methods of managing hazardous waste, with disposal used only as a last resort when all other hazardous waste management methods are ineffective or unavailable. The State program is coordinated with Hawaii's counties, taking into consideration the unique differences and needs of each county.

C.6 Health and Safety

Regulatory requirements related to the **Occupational Safety and Health Act** of 1970 have been codified in 29 CFR 1910, *General Industry Standards,* and 29 CFR 1926, *Construction Industry Standards.* The regulations contained in these sections specify equipment, performance, and administrative requirements necessary for compliance with Federal occupational safety and health standards, and apply to all occupational (workplace) situations in the United States. Requirements specified in these regulations are monitored and enforced by the Occupational Safety and Health Administration (OSHA), which is a part of the U.S. Department of Labor.

With respect to ongoing work activities, the primary driver is the requirements found in 29 CFR 1910, *Occupational Safety and Health Standards.* These regulations address such items as electrical and mechanical safety and work procedures, sanitation requirements, life safety requirements (fire and evacuation safety, emergency preparedness, etc.), design requirements for certain types of facility equipment (such as ladders and stair lifting devices), mandated training programs (employee Hazard Communication training, use of powered industrial equipment, etc.), and recordkeeping and program documentation requirements. For any construction or construction-related activities, additional requirements specified in 29 CFR 1926, *Safety and Health Regulations for Construction,* also apply.

OPNAVINST 5100.23G, Navy Safety and Occupational Health Program Manual, contains policy statements and outlines responsibilities for the implementation of the total safety and occupational health program for the Navy. The Navy's policy is to provide a safe and healthful working place for all personnel.

All work activities undertaken or managed by the U.S. Army Corps of Engineers, which can include many types of Federal construction projects, must comply with the requirements of EM 385-1-1, **U.S. Army Corps of Engineers Safety and Health Requirements Manual**. In many respects the requirements in this manual reflect those in 29 CFR 1910 and 1926, but also include Army Corps of Engineers-specific reporting and documentation requirements.

The **Range Commanders Council (RCC) Standard 321**, *Common Risk Criteria for National Test Ranges,* sets requirements for minimally-acceptable risk criteria to occupational and non-occupational personnel, test facilities, and non-military assets during range operations. Methodologies for determining risk are also set forth.

RCC 319-92, *Flight Termination System Commonality Standards* specifies performance requirements for flight termination systems used on various flying weapons systems.

Requirements pertaining to the safe shipping and transport handling of hazardous materials (which can include hazardous chemical materials, radioactive materials, and explosives) are found in the **Department of Transportation Hazardous Materials Regulations and Motor Carrier Safety Regulations** codified in 49 CFR 107, 171-180 and 390-397. These regulations specify all requirements that must be observed for shipment of hazardous materials over highways (truck shipment) or by air. Requirements include specific packaging requirements, material compatibility issues, requirements for permissible vehicle/shipment types, vehicle marking requirements, driver training and certification requirements, and notification requirements (as applicable).

Marine Terminals, 29 CFR 1917, applies to employment within a marine terminal (as defined in 29 CFR 1917.2) including the loading, unloading, movement or other handling of cargo, ship's stores, or gear within the terminal or into or out of any land carrier, holding or consolidation area, and any other activity within and associated with the overall operation and functions of the terminal, such as the use and routine maintenance of facilities and equipment. Cargo transfers accomplished with the use of shore-based material handling devices are also regulated.

Air Installation Compatible Use Zones and Aircraft Safety

The DoD established the Air Installation Compatible Use Zone (AICUZ) program in 1973 to plan for land use compatibility in areas surrounding military air installations. The purposes of the AICUZ program are to minimize public exposure to safety hazards associated with aircraft operations and to protect the operational capability of an air installation. In addition to noise, the AICUZ program includes analyses of airfield Accident Potential Zones (APZs) and height and obstruction criteria. An AICUZ study has not been prepared specifically for the Hawaii Range Complex (HRC).

Guidelines for establishing aviation safety zones around helicopter landing zones include clear zones and APZs. Infrequent helicopter operations require designation of a clear zone, but not APZs. The clear zone for VFR aircraft is the same as the takeoff safety zone. The takeoff safety zone constitutes the area under the approach/departure surface until that surface is 50 to 100 ft above the landing zone elevation. This zone is required to be free of obstructions.

Fleet Area Control and Surveillance Facility (FACSFAC) Pearl Harbor is responsible for area containment to preclude conflicts with other air traffic under FAA control. FACSFAC is not responsible for safe separation of aircraft operating under VFR in the Warning Areas. Commanding Officers will ensure that firing exercises and other hazardous operations have been approved and scheduled by the Scheduling Authority. In all Live Fire Exercises and those involving hazards to other units, final responsibility for ensuring the range is clear rests with the Commanding Officer of the firing unit.

Electromagnetic Radiation

Communications and electronic devices such as radar, electronic jammers, and other radio transmitters produce electromagnetic radiation (EMR). Equipment that produces an electromagnetic field has the potential to generate hazardous levels of EMR. An EMR hazard exists when transmitting equipment generates electromagnetic fields that induce currents or voltages great enough to trigger electro-explosive devices in ordnance, cause harmful effects on people or wildlife, or create sparks that can ignite flammable substances in the area. EMR can pose a health hazard to people or pose an explosive hazard to ordnance or fuels. Hazards are reduced or eliminated by establishing minimum distances from EMR emitters for people, ordnance, and fuels.

Explosive Safety Quantity Distance Arcs and Explosives

The types and amounts of explosives materials that may be stored in an area are determined by the quantity-distance requirements established by the DoD Explosives Safety Board. Explosive Safety Quantity-Distance (ESQD) arcs are defined by the Naval Sea Systems Command, and are used to establish the minimum safe distance between munitions storage areas and habitable structures. To ensure safety, personnel movements are restricted in areas surrounding a magazine or group of magazines. ESQD arcs have been developed for the Navy's munitions storage facilities at Naval Magazine Pearl Harbor.

Procedures for notification of underwater detonations are provided by Commander, Naval Surface Force, U.S. Pacific Fleet (COMNAVSURFPAC). Upon receipt of a “Request for Detonation of Underwater Ordnance” Commander, Naval Base Pearl Harbor determines whether the proposed detonation would constitute any danger, and replies to COMNAVSURFPAC by message stating concurrence or objection. Upon receipt of concurrence by appropriate Submarine Operating Authority and Naval Oceanographic Processing Facility, COMNAVSURFPAC grants permission via message to the requesting command to conduct underwater detonations. COMNAVSURFPAC simultaneously requests issuance of a local Notice to Mariners from the appropriate U.S. Coast Guard District (U.S. Department of the Navy, 2003b).

High-Velocity Air

High-velocity air is generated by hovercraft operations during amphibious training activities. The high-velocity air that exits the hovercraft creates potential hazards from foreign objects propelled due to the force of the air induction during hovercraft operation. Due to diffusion with existing air, as distance from the hovercraft increases, the velocity of the air decreases. While in operation, the hovercraft requires a 250-ft radius safety zone. Hovercraft such as the Landing Craft, Air Cushioned are most likely to generate high-velocity air near members of the public during Expeditionary Assault Exercises.

To a lesser extent than hovercraft operations, high-velocity air also is created near helicopters when they land or take off, or hover within about 50 ft of the water surface. Depending on the ground conditions, a 50- to 100-ft diameter safety zone is required when helicopters take off or land. Military personnel are trained in the correct procedures for approaching helicopters at landing zones, and these areas are generally restricted to military personnel, so the potential for high-velocity air from helicopters to affect public safety is very low.

Most of the naval training that takes place in the HRC occurs in international waters and airspace. Non-participating aircraft and surface vessels may be present. Notices to Airmen and Notice to Mariners are published to inform the public of training activities and exercises in the area that may pose a public safety hazard. In general, if non-participating aircraft or ships are present, hazardous operations are suspended until the range is clear.

C.7 Land Use

Land use is described as the human use of land resources for various purposes, including economic production, natural resources protection, or institutional uses. Land uses are frequently regulated by management plans, policies, ordinances, and regulations that determine the types of uses that are allowable or protect specially designated or environmentally sensitive uses. Potential issues typically stem from encroachment of one land use or activity on another or an incompatibility between adjacent land uses that leads to encroachment.

Any needed modifications to existing agreements or acquisition of any necessary real estate rights to accomplish HRC training would be performed by the Navy as required.

The **Federal Coastal Zone Management Act** of 1972 (as amended 16 U.S.C. 1451, et seq.,) excludes Federal lands from the coastal zone. However, Federal agencies that conduct activities directly affecting the zone must ensure that the activity is consistent with the State's Coastal Zone Management Program. The Hawaii Coastal Zone Management Program (HRS Chapter 205A), which is administered by the Department of Land and Natural Resources, regulates public and private uses in the coastal zone. The objectives and policies of the program consist of providing recreational resources; protecting historic and scenic resources and the coastal ecosystem; providing economic uses; reducing coastal hazards; and managing development in the coastal zone. The Hawaii Coastal Zone Management Program designates special management areas in the coastal zone which are subject to special controls on development. These areas extend inland from the shoreline and are established by the county planning commission or by the county council. The special management area is a designated area inland to the extent necessary to control shorelands, the uses of which have a direct and significant impact on the coastal waters.

C.8 Noise

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, diminishes the quality of the environment, or is otherwise annoying. Response to noise varies by the type and characteristics of the noise source, distance between source and receptor, receptor sensitivity, and time of day. Noise may be intermittent or continuous, steady or impulsive, and may be generated by stationary sources or by transient sources. Noise receptors can include humans as well as terrestrial and marine animals. Of specific concern are potential noise effects on humans, marine mammals, birds, and fish. Each receptor has higher or lower sensitivities to sounds of varying characteristics.

Sound levels can be easily measured, but the variability in subjective and physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as “loudness” or “noisiness.” Physically, sound pressure magnitude is measured and quantified in terms of a level scale in units of decibels (dB).

The human hearing system is not equally sensitive to sound at all frequencies. Because of this variability, a frequency-dependent adjustment called A-weighting has been devised so that sound may be measured in a manner similar to the way the human hearing system responds. The abbreviation for A-weighted sound level, dBA, is often used for expressing the units of the sound level quantities. Table C-7 lists typical A-weighted noise levels measured for various sources. When sound levels are read and recorded at distinct intervals over a period of time, they indicate the statistical distribution of the overall sound level in a community during the measurement period. The most common parameter derived from such measurements is the energy equivalent sound level (L_{eq}). L_{eq} is a single-number noise descriptor that represents the average sound level in a real environment where the actual noise level varies with time.

While the A-weighted scale is often used to quantify the sound level of an individual event, the degree of annoyance perceived by individuals depends on a number of factors. Some of the factors identified by noise researchers that affect our perception and cause us to categorize a sound as an annoyance or “noise” are magnitude of the event sound level in relation to the background (i.e., ambient) sound level, duration of the sound event, frequency of occurrence of events, and time of day at which events occur.

Several methods have been devised to relate noise exposure over time to community response. USEPA has developed the Day-Night Average Sound Level (L_{dn}) as the rating method to describe long-term annoyance from environmental noise. L_{dn} is similar to a 24-hour L_{eq} A-weighted, but with a 10 dB penalty for nighttime (10:00 p.m. to 7:00 a.m.) sound levels to account for the increased annoyance that is generally felt during normal sleep hours. The Air Force also uses L_{dn} for evaluating community noise impact.

Table C-7. Noise Levels of Common Sources

Source	Noise Level (in A-weighted decibels)	Comment
Air raid siren	120	At 50 feet (threshold of pain)
Rock concert	110	
Airplane, 747	102.5	At 1,000 feet
Jackhammer	96	At 10 feet
Power lawn mower	96	At 3 feet
Football game	88	Crowd size: 65,000
Freight train at full speed	88 to 85	At 30 feet
Portable hair dryer	86 to 77	At 1 feet
Vacuum cleaner	85 to 78	At 5 feet
Long range airplane	80 to 70	Inside
Conversation	60	
Typical suburban background	50	
Bird calls	44	
Quiet urban nighttime	42	
Quiet suburban nighttime	36	
Library	34	
Bedroom at night	30	

Source: Cowan, 1994

The Community Noise Equivalent Level (CNEL) has been adopted by the State of California for environmental noise monitoring purposes. CNEL is also similar to the A-weighted L_{eq}, but includes a penalty of 5 dB during evening hours (7:00 p.m. to 10:00 p.m.), while nighttime hours (10:00 p.m. to 7:00 a.m.) are penalized by 10 dB. For outdoor noise, the L_{dn} noise descriptor is usually 0.5 to 1 dB less than CNEL in a given environment.

CNEL and L_{dn} values can be useful in comparing noise environments and indicating the potential degree of adverse noise impact. However, averaging the noise event levels over a 24-hour period tends to obscure the periodically high noise levels of individual events and their possible adverse effects. In recognition of this limitation of the CNEL and L_{dn} metrics, USEPA uses single-event noise impact analyses for sources with a high noise level and short duration.

The maximum sound level (L_{max}) is a noise descriptor that can be used for high-noise sources of short duration, such as space vehicle launches. The L_{max} is the greatest sound level that occurs during a noise event. The term “peak” defines peak sound over an instantaneous time frame for a particular frequency.

Federal and State governments have established noise regulations and guidelines for the purpose of protecting citizens from potential hearing damage and various other adverse physiological, psychological, and social effects associated with noise. The Federal government preempts the State on control of noise emissions from aircraft, helicopters, railroads, and interstate highways.

The **Noise Control Act** (PL 92-574, 42 U.S.C. 4901, et seq.) directs all Federal agencies, to the fullest extent within their authority, to carry out programs within their control in a manner that promotes an environment free from noise that jeopardizes the health or welfare of any American. The act requires a Federal department or agency engaged in any activity resulting in the emission of noise to comply with Federal, State, interstate, and local requirements respecting control and abatement of environmental noise. OSHA has established noise limits for workers. For an 8-hour workday, people should not be exposed to a continuous noise level greater than 90 dBA. In addition, personnel should not be exposed to noise levels higher than 115 dBA for periods longer than 15 minutes. For the general public, USEPA recommends a 24-hour average noise level not to exceed 70 dBA. Table C-8 shows permissible noise exposures. The DoD Noise–Land Use Compatibility Guidelines state that sensitive land use, such as residential areas, are incompatible with annual L_{dn} greater than 65 dBA. Table C-9 shows land use zones for noise and accompanying day-night noise levels.

Table C-8. Permissible Noise Exposures*

Duration (hours per day)	Sound level (dBA) Slow Response
8	90
6	92
4	95
3	97
2	100
1 to 1.5	102
1	105
0.5	110
0.25 or less	115

Source: 29 CFR 1910.95, Table G-16
*Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level

Table C-9. Definition of Land Use Zones for Noise

Noise Zone	Compatibility with Noise Sensitive Land Uses	Percent of Population Highly Annoyed	C-Weighted Annual Average Day-Night Sound Level (Ldn)
I	Acceptable	Less than 15%	Less than 62 dB
II	Normally Unacceptable	15-39%	62–70 dB
III	Unacceptable	More than 39%	More than 70 dB

Source: U.S. Department of the Army, Regulation 200-1

C.9 Socioeconomics

Socioeconomics describes the social and economic character of a community through the review of several metrics including population size, employment characteristics, income generated, and the type and cost of housing. This section presents a socioeconomic overview of the region.

C.10 Transportation

Ground Transportation

Traffic circulation refers to the movement of ground transportation vehicles from origins to destinations through a road and rail network. Roadway operating conditions and the adequacy of the existing and future roadway systems to accommodate these vehicular movements usually are described in terms of the volume-to-capacity ratio, which is a comparison of the average daily traffic volume on the roadway to the roadway capacity. The volume-to-capacity ratio corresponds to a Level of Service (LOS) rating, ranging from free-flowing traffic conditions (LOS A) for a volume-to-capacity of usually less than 30 percent of the roadway capacity to forced-flow, congested conditions (LOS F) for a volume-to-capacity of 100 percent of the roadway capacity (U.S. Department of Defense, 2004).

Waterways

Water traffic is the transportation of commercial, private, or military vessels at sea, including submarines. Sea traffic flow in congested waters, especially near coastlines, is controlled by the use of directional shipping lanes for large vessels (cargo, container ships, and tankers). Traffic flow controls also are implemented to ensure that harbors and ports-of-entry do not become congested. There is less control on ocean traffic involving recreational boating, sport fishing, commercial fishing, and activity by naval vessels. However, Navy vessels follow military procedures and orders (e.g., Fleet Forces Command) as well as Federal, State, and local marine regulations. In most cases, the factors that govern shipping or boating traffic include adequate depth of water, weather conditions (primarily affecting recreational vessels), the availability of fish of recreational or commercial value, and water temperature (higher water temperatures will increase recreational boat traffic and diving activities) (U.S. Department of Defense, 2004).

Airways

Air transportation is the movement of aircraft through airspace. The control of airspace used by air traffic varies from very highly controlled to uncontrolled areas. Examples of highly controlled air traffic situations are flight in the vicinity of airports, where aircraft are in critical phases of flight (take-off and landing); flight under IFR; and flight on the high or low altitude route structure (airways). Less-controlled situations include flight VFR or flight outside of U.S. controlled airspace (e.g., flight over international waters off the coast of Hawaii) (U.S. Department of Defense, 2004).

C.11 Water Resources

Regulatory Context

Federal

The objective of the **CWA** and its amendments is to “restore and maintain the chemical, physical and biological integrity of the nation’s waters.” The overall goal of the CWA is to produce waters of the United States that are “fishable and swimmable.” Under the CWA, the Federal government delegated responsibility for establishing water quality criteria to each State, subject to approval by USEPA.

A primary means of evaluating and protecting water quality is establishing and enforcing water quality standards. Water quality standards consist of:

- Designated beneficial uses of water (for example, drinking, recreation, aquatic life);
- Numeric criteria for physical and chemical characteristics for each type of designated use;
- An “antidegradation” provision to protect uses and water quality.

In accordance with the CWA, States define the uses of waters within their borders, and each water body must be managed in accordance with its designated uses. Water quality standards are established for each designated use. Standards must be at least as stringent as those established by USEPA. Most States have adopted the USEPA standards.

Under Section 313 of the CWA, Federal agencies must comply with all Federal, State, interstate, and local requirements to control and abate water pollution. Compliance includes managing any activity that may result in the discharge or runoff of pollutants. The CWA does not apply, however, to Navy training more than 3 nm from the shoreline of the United States.

Water bodies that do not meet designated minimum quality standards are listed as “impaired” waters. For impaired water bodies, States are expected to develop Total Maximum Daily Loads (TMDLs), which are the amounts of pollutants that can be delivered to a body of water without exceeding the water quality standards. Based on the TMDLs that are developed, the State can limit discharges of pollutants to achieve the minimum water quality standards. Hawaii has identified 70 streams and 174 coastal stations as impaired waters.

State

HRS Chapter 342D authorizes Hawaii's Department of Health to regulate water quality in Hawaii. Hawaii’s water quality regulations are found in HAR Title 11, Chapters 54, 55 (Water Pollution Control), 62 (Wastewater Systems), and 64 (Water Quality Standards). The Department of Health Clean Water Branch protects coastal and inland water resources, its Safe Drinking Water Branch safeguards Hawaii’s potable surface and ground waters, and its Wastewater Branch regulates water pollution control and wastewater treatment plants. The Clean Water Branch administers the Federal National Pollutant Discharge Elimination System program and issues State water quality certifications under Section 404 of the CWA.

The **Non-Point Source Pollution Management and Control Law** (HRS 342E) authorizes the Department of Health to regulate the runoff of polluted water into lakes, streams, and coastal waters. This program was established pursuant to portions of the Federal Water Pollution Control Act and Coastal Zone Act Reauthorization Amendments.

Water quality is evaluated relative to criteria established under **State Water Quality Standards (HAR 11-54**). A water body may be polluted by a point source (e.g., sewage or industrial plant outfall) or by non-point-source pollution, which is caused by precipitation moving over and through the ground, picking up and carrying pollutants and depositing them in water bodies. Examples of non-point-source pollution are runoff from agricultural fields and urban streets.

Water quality is an increasing concern in Hawaii. Hawaii's Department of Health is promulgating contaminant TMDLs for impaired surface waters, pursuant to Section 303(d) of the CWA that will further restrict the allowable amounts of pollutants in surface runoff.

Training activities that disturb vegetation or soils can increase sediment concentrations. Training may also result in releases of petroleum products and other pollutants to surface waters. On live fire ranges, explosive and propellant residues, residues from munitions remnants (e.g., heavy metals), and residues from targets could be a particular concern. At some point, further increases in training may conflict with achieving and maintaining Federally mandated TMDLs.

The State's 1991 **Hawaii Ocean Resources Management Plan** (ORMP) identified strategies for conserving and enhancing ocean resources, and for coordinating the resource management efforts of State agencies. The ORMP was updated in 2006. The September 2006 Draft ORMP focuses on (a) reducing pollutant discharges into the ocean, (b) resolving conflicts between expanded urban development, increased tourism, and resource conservation, (c) addressing a trend toward decreased agricultural runoff and increased urban runoff, and (d) managing increased vessel traffic.

Appendix D
Hawaii Range Complex Training

APPENDIX D
HAWAII RANGE COMPLEX TRAINING

Table D-1 lists descriptions of training areas in the Hawaii Range Complex (HRC).

Table D-1. Hawaii Range Complex Training Areas

Training Area	Description
OPEN OCEAN & OFFSHORE	
Northern Warning Areas	
W-188 Rainbow, W-189, W-190	The Northern Warning Areas lie north of Kauai and Oahu. These areas are available from the surface to an unlimited altitude and are used for surface and air operations.
Southern Warning Areas	
W-186, W-187, W-192, W-193, W-194	The Southern Warning Areas are located south of Kauai and Oahu. Available from the surface to an unlimited altitude, they are used for air and surface operations.
W-191	W-191, located directly south of Oahu, is available from the surface to 3,000 feet (ft) for air and surface operations.
W-196	W-196 is used only for surface and helicopter operations. The airspace extends from the surface to 2,000 ft, and is not available to fixed-wing aircraft.
Kapu/Quickdraw, Wela Hot Areas	Kapu/Quickdraw and Wela Hot Areas are located completely within W-192. These Areas are used for surface-to-air and air-to-air gunnery, air-to-surface bombing and gunnery, and jettisoning of ordnance.
Air Traffic Control Assigned Airspace (ATCAA)	
Nene	Nene is the only ATCAA associated with the Northern Warning Areas. It is typically activated for use during Hawaii Air National Guard intercept training.
Pali	Pali is a roughly 40-nautical-mile (nm) circular area over Oahu, from 25,000 ft to an unlimited altitude, although it is normally not available below 28,000 ft. Pali is used by high-altitude aircraft transiting between the Northern and Southern Warning Areas.
Taro	Taro overlies W-191, sharing the same borders and, when available, extending its airspace from 3,000 ft to 16,000 ft. This airspace allows aircraft to remain in controlled airspace while testing above W-191's 3000-ft ceiling.
Quint	Quint is located 45 nm southwest of Honolulu, with available airspace from flight level (FL) 250 to an unlimited altitude, although it is usually not available below FL 280.
Mela North, Mela Central, Mela South	The Mela ATCAAs connect the western border of W-192 with the southern border of W-186 (Pacific Missile Range Facility [PMRF]). They are available from the floor of controlled airspace (1,200 ft) to an unlimited altitude, except for Mela North which has a ceiling of 15,000 ft.
Mako, Lono West, Lono Central, Lono East	The Mako and Lono ATCAAs are available to extend the Special Use Airspace of Mela South, W-192, W-193, and W-194 by an additional 104 nm. All are available from the floor of controlled airspace to an unlimited altitude, and are activated to provide more southern area airspace.
Pele	Pele provides a transit corridor from W-194 and Lono East into R-3103 airspace over Pohakuloa Training Area on Hawaii. When activated, Pele extends from 16,000 ft to FL 290.

Table D-1. HRC Training Areas (Continued)

Training Area	Description
Kaula	
R-3107, W-187	Kaula is a 0.5-nm by 0.7-nm island surrounded by a 3-nm radius restricted area (R-3107), and a 5-nm radius warning area (W-187). Both R-3107 and W-187 extend from surface to 18,000 ft.
Pacific Missile Range Facility (PMRF)	
W-186, W-188	W-186 extends from surface to 9,000 ft, and W-188 extends from surface to unlimited. These two warning areas support activities at PMRF.
R-3101, Majors Bay	R-3101 extends from surface to unlimited and provides necessary airspace to support training and research, development, test, and evaluation activities at PMRF. Majors Bay lies beneath R-3101 and includes beach area on PMRF property.
Barking Sands Tactical Underwater Range (BARSTUR)	BARSTUR is an instrumented underwater range that provides approximately 120 nm^2 of underwater tracking of participants and targets
Barking Sands Underwater Range Expansion (BSURE)	BSURE extends BARSTUR to the north, providing an additional 900 nm^2 of underwater tracking capability.
Other Restricted Areas	
Ewa Training Minefield	The Ewa Training Minefield is an ocean area extending from Ewa Beach approximately 2 nm toward Barbers Point, and out to sea approximately 4 nm. This restricted area has been used in the past for surface ship mine avoidance training.
Submarine Operating Area	The Submarine Operating Area encompasses the entire ocean area of the Hawaii Range Complex. This area is bounded by 17N, 25N, 154W, and 162 W.
Naval Undersea Warfare Center (NUWC), Detachment Pacific Ranges	
Fleet Technical Evaluation Center (FTEC)	The FTEC Range Operations Building is located on the southern shore of Oahu, west of the former Barbers Point Naval Air Station. The FTEC supports SESEF events, and will support FORACS events in the future.
Shipboard Electronic Systems Evaluation Facility (SESEF)	The SESEF range is located south and west of FTEC. Ships operate and maneuver in this area as necessary to remain within electronic signal reception range of FTEC.
Fleet Operational Readiness Accuracy Check Site (FORACS)	The FORACS range includes an approximately 5-nm by 5-nm ocean area just offshore of the southwestern coast of Oahu, northwest of the SESEF range.
Explosive Ordnance Disposal (EOD) Ranges	
West Loch EOD Shore Area	The EOD shore area consists of a 2.75-acre facility at Naval Magazine Pearl Harbor West Loch.
Lima Landing Underwater Area	Lima Landing is a small underwater area just off an abandoned concrete pier at the approach to Pearl Harbor near the entrance of West Loch.
Puuloa Underwater Range	The Puuloa Underwater Range is a 1 nm^2 area in the open ocean outside and to the west of the entrance to Pearl Harbor.

Table D-1. HRC Training Areas (Continued)

Training Area	Description
ONSHORE	
Kauai	Activities occur at the following PMRF locations: Main Base, Makaha Ridge, Kokee, Kamokala Magazine, Hawaii Air National Guard, Kauai Test Facility, Port Allen, Kikiaola Boat Harbor, and Mt. Kahili.
Niihau	Activities occur at Perch site, and other authorized areas.
Kaula	Kaula is used exclusively for air-to-ground bombing and gunnery training.
Oahu	Activities occur at Naval Inactive Ship Maintenance Facility, Pearl Harbor, EOD Land Range Naval Magazine Pearl Harbor West Loch, Marine Corps Training Area/Bellows, Ford Island, Marine Corps Base Hawaii, Hickam Air Force Base, Wheeler Army Airfield, Schofield Barracks (R-3109), Coast Guard Station Barbers Point/Kalaeloa Airport, Makua Military Reservation (R-3110), Kahuku Training Area (A-311), Kaena Point, Mt. Kaala, Wheeler Network Communications Control, and Dillingham Military Reservation.
Maui	Activities occur at Maui Space Surveillance System, Maui High Performance Computing Center, and Sandia Maui Haleakala Facility.
Hawaii	Activities occur at Pohakuloa Training Area (R-3103) and adjacent leased property, Bradshaw Army Airfield, and Kawaihae Pier.

Anti-Air Warfare

Air Combat Maneuver

Air Combat Maneuver (ACM) includes basic flight maneuvers where aircraft engage in offensive and defensive maneuvering against each other. These maneuvers typically involve supersonic flight and use of chaff and flares. No air-to-air ordnance is released during this training event. ACM training events within the HRC are primarily conducted within W-188, W-189, W-190, W-192, W-193, and W-194 under Fleet Area Control and Surveillance Facility (FACSFAC) Pearl Harbor's control. These training events typically involve from two to eight aircraft. However, based on the training requirement, ACM training events may involve over a dozen aircraft. Sorties can be as short as 30 minutes or as long as 2 hours, but the typical ACM mission has an average duration of 1.5 hours. No live ordnance is used, only chaff and flares.

Baseline Training Events					
	NTA	Area	Metric	Duration (Hours)	Total Training Events
Air Combat Maneuver (ACM)	3.2.3	W-188, 189, 190, 192, 193, 194	Ops	1.5	738

Air-to-Air Missile Exercise

In an Air-to-Air Missile Exercise (A-A MISSILEX), missiles are fired from aircraft against unmanned aerial target drones such as BXM-34s and BQM-74s. Additionally, weapons may be fired against flares or Tactical Air Launched Decoys dropped by supporting aircraft. Typically, about half of the missiles fired have live warheads and half have telemetry packages. The fired missiles and targets are not recovered, with the exception of the BQM drones, which have parachutes and will float to the surface, where they are recovered by boat.

A-A MISSILEX training events include 1 to 6 jet target drones, 2 to 20 aircraft, 2 to 20 missiles, and a weapons recovery boat for target recovery, and are conducted within Pacific Missile Range Facility (PMRF) Warning Area W-188. Jet target drones are launched from an existing ground-based target launch site at PMRF Launch Complex, from a Mobile Aerial Target Support System (MATSS) located in the open ocean within the PMRF Warning Areas, or from an aircraft controlled by PMRF. The targets are engaged by aircraft equipped with air-to-air missiles. The targets are tracked by the aircraft and then the air-to-air missiles are launched at the targets. Recoverable target drones and all recoverable elements are refurbished and reused. Live and inert missiles can be fired during this training event.

Baseline Training Events					
A-A MISSILEX	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.3	W-188	Ops	2-6	12

Surface-to-Air Gunnery Exercise

A Surface-to-Air Gunnery Exercise (S-A GUNEX) requires an aircraft or missile that will fly high or low altitude threat profiles. Commercial aircraft also tows a target drone unit that ships track, target, and engage with their surface-to-air weapon systems. The training event involves 1 to 10 surface vessels, towed aerial targets, and/or jet aerial targets. Ship-deployed and air-deployed weapons systems are used, ranging from 20-mm to 5-inch caliber guns. GUNEX events are conducted within PMRF Warning Areas W-186 and W-188, Oahu Warning Areas W-187 (Kaula), W-194, and Restricted Airspace R-3107 (Kaula). Live and inert missiles can be fired during this training event.

Baseline Training Events					
Surface to Air Gunnery Exercise (S-A GUNEX)	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.7	W-188, 192, Mela South	Ops	3.1	86

Surface-to-Air Missile Exercise

A Surface-to-Air Missile Exercise (S-A MISSILEX) involves surface combatants firing live missiles (RIM-7 Sea Sparrows, SM-1 or SM-2 Standard Missiles) at target drones. The surface ship must detect, track, and engage the target using its onboard weapon systems. The purpose of the training event is to provide realistic training and evaluation of surface ships and their crews in defending against enemy aircraft and missiles.

Target drones representing enemy aircraft or missiles are flown or towed into the vicinity of the surface ship. The crew must identify the incoming object and respond with surface-to-air missiles as appropriate. There are two types of missiles: one type of missile is equipped with an instrumentation package, while the other type is equipped with a warhead. Recoverable target drones are refurbished and reused.

The training event consists of one or more surface ships, one or more target drones, and a helicopter and weapons recovery boat for target recovery. The surface-to-air missiles are launched from ships located within PMRF Warning Area W-188. Targets are launched from an existing ground-based target launch site at PMRF Launch Complex; from a MATSS located in the open ocean within the PMRF Warning Areas; or released from an aircraft. Live missiles are fired at target drones.

Baseline Training Events					
Surface-to-Air Missile Exercise (S-A MISSILEX)	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.7	W-188	Ops	5.1	17

Chaff Exercise

A Chaff Exercise (CHAFFEX) trains aircraft and shipboard personnel in the use of chaff to counter anti-ship missile threats. During a CHAFFEX, the ship combines maneuvering with deployment of multiple rounds of MK-36 super rapid bloom offboard chaff to confuse incoming missile threats, simulated by aircraft. In an integrated CHAFFEX scenario, helicopters deploy air-launched, rapid-bloom offboard chaff in pre-established patterns designed to enhance anti-ship missile defense. CHAFFEXs average 3.8 hours in duration. No ordnance is used during this training event.

Baseline Training Events					
Chaff Exercise (CHAFFEX)	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.9	Hawaii Operating Area	Ops	3.8	34

<u>Amphibious Warfare</u>

Naval Surface Fire Support Exercise (NSFS)

Navy surface combatants conduct Fire Support Exercise (FIREX) events at PMRF on a virtual range against “Fake Island,” located on Barking Sands Tactical Underwater Range (BARSTUR). Fake Island is unique in that it is a virtual landmass simulated in three dimensions. Ships conducting FIREX training against targets on the island are given the coordinates and elevation of targets. PMRF is capable of tracking fired rounds to an accuracy of 30 feet (ft). Live gunnery rounds are fired into the ocean during this training event.

Baseline Training Events					
Naval Surface Fire Support Exercise NSFS	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.8	W-188	Ops	8.1	4

Expeditionary Assault

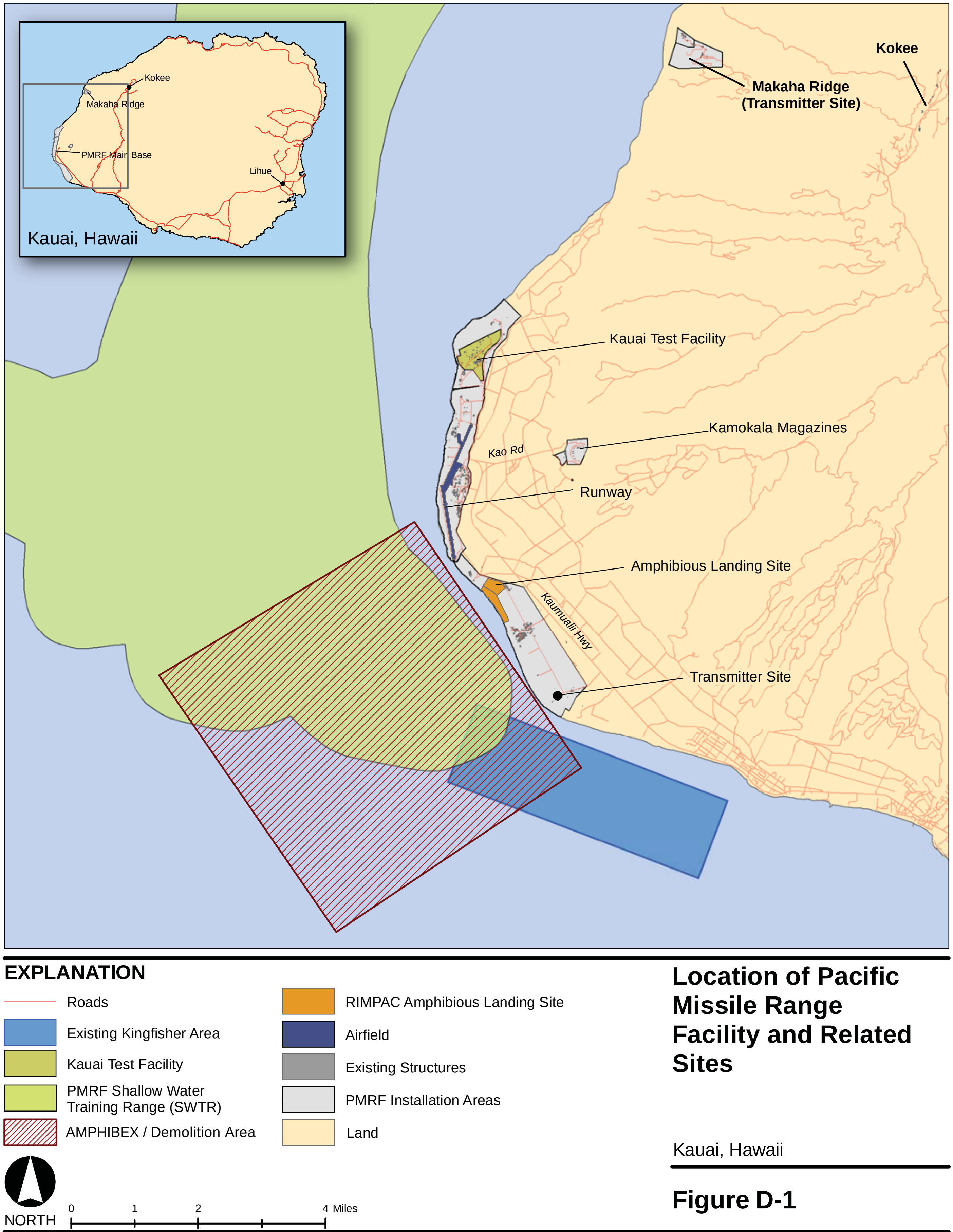
An Expeditionary Assault training event provides a realistic environment for amphibious training, reconnaissance training, hydrographic surveying, surf condition observance, and communication. Expeditionary Assault (formerly known as Amphibious Exercise) consists of a seaborne force assaulting a beach with a combination of helicopters, Vertical Takeoff and Landing (VTOL) aircraft, Landing Craft Air Cushion (LCAC), Amphibious Assault Vehicles (AAVs), Expeditionary Fighting Vehicle (EFV) and landing craft. More robust Expeditionary Assault events include support by Naval Surface Fire Support (NSFS), Close Air Support (CAS), and Marine artillery.

Types of amphibious landing craft and vehicles include:

- LCAC, an air-cushioned vessel equipped with an open-bay craft with roll-on, roll-off ramps capable of carrying tank-sized vehicles or up to 185 troops. The LCAC is approximately 88 ft by 47 ft.
- Landing Craft, Utility (LCU), a displacement hull craft designed to land very heavy vehicles, equipment, and cargo or up to 400 troops on the beach. The LCU is approximately 135 ft by 29 ft.
- AAV, a tracked, armored personnel carrier with a capacity of 21 troops. The AAV is approximately 24 ft by 13 ft.
- Combat Rubber Raiding Craft (CRRC), a lightweight, inflatable boat carrying up to 8 people used for raid and reconnaissance missions. The CRRC is approximately 16 ft by 6 ft.
- Rigid Hull, Inflatable Boat (RHIB), similar to the CRRC, but larger, carrying up to 15 people. The RHIB is approximately 24 ft by 9 ft.

An Expeditionary Strike Group (ESG) is normally a mix of three to five amphibious ships equipped with aircraft landing platforms for helicopter and fixed wing activities and well decks for carrying landing craft and AAVs. The ESG typically launches its aircraft and landing craft up to 25 miles from a training beachhead. AAVs are typically launched approximately 2,000 yards from the beach. The aircraft provide support while the landing craft approach and move onto the beach. The troops disperse from the landing craft and use existing vegetation for cover and concealment while attacking enemy positions. The landing craft and troops proceed to a designated area where they stay 1 to 4 days. When the Expeditionary Assault training event is complete, the backload takes place. The backload is normally accomplished over a 2- to 3-day period.

Amphibious landings are restricted to specific areas of designated beaches. Before each major amphibious landing training event is conducted, a hydrographic survey is performed to map out the precise transit routes through sandy bottom areas. During the landing, the crews follow established procedures, such as having a designated lookout watching for other vessels, obstructions to navigation, marine mammals (whales or monk seals), or sea turtles. The primary location for the amphibious landings is Majors Bay, PMRF, Kauai (Figure D-1). Amphibious landings could also occur at Marine Corps Base Hawaii (three beaches), Marine Corps Training Area–Bellows (MCTAB), Oahu (Figure D-2), and K-Pier boat ramp, Kawaihae, Hawaii. No ordnance is used during this training event.



Location of Pacific Missile Range Facility and Related Sites

Kauai, Hawaii

Figure D-1

EXPLANATION

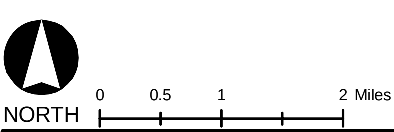
Major Roads

Airfield Runway

Installation Areas

Land

AAV	Amphibious Assault Vehicle
CRRC	Combat Rubber Raiding Craft
LCAC	Landing Craft, Air Cushioned
LCU	Landing Craft, Utility
RHIB	Rigid Hull, Inflatable Boat



Marine Corps Base Hawaii and Marine Corps Training Area / Bellows

Oahu, Hawaii

Figure D-2

Baseline Training Events					
Expeditionary Assault	NTA	Area	Metric	Duration (Hours)	Total Training Events
	1.5.4	Pacific Missile Range Facility, Marine Corps Training Area-Bellows, Kawaihae Pier	Ops	48	11

Anti-Surface Warfare

Visit, Board, Search, and Seizure

Visit, Board, Search, and Seizure (VBSS) is conducted to train helicopter crews to insert personnel onto a vessel for the purpose of inspecting the ship's personnel and cargo for compliance with applicable laws and sanctions. VBSS training requires a cooperative surface ship. Typical duration of a VBSS is approximately 1.5 hours. No ordnance is used during this training event.

Baseline Training Events					
Visit, Board, Search, and Seizure (VBSS)	NTA	Area	Metric	Duration (Hours)	Total Training Events
	1.4.6	Hawaii Operating Area	Ops	1.5	60

Surface-to-Surface Gunnery Exercise

Surface-to-Surface Gunnery Exercises (S-S GUNEX) take place in the open ocean to provide gunnery practice for Navy and Coast Guard ship crews. S-S GUNEX training events conducted in the Offshore Operating Area (OPAREA) involve stationary targets such as an MK-42 Floating At Sea Target (FAST) or an MK-58 marker (smoke) buoy. An S-S GUNEX lasts approximately 2 to 4 hours, depending on target services and weather conditions.

The gun systems employed against surface targets include the 5-inch, 76-millimeter (mm), 25-mm chain gun, 20-mm Close In Weapon System, and .50-caliber machine gun. Typical ordnance expenditure for a single GUNEX is a minimum of 21 rounds of 5-inch or 76-mm ammunition, and approximately 150 rounds of 25-mm or .50-caliber ammunition. Both live and inert training rounds are used. After impacting the water, the rounds and fragments sink to the bottom of the ocean.

There are three new rounds of 5-inch gun ordnance nearing introduction to the Fleet. The High Explosive Electronically Timed Projectile is a standard High Explosive round with an improved electronically timed fuse. The Kinetic Energy Projectile, commonly called the “BB” round, contains 9,000 tungsten pellets and is designed to be fired down a bearing at incoming boats. The EX-171 Extended Range Guided Munition projectile is a major component of the Navy's littoral warfare concept. The 5-inch, rocket-assisted projectile is capable of carrying a 4-caliber submunition, and will be fired from the new 5-inch, 62-caliber gun being installed on Arleigh

Burke (DDG-51) class destroyers. Live gunnery rounds are fired at surface targets during this training event.

Baseline Training Events					
Surface-to-Surface Gunnery Exercise (S-S GUNEX)	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.1.1	W-191, 192, 193, 194, 196, Mela South,	Ops	2 to 4	14

Surface-to-Surface Missile Exercise

A Surface-to-Surface Missile Exercise (S-S MISSILEX) involves the attack of surface targets at sea by use of cruise missiles or other missile systems, usually by a single ship conducting training in the detection, classification, tracking and engagement of a surface target. Engagement is usually with surface-to-surface Harpoon missiles or Standard missiles. Targets include virtual targets or the seaborne powered target (SEPTAR) or ship deployed surface target.

S-S MISSILEX includes 4 to 20 surface-to-surface missiles, SEPTARs, a weapons recovery boat, and a helicopter for environmental and photo evaluation. All missiles are equipped with instrumentation packages or a warhead. Surface-to-air missiles can also be used in a surface-to-surface mode.

S-S MISSILEX activities are conducted within PMRF Warning Area W-188. Each training event typically lasts 5 hours. Future S-S MISSILEX could range from 4 to 35 hours. Live and inert missiles are fired against surface targets during this training event.

Baseline Training Events					
Surface-to-Surface Missile Exercise (S-S MISSILEX)	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.1.1	Pacific Missile Range Facility (W-188)	Ops	5.0	7

Air-to-Surface Gunnery Exercise

Air-to-Surface Gunnery Exercise (A-S GUNEX) training events are conducted by rotary-wing aircraft against stationary targets (FAST and smoke buoy). Rotary-wing aircraft involved in this training event include a single SH-60 using either 7.62-mm or .50-caliber door-mounted machine guns. A typical GUNEX lasts approximately 1 hour and involves the expenditure of approximately 400 rounds of .50-caliber or 7.62-mm ammunition. Live gunnery rounds are fired at surface targets during this training event.

Baseline Training Events					
Air-to-Surface Gunnery Exercise (A-S GUNEX)	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.1.1	Hawaii Operating Area	Ops	1.1	128

Air-to-Surface Missile Exercise

The Air-to-Surface Missile Exercise (A-S MISSILEX) consists of releasing a forward-fired, guided weapon at the designated towed target. The training event involves designating the target with a laser.

A-S MISSILEX training that does not involve the release of a live weapon can take place if a captive air training missile (CATM), simulating the weapon involved in the training, is carried. The CATM MISSILEX is identical to a Live Fire Exercise (LFX) in every aspect except that a weapon is not released. The training event requires a laser-safe range as the target is designated just as in an LFX.

From 1 to 16 fixed wing aircraft and/or helicopters, carrying air training missiles or flying without ordnance (dry runs), are used during the training event. Missiles include air-to-surface missiles and anti-radiation missiles (electromagnetic radiation source-seeking missiles). When a high-speed anti-radiation missile (HARM) is used, the event is called a HARMEX. At sea, SEPTARs, Improved Surface Towed Targets, and excess ship hulks are used as targets. Inert HELLFIRE missiles are fired at targets during this training event.

Baseline Training Events					
Air-to-Surface Missile Exercise (A-S MISSILEX)	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.1.1	Pacific Missile Range Facility (W-188)	Ops	5.5	36

Bombing Exercise (BOMBEX [Sea])

Fixed-wing aircraft conduct BOMBEX (Sea) against stationary targets (MK-42 FAST or MK-58 smoke buoy) at sea. An aircraft clears the area, deploys a smoke buoy or other floating target, and then sets up a racetrack pattern, dropping on the target with each pass. At PMRF, a range boat might be used to deploy the target for an aircraft to attack. Live and inert bombs are dropped on surface targets during this training event.

Baseline Training Events					
Bombing Exercise (BOMBEX) (Sea)	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.1.1	Hawaii Operating Area	Ops	6.0	35

Sinking Exercise

A Sinking Exercise (SINKEX) provides training to ship and aircraft crews in delivering live ordnance on a real target. Each SINKEX uses an excess vessel hulk as a target that is eventually sunk during the course of the training event. The target is an empty, cleaned, and environmentally remediated ship hull that is towed to a designated location where multiple types of weapons are used against the hulk. SINKEX vessels can number from one to as many as six during a Major Exercise. The duration of a SINKEX is unpredictable since it ends when the target sinks, sometimes immediately after the first weapon impact and sometimes only after multiple impacts by a variety of weapons.

Weapons can include missiles, precision and non-precision bombs, gunfire, and torpedoes. Examples of missiles that could be fired at the targets include AGM-142 from a B-52 bomber, Walleye AGM-62 from FA-18 aircraft, and a Harpoon from a P-3C aircraft. Surface ships and submarines may use either torpedoes or Harpoons, surface-to-air missiles in the surface-to-surface mode, and guns. Other weapons and ordnance could include, but are not limited to, bombs, Mavericks, and Hellfire.

If none of the shots result in the hulk sinking, either a submarine shot or placed explosive charges are used to sink the ship. Charges ranging from 100 to 200 pounds (lb), depending on the size of the ship, are placed on or in the hulk.

The vessels used as targets are selected from a list of U.S. Environmental Protection Agency (USEPA) approved destroyers, tenders, cutters, frigates, cruisers, tugs, and transports. USEPA granted the Department of the Navy a general permit through the Marine Protection, Research, and Sanctuaries Act to transport vessels “for the purpose of sinking such vessels in ocean waters…” (40 CFR Part 229.2) Subparagraph (a)(3) of this regulation states “All such vessel sinkings shall be conducted in water at least 1,000 fathoms (6,000 feet) deep and at least 50 nautical miles from land.” In Hawaii, SINKEX events take place within PMRF Warning Area W-188. Multiple types of live ordnance are fired on an excess vessel hulk during this training event.

Baseline Training Events					
Sinking Exercise (SINKEX)	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.1.1	Hawaii Operating Area	Ops	14.5	6

Anti-Surface Warfare Torpedo Exercise (Submarine-Surface)

Submarines conduct most of their torpedo firings at PMRF, and many of those are against surface targets. Surface targets will typically be PMRF range boats or targets, or Navy combatants. The Anti-Surface Warfare (ASUW) Torpedo Exercise (TORPEX) culminates with the submarine firing an MK-48 torpedo against the surface target.

Twice a year, "Hollywood" training events are conducted on PMRF as part of the Submarine Commander's Course, which trains prospective submarine Commanding Officers and Executive Officers. These are integrated training events involving complex scenarios that will include a coordinated surface, air, and submarine force challenging the submarine Commanding Officers and crew. During these events, submarines engage in ASUW torpedo firings, as well as Anti-Submarine Warfare (ASW) Tracking Exercises (TRACKEX), and ASW TORPEX. Inert exercise torpedoes are fired during this training event.

Baseline Training Events					
Anti-Submarine Warfare Torpedo Exercise (ASUW TORPEX) (Submarine-Surface)	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.1.1	Hawaii Operating Area	Ops	12.3	35

Flare Exercise

A Flare Exercise is an aircraft defensive event in which the aircrew uses an infrared (IR) source or radar energy absorbing chaff to disrupt attempts to lock onto the aircraft. During IR break-lock (flare) training, a shoulder-mounted IR surface-to-air missile simulator is trained on the aircraft by an operator attempting to lock onto the aircraft's IR signature. The aircraft maneuvers while expending flares. The scenario is captured on videotape for replay and debrief. No actual missiles are fired during this training event. Radar break-lock training is similar except that the energy source is an electronic warfare (EW) simulator, and the aircraft expels chaff during its defensive maneuvering. Chaff is a radar confusion reflector, consisting of thin, narrow metallic strips of various lengths and frequency responses, used to deceive radars.

Baseline Training Events					
Flare Exercise	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.9	Pacific Missile Range Facility (W-188)	Ops	5.7	6

Anti-Submarine Warfare

Other Anti-Submarine Warfare Exercises

Anti-Submarine Warfare Tracking Exercise

An Anti-Submarine Warfare Tracking Exercise (ASW TRACKEX) trains aircraft, ship, and submarine crews in tactics, techniques, and procedures for search, detection, and tracking of submarines. No torpedoes are fired during a TRACKEX. ASW TRACKEX includes ships, fixed wing aircraft, helicopters, torpedo targets, 1 to 10 submarines, and weapons recovery boats and/or helicopters. As a unit-level training event, an aircraft, ship, or submarine is typically used versus one target submarine or simulated target.

The target may be non-evading while operating on a specified track or it may be fully evasive, depending on the state of training of the ASW unit. Duration of a TRACKEX is highly dependent on the tracking platform and its available on-station time. A maritime patrol aircraft can remain on station for 8 hours, and typically conducts tracking events that last 3 to 6 hours. An ASW helicopter has a much shorter on-station time, and conducts a typical TRACKEX in 1 to 2 hours. Surface ships and submarines, which measure their on-station time in days, conduct tracking events exceeding 8 hours and averaging up to 18 hours. For modeling purposes, TRACKEX and TORPEX sonar hours are averaged resulting in a sonar time of 13.5 hours.

ASW TRACKEX events are conducted on ranges within PMRF Warning Area W-188, the Hawaii Offshore Areas and/or the open ocean. Whenever aircraft use the ranges for ASW training, range clearance procedures include a detailed visual range search for marine mammals and unauthorized boats and planes by the aircraft releasing the inert torpedoes, range safety boats/aircraft, and range controllers.

Sensors used during ASW training events include sonars, sonobuoys, non-acoustic sensors, such as radars. The use of sonobuoys is generally limited to areas greater than 100 fathoms, or 600 ft, in depth. Before dropping sonobuoys, the crew visually determines that the area is clear. When the sonobuoy is released, a small parachute (about 4 ft in diameter) retards its entry into the ocean. The sonobuoy is designed to float on the surface and, after a controlled period of time (no longer than 8 hours), the complete package (with the parachute) sinks to the bottom. No ordinance is used during this training event. Sonobuoys are released from aircraft, and active and passive sonar is used.

Anti-Submarine Warfare Torpedo Exercises

Anti-submarine Warfare Torpedo Exercises (ASW TORPEX) events train crews in tracking and attack of submerged targets, firing one or two exercise torpedoes or recoverable exercise torpedoes. TORPEX targets used in the Offshore Areas include live submarines, MK-30 ASW training targets, and MK-39 Expendable Mobile ASW Training Targets. The target may be non-evading while operating on a specified track, or it may be fully evasive, depending on the training requirements.

Submarines periodically conduct torpedo firing training events within the Hawaii Offshore OPAREA. Typical duration of a submarine TORPEX event is 22.7 hours, while air and surface ASW platform TORPEX events are considerably shorter. Inert exercise torpedoes are fired, and active and passive sonar is used during this training event. For modeling purposes, TRACKEX and TORPEX sonar hours are averaged resulting in a sonar time of 13.5 hours.

Baseline Training Events					
Anti-Submarine Warfare Tracking Exercise (ASW TRACKEX) and Anti-Submarine Warfare Torpedo Exercises (ASW TORPEX)	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.1.2	Hawaii Operating Area, Pacific Missile Range Facility	Ops	15	29

Major Integrated ASW Training Exercises

Integrated ASW training events conducted during a Major Integrated ASW Training Event are called a Major Exercise, which uses ships, submarines, aircraft, non-explosive training weapons, and other training systems and devices. No new or unique events take place during integrated training; it is merely the compilation of numerous ASW events as conducted by multiple units over a period of time ranging from 3 to 30 days. No ordinance is used during this training event. Sonobuoys are released from aircraft and active and passive sonar is used.

Baseline Training Events					
Major Integrated ASW Training Exercise	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.1.2	Hawaii Operating Area	Ops	Various	6

Extended Echo Ranging/Improved Extended Echo Ranging Training Exercise

The Extended Echo Ranging and Improved Extended Echo Ranging (EER/IEER) Systems are airborne ASW systems used in conducting “large area” searches for submarines. These systems are made up of airborne avionics ASW acoustic processing and sonobuoy types that are deployed in pairs. The IEER System's active sonobuoy component, the AN/SSQ-110 Sonobuoy, contains a small explosive charge that generates acoustic energy when detonated. If an underwater target is within range, the echo is received by the passive AN/SSQ-101 Air Deployable Active Receiver (ADAR) sonobuoy and transmitted to the aircraft. These sonobuoys are designed to provide underwater acoustic data necessary for naval aircrews to quickly and accurately detect submerged submarines. The sonobuoy pairs are dropped from a fixed-wing aircraft into the ocean in a predetermined pattern with a few buoys covering a very large area. Each training event includes approximately 12 events with 10 to 20 sonobuoys per event for a total of 120 to 240 sonobuoys per training event. The AN/SSQ-110 Sonobuoy Series is an expendable and commandable sonobuoy. Upon command from the aircraft, the bottom payload is released to sink to a designated operating depth. A second command is required from the aircraft to cause the second payload to release and detonate generating a “ping.” There is only one detonation in the pattern of buoys at a time.

The ANJSSQ-101 ADAR Sonobuoy is an expendable passive sonobuoy. After water entry, the ADAR sonobuoy descends to a selected depth and deploys hydrophones. Once activated, the ADAR sonobuoy works in conjunction with the SSQ-110 sonobuoy sound source, receiving active echoes reflecting off any target or reverberant present, including submarine hulls, seamounts, bottom features, etc.

Ordnance is used during this training event. Sonobuoys are released from aircraft, and active and passive sonar is used.

Baseline Training Events					
Extended Echo Ranging and Improved Extended Echo Ranging (EER/IEER)	NTA	Area	Metric	Duration (Hours)	Total Training Events
		Hawaii Operating Area	Ops	4 to 8 hours	4

Electronic Combat

Electronic Combat Operations

Electronic Combat (EC) Operations consist of air-, land-, and sea-based emitters simulating enemy systems and activating air, surface and submarine electronic support measures and electronic countermeasures systems. Appropriately configured aircraft fly threat profiles against the ships so that crews can be trained to detect electronic signatures of various threat aircraft, or so that ship crews can be trained to detect counter jamming of their own electronic equipment by the simulated threat. No ordnance is expended during this training event.

Baseline Training Events					
Electronic Combat (EC) Operations	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.5	Hawaii Operating Area	Ops	6.1	50

Mine Warfare

Mine Countermeasures Exercise

Mine Countermeasures (MCM) Exercises train forces to detect, identify, mark, and/or disable mines using a variety of methods. No ordnance is expended during this training event. Active sonar is used.

Organic Mine Countermeasures

Organic Mine Countermeasures (OMCM) include systems deployed by air, ship, and submarine. Five Organic Airborne Mine Countermeasures (OAMCM) systems (Figure D-3) are deployed by the MH-60S Seahawk Multi-Mission, including:

- **Advanced Mine Hunting Sonar:** The AN/AQS-20A Advanced Mine Hunting Sonar is a single-pass multi-sonar system designed to detect, locate, and identify mines on the sea floor and in the water.
- **AN/AES-1 Airborne Laser Mine Detection System (ALMDS):** The AN/AES-1 ALMDS is a sensor designed to detect moored, near surface mines using light detection and ranging technology.

AN/AES-1

AN/ASQ-20A

AN/AWS-2

AN/ALQ-220 OASIS

Organic Mine Countermeasures

Figure D-3

- **AN/ALQ-220 Organic Airborne and Surface Influence Sweep (OASIS):** The AN/ALQ-220 OASIS System is a lightweight magnetic/acoustic system employed by the MH-60S.
- **AN/AWS-2 Rapid Airborne Mine Clearance System (RAMICS):** The AN/AWS-2 RAMICS is being developed to destroy near-surface and floating mines using a 30-mm cannon hydro-ballistic projectile, and includes a target reacquisition pod on the MH-60S.
- **AN/ASQ-235 Airborne Mine Neutralization System (AMNS):** The AN/ASQ-235 AMNS is a lightweight expendable system designed to rapidly neutralize bottom and moored mines.

One OMCM System, the Remote Minehunting System, is deployed from a surface ship. Another OMCM system, the Long-term Mine Reconnaissance System, is deployed from a submarine. The Remote Minehunting System and the Long-term Mine Reconnaissance System should be operational after FY 2007.

Baseline Training Events					
	NTA	Area	Metric	Duration (Hours)	Total Training Events
Mine Countermeasures Exercise (MCM)	1.3.1	Hawaii Operating Area, Kingfisher, Shallow-water Minefield Sonar Training Area	Ops	6-12	32

Mine Neutralization

Mine Neutralization involves the detection, identification, evaluation, rendering safe, and disposal of mines and unexploded ordnance (UXO) that constitutes a threat to ships or personnel. Mine neutralization training is conducted by a variety of air, surface, and sub-surface assets.

Tactics for neutralizing ground or bottom mines involve the diver placing a specific amount of explosives which, when detonated underwater at a specific distance from a mine, results in neutralization of the mine. Floating, or moored, mines involve the diver placing a specific amount of explosives directly on the mine. Floating mines encountered by fleet ships in open-ocean areas are detonated at the surface. In support of a military expeditionary assault, the Navy deploys divers in very shallow water depths (10 to 40 ft) to locate mines and obstructions.

Divers are transported to the mines by boat or helicopter. Inert dummy mines are used in training events. The total net explosive weight used against each mine ranges from 1 lb to 20 lb.

Various types of surveying equipment are used during RIMPAC Exercises. Examples include the Canadian Route Survey System that hydrographically maps the ocean floor using multi-beam side scan sonar, and the Bottom Object Inspection Vehicle used for object identification.

These units help to support mine detection prior to Special Warfare Operations (SPECWAROPS) and Expeditionary Assault.

Occasionally, marine mammals are used in mine detection training. The Navy's Very Shallow Water Mine Countermeasures Detachment of Commander Mine Warfare Command deploys trained Atlantic bottlenose dolphins (*Tursiops truncatus*) of their marine mammal mine-hunting systems in several missions. Each mission includes up to four motorized small craft, several crew members and a trained dolphin. Training events using dolphins are coordinated with other Navy units to avoid conflicts with other Navy activities, underwater acoustic emissions associated with those activities, or civilian craft. Any unplanned situation that has the potential for exposing a dolphin to dangerous or conflicting underwater acoustic emissions or other interference is mitigated by recalling it into a small craft and moving the dolphin out of the area. As such, these marine mammals are continuously protected. Transportation of these animals into the State of Hawaii is in accordance with the regulations of the Hawaii State Department of Agriculture.

Mine neutralization events take place offshore in the Puuloa Underwater Range (called Keahi Point in earlier documents), Pearl Harbor; Lima Landing; Barbers Point Underwater Range off-shore of Coast Guard Air Station Barbers Point/Kalaeloa Airport (formerly Naval Air Station Barbers Point); PMRF, Kauai (Majors Bay area); PMRF and Oahu Training Areas; and in open-ocean areas.

All demolition activities are conducted in accordance with Commander Naval Surface Forces Pacific Instruction 3120.8F, Procedures for Disposal of Explosives at Sea/Firing of Depth Charges and Other Underwater Ordnance (U.S. Department of the Navy, 2003a). Before any explosive is detonated, divers are transported a safe distance away from the explosive. Standard practices for tethered mines in Hawaiian waters require ground mine explosive charges to be suspended 10 ft below the surface of the water. For mines on the shallow water floor (less than 40 ft of water), only sandy areas that avoid/minimize potential impacts on coral are used for explosive charges. Underwater detonations do occur during this training event.

Baseline Training Events					
	NTA	Area	Metric	Duration (Hours)	Total Training Events
Mine Neutralization	1.3.1	Puuloa Underwater Range, MCBH, MCTAB, Barbers Point Underwater Range, Naval Inactive Ship Maintenance Facility, Lima landing, Ewa Training Minefield	Ops	6	62

Mine Laying

Mine Laying events are designed to train forces to conduct offensive (deploy mines to tactical advantage of friendly forces) and defensive (deploy mines for protection of friendly forces and facilities) mining events. Mines can be laid from the air (FA-18/P-3) or by submarine.

Airborne Mine Laying involves one or more aircraft and either computer-simulated or inert exercise mines. Mine warfare events are limited to either the simulated laying of aircraft-deployed mines, where no actual mine ordnance is dropped, or the use of inert exercise mines or inert exercise submarine-deployed mines.

The use of inert exercise mines is generally limited to areas greater than 100 fathoms, or 600 ft in depth. Before dropping inert exercise mines, the crew visually determines that the area is clear. Although the altitude at which inert exercise mines are dropped varies, the potential for drift during descent generally favors release at lower altitudes, where visual searches for marine mammals are more effective. When the inert exercise mine is released, a small parachute retards its entry into the ocean. The mine can be designed to float on the surface or near surface or to sink on a tether. Ultimately the mine sinks carrying the parachute with it. Standard Navy procedures are followed for the deployment of inert mines from submarines.

Aerial mining lines are generally developed off the southwest coast of Kauai and the southeast coast of Niihau, within PMRF Warning Areas W-186 and W-188. Submarine mining events are conducted within PMRF Warning Area W-188. Air Operations are conducted within R3101. Inert mine shapes are released into the ocean during these training events.

Baseline Training Events					
Mine Laying	NTA	Area	Metric	Duration (Hours)	Total Training Events
	1.4.1	Pacific Missile Range Facility (R-3101)	Ops	6-12	22

Land Demolitions

Land demolitions events are designed to train forces to cause the explosion and the resulting destruction of enemy personnel, vehicles, aircraft, obstacles, facilities, or terrain on land. These events are also designed to develop and hone Explosive Ordnance Disposal (EOD) mission proficiency in locating, identifying, excavating, and neutralizing land mines. Land demolitions take place at the West Loch EOD Training Facility. In addition to Navy personnel, Honolulu Police, Federal Bureau of Investigation, and several research, development, test, and evaluation (RDT&E) companies conduct land demolitions at the EOD land facility. The EOD facility is limited to 2.5 lb of non-fragment producing explosives. EOD Range demolition events take approximately 4.5 hours to complete, and there are between 70 and 80 events per year. Land detonations occur during this training event.

Baseline Training Events					
Land Demolitions	NTA	Area	Metric	Duration (Hours)	Total Training Events
	1.4.4	Explosive Ordnance Disposal Land Range	Ops	4	85

Naval Special Warfare

Swimmer Insertion/Extraction

Naval Special Warfare (NSW) personnel conduct underwater swimmer insertion and extraction training in the Hawaii Offshore Areas using either the Sea, Air, Land (SEAL) Delivery Vehicle (SDV), or the Advanced SEAL Delivery System (ASDS). Both submersibles are designed to deliver special operations forces for clandestine activities. The SDV is an older, open-design delivery vehicle. The ASDS is a new dry compartment vehicle that keeps the SEALs warmer during transit. The battery-powered ASDS is capable of operating independently or with submarines.

Two types of training occur with the ASDS—unit and integrated. Unit training with the ASDS consists of the SDV Team operating the ASDS independently. Integrated training involves the SDV Team working with a submarine and the ASDS.

Underwater swimmer insertion and extraction training is focused on undersea operation of the SDV or ASDS, and does not typically involve SEAL personnel landing ashore or conducting shore training. Although undersea range areas are usually reserved for a 24-hour period, the insertion/extraction event itself lasts approximately 8 hours. Swimmer insertion and extraction events can also include the use of helicopters to insert or extract NSW personnel using a variety of techniques. No ordnance or sonar will be used during this training event.

Baseline Training Events					
	NTA	Area	Metric	Duration (Hours)	Total Training Events
Swimmer Insertion/Extraction	1.1.2.4	Hawaii Operating Area, Marine Corps Training Area-Bellows, Pacific Missile Range Facility (Main Base)	Days	8	132

Special Warfare Operations

SPECWAROPS are performed by Navy SEALs and U.S. Marines. Activities include special reconnaissance (SR), reconnaissance and surveillance, combat search and rescue (CSAR), and direct action (DA). SR units consist of small special warfare unit and utilize helicopters, submarines, and combat rubber raiding craft to gain covert access to military assets, gather intelligence, stage raids, and return to their host units. Reconnaissance inserts and beach surveys are often conducted before large-scale amphibious landings and can involve several units gaining covert access using a boat. CSAR activities are similar to SR (R&S), but the mission is to locate and recover a downed aircrew. DA missions consist of an initial insertion, followed by the helicopters/boats inserting additional troops to take control of an area. The helicopters may land for refueling. No ordnance or sonar will be used during this training.

Baseline Training Events					
	NTA	Area	Metric	Duration (Hours)	Total Training Events
Special Warfare Operations (SPECWAROPS)	1.5.6	PMRF (Main Base, Makaha Ridge), Puuloa underwater Range, MCBH, Barbers Point Underwater Range, Naval Station Pearl Harbor, Naval Inactive Ship Maintenance Facility, Lima Landing, U.S. Coast guard Air Station Barbers Point/Kalaeloa Airport, Hickam AFB, Bradshaw Army Airfield, Makua Military Reservation, Kahuku Training Area, Kawaihae Pier, Dillingham Military Reservation, Wheeler Army Airfield, Niihau, MCTAB, Pohakuloa Training Area	Days	8	30

Strike Warfare

Bombing Exercise (Land)

Kaula also is used for BOMBEX training. BOMBEX events consist of air-to-ground delivery of small, 25-lb, inert MK-76 (a type of training ordnance); inert laser-guided bombs, such as the Hellfire, or the MK-82, a 500-lb bomb. BOMBEX events originate from an aircraft carrier or a land base. CSG fixed-wing aircraft account for all of the Navy BOMBEX events at Kaula. Only inert ordnance 500 lb or less is authorized for use on Kaula. Inert bombs will be dropped from aircraft during this training. Live and inert bombs may be used at Pohakuloa Training Area.

Baseline Training Events					
	NTA	Area	Metric	Duration (Hours)	Total Training Events
Bombing Exercise (BOMBEX) (Land)	3.2.6	Kaula, Pohakuloa Training Area	Ops	0.8	165

Air-to-Ground Gunnery Exercise

Kaula, a small island southwest of Kauai (shown in Figure 1.2-2), is used for air-to-ground gunnery training. Air-to-ground GUNEX includes live fire gunnery training from fixed- or rotary-wing aircraft. The use of 20-mm and 30-mm cannon fire is not allowed from November through May. Live gunnery rounds will be fired at land targets during this training event.

Baseline Training Events					
	NTA	Area	Metric	Duration (Hours)	Total Training Events
Air-to-Ground Gunnery Exercise (GUNEX)	3.2.6	Kaula, Pohakuloa Training Area	Ops	0.8	16

Other Training

Salvage Operations

The purpose of Salvage Operations is to provide a realistic training environment for battling fires at sea, de-beaching of stranded ships, and harbor clearance operations training by Navy diving and salvage units.

The Navy's Mobile Diving and Salvage Unit One (MDSU-1) (Figure D-4) and divers from other countries practice swift and mobile ship and barge salvage, towing, battle damage repair, deep ocean recovery, harbor clearance, removal of objects from navigable waters, and underwater ship repair capabilities.

Diving and salvage forces training include the following activities:

- SCUBA and surface supplied air and mixed gas (HeO_2) diving operations to depths of 300 ft of sea water
- Hyperbaric recompression chamber operations
- Underwater ship inspection, husbandry, and repair of coalition Naval ships and submarines
- Underwater search and recovery operations
- Underwater cutting employing hydraulic, pneumatic, and oxy-arc powered tools
- Underwater welding
- Removal of petroleum, oil, and lubricants (POL) exercising various POL offload techniques
- Restoring Buoyancy (Survey, Patch, De-water) to a grounded or sunken vessel or object of value
- Harbor clearance for removal of derelict vessels or other obstructions from navigable waterways and berthing
- Off-Ship fire fighting to simulate rescue and assistance operations battling fires

These activities take place at Puuloa Underwater Range, Pearl Harbor, and Keehi Lagoon. Staging for these activities is from the MDSU-1 Facility located on Bishop Point, an annex of Pearl Harbor, on the southwestern side of Hickam Air Force Base, Oahu. To capitalize on real-world training opportunities and to provide mutual benefit for both the U.S. Naval and Coalition Salvage Force and for the State of Hawaii, salvage training and harbor clearance events take place in any of the shoal waters, harbors, ports, and in-land waterways throughout the Hawaiian OPAREA.

The ship fire training lasts no more than 1 day per event. De-beaching activities last no more than 1 to 2 days per event. Deep ocean recovery training last up to 2 weeks and could be longer depending on the availability of missions.

EXPLANATION

Road

Ewa Training Minefield

Pu'uloa Underwater Range

Pearl Harbor Naval Defense Sea Area

Existing Structure

Installation Area

Land

NORTH

0 0.5 1 2 Miles

Pearl Harbor Area / Hickam Air Force Base

Oahu, Hawaii

Figure D-4

The duration of Salvage Operations varies considerably. For a fire at sea or ship retraction of a grounded vessel, the training event lasts up to 4 days. For underwater cutting, welding, pumping, restoring buoyancy, and training that practice a single skill in a controlled environment, the event usually does not exceed 1 day. However, multiple iterations could extend throughout the duration of the training event. No ordnance or sonar will be used during this training.

All U.S. and Coalition Naval Salvage Force training event scenarios will be conducted in accordance with the following references:

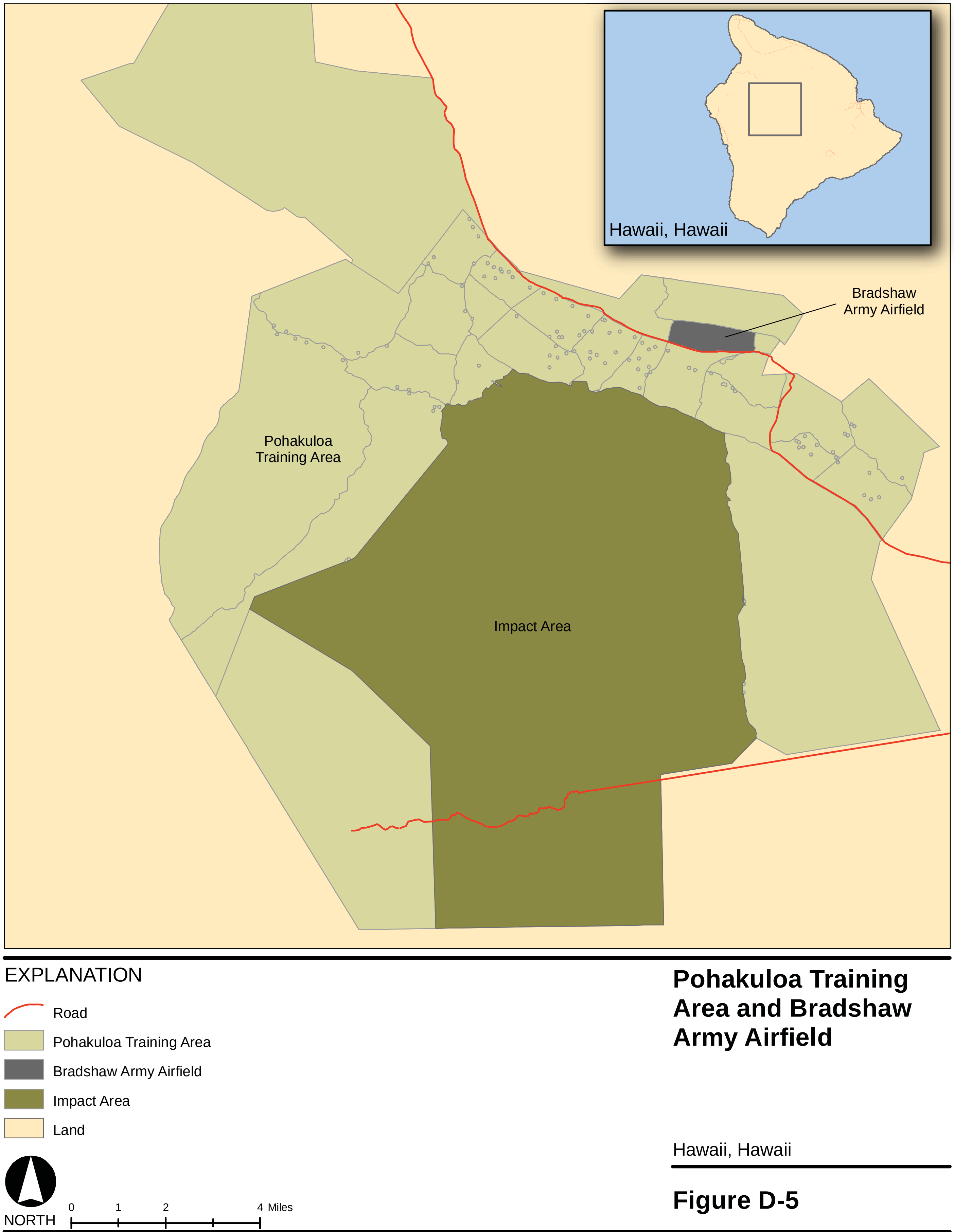
a. U.S. Navy Diving Manual Revision 4, with a change dated March 2001
b. U.S. Navy Salvage Safety Manual
c. U.S. Navy Salvage Manual Vol. 1—Strandings
d. U.S. Navy Salvage Manual Vol. 2—Harbor Clearance
e. U.S. Navy Salvage Manual Vol. 3—Firefighting and Damage Control
f. U.S. Navy Salvage Manual Vol. 5—Petroleum Oil and Lubricant Offload
g. U.S. Navy Towing Manual
h. OPNAVINST 5100.19B (safety manual)
i. Fleet Exercise Publication–4, Chapter 12, Mobile Diving and Salvage Units and Chapter X, ARSs

Baseline Training Events					
	NTA	Area	Metric	Duration (Days)	Total Training Events
Salvage Operations	4.13	Naval Station Pearl Harbor, Puuloa Underwater Range, Naval Defensive Sea Area, Keehi Lagoon	Ops	1	3

Live Fire Exercise

Live Fire Exercise (LFX) provides ground troops with live fire training and combined arms LFX training, including aerial gunnery and artillery firing. These training events include platoon troop movements through numerous target objectives with various weapons. Aerial Gunnery Exercises and artillery and mortar training are also conducted as part of combined and separate training events. Live fire and blanks are used. Blanks are used outside of defined impact areas. LFX benefit ground personnel who receive semi-realistic training.

LFX typically consists of ground troops and special forces, including a sniper unit, of about 2 to 18 people, a helicopter, artillery, mortars, and miscellaneous small arms. In the future, up to a brigade of U.S. or foreign troops could receive LFX training during a Major Exercise. LFX is conducted at Pohakuloa Training Area (Figure D-5) and Makua Military Reservation (Figure D-6). Live rounds will be fired at Pohakuloa Training Area, and inert rounds (blanks) will be fired at Makua Military Reservation.



Pohakuloa Training Area and Bradshaw Army Airfield

Hawaii, Hawaii

Figure D-5

EXPLANATION

Roads

Installation Areas

Land

NORTH

0 2,000 4,000 8,000 Feet

Makua Military Reservation and Dillingham Military Reservation

Oahu, Hawaii

Figure D-6

Baseline Training Events					
LFX	NTA	Area	Metric	Duration (Hours)	Total Training Events
	3.2.2	Makua Military Reservation, Pohakuloa Training Area	Ops	1 - 24	3

Humanitarian Assistance Operation/Non-combatant Evacuation Operation

The purpose of Humanitarian Assistance Operation/Non-combatant Evacuation Operation (HAO/NEO) is to provide training in providing humanitarian assistance in an increasingly hostile setting, which could require the evacuation of personnel and troops. Marine Corps Base Hawaii is used for HAO/NEO and direct action training. MCTAB, Kahuku Training Area, Majors Bay at PMRF, and Niihau are also used for HAO/NEO.

HAO/NEO training events, which last approximately 4 days, involve approximately 150 personnel, troops, and specialists who initially provide assistance to civilians and then evacuate them when necessary. This scenario is also used to simulate a prisoner-of-war camp or place where people are interned. A Direct Action Exercise (lasting several hours) is another scenario included in the HAO/NEO. It is much quicker and involves approximately 50 personnel and 150 troops who gain access to an area by boat or helicopter, storm the location, recover the mission target, and return to their units.

HAO/NEO events use trucks, helicopters, LCAC, LCU, and/or CRRC to shuttle supplies. Evacuations may be made using helicopters, and/or LCAC vehicles. Direct Actions may use CRRC, RHIB, trucks, and/or helicopters. Existing building and facilities are used to the extent practicable, but in some instances tents and other temporary structures may be used. No ordnance is used during this training.

Baseline Training Events					
Humanitarian Assistance Operation/Non-combatant Evacuation Operation (HAO/NEO)	NTA	Area	Metric	Duration (Days)	Total Training Events
	6.2.1	Niihau, MCBH, MCTAB, Kahuku Training Area, Pacific Missile Range Facility (Main Base)	Ops	4	1

Humanitarian Assistance/Disaster Relief

The purpose of Humanitarian Assistance/Disaster Relief (HA/DR) is to provide training in responding to a United Nations request for complex emergency support. HA/DR training events involve approximately 125 to 250 troops and 125 to 200 refugee actors. An amphibious landing craft off-loads approximately 4 transport trucks, 3 support vehicles, 3 water supply vehicles, water and food supply, and 125 troops. They travel along authorized highways to the HA/DR site. A safe haven camp is established in existing facilities or temporary facilities (tents, etc.).

The HA/DR training event lasts for approximately 10 days. Future HA/DR training events could range from 2 to 18 days. The camp is established in 2 days. Personnel are provided water, shelter, food, sanitation, and communications for 5 days. Takedown takes about 2 days.

For each training event, there are two sites: a refugee camp and a Civil–Military Operations Center area. There are roughly 30 five-person Red Cross tents within the refugee camp, with a few larger tents for various support functions including meals, showers, recreation, administration, and storage. The Civil–Military Operations Center section contains more storage, communication links, staff housing, experimentation (including information management and high-bandwidth informatics support, digital transcription facilities to interview refugees for war-crimes documentation, and solar powered computer systems), and various public relations areas for visitors. Approximately 18 portable latrines are at the sites. Buses and/or trucks, and military helicopters as needed, are used to transport refugees.

A safe haven refugee camp would be established within the Marine Corps Base Hawaii, MCTAB, and/or Kahuku Training Area. An amphibious landing craft or trucks would offload equipment, vehicles, troops, and refugees. Airstrips at these locations would be used to transport personnel.

The HA/DR training event takes place near an existing training trail. The access road to the site would be graded before the event, if required. Grading would be within the existing roadway in accordance with standard procedures. Equipment and personnel would be transferred to the camp location via transport trucks and buses, respectively. Training map overlays that identify the transit route, camp location, and any nearby restricted areas or sensitive biological and cultural resource areas would be used by participants. No ordnance is used during this training.

Baseline Training Events					
Humanitarian Assistance/Disaster Relief HA/DR	NTA	Area	Metric	Duration (Days)	Total Training Events
	6.2.3	MCBH, MCTAB, Kahuku Training Area	Ops	10	1

Table D-2 includes the current and future RDT&E activities conducted within the HRC.

Table D-2. Baseline and Planned RDT&E Activities

Mission Area	Activity	Activity Description
Pacific Missile Range Facility (PMRF)	Anti-Air Warfare RDT&E	Testing and training on Aegis-capable ships after refurbishment or overhaul.
	Anti-Submarine Warfare	Sensor, fire control, and weapon testing.
	Combat System Ship Qualification Trial	Conducted for new ships and for ships that have undergone modification and/or overhaul of their combat systems, can include operating any or all of a ship's combat systems.
	Electronic Combat/Electronic Warfare (EC/EW)	Tests designed to assess how well EC/EW training and RDT&E activities are performed.
	High Frequency	Use of high-frequency radio signals and the evaluation of their effectiveness.
	Missile Defense	Aerial targets launched from PMRF, mobile sea-based platforms, or military cargo aircraft. A ballistic missile target vehicle is launched from PMRF and intercepted by a ship- or land-launched missile.
	Joint Task Force Wide Area Relay Network	Demonstration of advanced Command, Control and Communications technologies in a highly mobile, wireless, wide-area relay network in support of tactical forces.
Naval Undersea Warfare Center Ranges	Shipboard Electronic Systems Evaluation Facility (SESEF) Quick Look Tests	Evaluate ship, shore, and aircraft systems that emit or detect electronic emissions. These systems include those used for radio communications, data transfer, navigation, radar, and identification of friend and foe.
	SESEF System Performance Tests	Provide accuracy checks of ship and submarine sonar, both in active and passive modes, and to evaluate the accuracy of a ship's radar.
	Fleet Operational Readiness Accuracy Check Site (FORACS) Tests	Provide accuracy checks of ship and submarine sonar, both in active and passive modes, and to evaluate the accuracy of a ship's radar.
Future RDT&E Activities	Additional Chemical Simulant	Target launches from PMRF would incorporate additional chemical simulants to include larger quantities of tributyl phosphate (TBP) and various glycols.
	Intercept Targets launched into PMRF Controlled Area	Launches from Wake Island, the Reagan Test Site at U.S. Army Kwajalein Atoll (USAKA), and Vandenberg AFB towards the vicinity of PMRF are proposed. Intercept areas would be in the Broad Ocean Area and Temporary Operating Area.
	Launched SM-6 from Sea-Based Platform (AEGIS)	Capability to launch the Extended Range Active Missile, tentatively designated SM-6, from a sea-based platform. Similar to ongoing launches of the current version of the Standard Missile from Aegis ships.
	Micro-Satellites Launch	A joint venture between PMRF, the Department of Energy at the Kauai Test Facility, and the University of Hawaii to launch micro-satellites into space.
	Test Unmanned Surface Vehicles	Remote-controlled boats equipped with modular packages to potentially support surveillance and reconnaissance activities, mine warfare, anti-terrorism/force protection, port protection, Special Forces operations, and possibly anti-submarine warfare.
	Test Unmanned Aerial Vehicles	Remotely piloted or self-piloted aircraft that include fixed-wing, rotary-wing, and other vertical takeoff vehicles. Can carry cameras, sensors, communications equipment, weapons, or other payloads. Could support intelligence, surveillance, and reconnaissance; suppression of enemy air defenses; electronic attack; anti-surface ship and anti-submarine warfare; mine warfare; communications relay; and derivations of these themes.

Table D-2. Baseline and Planned RDT&E Activities (Continued)

Mission Area	Activity	Activity Description
Future RDT&E Activities	Test Hypersonic Vehicles	Development of air-breathing hypersonic vehicles that are capable of maximum sustainable cruising speeds in excess of Mach 4, as potential ordnance delivery systems.
Offshore Enhancements	Portable Undersea Tracking Range	Provide submarine training in areas where the ocean depth is between 300 ft and 12,000 ft and at least 3 nm from land.
PMRF Enhancements	Large Area Tracking Range Upgrade	Upgraded with ground relay stations to cover training throughout much of the HRC. Proposed ground relay stations would be modifications to existing facilities.
	Enhanced Electronic Warfare Training	Capability for EW training would be enhanced to include sites on other islands (e.g., Maui and Hawaii).
	Expanded Training Capability for Transient Air Wings	Provide dedicated equipment to enable Mid-Pacific and transiting strike groups to participate in either live or virtual activities.
	Kingfisher Underwater Training Area	Underwater training area would be approximately 2 mi off the southeast coast of Niihau at a depth of between 300 and 400 ft.
	FORCEnet Antenna	Effort to integrate military personnel, sensors, networks, command and control, platforms, and weapons into a fully netted, combat force. Existing building or a portable trailer.
	Enhanced Auto ID System and Force Protection Capability	AIS equipment installed on each island so each ship would have sensor connectivity and communication connections.
	Construct Range Operations Control Building	Build a new, almost 90,000 sq-ft range operations building to consolidate the activities currently in 13 buildings.
	Improve Fiber Optics Infrastructure	Installation of approximately 23 mi of fiber optic cable, which would be hung on existing Kauai Island Utility Cooperative poles between PMRF/Main Base and Kokee.
Pearl Harbor Enhancements	MK-84/MK-72 Pinger Acoustic Test Facility	New open-water Acoustic Test Facility capability near the Naval Undersea Warfare Center's Ford Island facility in Pearl Harbor.
	Mobile Diving and Salvage Unit Training Area	Establish an underwater training area in which Mobile Diving and Salvage Unit-1 can conduct military diving and salvage training, including submerging a 100-ft by 50-ft barge.
Future RDT&E Activities	Directed Energy	Develop the necessary standard operating procedures and range safety requirements necessary to provide safe operations associated with future high-energy laser tests.
	Advanced Hypersonic Weapon	Launches of long range (greater than 3,400 miles) missiles deploying an unpowered payload. A four-missile launch program, with the first two tests using a Strategic Target System booster launched from Kauai Test Facility (KTF) at PMRF. The payload would travel approximately 2,500 mi from PMRF to Illeginni Island in USAKA.

RIMPAC and USWEX

The Commander, U.S. THIRD Fleet, conducts RIMPAC within the HRC every other year. The biennial RIMPAC is a multinational, sea control and power projection Major Exercise that consists of various phases of activity by Army, Marine Corps, Navy, and Air Force forces, as well as the military forces of several Pacific Rim nations. During the month-long Major Exercise, individual training events occur in open ocean, offshore, and onshore areas. Table D-3 shows the matrix of training events used during previous RIMPAC Exercises by location.

USWEX includes a single Strike Group, training in the HRC for up to 4 days, four times per year. Table D-4 shows the matrix of training events generally used during a USWEX Exercise by location.

Under Alternative 1 the Navy proposes to continue RIMPAC and USWEX Exercises described in the No-action Alternative. USWEX frequency would increase from four to six times per year. RIMPAC would include two Strike Groups, and FCLPs would occur in association with transiting Strike Groups participating in Major Exercises. The training associated with Major Exercises would be chosen from the appropriate matrix of training events, in Table D-5.

Under Alternatives 2 and 3, up to three Strike Groups would conduct training events simultaneously in the HRC. The Strike Groups would not be homeported in Hawaii, but would stop in Hawaii en route to a final destination. The Strike Groups would be in Hawaii for up to 10 days per event. Proposed training would be similar to current training events for the RIMPAC and USWEX Exercises. Also included in the training would be FCLP events conducted at the following airfields: Marine Corps Base Hawaii and PMRF. The events associated with Multiple Strike Group training would be chosen from the appropriate matrix of training events listed in Table D-6.

Table D-3. Rim of the Pacific 06 Exercise Matrix

			Training Events																							
											MIW															
					AAW				ASUW / ASW			MCM			ASUW											
Service	Location	Island	IN-PORT/ SUPPORTEX	C2	AIROPS	S-A MISSILEX	A-A MISSILEX/ ACM	A-S MISSILEX	S-S MISSILEX	ASW	MINEX	SMWEX	Air MIWEX	UMWEX	STW, CASEX	GUNEX	SINKEX	LFX	HAO/NEO	HA/DR	SPECWAROPS	DEMO	SALVAGE OPS	Expeditionary Assault	SUBOPS	Seaglider
Navy	Pacific Missile Range Facility*	Kauai																								
	Niihau	Niihau																								
	Kaula	Kaula																								
	Pearl Harbor**	Oahu																								
	Lima Landing	Oahu																								
	Puuloa Underwater Range – Pearl Harbor	Oahu																								
	Barbers Point Underwater Range	Oahu																								
	Coast Guard AS Barbers Point/ Kalaeloa Airport	Oahu																								
	PMRF Warning Areas#	Ocean Areas																								
	Oahu Warning Areas#	Ocean Areas																								
	Open Ocean Areas#	Ocean Areas																								
	U.S. Command Ship	Ocean Areas																								
Marines	Marine Corps Base Hawaii	Oahu																								
	Marine Corps Training Area Bellows	Oahu																								
Air Force	Hickam Air Force Base	Oahu																								
Army	Kahuku Training Area	Oahu																								
	Makua Military Reservation	Oahu																								
	Dillingham Military Reservation	Oahu																								
	Wheeler Army Airfield	Oahu																								
	K-Pier, Kawaihae	Hawaii																								
	Bradshaw Army Airfield	Hawaii																								
	Pohakuloa Training Area	Hawaii																								
State	Keehi Lagoon	Oahu																								

* Includes Port Allen and Makaha Ridge

** Includes Ford Island and all other areas within the harbor.

These areas are included in the HRC. The HRC is now used to define the outer limits of the ocean areas used during Major Exercises.

Locations where events can occur — RIMPAC 02 Programmatic — Added RIMPAC 04 Supplement — Added RIMPAC 06 Supplement

Training Events:

A-A MISSILEX	Air-to-Air Missile Exercise (formerly AAMEX)	C2	Command and Control	SALVAGE OPS	Salvage Operations
AAW[1]	Anti-Air Warfare	DEMO	Demolition Exercise	S-A MISSILEX	Surface-to-Air Missile Exercise (formerly SAMEX)
AIROPS	Air Operations	GUNEX	Gunnery Exercise	SINKEX	Sinking Exercise
AMPHIBEX	Amphibious Landing Exercise (now Expeditionary Assault)	HA/DR	Humanitarian Assistance/Disaster Relief	SMWEX	Ship Mine Warfare Exercise
Air MIWEX	Air Mine Warfare Exercise (formerly AMWEX)	HAO/NEO	Humanitarian Assistance Operation/ Non-Combatant Evacuation Operation	SPECWAROPS	Special Warfare Operations
A-S MISSILEX	Air-to-Surface Missile Exercise (formerly ASMEX)			S-S MISSILEX	Surface-to-Surface Missile (formerly SSMEX)
ASUW[2]/ASW[3]	Anti-Surface Warfare/ Anti-Submarine Warfare Exercise	IN-PORT	In-port Briefings and Activities	STW	Strike Warfare Exercise (formerly STWEX)
		LFX	Live Fire Exercise	SUBOPS	Submarine Operations
ASW	Anti-Submarine Warfare Exercise (formerly ASWEX)	MCM	Mine Countermeasures	SUPPORTEX	In-Port Support Exercise
CASEX	Close Air Support	MINEX	Mine Exercise	UMWEX	Underwater Mine Warfare Exercise
		MIW[4]	Mine Warfare		

Note: Since the publication of the RIMPAC 02 Programmatic (U.S. Department of the Navy, 2002a), new terminology and/or categories of exercises have come into use. They are as follows:

[1] AAW includes AIROPS, S-A MISSILEX, A-A MISSILEX, and A-S MISSILEX

[2] ASUW includes GUNEX, S-S MISSILEX, and ASW

[3] ASW includes S-S MISSILEX and ASW

[4] MIW encompasses two subsets, MINEX and MCM. MINEX is the act of laying mines. MCM is the act of locating and countering mining by others and includes SMWEX, AMWEX, and UMWEX.

Table D-4. Example Undersea Warfare Exercise Matrix

Training Events

					AAW/ACM				ASUW / ASW		MIW				ASUW											
												MCM														
Service	Location	Island	IN-PORT/ SUPPORTEX	C2	AIROPS	S-A MISSILEX	A-A MISSILEX/ ACM	A-S MISSILEX	S-S MISSILEX	ASW	MINEX	SMWEX	Air MIWEX	UMWEX	STW, CASEX	GUNEX	SINKEX	LFX	HAO/NEO	HA/DR	SPECWAROPS	DEMO	SALVAGE OPS	Expeditionary Assault	SUBOPS	Seaglider
Navy	Pacific Missile Range Facility*	Kauai																								
	Niihau	Niihau																								
	Kaula	Kaula																								
	Pearl Harbor**	Oahu																								
	Lima Landing	Oahu																								
	Puuloa Underwater Range – Pearl Harbor	Oahu																								
	Barbers Point Underwater Range	Oahu																								
	Coast Guard AS Barbers Point/ Kalaeloa Airport	Oahu																								
	PMRF Warning Areas#	Ocean Areas																								
	Oahu Warning Areas#	Ocean Areas																								
	Open Ocean Areas#	Ocean Areas																								
	U.S. Command Ship	Ocean Areas																								
Marines	Marine Corps Base Hawaii	Oahu																								
	Marine Corps Training Area Bellows	Oahu																								
Air Force	Hickam Air Force Base	Oahu																								
Army	Kahuku Training Area	Oahu																								
	Makua Military Reservation	Oahu																								
	Dillingham Military Reservation	Oahu																								
	Wheeler Army Airfield	Oahu																								
	K-Pier, Kawaihae	Hawaii																								
	Bradshaw Army Airfield	Hawaii																								
	Pohakuloa Training Area	Hawaii																								
State	Keehi Lagoon	Oahu																								

* Includes Port Allen and Makaha Ridge

** Includes Ford Island and all other areas within the harbor.

[#] These areas are included in the HRC. The HRC is now used to define the outer limits of the ocean areas used during Major Exercises.

Locations where training events occur

USWEX training events

Training Events:

A-A MISSILEX	Air-to-Air Missile Exercise (formerly AAMEX)	C2	Command and Control			SALVAGE OPS	Salvage Operations
AAW[1]	Anti-Air Warfare	DEMO	Demolition Exercise			S-A MISSILEX	Surface-to-Air Missile Exercise (formerly SAMEX)
AIROPS	Air Operations	GUNEX	Gunnery Exercise			SINKEX	Sinking Exercise
AMPHIBEX	Amphibious Landing Exercise (now Expeditionary Assault)	HA/DR	Humanitarian Assistance/Disaster Relief			SMWEX	Ship Mine Warfare Exercise
Air MIWEX	Air Mine Warfare Exercise (formerly AMWEX)	HAO/NEO	Humanitarian Assistance Operation/ Non-Combatant Evacuation Operation			SPECWAROPS	Special Warfare Operations
A-S MISSILEX	Air-to-Surface Missile Exercise (formerly ASMEX)					S-S MISSILEX	Surface-to-Surface Missile (formerly SSMEX)
ASUW[2]/ASW[3]	Anti-Surface Warfare/ Anti-Submarine Warfare Exercise	IN-PORT	In-port Briefings and Activities			STW	Strike Warfare Exercise (formerly STWEX)
		LFX	Live Fire Exercise			SUBOPS	Submarine Operations
ASW	Anti-Submarine Warfare Exercise (formerly ASWEX)	MCM	Mine Countermeasures			SUPPORTEX	In-Port Support Exercise
CASEX	Close Air Support	MINEX	Mining Exercise			UMWEX	Underwater Mine Warfare Exercise
		MIW[4]	Mine Warfare				

Note: Since the publication of the RIMPAC 02 Programmatic (U.S. Department of the Navy, 2002a), new terminology and/or categories of exercises have come into use. They are as follows:

[1] AAW includes AIROPS, S-A MISSILEX, A-A MISSILEX, and A-S MISSILEX

[2] ASUW includes GUNEX, S-S MISSILEX, and ASW

[3] ASW includes S-S MISSILEX and ASW

[4] MIW encompasses two subsets, MINEX and MCM. MINEX is the act of laying mines. MCM is the act of locating and countering mining by others and includes SMWEX, AMWEX, and UMWEX.

Table D-5. Proposed Future RIMPAC Exercise Matrix

Training Events

Service	Location	Island	IN-PORT/ SUPPORTEX	C2	AAW: AIROPS	AAW: S-A MISSILEX	AAW: A-A MISSILEX/ ACM	AAW: A-S MISSILEX	ASUW / ASW: S-S MISSILEX	ASUW / ASW: ASW	MIW: MINEX	MIW: MCM: SMWEX	MIW: MCM: Air MIWEX	MIW: MCM: UMWEX	ASUW: STW, CASEX	ASUW: GUNEX	ASUW: SINKEX	LFX	HAO/NEO	HA/DR	SPECWAROPS	DEMO	SALVAGE OPS	Expeditionary Assault	SUBOPS	Seaglider	FCLP
Navy	Pacific Missile Range Facility*	Kauai		■	■	■	■		■			■			■				■		■	■		■			■
	Niihau	Niihau																	■		■						
	Kaula	Kaula													■	■											
	Pearl Harbor**	Oahu	■	■	■																■	■	■				
	Lima Landing	Oahu																			■	■					
	Puuloa Underwater Range – Pearl Harbor	Oahu																			■	■	■				
	Barbers Point Underwater Range	Oahu																			■	■					
	Coast Guard AS Barbers Point/ Kalaeloa Airport	Oahu			■																■						
	PMRF Warning Areas[#]	Ocean Areas				■	■	■	■	■	■				■	■	■				■	■			■		
	Oahu Warning Areas[#]	Ocean Areas				■	■			■						■					■	■			■		
	Open Ocean Areas[#]	Ocean Areas																									
	U.S. Command Ship	Ocean Areas		■																							
Marines	Marine Corps Base Hawaii	Oahu		■	■									■					■	■	■			■			■
	Marine Corps Training Area Bellows	Oahu																	■	■	■			■			
Air Force	Hickam Air Force Base	Oahu		■	■																■						
Army	Kahuku Training Area	Oahu																	■	■	■						
	Makua Military Reservation	Oahu																■			■						
	Dillingham Military Reservation	Oahu																			■						
	Wheeler Army Airfield	Oahu		■	■																■						
	K-Pier, Kawaihae	Hawaii																			■			■			
	Bradshaw Army Airfield	Hawaii		■	■																■						
	Pohakuloa Training Area	Hawaii		■											■			■			■						
State	Keehi Lagoon	Oahu																					■				

* Includes Port Allen and Makaha Ridge   ** Includes Ford Island and all other areas within the harbor.

[#] These areas are included in the HRC. The HRC is now used to define the outer limits of the ocean areas used during Major Exercises.

Locations where events can occur   Future RIMPAC (Additional Exercises)

Training Events:

A-A MISSILEX	Air-to-Air Missile Exercise (formerly AAMEX)	C2	Command and Control	SALVAGE OPS	Salvage Operations
AAW[1]	Anti-Air Warfare	DEMO	Demolition Exercise	S-A MISSILEX	Surface-to-Air Missile Exercise (formerly SAMEX)
AIROPS	Air Operations	FCLP	Field Carrier Landing Practice	SINKEX	Sinking Exercise
AMPHIBEX	Amphibious Landing Exercise (now Expeditionary Assault)	GUNEX	Gunnery Exercise	SMWEX	Ship Mine Warfare Exercise
Air MIWEX	Air Mine Warfare Exercise (formerly AMWEX)	HA/DR	Humanitarian Assistance/Disaster Relief	SPECWAROPS	Special Warfare Operations
A-S MISSILEX	Air-to-Surface Missile Exercise (formerly ASMEX)	HAO/NEO	Humanitarian Assistance Operation/Non-Combatant Evacuation Operation	S-S MISSILEX	Surface-to-Surface Missile (formerly SSMEX)
ASUW[2]/ASW[3]	Anti-Surface Warfare/ Anti-Submarine Warfare Exercise	IN-PORT	In-port Briefings and Activities	STW	Strike Warfare Exercise (formerly STWEX)
		LFX	Live Fire Exercise	SUBOPS	Submarine Operations
ASW	Anti-Submarine Warfare Exercise (formerly ASWEX)	MCM	Mine Countermeasures	SUPPORTEX	In-Port Support Exercise
CASEX	Close Air Support	MINEX	Mine Exercise	UMWEX	Underwater Mine Warfare Exercise
		MIW[4]	Mine Warfare		

Note: Since the publication of the RIMPAC 02 Programmatic (U.S. Department of the Navy, 2002a), new terminology and/or categories of exercises have come into use. They are as follows:

[1] AAW includes AIROPS, S-A MISSILEX, A-A MISSILEX, and A-S MISSILEX   [2] ASUW includes GUNEX, S-S MISSILEX, and ASW   [3] ASW includes S-S MISSILEX and ASW

[4] MIW encompasses two subsets, MINEX and MCM. MINEX is the act of laying mines. MCM is the act of locating and countering mining by others and includes SMWEX, AMWEX, and UMWEX.

Table D-6. Proposed Multiple Carrier Strike Group Matrix

			Training Events																								
					AAW				ASUW / ASW		MIW					ASUW											
												MCM															
Service	Location	Island	IN-PORT/ SUPPORTEX	C2	AIROPS	S-A MISSILEX	A-A MISSILEX/ ACM	A-S MISSILEX	S-S MISSILEX	ASW	MINEX	SMWEX	Air MIWEX	UMWEX	STW, CASEX	GUNEX	SINKEX	LFX	HAO/NEO	HA/DR	SPECWAROPS	DEMO	SALVAGE OPS	Expeditionary Assault	SUBOPS	Seaglider	FCLP
U.S. Navy	Pacific Missile Range Facility*	Kauai		G	G	G	G		G			G			G												Y
	Niihau	Niihau																	G		G						
	Kaula	Kaula														G											
	Pearl Harbor**	Oahu	G	G	G																G	G	G				
	Lima Landing	Oahu																			G	G					
	Puuloa Underwater Range – Pearl Harbor	Oahu																			G	G	G				
	Barbers Point Underwater Range	Oahu																			G	G					
	Coast Guard AS Barbers Point/Kalaeloa Airport	Oahu			G																G						
	PMRF Warning Areas#	Ocean Areas				Y	Y	G	Y	Y	G				G	G	Y				G	G			G		
	Oahu Warning Areas#	Ocean Areas				Y	Y			Y						G					G	G			G		
	Open Ocean Areas#	Ocean Areas								Y		G	G	G							G	G			G	G	
	U.S. Command Ship	Ocean Areas		Y																							
U.S. Marines	Marine Corps Base Hawaii	Oahu																									Y
	Marine Corps Training Area Bellows	Oahu																	G	G	G			G			
U.S. Air Force	Hickam Air Force Base	Oahu		Y	G																G						
U.S. Army	Kahuku Training Area	Oahu																	G	G	G						
	Makua Military Reservation	Oahu																G			G						
	Dillingham Military Reservation	Oahu																			G						
	Wheeler Army Airfield	Oahu		G	G																G						
	K-Pier, Kawaihae	Hawaii																			G			G			
	Bradshaw Army Airfield	Hawaii		G	G																G						
	Pohakuloa Training Area	Hawaii		G											G			G			G						
State	Keehi Lagoon	Oahu																					G				

* Includes Port Allen and Makaha Ridge

** Includes Ford Island and all other areas within the harbor.

These areas are included in the HRC. The HRC is now used to define the outer limits of the ocean areas used during Major Exercises.

Locations where events can occur

Multiple Carrier Strike Group

Training Events:

A-A MISSILEX	Air-to-Air Missile Exercise (formerly AAMEX)	C2	Command and Control	SALVAGE OPS	Salvage Operations
AAW[1]	Anti-Air Warfare	DEMO	Demolition Exercise	SAMEX	Surface-to-Air Missile Exercise (now S-A MISSILEX)
AIROPS	Air Operations	GUNEX	Gunnery Exercise	SINKEX	Sinking Exercise
AMPHIBEX	Amphibious Landing Exercise (now Expeditionary Assault)	HA/DR	Humanitarian Assistance/Disaster Relief	SMWEX	Ship Mine Warfare Exercise
Air MIWEX	Air Mine Warfare Exercise (formerly AMWEX)	HAO/NEO	Humanitarian Assistance Operation/ Non-Combatant Evacuation Operation	SPECWAROPS	Special Warfare Operations
A-S MISSILEX	Air-to-Surface Missile Exercise (formerly ASMEX)			SSMEX	Surface-to-Surface Missile (now S-S MISSILEX)
ASUW[2]/ASW[3]	Anti-Surface Warfare/ Anti-Submarine Warfare Exercise	IN-PORT	In-port Briefings and Activities	STWEX	Strike Warfare Exercise
		LFX	Live Fire Exercise	SUBOPS	Submarine Operations
ASW	Anti-Submarine Warfare Exercise (formerly ASWEX)	MCM	Mine Countermeasures	SUPPORTEX	In-Port Support Exercise
CASEX	Close Air Support	MINEX	Mine Exercise	UMWEX	Underwater Mine Warfare Exercise
		MIW[4]	Mine Warfare		

Note: Since the publication of the RIMPAC 02 Programmatic (U.S. Department of the Navy, 2002a), new terminology and/or categories of exercises have come into use. They are as follows:

[1] AAW includes AIROPS, S-A MISSILEX, A-A MISSILEX, and A-S MISSILEX

[2] ASUW includes GUNEX, S-S MISSILEX, and ASW

[3] ASW includes S-S MISSILEX and ASW

[4] MIW encompasses two subsets, MINEX and MCM. MINEX is the act of laying mines. MCM is the act of locating and countering mining by others and includes SMWEX, AMWEX, and UMWEX.

Appendix E
Weapon Systems

APPENDIX E
WEAPON SYSTEMS

Table E-1. Typical Missile Exercise Weapons Used at Pacific Missile Range Facility

TYPE	CHARACTERISTICS				
	Weight	**Length**	**Diameter**	**Range**	**Propulsion**
Surface-to-Air Missiles					
Short Range					
Stinger (FIM-92A)	10.0 kg (22 lb)	1.5 m (5 ft)	70 mm (2.8 in)	4.8 km (3.4 nm)	Solid fuel
Sea Sparrow (RIM-7)	204 kg (450 lb)	3.7 m (12 ft)	203-2 mm (8 in)	14.8 km (10.6 nm)	Solid fuel
Rolling Airframe (RIM-116)	73.5 kg (162 lb)	2.8 m (9 ft 3 in)	127 mm (5 in)	7 km (5.0 nm)	Solid fuel
Medium Range					
Standard SM-1 MR (RIM-66B)	499 kg (1,100 lb)	4.5 m (14 ft 8 in)	342.9 mm (13.5 in)	46.3 km (33 nm)	Solid fuel
Standard SM-2 (RIM-66C)	612 kg (1,350 lb)	4.4 m (14 ft 7 in)	342.9 mm (13.5 in)	74.1 km (53 nm)	Solid fuel
Long Range					
Standard SM-2 ER (RIM-67A/B and 67-C/D)	1,325 kg (2,920 lb)	8.2 m (27 ft)	342.9 mm (13.5 in)	166.7 km (90 nm)	Solid fuel
Standard SM-2 AER (RIM-67B)	1,452 kg (3,200 lb)	6.7 m (22 ft)	342.9 mm (13.5 in)	150 km (107.1 nm)	Solid fuel
Air-to-Air Missiles					
Short Range					
Sidewinder (AIM-9)	84.4 kg (186 lb)	2.9 m (9 ft 6 in)	127 mm (5 in)	18.5 km (10 nm)	Solid fuel
Medium Range					
Sparrow (AIM-7)	231 kg (510 lb)	3.6 m (11 ft 10 in)	203.2 mm (8 in)	55.6 km (30 nm)	Solid fuel
Long Range					
Phoenix (AIM-54)	447 kg (985 lb)	4 m (13 ft)	381 mm (15 in)	203.9 km (110 nm)	Solid fuel
Air-to-Surface Missiles					
Short Range					
Skipper II (AGM-123)	582 kg (1,283 lb)	4.3 m (14 ft)	355.6 mm (14 in)	9.6 km (5.2 nm)	Solid fuel

Notes:

ft	feet	lb	pounds
in	inches	m	meters
kg	kilograms	mm	millimeters
km	kilometers	nm	nautical miles

Table E-1. Typical Missile Exercise Weapons Used at Pacific Missile Range Facility (Continued)

TYPE	CHARACTERISTICS				
	Weight	Length	Diameter	Range	Propulsion
Air-to-Surface Missiles (Concluded)					
Medium Range					
HARM (AGM-88)	366.1 kg (807 lb)	4.2 m (13 ft 9 in)	254 mm (10 in)	18.5 km (10 nm)	Solid fuel
Shrike (AGM-45)	177 kg (390 lb)	3 m (10 ft)	203.2 mm (8 in)	18.5 km (10 nm)	Solid fuel
Sidearm (AGM-122)	90.7 kg (200 lb)	3 m (10 ft)	127 mm (5 in)	17.8 km (9.6 nm)	Solid fuel
Long Range					
Harpoon (AGM-84/ RGM-84/UGM-84)*	797 kg (1,757 lb)	5.2 m (17 ft 2-in)	342.9 mm (13.5 in)	278 km (150 nm)	Solid fuel
Surface-to-Surface Missiles (Cruise)					
Harpoon (AGM-84/ RGM-84/UGM-84)*	797 kg (1,757 lb)	5.2 m (17 ft 2-in)	342.9 mm (13.5 in)	278 km (150 nm)	Solid fuel

Source: U.S. Department of the Navy, 1998a

Notes:

*Characteristics vary according to variant. Those for RGM-84F are shown.

ft	feet	lb	pounds
in	inches	m	meters
kg	kilograms	mm	millimeters
km	kilometers	nm	nautical miles

Table E-2. Typical Aerial Target Drones and Missiles Used at Pacific Missile Range Facility

TYPE	CHARACTERISTICS			
	Length	Speed (Maximum)	Operational Altitude (Maximum)	Time on Station (Maximum)
Subsonic				
BQM-34S	7 m (23 ft)	Mach 0.9	15,240 m (50,000 ft)	60 minutes
BQM-74C	4 m (13 ft)	430 knots	10,668 m (35,000 ft)	75 minutes
Supersonic				
MQM-8G (ER)	7.6 m (25 ft)	Mach 2.7	1,524 m (5,000 ft)	N/A
AQM-37C	4.1 m (13.6 ft)	Mach 4.0	30,480 m (100,000 ft)	N/A

Source: U.S. Department of the Navy, 1998a

Notes:

ft feet
m meters
N/A Not Applicable

Table E-3. Typical Existing Target Systems Used at Pacific Missile Range Facility

Type	Category	Name	Propellant Type
Ballistic Missile			
	Small	AQM-37C	Liquid
		Black Brant V	Solid
		Hawk	Solid
		Recruit	Solid
		Malemute	Solid
		HERMES	Solid
		Lance	Liquid
		Standard	Solid
		Tomahawk (Rocket)	Liquid/Solid
		Honest John (Booster)	Solid
		Nike (Booster)	Solid
		PATRIOT as a Target (PAAT)	Solid
		Apache	Solid
		Cajun	Solid
		Genie (14” diameter)	Solid
	Medium	Terrier	Solid
		Talos	Solid
		Castor	Solid
		STRYPI	Solid
		Antares (Stack)	Solid
		Aries	Solid
		Spartan	Solid
		Talos	Solid
		SR-19 (Air Drop)	Solid
		STORM	Solid
		MA-31	Liquid
		Liquid Fuel Target System	Liquid
	Large	Strategic Target System	Solid
		Hera	Solid
		Terrier	Solid
	Supersonic	AQM-37C	Liquid
		Vandal	Liquid/Solid

Table E-3. Typical Existing Target Systems Used at Pacific Missile Range Facility (Continued)

Type	Category	Name	Propellant Type
Aircraft			
	Subsonic	QF-4	Liquid
		AF-16	Liquid
Balloon			
		Balloon	N/A
Towed			
	Aerial	TDU-34A	N/A
Subsurface			
		MK-30 Mod 1	Liquid
		EMATT	Liquid
		SPAT-1 (Self Prop Acoustic Target)	Liquid
		MK-17 (Stationary Target for MK-46)	N/A
Surface			
		QST 35	Liquid
		HULK (TBD)	N/A
		ISTT (Improved Surface Towed Target)	N/A
Cruise Missiles			
	Subsonic	BQM-34S	Liquid
		BQM-74/CHUKAR	Liquid
		AQM-34	Liquid
		MQM-107	Liquid
		Harpoon	Liquid
		Liquid Fuel Target System	Liquid
		Tactical Air Launched Decoy (TALD ADM-141A)	Liquid
		ITALD (Improved version ADM-141C)	Liquid
	Supersonic	Vandal	Liquid/Solid
		MA-31	Liquid
		Terrier	Solid
		GQM-163A (Coyote)	Solid
		Liquid Fuel Target System	Liquid

Source: U.S. Department of the Navy, 1988a

Notes: N/A Not Applicable

Table E-4. Typical Existing Weapon Systems Used at Pacific Missile Range Facility

Type	Category	Name	Propellant Type (Liquid/Solid)
Missiles			
	Ship	ASROC	Liquid/Solid
	Ship	Harpoon (RTM-84)	Liquid
	Ship	MK-46 VLA	Liquid/Solid
	Ship	SM-2 BLK II	Solid
	Ship	SM-2 BLK III	Solid
	Ship	SM-2 BLK IV	Solid
	Ship	Sparrow (A1M7)	Solid
	Surf/Ship/Sub	Harpoon (R/UGM-84)	Liquid/Solid
	Air	AGM-45 (SHRIKE)	Solid
	Air	Harpoon (AGM-84)	Liquid
	Air	Phoenix	Solid
	Air	Sidewinder	Solid
	Air	Sparrow	Solid
	Air/Surf/Sub	Tomahawk	Liquid/Solid
	Land	Hawk	Solid
	Land	MEADS	Solid
	Land	PATRIOT	Solid
	Land	THAAD	Solid
	Land/Ship	Stinger	Solid
Guns			
	Ship	Naval Guns	N/A
	Ship	Phalanx/Vulcan	N/A
	Air	Aircraft Mounted Guns	N/A
	Land	Howitzer	N/A
Weather Rocket			
	Land	PWN-11D	Solid
	Land	PWN-12A	Solid
Torpedoes			
	Sub	MK-48 ADCAP	Liquid
	Sub	MK-48	Liquid
	Air/Ship	MK-44 (PLLT)	Battery
	Air/Ship	MK-30	Battery
	Air/Ship	MK-50	Liquid
	Air/Ship	MK-54	Liquid
	Air/Ship	Type 80 (Japanese)	Liquid
	Air/Surf	MK-46	Liquid

Source: U.S. Department of the Navy, 1998a

Note: N/A Not Applicable

Table E-4. Typical Existing Weapon Systems Used at Pacific Missile Range Facility (Continued)

Type	Category	Name	Propellant Type (Liquid/Solid)
Sub Launched Mines			
	Sub	MK-67-2 Sub Launched Mobile Mine (SLMM)	Battery
Air Deployed Mines			
	Air	MK-25	N/A
	Air	MK-36	N/A
	Air	MK-36 DST	N/A
	Air	MK-52	N/A
	Air	MK-76	N/A
Bombs			
	Air	BDU-45	N/A
	Air	MK-82	N/A

Source: adapted from U.S. Department of the Navy, 1998a
Note: N/A Not Applicable

Table E-5. Typical Electronic Warfare Assets Used at Pacific Missile Range Facility

TYPE	CHARACTERISTICS		
	Frequency Bands	**Power Output (Maximum)**	**Location Used**
Air and Seaborne Electronic Warfare Assets			
Airborne Simulator Systems			
APS-504(V)5	8.9925 to 9.375 GHz	8 kW	Pacific Missile Range Facility (PMRF) RC-12F Aircraft
MK-67	907.2 kg (2,000 lb)	4.00 m (13 ft 5 in)	533 mm (21 in)
Expendable Radar Transmitter Sets			
AN/DPT-1(V)	7.8 to 9.6, 14.0 to 15.2 GHz	80 kW	BQM-334S Targets
AN/DPT-2(V)	9.375 GHz	20 kW	BQM-74C Targets
Airborne Electronic Countermeasures Systems			
Traveling Wave Tube Countermeasures System	425 to 445 MHz, 902 to 928 MHz, 2 to 4 GHz	100 W	PMRF RC-12F Aircraft
ALT-41	425 to 445 MHz	100 W	PMRF RC-12F Aircraft
ALT-42	902 to 928 MHz	100 W	PMRF RC-12F Aircraft
DLQ-3	2 to 4 GHz	100 W	PMRF RC-12F Aircraft
ULQ-21	8 to 10.5 GHz	100 W	PMRF RC-12F Aircraft

Table E-5. Typical Electronic Warfare Assets Used at Pacific Missile Range Facility (Continued)

TYPE	CHARACTERISTICS		
	Frequency Bands	Power Output (Maximum)	Location Used
Seaborne Simulator Systems			
AN/DPT-1(V)	7.8 to 9.6, 14.0 to 15.2 GHz	80 kW	Range Boats
AN/DPT-2(V)	7.8 to 9.6, 14.0 to 15.2 GHz	150 kW	Range Boats
Land-Based Electronic Warfare Assets			
Simulator Systems - Fixed			
AN/DPT-1(V)	7.8 to 9.6, 14.0 to 15.2 GHz	70 kW	Makaha Ridge, Kauai
ENSYN	2 to 4, 7 to 11 GHz	1 kW	Makaha Ridge, Kauai
I/J-TES	7.8 to 9.6, 14.0 to 15.2 GHz	70 kW	Makaha Ridge, Kauai
AN/DPT-1(V)	7.8 to 9.6, 14.0 to 15.2 GHz	70 kW	Mauna Kapu, Oahu
Simulator Systems - Mobile			
AN/DPT-1(V)	2.9 to 3.1, 7.8 to 9.6, 14.0 to 15.2 GHz	70 kW	Barking Sands, Kauai
AN/UPT-2A(V)	2.9 to 3.1, 7.8 to 9.6, 14.0 to 15.2 GHz	150 kW	Barking Sands, Kauai
AN/D/DPT-1(V)	7.8 to 9.6, 14.0 to 15.2 GHz	70 kW	Perch Site, Niihau
AN/UPT-2A(V)	2 to 4, 8 to 18 GHz	150 kW	Perch Site, Niihau
ENSYN	2 to 4, 8 to 18 GHz	1 kW	Naval Air Station (NAS) Barbers Point, Oahu
AN/DPT-1(V)	2.9 to 3.1, 7.8 to 9.6, 14.0 to 15.2 GHz	70 kW	NAS Barbers Point, Oahu
Electronic Countermeasures Systems - Fixed			
ALT-41	425 to 445 MHz	100 W	Makaha Ridge, Kauai
ALT-42	902 to 928 MHz	100 W	Makaha Ridge, Kauai
ULQ-26	2 to 4 GHz	100 W	Makaha Ridge, Kauai
ULQ-21	8.0 to 10.5-GHz	100 W	Makaha Ridge, Kauai
Electronic Countermeasures Systems - Mobile			
DLQ-3	425 to 445 MHz 14.0 to 15.2 GHz	100 W	Range Boats, Remote Sites
ULQ-26	425 to 445 MHz 14.0 to 15.2 GHz	100 W	Range Boats, Remote Sites
ULQ-21	425 to 445 MHz 14.0 to 15.2 GHz	100 W	Range Boats, Remote Sites
ALT-41/42	425 to 445 MHz 14.0 to 15.2 GHz	100 W	Range Boats, Remote Sites

Source: adapted from U.S. Department of the Navy, 1998a

Notes:

ft	feet	in	inches	kW	kilowatts	m	meters	mm	millimeters
GHz	gigahertz	kg	kilograms	lb	pounds	MHz	megahertz	W	watts

Table E-6. Existing Pacific Missile Range Facility Radars, Locations, and Characteristics

Emitter	Comments	Location	Power Peak (kW)	Scan Rate	Frequency (MHz) Low	Frequency (MHz) High	Pulse Width (µS)	PRF (PPS)	Ant. Gain (dBi)	Ant. Elev. (m)	Remarks
AN/MPS-25	Monopulse Tracking (2 each)	Main Base	1,000	--	5,400	5,900	0.25, 0.5, 1	160, 640	46	18	AZ=0 to 360 degrees. Elevation=-5 to +185 degrees
AN/SPS-10	Surveillance	Main Base	250	15 rpm	5,450	5,825	0.5, 1.3	640	30	22	
AN/UPX-27	AN/SPS-10 IFF Interrogator	Main Base	1	15 rpm	1,030	1,030	0.8	640	23	22	Uses AN/SPS-10 antenna
AN/FPS-106	Weather Radar	Main Base	500		5,450	5,650	0.5	320	35	20	
AN/WRF-100	DOE Radar Facility	Main Base	250	--	9,375	9,375	1	640	32	10	
THAAD Radar	X-Band Tracking	Main Base			8,000	12,000				22	
AN/MPS-25	Monopulse Tracking (2 each)	Makaha Ridge	1,000	--	5,400	5,900	0.25, 0.5, 1	160, 640	46	500	AZ=0 to 360 degrees. Elevation=-5 to +185 degrees
AN/FPQ-10	Monopulse Tracking (2 each)	Makaha Ridge	1,000	--	5,400	5,900	0.25, 0.5, 1	160, 640	43	473	AZ=0 to 360 degrees. Elevation=-5 to +90 degrees
AN/SPS-48E	Track-While-Scan Surveillance	Makaha Ridge	2,400	15 rpm	2,908	3,110	27	Various	39.1	462	
AN/UPX-27	AN/SPS-48E IFF Interrogator	Makaha Ridge	1	15 rpm	1,030	1,030	0.8	Various	19	462	
AN/APS-134	Surface Surveillance	Makaha Ridge	500	15 rpm	9,500	10,000	0.5	500	42	457	Linear frequency chirp each pulse
AN/FPS-16	Monopulse Tracking	Kokee	1,000	--	5,400	5,900	0.25, 0.5, 1	160, 640	43	1,155	AZ=0 to 360 degrees. Elevation=-5 to +185 degrees
AN/FPQ-10	Monopulse Tracking	Kokee	1,000	--	5,400	5,900	0.25, 0.5, 1	160, 640	43	1,150	AZ=0 to 360 degrees. Elevation=-5 to +90 degrees
USB	Unified S-Band System	Kokee	20	--	2,090	2,120	CW	CW	44	1,110	
AN/FPS-117	Surveillance	Kokee	24.75	5 rpm	1,215	1,400	51.2, 409.6	241	38.6	1,310	
OX-60/FPS-117	AN/FPS-117 IFF Interrogator	Kokee	2	5 rpm	1,030	1,030	Various	241	21	1,310	
AN/APS-134	Surveillance	Niihau	500	15 rpm	9,500	10,000	0.5	500	42	375	
R73-6	Raytheon Pathfinder (3 each)	Weapons Recovery Boat and Torpedo Weapons Recovery	10	24 rpm	9,410	9,410	0.08, 0.4, 0.8, 1.2	2,000, 1,500, 750, 500	16	8	
APS-134	Surveillance	HIANG Kokee	500	15 rpm	9,500	10,000	0.5	500	42	375	

Source: U.S. Department of the Navy, 1998a

Table E-7. Representative Proposed Target Systems

Type	Name	Propellant Type
Ballistic Missile		
	New Advanced Hypersonic Weapon 1st stage	Solid
	New Advanced Hypersonic Weapon 2nd stage	Solid
	Super STRYPI	Solid

Table E-8. Target Launch Pad—Rail and Stool Requirements

Item/Facility Type	Requirements 0 to 1,200 kilometers (0 to 647.9 nautical miles)
Dimensions of Launch Pads/Construction Materials Assumed	12.2 meters x 15.2 meters + 15.2 meters (40 x 50 feet + 50 feet) for environmental shelter = 12.2 meters x 30.5 meters (40 x 100 feet) = 371.6 square meters (4,000 square feet). Concrete pad with outer gravel or coral area.
Cleared Area/No Vegetation Zone Surrounding Launch Pad	15.2 to 30.5 meters (50 to 100 feet)
Explosive Safety Quantity-Distance (ESQDs) by Category Type (Intraline [IL], Public Transportation Route [PTR], Inhabited Building [IB])	85.3 meters (280 feet) IL 228.6 meters (750 feet) PTR 381 meters (1,250 feet) IB ESQD
Ground Hazard Area (GHA) Radius	For most unguided systems, GHA = 609.6 meters (2,000 feet) For guided systems, GHA = 1,828.8 to 3,048 meters (6,000 to 10,000 feet)
Electromagnetic Radiation Constraints to Personnel, Fuels, or Ordnance	Consider HERO (ordnance electronic triggering mechanisms potentially set off due to electromagnetic radiation).
Launch Pad Fencing/Security Needs	Should have access control to the hazardous operations/ launching area. The target payload may be classified.
Utilities to Launch Pad/Type Needed	Will bring some portable electrical generator capability (campaign). Will require a power distribution system, fuel storage, and containment area to avoid soil contamination.
Road Access to Launch Pad/Hazardous Transportation Route/ % Grade	Prefer gravel road of less than 6 percent grade. Prefer to stay off public highways.
Environmental Shelter/Pad/Dimensions	Depends on the type of missile system and site environmental constraints (some missiles are temperature, humidity, and salt spray dependent). At Kauai Test Facility, only tarps are used in some cases. Some booster rockets must be maintained between 15.5 to 26.7 degrees Celsius (60 to 80 degrees Fahrenheit). Also stool launch items will require wind protection.
Soil Conditions Desired	Stable soil, cleared gravel or paved area around the launcher.
Minimum Distance to Shoreline If Any	None. Consider waves, salt spray.

Source: U.S. Department of the Navy, 1998a

Table E-9. Target Support/Preparation and Launch Control Facilities Requirements

Item/Facility Type	Requirements
Missile Assembly—Need missile assembly building on Island or Build-up at Another Location (Specify if Known), Ship by Aircraft or Barge to Island, or Other Logistics Based on Distance, Weight, Airfield, etc.	No new missile assembly building needed. Build up at Pacific Missile Range Facility (PMRF). Transport by aircraft or barge to island. May have an environmental shelter (stool) and/or clamshell (rail) at the launch site. .
Vertical Target Missile Service Tower Needed, Dimensions	None required.
Launch Control Van or Building	Mobile Launch Control Van [could be a van brought in by air or barge or a trailer like Kokole Point at PMRF with a berm (if a rail), or a van in a hardened van shelter (if a stool)].
Launch Pad Equipment Building	Equipment building [8 x 8 feet] next to pad.
Missile Storage Facility	May need missile storage if the number of launches per year justifies the cost.
Warehousing	Would use existing warehousing if available. If not, keep supplies on a barge or fly in/out. May use military vans or enclosed semi trailers.
Road Access Dimensions/Minimum Radii	12 feet wide road minimum, 50 feet turning radius to launch pad, 8 feet minimum to launch control.
Min. Distance to Shoreline If Any	None. Consider wave action, salt spray.
Utilities to Facilities/Type Needed	Electricity.
Security/Fencing/Clear Zone Needed/Dimensions	Not required unless there is a need to provide security protection or to mitigate for bird control (site specific—Tern). Dimensions undefined.
Electromagnetic Radiation Constraints to Personnel, Fuels, or Ordnance	Consider HERO (ordnance electronic triggering mechanisms potentially set off as a result of electromagnetic radiation).
View of Launch Pad Needed from Control Van/Building	Desired.

Source: U.S. Department of the Navy, 1998a

Table E-10. Representative Defensive Missile Systems

Type	Category	Name	Propellant Type (Liquid/Solid)
Missiles			
	Ship	SM-2 BLK IVA	Solid
	Ship	SM-3	Solid
	Ship	SM-6	Solid
	Air	AMRAAM	Solid
	Land	MEADS	Solid
	Land	PATRIOT (PAC-2)	Solid
	Land	PAC-3	Solid
	Land	THAAD	Solid

Source: U.S. Department of the Navy, 1998a

Table E-11. Land-based Interceptor Launch Site (Mobile) Requirements

Item/Facility Type	Requirements 0 to 1,200 kilometers (0 to 647.9 nautical miles)
Desired Operational Launch Orientation/Flight Path	Need target range of between 350 and 1,000 kilometers (217.5 and 621.4 miles)
Dimensions of Launch Pads/Construction Materials Assumed	Need a hardstand area (prefer gravel or coral) and relatively level ground. Need an area of approximately 42.1 x 20.1 meters = 846 square meters (138 x 66 feet = 9,108 square feet). The launchers are to be sited within the 120 degree angle of the radar signal (60 degrees either side of the boresight). The launchers are to be located between 130.1 meters (427 feet) and 10 kilometers (6.2 miles) from the radar set. Several launchers may be sited within this area.
Cleared Area/No Vegetation Zone Surrounding Launch Pad	None. Consider security/visibility.
Explosive Safety Quantity-Distance (ESQD) by Category Type (Intraline [IL], Public Transportation Route [PTR], Inhabited Building [IB])	381 meters (1,250 feet) for IB ESQD, 85.3 meters (280 feet) IL, 228.6 meters (750 feet) PTR Note—Should plan for 381 meters (1,250 feet)—Dual mode Area Interceptors.
Ground Hazard Area (GHA) Radius	1,829-meter (6,000-foot) radius
Electromagnetic Radiation Constraints to Personnel, Fuels, or Ordnance	120.1 meters (394 feet) in front of the radar - 60 degrees both sides of boresight (refer to PAC-3 environmental document).
Launch Pad Fencing/ Security Needs/Dimensions	Security guards required.
Utilities to Launch Pad/Type Needed	Utilities are required for aerospace ground equipment and test instrumentation.
Road Access to Launch Pad/Percent Grade	Require road access through rough terrain, gravel preferred. Turning radius of 15.2 meters (50 feet). System designed to be mobile.
Soil Conditions Desired	Stable soil. Gravel surface desirable. Do not want equipment to sink.
Environmental Shelter/Pad/Dimensions	Re-enforced structures for Command and Control trailers.
Minimum Distance to Shoreline If Any	None. Consider wave action, salt spray.

Source: U.S. Department of the Navy, 1998a

Table E-12. Telemetry, Optics, and Radar Instrumentation Requirements

Item/Facility Type	Requirements
Instrumentation Devices/Facilities Required—Targets	Targets—Short- and medium-range multi-participant target and interceptor tracking and telemetry reception, additional range safety monitoring, and additional data products needed. Makaha Ridge: Radars (COSIP), optics, lasers, electronic warfare, telemetry (receivers, recorders, antennas) and internal power plant upgrades Kokee Parcel A: Radar (x band), Communications (CEC [tower], voice, data [telephone poles]) Parcel C: Telemetry antenna (phase array or dish), building (40x60) Parcel D: Radar (COSIP), telemetry antenna
Instrumentation Device(s)/Facilities Required - Interceptors	Area Interceptors—Assumes that Range assets are fixed or trailer mounted (portable).
Number of Interceptor Personnel Working/How Long	Radar site requires 15 people working 2 to 3 weeks.
Mobile Instrumentation Alternative	May consider mobile instrumentation at some sites if no or inadequate on-ground facilities exist. Example is the Wallops Flight Facility (NASA) system. Requires C-141 accessibility for airborne assets. On-ground assets require concrete pad for mobile radar pedestal, line of sight, adequate safety clear zone, and generator use. May also consider military P-3 aircraft use.

Source: U.S. Department of the Navy, 1998a

Table E-13. Communications, Command, and Control Requirements

Item/Facility Type	Requirements
Number of Interceptor Personnel Working/How Long	Battle management, communications, command, and control, and intelligence—15 people for 2 to 3 weeks.
Command and Control Enhancements—Targets/ Interceptors	Command and control needed; enhanced range safety monitoring needed; and FTS enhancement needed. Possible use of Building 105—Control Center at PMRF. Expand fiber optics. Expand office space. Add transmitters and receivers, other communication equipment. Could be mobile in aircraft.

Source: U.S. Department of the Navy, 1998a

Table E-14. Support Infrastructure Requirements

Item/Facility Type	Requirements
Electric Power/Portable Generator/Backup	For Interceptors—Need power under Test mode, no power under Tactical mode. Self contained. For Targets—Power needed, either local power or a generator.
Sanitation/Septic/Waste Treatment	For Interceptors—Total sanitation need is for 47 personnel for 2 to 3 weeks/launch. For Targets—Total sanitation need is for 6 to 10 personnel for 1 to 2 weeks/launch.
Solar Power	None for Interceptors. Targets—No need defined.
Natural Gas/Propane	None for Interceptors. Targets—No need defined.
Potable Water/Fire Flow/Storage	Interceptors and Targets—Drinking water for personnel, minor fire control.
Solid Waste Disposal/Transfer	Interceptors and Targets—Temporary on site storage and/or transport away.
Hazardous Materials Temporary Storage Transfer–Liquid and Storage	Interceptors and Targets—Temporary storage.
Storage/Warehousing/ Logistics Support and Services—Campaign Only	Interceptors and Targets—Use existing space, if available.
On-Island Road Access/Vehicle Storage, Maintenance, and Parking—Campaign Only	Interceptors and Targets—Semi-trailer road access to assets required. Campaign—No storage.
Off-Island Transportation (Air, Barge, Other)	Interceptors and Targets—Air transport (C-130, C-141, and C-5/C-17) and landing craft or ship. Aircraft use desirable.
Fire Station/Pumper/Training/Equipment/ Emergency Medical Team	As defined by PMRF Safety.
Security Forces/Training	Interceptors and Targets—Security guards will be required during launches. No permanent support.
Recreation Facilities/Services	Interceptor and Targets—No need defined.
Fuel Storage	Interceptor and Targets—Electric generator and vehicle fuel storage.
Transient Quarters/Berthing Quarters-Barges	Interceptor and Targets—Need defined. Self-contained onshore camp concept or ship/barge quarters. See personnel numbers. Depends on frequency/location.
Permanent Housing (Base UEPH/Family Housing or Private Rental Housing)	Interceptor and Targets–No need defined.
Administrative Services/Office Space/ Campaign Trailer	Interceptor and Targets—Possible use of Building 105 at PMRF or SNL/KTF complex. Possible use of campaign trailer(s).
Medical Facility and Services	Interceptors and Targets—No special facilities required. Typical services assumed.
Mess Hall/Laundry Facility and Services	Interceptors and Targets—Self-contained onshore camp concept or ship/barge facilities.
Communications Facility and Services	Interceptors and Targets—No need defined.
Liquid Propellant Storage (Hypergolic)	Interceptor—May require temporary storage. Targets—Need defined for targets.

Table E-14. Support Infrastructure Requirements (Continued)

Item/Facility Type	Requirements
Small Explosives/Igniter/Squib Storage/Setbacks	Interceptor—No need defined. Targets—May require squib storage.
Heavy Equipment/Crane	Interceptor—No need defined. Targets—May require crane.
Lightering Boat and Marine Crew Services/Stevedoring	Interceptor and Targets—Need defined.
Berthing/Moorage/Dock and Ramp	Interceptor and Targets–Need defined if no adequate airfield.
Helipad	Interceptor and Targets–Need helipad support capability for emergency medical evacuation and supplies delivery, or airfield capability.
Aircraft Runway (C-130, C-141, C-5, C-17 or Other)/Airfield operations and maintenance/Hotpad/Aircraft Parking and Maintenance	C-130, C-141, and C-5/C-17.

Source: U.S. Department of the Navy, 1998a

Table E–15. Representative Missile Propellant and Exhaust Components

Missile	Propellant Class	Major Propellant Components	Major Exhaust Components
Weapon Systems			
MEADS	Solid	Aluminum, HTPB	Aluminum Oxide, Carbon Dioxide, Carbon Monoxide, Hydrogen, Hydrogen Chloride, Nitrogen, Water
PAC-2	Solid	Aluminum, Ammonium Perchlorate, Iron Oxide, Polymer Binder	Aluminum Oxide, Carbon Dioxide, Carbon Monoxide, Hydrogen, Hydrogen Chloride, Nitrogen, Water
PAC-3	Solid	Aluminum, HTPB	Aluminum Oxide, Carbon Dioxide, Carbon Monoxide, Hydrogen, Hydrogen Chloride, Nitrogen, Water
Standard Missile	Solid	Aluminum, Ammonium Perchlorate, HMX	Aluminum Chloride, Aluminum Oxide, Ammonia, Carbon Dioxide, Carbon Monoxide, Ferric Chloride, Ferric Oxide, Hydrogen, Hydrogen Chloride, Nitric Oxide, Nitrogen, Water
THAAD	Solid	Aluminum, Ammonium Perchlorate, Binder	Aluminum Oxide, Carbon Dioxide, Carbon Monoxide, Hydrogen, Hydrogen Chloride, Nitrogen, Water
Target System			
HERA	Solid	Aluminum, Ammonium Perchlorate, CTPB, HMX, Nitrocellulose-Nitroglycerine	Aluminum Oxide, Carbon Dioxide, Carbon Monoxide, Hydrogen, Hydrogen Chloride, Nitrogen, Water
LANCE	Liquid	IRFNA (Hydrogen Fluoride, Nitric Acid, Nitrogen Dioxide), UDMH, Water	Carbon Dioxide, Carbon Monoxide, Nitrogen, Oxygen, Water
STRYPI	Solid	Aluminum, Ammonium Perchlorate, CTPB, Nitrocellulose-Nitroglycerine, Polysulfide Elastomer	Aluminum Oxide, Carbon Dioxide, Carbon Monoxide, Chlorine, Hydrogen, Hydrogen Chloride, Hydrogen Sulfide, Nitrogen, Sulfur Dioxide, Water

Source: U.S. Department of the Navy, 1998a
Notes:
CTPB = Carboxyl-terminated Polybutadiene
HMX = Cyclotetramethylenetetranitramine
IRFNA = Inhibited Red Fuming Nitric Acid
HTPB = Hydroxyl-terminated Polybutadiene
UDMH = Unsymmetrical Dimethyl Hydrazine

Appendix F
Major Exercise Monitoring Reports

APPENDIX F

2006 Rim of the Pacific Exercise After Action Report:

Analysis of the Effectiveness of the Mitigation and Monitoring Measures as Required Under the Marine Mammal Protection Act (MMPA) Incidental Harassment Authorization and National Defense Exemption from the Requirements of the MMPA for Mid-Frequency Active Sonar Mitigation Measures

Dated December 7, 2006

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INTRODUCTION

This report is presented to fulfill the requirements conditional to the 2006 Rim of the Pacific Exercise (RIMPAC 06) Marine Mammal Protection Act (MMPA) Incidental Harassment Authorization (IHA) and the National Defense Exemption from the Requirements of the MMPA for Certain DoD Mid-Frequency Active Sonar Activities (NDE).

Pursuant to the MMPA, an IHA was sought from the National Marine Fisheries Service (NMFS), which was issued by the NMFS Division of Permits, Conservation, and Education, Office of Protected Resources for 2006 RIMPAC Exercise on 27 June 2006. On 30 June 2006, the Deputy Secretary of Defense issued the NDE, which specified that for the conduct of RIMPAC 2006, the Navy would comply with all mitigation measures set out in the IHA. The IHA required that the Navy, "Submit a report to the Division of Permits, Conservation, and Education, Office of Protected Resources, NMFS and the Pacific Islands Regional Office, NMFS, within 90 days of the completion of RIMPAC."[1] The IHA further specifies that the report contain and summarize the following information:

> (1) "An estimate of the number of marine mammals affected by the RIMPAC ASW exercises and a discussion of the nature of the effects, if observed, based on both the modeled results of real-time exercises and sightings of marine mammals";
> (2) "An assessment of the effectiveness of the mitigation and monitoring measures with recommendations on how to improve them";
> (3) "Results of the marine species monitoring (real-time monitoring from all platforms, independent aerial monitoring, shore-based monitoring at chokepoints, etc.) before, during, and after the RIMPAC exercises"; and
> (4) "As much information (unclassified and, to appropriately cleared recipients, classified "secret") as the Navy can provide including, but not limited to, where and when sonar was used (including sources not considered in take estimates, such as submarine and aircraft sonars) in relation to any measures received levels (such as sonobuoys or on PMRF range), source levels, numbers of sources, and frequencies so it can be coordinated with observed cetacean behaviors."

This report, which contains only unclassified material, provides the necessary information and analyses, and thus fulfills these requirements. The report is organized by section following the order of the requirements in the IHA.

Section 1 provides an estimated number of marine mammals affected by the RIMPAC 06 ASW events based on analysis of actual events and sightings of marine mammals, noting the nature of any observed effects where possible.

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1 Given that the last day of the RIMPAC 2006 exercise was 26 July 2006, this report is due no later than 24 October 2006.

Section 2 of this report assesses the effectiveness of the mitigation and monitoring measures required during RIMPAC 2006 with regard to minimizing the use of Mid-Frequency Active Sonar (MFAS) in the vicinity of marine mammals. This section also includes an assessment of the practicality of implementation of the mitigation measures, the scientific basis behind those measures, and the impact some of the measures had on safety and the effectiveness of the required military readiness activities.

Section 3 presents the results of the marine species monitoring comprised of independent aerial reconnaissance, shore-based monitoring in the vicinity of the chokepoint events, and results from the NMFS observers embarked on the USS LINCOLN during one of the choke-point exercises. Also included in this section is a summary of the 29 marine mammal detections made by exercise participants during RIMPAC 06.

Section 4 of this report provides data on the location and hours of active MFAS used during RIMPAC 06 placed in context with observations of cetacean behaviors resulting from the aerial reconnaissance and shore-based monitoring and exercise participants.

SECTION 1: Marine Mammals Affected

The requirements stipulated in the IHA are to provide; "An estimate of the number of marine mammals affected by the RIMPAC ASW exercises and a discussion of the nature of the effects, if observed, based on both the modeled results of real-time exercises and sightings of marine mammals". To meet this requirement, Section 1 provides an estimated number of marine mammals affected by the RIMPAC 06 ASW events based on Navy's original calculations using a threshold of 190dB for sub-TTS effects, and analysis of actual events and sightings of marine mammals, noting the nature of any observed effects. It is compared to the estimated number of marine mammals affected as calculated when applying the 173dB sub-TTS threshold required by NMFS for issuance of the IHA.

The RIMPAC 2006 Supplemental Environmental Assessment predicted 532 hours of hull mounted MFAS use by exercise participants based on what had occurred in the previous RIMPAC exercise (RIMPAC 2004) and based on the present tactical ASW training requirements. In actuality, 472 hours of MFAS use from hull mounted sources occurred during RIMPAC 06 exercise.[2]

The types of ASW training conducted during RIMPAC 06 involved the use of ships, submarines, aircraft, non-explosive exercise weapons, and other training related devices. While ASW events would occur throughout the Hawaiian Islands Operating Area, most events would occur within six areas that were used for the modeling analysis since they were representative of variation in the marine mammal habitats and the bathymetric, seabed, wind speed, and sound velocity profile conditions within the entire Hawaiian Islands Operating Area (OPAREA). Figure 1 on the following page displays the areas used for modeling and the OPAREA for the RIMPAC 06 exercise.

For purposes of the impacts analysis, all likely RIMPAC 06 ASW events were modeled as occurring in these areas. In fact, the majority of MFAS use occurred in the modeled areas as predicted (see Section 4 for a more detailed discussion), but any deviation from this would have been immaterial since the modeled areas were delineated so as to encompass the variation occurring in the entire Hawaiian Islands Operating Area.

Modeling a predicted number of marine mammals affected by the RIMPAC 06 ASW events was undertaken based on acoustic thresholds derived from experimental data – 190 dB Sound Exposure Level (SEL), which Navy believed, in a worst case analysis, indicated the potential to affect 289 marine mammals (for further details see the 2006 Supplement to the 2002 Rim of the Pacific Programmatic Environmental Assessment). This number was calculated from the modeling without consideration for reductions resulting from the standard Navy protective measures mitigating exposure to MFAS or the additional measures imposed by the IHA.

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2 Three days of planned MFAS use were precluded by a temporary restraining order resulting from a lawsuit.

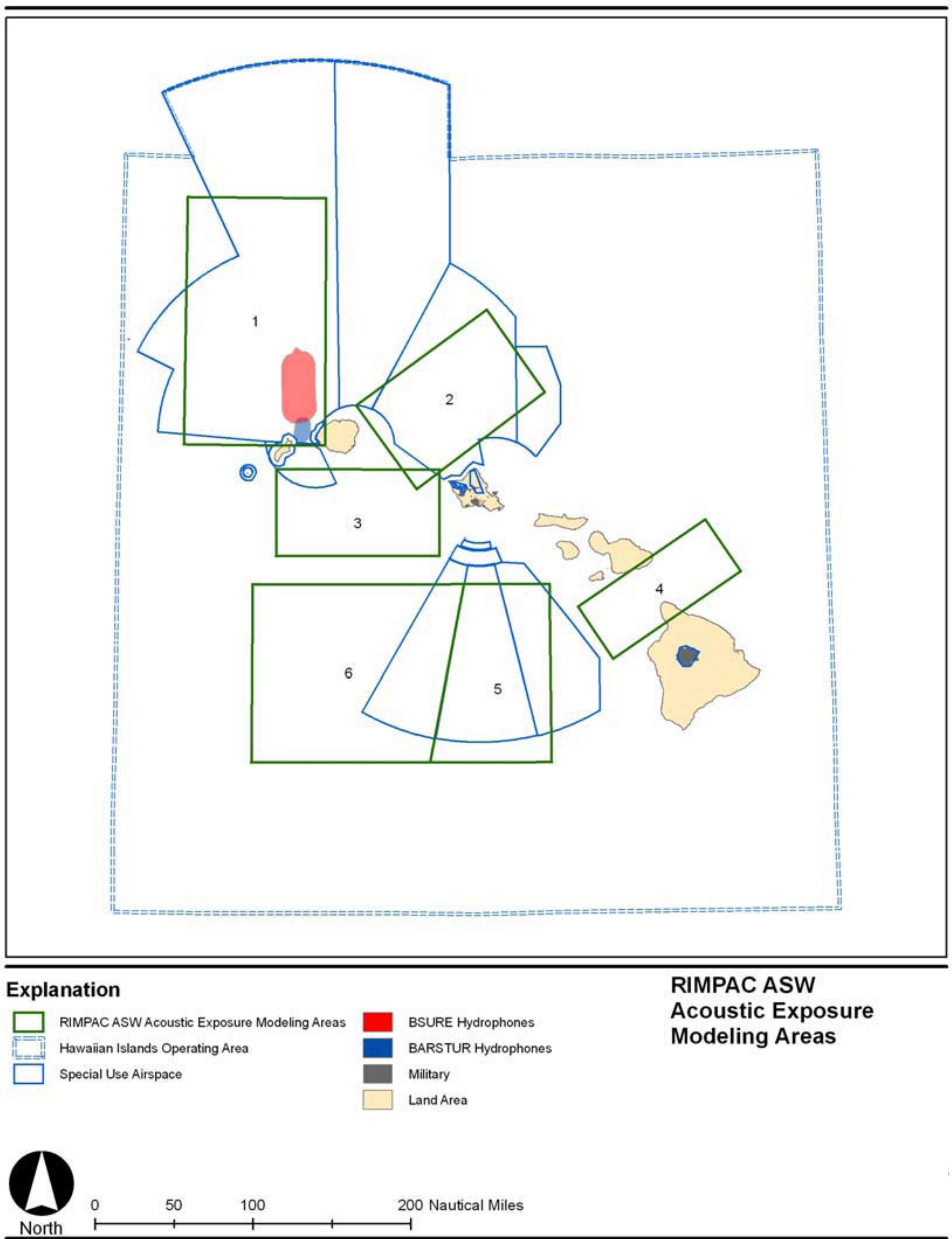

Figure 1. RIMPAC 2006 Exercise Operating Area depicting the areas used for modeling purposes in the analysis of effects on marine mammals.

Based on the reduction of MFAS hours from the modeled 532 to the actual 472 hours, the estimated potential number of marine mammals affected may be reduced to approximately 256 marine mammals (based on a ratio of marine mammal exposures exceeding the threshold to hours of MFAS operation).

Following the modeled calculation of marine mammals affected, if required to determine the actual number of marine mammals affected by the exercise as mandated by the IHA, it is necessary to take into consideration standard Navy protective measures including decreasing the source level and then shutting down MFAS when detected marine mammals are approached. This must be done since the mitigative effect of the protective measures were not factored into the modeling calculations. While there is no clear metric value that can be assigned to mitigative effect of these measures, there was a reduction in potential to impact marine mammals by their implementation.

During the exercise, there were 29 instances when marine mammals (individuals or pods) were detected by exercise participants. All detections were made by standard lookout and aircraft reporting procedures except for one case of passive acoustic detection, which is also a standard Navy practice protective measure. As a result of the protective measures in place and the high-level emphasis placed upon marine mammal protection, MFAS was shutdown by 12 exercise participants due to the detected marine mammals as detailed in Table 1.

Table 1. Details of the 29 marine mammal detections and actions by exercise participants during RIMPAC 06.

	July Date-Time (Z)	Modeled Area (Fig. 1)	Lost Hours	Description of Actions Taken
1	7/10-1738	1	0.5	Helicopter sighted “marine mammal” >30Kyds from two active ships. Two ships shutdown MFAS for 15 min until further information from reporting unit was obtained and assessed in regard to requirements. Submarines in vicinity.
2	7/10-1912	5	1.5	Surface ship sighted “marine mammal” and shutdown MFAS. Other Surface Action Group (SAG) units notified. Helicopter obtained visual on “a whale”; notified nearest ship in SAG. Second helicopter 11 nm west detected another “whale” four minutes later but contact then immediately lost on both whales. Ship in SAG obtained visual on “pod of dolphins”, which then approached w/in 1000 yards so MFAS reduced sonar by 6 dB. Second pod of dolphins appeared soon thereafter and then a third “whale” appeared inside 200 yards MFAS shutdown for all three 3 SAG surface and 2 air units 30 min. MFAS resumed 30 minutes later after range opened. Submarine in vicinity. Note: 6 total marine mammal detections this event.
3	7/11-1314	2		Surface ship sighted “dolphin” at 500 yds. MFAS not active.
4	7/11-1522	2		Surface ship sighted “pod of whales” range at 300 yds. Maneuvered to open range. MFAS not active.
5	7/11-1641	2		Surface ship sighted “whale” at 200 yds. MFAS not active.
6	7/12 0215	2	0.5	Sighted “marine mammal” and shutdown MFAS opened range prior to recommencing active.

Table 1 (cont.). Details of marine mammal detections and actions by exercise participants during RIMPAC 06

	July Date-Time (Z)	Modeled Area (Fig. 1)	Lost Hours	Description of Actions Taken
7	7/12-1827	5	2.0	P-3 aircraft detected passive acoustic marine mammal traces within 4000 yards. Active tracking of submarine ceased with limitation to passive only and lost contact. Four submarines in vicinity.
8	7/14-1909	1		Ship sighted "whale" >1000 yards. MFAS remained active.
9	7/14-1923	1		Ship sighted "marine mammal" >1000 yards. MFAS remained active.
10	7/17-1625	1		Ship sighted a "dolphin". MFAS not active.
11	7/17 2248	2	0.5	P-3 aircraft sighted two "whales". Could not use active (DICASS) buoys. Submarine in vicinity.
12	7/19 0046	1	0.25	Ship sighted "2 pods of 10 pilot whales". Shutdown MFAS.
13	7/19 0320	1	0.5	Ship sighted "pod of three pilot whales" to the south bearing 040T @200 yds. Shutdown MFAS.
14	7/19 1819	2	0.25	Ship sighted "whales" 1000 yards off port beam. Shutdown MFAS.
15	7/20 0346	5	1.0	Ship sighted "pod of whales". Shutdown MFAS.
16	7/20 1612	2	0.5	Ship sighted "marine mammals". Shutdown MFAS. Submarine in vicinity.
17	7/20 2013	6		Ship sighted "dolphins" off bow. MFAS not active.
18	7/20 2128	6		P-3 aircraft sighting of 8 "whales". DICASS not available for tactical development. Submarine in immediate vicinity.
19	7/20 2300	5		Ship sighted 5 "dolphins" moving SE at 8 kts. MFAS not active Two submarines in vicinity.
20	7/21 1742	5		Ship sighted pod of approx 20 "dolphins" moving to SE. MFAS not active. Two submarines in vicinity.
21	7/22 0429	5		Ship sighted "porpoises" 1-2 miles off starboard beam. MFAS not active. Two submarines in vicinity.
22	7/23 0457	3		Ship sighted "pilot whale". MFAS not active.
23	7/23 1913	5	0.5	Ship sighted 20 "whales" heading SW and shutdown MFAS. Two submarines in the area.
24	7/25 0015	4		**NMFS** passed along report of pod of approx 400-500 melon-headed whales in channel between Maui and Hawaii. P-3 tasked to investigate but verification precluded due to cloud cover.
25	7/25 0430	5		Ship sighted "whale". MFAS not active.
		Participant Hours Lost	**8.0**	

As noted previously, instances of marine mammal detection by exercise participants with the resulting implementation of protective measures was unaccounted for by the predictive modeling assessing potential exercise effects on marine mammals. In RIMPAC 06, there were 29 marine mammal detections by exercise participants, which resulted in protective measures being implemented for approximately 70 marine mammals and eight additional "pods" of marine mammals (Table 1). Assuming that each detected (un-quantified) pod of marine mammals consisted of at least four marine mammals, then the total number of detected marine mammals for which exposure to MFAS was limited by standard Navy lookouts was approximately 100 marine mammals.

Also required for the analysis in this section was consideration of "the nature of any observed effects" resulting from MFAS use. The reports from exercise participants contained nothing that could be construed as abnormal or "observed effects" of MFAS. There were no instances where marine mammals behaved in an erratic, unusual, or anything other than a normal manner.

Details regarding sightings and behaviors resulting from the aerial reconnaissance and the shore-based observers are presented in Section 3 of this report. In short, there were no abnormal behaviors or unusual distributions of marine mammals observed during these monitoring efforts and, therefore, no observed effects resulting from MFAS use.

Of the estimated potential 256 marine mammals affected by 472 hours of MFAS use, approximately 100 were precluded from exposure to MFAS by implementation of the protective measures. Therefore, an estimate of the number of marine mammals affected by the RIMPAC ASW exercises was 156 marine mammals based on the modeled results of real-time exercises, actual events, and sightings.

NMFS believed that the 190dB SEL sub-TTS threshold was not sufficiently precautionary and required Navy to apply for its IHA using 173dB SEL. Using the 173dB threshold with the same modeling program and marine mammal density estimates as before, we arrived at in excess of 33,000 behavioral disturbances, or takes. For perspective, this is about twice the number of marine mammals estimated to inhabit the waters around Hawaii in which the exercise took place.

There were no affected marine mammals observed by exercise participants, aerial or shore based monitors, or via any other reports. Therefore, further analysis based on observed effects, as mandated by this reporting requirement, is not possible and was not attempted.

In summary, the pre-exercise estimate of marine mammals behaviorally affected in RIMPAC 06 was 289 using 190dB sub-TTS threshold and over 33,000 using 173dB. No observers, from any platform or vantage point, noted in any reports that any marine mammals were affected by sonar. Conclusions are:

- Using 173dB SEL, a discrete decibel level, to define sub-TTS threshold was overly precautionary to a significant degree.

- There was no evidence of any behavioral affects on marine mammals throughout the exercise.

SECTION 2: Mitigation And Monitoring

As required under the IHA the report must contain, "An assessment of the effectiveness of the mitigation and monitoring measures with recommendations on how to improve them". This section of the report, therefore, provides an assessment of the effectiveness of the mitigation and monitoring measures, the scientific validity behind each measure, and recommendations on how to improve them with regard to practicality of implementation, their impact on exercise safety, and their impact on the effectiveness of the military readiness training activity.

During RIMPAC 06, there were 199 anti-submarine warfare (ASW) events and 472 total hours of mid-frequency active sonar (MFAS) use. There were no reported stranding events or observations of behavioral disturbance of marine mammals linked to sonar use during the exercise. Specifically, there were three monitored choke-point exercises with observations by aerial reconnaissance and shore-based monitors before, during, and after. There was no indication from the Navy monitors or from the non-governmental civilian monitors of any effects on marine mammals. These results are consistent with the previous 19 RIMPAC exercises in which no strandings linked to sonar use.

The only mitigation measures that prevented the use of MFAS in the vicinity of marine mammals were those that the Navy already had in place (Lookouts, aircraft reporting, and "safety zones") with the exception of a modification of the Navy's safety zone (450 yds) to 1000 m, agreed to for issuance of the IHA. The result of applying these standard mitigation measures was that exercise participants lost approximately eight hours of active sonar use.

In the 12 events where MFAS was shutdown by exercise participants, a total of approximately eight hours of ongoing MFAS use ceased, thus impacting the effectiveness of those military readiness activities. Some of the interrupted events involved lost time by multiple units operating in an integrated manner with the ramification being that shutdown of MFAS by a Surface Action Group (SAG) consisting of three vessels for 30 minutes resulted in 1.5 hours lost training time. Many of these events took place when submarines were in the vicinity of exercise participants and could have possibly been detected if MFAS had been available. It is important to realize that for the remainder of the instances for which marine mammals were detected, the option to use MFAS as tactically indicated was precluded and thus impacted the effectiveness of exercise event since commanders were operating without the option of their full sensor suite (e.g., helicopters operating with the SAG). This is especially true in the case of events involving sonobuoys where the inability to command-activate DICASS may have precluded the ability to track a contact or precluded development of attack criteria. In one case during RIMPAC 06 (Table 1, #7), a P-3 aircraft lost track on a submarine actively being prosecuted resulting in a major training impact to the unit involved.

ASW proceeds slowly and requires careful development of a tactical frame of reference over time as data is integrated from a number of sources and sensors. Once MFAS is turned off for a period of time, simply turning it back on minutes later does not usually allow a Commander to simply continue from the last frame of reference. Thus, 15 minutes of lost MFAS time does not equate to only 15 minutes of lost exercise time but should be considered in the fuller context of its overall impact on the tempo and tactical development of a Common Operational Picture shared among exercise participants as they trained with the goal of interoperability and improvement of ASW skills in general.

While the Navy's standard protective measures impacted the effectiveness of the training, a subset of the additional measures imposed by the IHA had no observed increased effectiveness in the protection of mammals during this exercise, and restricted the ability to train realistically in the known diesel submarine threat environments required for warfighting readiness. This subset of mitigation measures is as follows:

- Requirements regarding "strong surface ducting conditions"
- Requirements regarding "low visibility conditions"
- Restrictions from operating MFAS within 25 km of the 200 m isobath.
- Restrictions from operating MFAS in choke-points, constricted channels or canyon-like areas.

The following requirements associated with choke-point events were monitoring efforts mandated by NMFS as a sampling strategy to determine if there was any effect on marine mammals during these transits of the channels while conducting ASW operations..

- Additional requirements when conducting choke-point operations, to include:
    - Additional Non-Navy observers
    - Extensive additional aircraft monitoring
    - Shoreline reconnaissance
    - Additional Navy lookouts

These measures arose from a precautionary concern that MFAS use in the channels could possibly have greater potential to impact marine mammals, despite no evidence suggestive of this from previous RIMPAC exercises. The cost to implement these requirements was $66,000 for RIMPAC 06.

Analysis of results from RIMPAC indicates that the types of measures already in place in the Protective Measures Assessment Protocol (PMAP) were adequate to prevent operation of MFAS in the vicinity of detected marine mammals:

- There were no indications of any effects to any marine species throughout the exercise.
- Of the 29 instances where marine mammals were detected, MFAS was shutdown for 12 units and ASW events were interrupted by implementation of standard mitigation measures by Navy watch standers or aircraft (see Table 1). Mitigation

measures agreed to for this exercise that were in addition to Navy SOP protective measures did not provide observable increased protection to marine mammals.

- Burdensome administration of the IHA's additional mitigation measures distracted exercise participants, watchstanders, and exercise commanders at the headquarters level from their primary responsibility of exercise training and safety. While personnel seemed to adequately absorb this increased workload, there were no indications from all observations that the additional mitigation measures required provided additional protection to marine mammals during this exercise.

The following protective measures were already Navy SOP (PMAP) and were also mandated as mitigation measures for RIMPAC:

1. Personnel are trained on marine mammal awareness and mitigation measures.
2. There are personnel on lookout with binoculars at all times when the vessel is moving through the water.
3. On surface ships there are always at least three people on the bridge on lookout at all times and during ASW operations at least five people on lookout.
4. Lookouts report the sighting of any marine species, disturbance to the water's surface, or object in the water to the Officer of the Deck, who is the Commanding Officer's direct representative on watch.
5. A safety zone is established around an active sonar source and sonar power is reduced when marine mammals enter this zone.
6. Submarine sonar operators review detection indicators of close-aboard marine mammals prior to the commencement of ASW operations involving MFAS.
7. Aerial surveillance for marine species occurs whenever possible and detections are reported to ships in the vicinity.
8. Helicopters using active (dipping) sonar observe and employ a safety zone.
9. Sonar is always operated at the lowest practicable level to meet tactical training objectives.

The following mitigation measures agreed to for issuance of the IHA had no observable impact on the protection of mammals in this exercise and negatively affected training. Prohibitions against operating in shallow water or in choke-points are contrary to ASW training requirements. These measures affect the ability to train realistically in the known diesel submarine threat environment and directly impact vital military readiness activity:

1. The restriction from operating MFAS within 25 km of the 200 m isobath.
2. The restriction from conducting sonar activities in constricted channels or canyon-like areas.

The following measures had no observable effect on the protection of mammals during this exercise, and could not be accurately and uniformly employed:

1. Requirements regarding "strong surface ducting conditions"
2. Requirements regarding "low visibility conditions"

To organize the assessment of each mitigation measure, they are presented below in the order and organization as presented by in the IHA.

RIMPAC 06 IHA Mitigation and Monitoring Requirements

<u>Measures (a) and (b)</u>
The first two mitigation measures ((a) and (b)) detail training requirements for units participating in MFAS ASW exercises. All of the requirements within these two measures are redundant with the Marine Species Awareness Training (MSAT) that Navy lookouts and bridge personnel receive as Navy SOP. MSAT was developed in coordination with marine biology experts within the Navy and provides all effective marine species detection cues and information necessary to detect marine mammals and sea turtles. This material is part of the Navy Lookout watchstander qualification system, and will soon be available as online interactive training, and can also be provided in a video format for large audience presentations.

NMFS (Pacific Islands Region) reviewed and approved MSAT to meet the purposes of these first two mitigation measures.

<u>Measure (a)</u>
The MMPA Permit Monitoring and Mitigation Measure (a) read as follows:

(a) All RIMPAC participants will receive the following marine mammal training/briefing during the port phase of RIMPAC:

(i) Exercise participants (CO/XO/Ops) will review the C3F Marine Mammal Brief, available OPNAV N45 video presentations, and a NOAA brief presented by C3F on marine mammal issues in the Hawaiian Islands.

(ii) NUWC will train observers on marine mammal identification observation techniques.

(iii) Third fleet will brief all participants on marine mammal mitigation requirements.

(iv) Participants will receive video training on marine mammal awareness.

Assessment: Training was already standard for all units before RIMPAC and is effective as a mitigation measure.

<u>Operational Impact of this mitigation measure</u>:
None. Using standardized and required training materials and procedures is more practical and effective.

<u>Recommendation</u>
Training personnel in marine species detection and cues to enable operators to make informed decisions regarding potential interactions with protected marine species should be retained and is standard Navy practice. This measure should be rewritten as provided in Appendix (A).

Measure (b)

The MMPA Permit Monitoring and Mitigation Measure (b) read as follows:

> *(b) Navy watchstanders, the individuals responsible for detecting marine mammals in the Navy's standard operating procedures, will participate in marine mammal observer training by a NMFS-approved instructor. Training will focus on identification cues and behaviors that will assist in the detection of marine mammals and the recognition of behaviors potentially indicative of injury or stranding. Training will also include information aiding in the avoidance of marine mammals and the safe navigation of the vessel, as well as species identification review (with a focus on beaked whales and other species most susceptible to stranding). At least one individual who has received this training will be present, and on watch, at all times during operation of tactical mid-frequency sonar, on each vessel operating mid-frequency sonar.*

Assessment: Training as a mitigation measure can be captured in one requirement as provided in Appendix (A).

Operational Impact of this mitigation measure:

None. Using standardized and required training materials and procedures is more practical and effective.

Recommendation

For Navy authorizations, adopt the training measure provided in Appendix (A), which is based on the MSAT training video.

(1) The Navy's training and qualification program meets or exceeds the expectations of this mitigation measure. Navy personnel serving as lookouts and on bridge watch are highly qualified and experienced marine observers. At all times, they are required to sight and report all objects sighted in the water (regardless of the distance from the vessel) to the Officer of the Deck, because any object (e.g., trash, periscope) or disturbance (e.g., surface disturbance, discoloration) in the water may be indicative of a threat to the vessel. Navy lookouts undergo extensive training in order to qualify. This training includes on-the-job instruction under the supervision of an experienced lookout, followed by completion of the Personal Qualification Standard program, certifying that they have demonstrated the necessary skills (such as detection and reporting of partially submerged objects). In addition to these requirements, many lookouts periodically undergo a 2-day refresher training course.

(2) The Navy includes MSAT as part of its regular training regimen for its bridge lookout personnel on ships and submarines. This training is the most appropriate material available to allow for the safe operation of Naval vessels while limiting interactions with marine mammals and has been approved by NMFS. This training addresses the lookout's role in environmental protection, laws governing the protection of marine species, Navy stewardship commitments, and general observation information to aid in avoiding interactions with marine mammals. Finally, Navy personnel are trained

in the most effective means to ensure quick and effective communication within the command structure and facilitate implementation of protective measures if marine species are spotted. Navy personnel are trained to act swiftly and decisively to ensure that information is passed to the appropriate supervisory personnel.

Measure (c)
This measure reads:

> *(c) All ships and surfaced submarines participating in the RIMPAC ASW exercises will have personnel on lookout with binoculars at all times when the vessel is moving through the water (or operating sonar). These personnel will report the sighting of any marine species, disturbance to the water's surface, or object to the Officer in Command.*

Assessment: This measure is included Navy's SOPs, but as written requires one change.

Operational Impact of this mitigation measure:
None.

Recommendation
This mitigation measure is standard Navy practice and necessary for safe navigation. Reference to surfaced submarines should be removed since surfaced submarines are never engaged in ASW or use MFAS for ASW when on the surface.

Measure (d)
This measure reads:

> *(d) All aircraft participating in RIMPAC ASW events will conduct and maintain, whenever possible, surveillance for marine species prior to and during the event. Marine mammal sightings will be immediately reported to ships in the vicinity of the event as appropriate.*

Assessment: This measure is part of Navy's SOPs.

Operational Impact of this mitigation measure:
None.

Recommendation
This mitigation measure is standard Navy practice and necessary for safe navigation.

Measure (e)
This measure reads:

> *(e) Submarine sonar operators will review detection indicators of close-aboard marine mammals prior to the commencement of ASW operations involving active mid-frequency sonar. Marine mammals detected by passive acoustic* (sic)[3]

3 The last sentence of this mitigation measure as published in both the IHA and the NDE is incomplete.

Assessment: This measure is in Navy's SOPs.

Operational Impact of this mitigation measure:
None.

Recommendation
These practices are already standard Navy procedures.

Measure (f)
This measure reads:

> *(f) Safety Zones - When marine mammals are detected by any means (aircraft, lookout, or acoustically) within 1000 m of the sonar dome (the bow), the ship or submarine will limit active transmission levels to at least 6 dB below normal operating levels. Ships and submarines will continue to limit maximum transmission levels by this 6-dB factor until the animal has been seen to leave the area, has not been seen for 30 minutes, or the vessel has transited more than 2000 m beyond the location of the sighting.*
>
> *Should a marine mammal be detected within or closing to inside 500 m of the sonar dome, active sonar transmissions will be limited to at least 10 dB below the equipment's normal operating level. Ships and submarines will continue to limit maximum ping levels by this 10-dB factor until the animal has been seen to leave the area, has not been seen for 30 minutes, or the vessel has transited more than 1500 m beyond the location of the sighting.*
>
> *Should the marine mammal be detected within or closing to inside 200 m of the sonar dome, active sonar transmissions will cease. Sonar will not resume until the animal has been seen to leave the area, has not been seen for 30 minutes, or the vessel has transited more than 1200 m beyond the location of the sighting.*
>
> *If the Navy is operating sonar above 235 dB and any of the conditions necessitating a power-down arise ((f), (g), or (h)), the Navy shall follow the requirements as though they were operating at 235 dB - the normal operating level (i.e., the first power-down will be to 229 dB, regardless of at what level above 235 sonar was being operated).*

Assessment: This mitigation measure is effective, and requires improvement.

Operational Impact of this mitigation measure:
During RIMPAC, marine mammals were visually detected three times by fixed-wing aircraft, three times by helicopters, and 23 times by lookouts aboard ships. Active MFAS use ceased in 12 exercise events, as the ships opened the range with the locations where the marine mammals had been detected. In three additional events, P-3 aircraft were not able to use active DICASS sonobuoys as tactics may have required. Due to this mitigation measure, a total of approximately eight hours of training time was lost.

This loss of MFAS training hours is more than a simple metric involving a loss of training time as a small percentage of the overall exercise hours since, in at least six cases, the proximity of a submarine in the vicinity meant there was a potential submarine detection opportunity missed by the exercise participants.

Recommendation

A "safety zone" mitigation measure was already SOP and this mitigation measure should be retained. Expansion of the safety zone beyond 1000 m (or 1000 yards) is not prudent. This distance is the maximum Navy should impose on its ship commanding officers to certify "safe" for marine mammals or decrease the output of MFA sonar.

The provision regarding the reduction of transmission power if operating sonar above 235 dB is reasonable and should be added as Navy SOP.

This mitigation measure involving "safety zones" should be retained with the following revisions:

- Yards should be used vice meters because all Navy training and operations use yards as a term reference and there is no substantive difference in sound propagation between 1000 meters and 1000 yards.
- The 2000 meter, 1500 meter, and 1200 meter variable distance for when active sonar can resume is unnecessarily complex and the expanded distances without scientific merit.

Measure (g)

This measure reads:

> *(g) In strong surface ducting conditions (defined below), the Navy will enlarge the safety zones such that a 6-dB power down will occur if a marine mammal enters the zone within a 2000 m radius around the source, a 10-dB power-down will occur if an animal enters the 1000 m zone, and shut down will occur when an animal closes within 500 m of the sound source.*
>
> *A strong surface duct (half-channel at the surface) is defined as having the all the following factors: (1) A delta SVP between 0.6 to 2.0 m/s occurring within 20 fathoms of the surface with a positive gradient (upward refracting); (2) Sea conditions no greater than Sea State 3 (Beaufort Number 4); and (3) Daytime conditions with no more than 50% overcast (otherwise leading to diurnal warming). This applies only to surface ship mid-frequency active mainframe sonar.*

Assessment: This mitigation measure could not be effectively implemented or uniformly employed in RIMPAC. Additionally, there is no evidence to indicate it is effective or that it provides protection for marine mammals in addition to that provided in measure (f).

Operational Impact of this mitigation measure:

This mitigation measure could not be accurately and uniformly employed during RIMPAC. The exercise headquarters found so many variations in water conditions across the exercise area that the determination of "strong surfacing ducting" was futile. It was problematic for the following reasons:

(1) There is so much local variation in the Pacific Fleet training areas that it would be necessary for a ship to constantly monitor the local environment to accurately comply with this measure. Measurements taken during RIMPAC indicated large variation in the presence or absence of significant surface ducts over relatively short distances in the Hawaiian operating areas.

(2) The models used in forecasting a significant surface duct used high resolution that still resulted in a generalized sea state, SVP, and cloud cover over a large operational area covered by exercise participants. Measured local variations were so different from these forecasts that the determination that "significant surface duct condition do/do not exist" was inherently inaccurate.

(3) There is no means to know if the local SVP ahead of the ship is the same as the SVP being measured. Oceanographic models are years away from being able to model the ocean's structure in four dimensions at the resolution required to accurately predict SVP changes on a detailed scale.

(4) There is no allowance for local variations from tidal flux, differential sea states (as frequently seen in channels or shear lines to the southwest of most points of land in Hawaii), and currents/eddies - all of which have a significant effect on surface ducting.

Recommendation

Because the process to determine if a significant surface duct exists across the entire exercise area could not be effectively implemented or uniformly employed, recommend this measure not be included in future authorizations.

In addition, this measure seems to have been an outgrowth of the apparent evidence that significant surface ducting may have played a role in previous incidents involving stranding of beaked whales in certain conditions. There is no evidence to suggest that significant surface ducting in and of itself causes MFA sonar's overall effects to be increased, and it is still not known whether the presence of surface ducting was actually significant in the known beaked whale stranding incidents.

Measure (h)

This measure reads:

> *(h) In low visibility conditions (i.e., whenever the entire safety zone cannot be effectively monitored due to nighttime, high sea state, or other factors), the Navy will use additional detection measures, such as infrared (IR) or enhanced passive acoustic detection. If detection of marine mammals is not possible out to the prescribed safety zone, the Navy will power down sonar (per the safety zone criteria above) as if marine mammals are present immediately beyond the extent of detection. (For example, if detection of marine mammals is only possible out to 700 m, the Navy must implement a 6 dB power-down, as though an animal is present at 701 m, which is inside the 1000 m safety zone)*

Assessment: This mitigation measure was not necessary in RIMPAC since a condition of low visibility, as defined by the measure, was never encountered. In other words, at night lookouts were still able to monitor out to the limits of the safety zone. This mitigation measure has the potential to directly affect training and therefore the effectiveness of the military readiness activity.

Operational Impact of this mitigation measure:
This measure would preclude use of a sensor when tactically required and significantly affects the military readiness activity. Navy must be allowed to operate MFAS at night and in heavy seas using the full potential of sonar as a sensor.

There is no "enhanced passive acoustic detection" – Navy ships continuously use every passive device available, and the state of technology for detecting marine mammals passively is rudimentary at best.

Recommendation
This procedure has the potential to directly affect the military readiness activity. Recommend it not be incorporated in future authorizations or modified as to avoid impacting training realism in low visibility conditions.

Measure (i)
This measure reads:

> *(i) Helicopters shall observe/survey the vicinity of an ASW exercise for 10 minutes before deploying active (dipping) sonar in the water. Helicopters shall not dip their sonar within 200 yards of a marine mammal and shall cease pinging if a marine mammal closes within 200 yards after pinging has begun.*

Assessment: This measure is part of Navy's SOPs.

Operational Impact of this mitigation measure:
None.

Recommendation
Continue as standard Navy protective measures.

Measure (j)
This measure reads:

> *(j) The Navy will operate sonar at the lowest practicable level, not to exceed 235 dB, except for occasional short periods of time to meet tactical training objectives.*

Assessment: This measure is part of Navy's SOPs.

Operational Impact of this mitigation measure:
None.

Recommendation
Continue as standard Navy protective measures.

Measure (k)
This measure reads:

> *(k) With the exception of three specific choke-point exercises (special measures outlined in item (m)), the Navy will not conduct sonar activities in constricted channels or canyon-like areas.*

Assessment: This mitigation measure could not be precisely implemented, significantly impacts military readiness, has no scientific basis for implementation in the Hawaiian Islands, and provided no observable protection to marine mammals during this exercise.

Operational Impact of this mitigation measure:
Restricting Navy operations in choke-points are contrary to ASW training requirements. This measure limits the ability to train realistically in the known diesel submarine threat environment and directly impacts a vital military readiness activity.

This prohibition against MFAS use in "constricted channels or canyon-like areas" could not be precisely implemented or uniformly enforced because there were no defining metrics. The terms "constricted channels or canyon-like areas" have no meaning within the Navy or in maritime communities and were not defined by the IHA. Additionally, there is no scientific basis for a determination that such vaguely defined bathymetric features tend to concentrate marine mammals and/or have a greater potential to effect marine mammals, and therefore warrant prohibitive measures.

RIMPAC 2006 completed three monitored choke-point events with observations before, during, and after the events. There was no indication of any marine mammal impacts from the Navy monitors or from the non-governmental civilian monitors who were out in small vessels off Kauai and Hawaii Island during these events.

There is no data for the Pacific indicating the need for the precautionary prohibition against choke-point exercises, "constricted channels", or "canyon-like areas". There have been 19 previous RIMPAC exercises and numerous JTFEX, USWEX and COMTUEX exercises in SOCAL and Hawaii involving choke-point exercises that have occurred over many years without an indication of effect on any marine mammals.

Recommendation
This procedure had no observable effect on the protection of mammals during this exercise. Recommend future authorizations contain better definition of bathymetric features of concern and that the features of concern are based on definitive evidence of increased risk to marine mammals.

Measure (l)

This measure reads:

> *(l) With the exception of three specific "choke-point" exercises (special measures outlined in item (m)), the Navy will not operate mid-frequency sonar within 25 km of the 200 m isobath.*

Assessment: This is no scientific basis indicating this measure is warranted in the Pacific and no basis for the specific metrics (25 km of the 200 m isobath). In addition, there are no standard US nautical charts depicting depths in meters making this a difficult measure to implement in the field. This measure significantly impacts military readiness.

Operational Impact of this mitigation measure:

During RIMPAC this measure precluded active ASW training in the littoral region, which significantly impacted realism and training effectiveness. Prohibitions against operating in littoral areas are contrary to ASW training requirements. This measure affects the ability to train realistically in the known diesel submarine threat environment and directly impacts vital military readiness activity. (Note: Any reference to isobath curves should be in fathoms vice meters. There are no approved NOAA nautical charts that provide for a 200m isobath.)

Recommendation

This procedure had no observable effect on the protection of mammals during this exercise and therefore its value is uncertain. Its effect on realistic training is, however, clear and significant. The areas prohibited by this measure are the very ones where training against quiet submarines is most important. With respect to the presence of marine mammals, there is no scientific basis for the metrics particular to the 200 m isobath nor the 25 km distance from the 200 m isobath. In addition, the lengthy history of sonar use in the Hawaiian Islands and SOCAL without any strandings or apparent effect on marine mammals argues that this measure is unnecessary. Recommend it not be included in future authorizations.

Measure (m)

This measure deals with "choke-point" events, contains various subparts, and reads:

> *(m) The Navy will conduct no more than three "choke-point" exercises. These exercises will occur in the Kaulakahi Channel (between Kauai and Niihau) and the Alenuihaha Channel (between Maui and Hawaii). These exercises fall outside of the requirements listed above in (k) and (l), i.e., to avoid canyon-like areas and to operate sonar farther than 25 km from the 200 m isobath. The additional measures required for these three choke-point exercises are as follows:*

Assessment: This measure is not a mitigation and therefore requires no assessment.

Measure (m) Part (i)

This part of measure (m) reads:

(i) The Navy will provide NMFS (Stranding Coordinator and Protected Resources, Headquarters) and the Hawaii marine patrol with information regarding the time and place for the choke-point exercises 24 hours in advance of the exercises.

Assessment: This measure is a monitoring effort vice a mitigation and does not provide additional protection to marine mammals.

Operational Impact of this mitigation measure:
Notification to NMFS did not meet the "24 hours in advance" requirement for several reasons. Since choke-point events are scheduled to occur within a range of time, such as within a 24 hour period, the exercise participants could not provide specific times for when the choke-point transit would begin. The actual transit of the channel occurred based on the on-scene Commander's read of the tactical situation as it developed over the course of many hours. To address this issue during RIMPAC 2006, and in coordination with NMFS Pacific Islands Regional Office, NMFS was kept apprised of the timeframe as it became available.

Recommendation
The coordination with stranding offices and Navy's cooperation with NMFS in the event of a stranding are established procedures and should not be confused with mitigation measures mandated for a specific exercise. In addition, the emphasis on monitoring for strandings during naval exercises has the potential to perpetuate unsubstantiated correlations of strandings as being caused by MFAS use. If a comprehensive marine mammal monitoring program is warranted, it should be pursued by NMFS through implementation of statistically based monitoring protocols and a research and sampling design that objectively assesses stranding occurrence across all potential causal factors, resulting in a baseline understanding of strandings for a given region.

Note: There is no "Hawaii marine patrol" and as a result, this component of the mitigation requirement could not be implemented.

Measure (m) Part (ii)
This part of measure (m) reads:

(ii) The Navy will have at least one dedicated Navy marine mammal observer who has received the NMFS-approved training mentioned above in (a), on board each ship and conducting observations during the operation of mid-frequency tactical sonar during the choke-point exercises. The Navy has also authorized the presence of two experienced marine mammal observers (non-Navy personnel) to embark on Navy ships for observation during the exercise.

Assessment: The first component of this measure duplicates standard Navy training requirements and is unnecessary. The "experienced marine mammal observers (non-Navy personnel)" detected no marine mammals during the time they were embarked and therefore provided no additional capability or protection to marine mammals during this exercise.

Operational Impact of this mitigation measure:
None for this exercise, however, it is usually not feasible to provide transportation, berthing, and manning for non-navy personnel aboard exercise vessels. In some cases, inclusion of these observers would result in the inability to accommodate essential Navy personnel associated with the exercise such as trainers and data collection personnel.

The requirement for a "dedicated Navy marine mammal observer" indicates a fundamental misunderstanding of Navy practices. This measure duplicates the watch standing requirements inherent in measures (a) and (b), because all lookouts have been trained to be "dedicated Navy marine mammal observers". Any marine mammals detected are reported to the OOD as required under normal procedures, regardless of whether the ship is conducting a choke point transit.

NMFS embarked two observers on 19 July to the CVN during one of the Kaulakahi choke-point events, because this served as a superb viewing platform in the approximate center of ASW operations. These observers detected no marine mammals, and therefore provided no additional value as a mitigation measure during this exercise. As discussed under measures (a) and (b), Navy spotters receive sufficient training to undertake the required tasks. Use of Navy lookouts is the most effective means to ensure quick and effective communication within the command structure and facilitate implementation of protective measures if marine species are spotted.

Recommendation
Navy lookouts have the skills and training to detect marine mammals without augmentation by additional non-navy observers onboard ships. Additional non-navy observers have the potential to adversely impact an exercise, and did not appear to improve marine mammal detection cabability during RIMPAC. Recommend this measure not be included in future authorizations.

Measure (m) Part (iii)
This part of measure (m) reads:

> *(iii) Prior to start up or restart of sonar, the Navy will ensure that a 2000 m radius around the sound source is clear of marine mammals.*

Assessment: This is unnecessary given that the safety zones established in Measure (f) already provide adequate protection.

Operational Impact of this mitigation measure:
None.

Conclusion
This measure is inconsistent with the provisions required in Measure ((f); Safety Zones). Recommend it not be included in future authorizations.

Measure (m) Part (iv)

This part of measure (m) reads:

> *(iv) The Navy will coordinate a focused monitoring effort around the choke-point exercises, to include pre-exercise monitoring (2 hours), during-exercise monitoring, and post-exercise monitoring (1-2 days). This monitoring effort will include at least one dedicated aircraft or one dedicated vessel for real-time monitoring from the pre- through post-monitoring time period, except at night. The vessel or airplane may be operated by either dedicated Navy personnel, or non-Navy scientists contracted by the Navy, who will be in regular communication with a Tactical Officer with the authority to shut-down, power-down, or delay the start-up of sonar operations. These monitors will communicate with this Officer to ensure the 2000 m safety zone is clear prior to sonar start-up, to recommend power-down and shut-down during the exercise, and to extensively search for potentially injured or stranding animals in the area and down-current of the area post-exercise.*

Assessment: This measure is relatively costly and did not result in any marine mammal sightings requiring MFAS source reduction or shutdown.

Operational Impact of this mitigation measure:

The time and money spent to provide this mitigation measure appeared to provide no additional protection to marine mammals.

Observations

The monitoring efforts consisted of shore-based observers, aerial surveys and the routine patrols of Torpedo Recovery Boats. Though these surveys spotted numerous marine mammals, none of the mammal detected were in the vicinity of exercise participants or provided protection from exercise MFAS. For marine mammals detected before the event, there was no way to determine if they were likely to move into or out of an exercise that was miles from a given observation/detection location.

The capability of sighting marine mammals from both surface and aerial platforms participating in the exercise provides excellent survey capabilities using the Navy's existing exercise assets. Six of the 29 marine mammal detections were made by Navy aerial assets participating in the RIMPAC exercise.

Given the vast distances involved, it was impossible to ensure a 2000 m safety zone was clear of every single participant by these additional monitors. The monitors could not recommend power-down or shut-down during the exercise because the focus of their efforts was so dispersed.

Although monitors did serve to extensively search for potentially injured or stranded animals in the area they were assigned to observe, none were detected and the value provided by this time consuming and expensive search is questionable.

Other comments on this measure: The provision for searching "down-current of the area post-exercise" fails to recognize that an exercise area may involve many hundreds of square miles of ocean with variable currents.

Shore-based monitors' observations: Resident groups of spinner dolphins nearshore at Kekaha, Kauai on five consecutive mornings before, during, and after two choke point exercises taking place in the Kaulakahi Channel. Three days of shore-based observation from the Kohala Coast of Hawaii Island occurred around a choke-point exercise taking place in the Alenuihaha Channel. A pod of bottlenose dolphins was observed feeding nearshore a few hours apart on the first day of observation. Over the eight days of shore-based observation, there were no unusual behaviors exhibited by these animals.

Aerial survey observations: Aerial surveys covered these same channels over six days (18 hours). This aerial survey effort was generally hampered by rough sea state conditions. Two days of aerial survey had to be cancelled due to safety requirements concerning the use of unmanned drones and weapon firing on the range at PMRF on those days. There were a total of 13 sightings of marine mammals over the six days with no unusual behavior or activity observed.

Finally, of note, the aerial surveys conducted around the time of the choke point exercises showed that "the densities of marine mammal species reported here is identical with that normally seen for the Hawaiian Islands, albeit at different times of the year." Therefore, although some 30-40 ships conducted a wide ranging exercise over more than three weeks and employed MFA sonar extensively, marine mammal densities remained stable, and observers detected no unusual behavior in the marine mammals they saw.

Recommendation

This procedure is a monitoring measure vice a mitigation measure and had no demonstrable impact on the protection of mammals during RIMPAC. Due to the experience of Navy aircrews and their sensitivity to detecting marine mammals, as well as the cost involved in contracting these services, recommend that for future authorizations, only Navy assets be considered for increased monitoring, and then only when required in the aggregations of conditions which show the most potential for risk to marine mammals.

Measure (m) Part (v)

This part of measure (m) reads:

> *(v) The Navy will further contract an experienced cetacean researcher to conduct systematic aerial reconnaissance surveys and observations before, during, and after the choke-point exercises with the intent of closely examining local populations of marine mammals during the RIMPAC exercise.*

Assessment: This measure duplicates measure (m)(iv) and provides no additional protection for marine mammals.

Operational Impact of this mitigation measure:
None. However, the money spent to provide this mitigation measure provided no observable protection to marine mammals during this exercise and cannot be resourced for routine Navy's exercises.

Conclusion
The contracted "experienced cetacean researcher" did not spot any marine mammals in the vicinity of the exercise. Recommend this measure not be included in future authorizations.

Measure (m) Part (vi) and (vii)
These parts of measure (m) reads:

> *(vi) Along the Kaulakahi Channel (between Kauai and Niihau), shoreline reconnaissance and nearshore observations will be undertaken by a team of observers located at Kekaha (the approximate mid point of the Channel). Additional observations will be made on a daily basis by range vessels while enroute from Port Allen to the range at PMRF (a distance of approximately 16 nmi) and upon their return at the end of each day's activities. Finally, surveillance of the beach shoreline and nearshore waters bounding PMRF will occur randomly around the clock a minimum four times in each 24 hour period.*
>
> *(vii) In the Alenuihaha Channel (between Maui and Hawaii), the Navy will conduct shoreline reconnaissance and nearshore observations by a team of observers rotating between Mahukona and Lapakahi before, during, and after the exercise.*

Assessment: This measure does not appear to provide additional protection for marine mammals and is unnecessary.

Operational Impact of this mitigation measure:
None. However, the personnel resources spent to provide this mitigation measure provided no demonstrable protection to marine mammals during this exercise and cannot be routinely resourced for Navy's exercises.

Conclusion
This procedure did not result in any effective mitigation during RIMPAC. Tasking personnel to observe a portion of the shoreline during a choke-point as a monitoring measure has no scientific basis (no research questions, research design, or sampling approach).
Although the shore based observers saw marine mammals and sea turtles, and these observations were reported to the RIMPAC Battle Watch as required, the observed marine species were miles from any exercise events and hours before the choke-point transits began. These observations were of no utility as a mitigation measure. Recommend this measure not be included in future authorizations.

Measure (n)
This measure reads:

> *(n) The Navy will continue to coordinate with NMFS on the "Communications and Response Protocol for Stranded Marine Mammal Events During Navy Operations in the Pacific Islands Region" that is currently under preparation by NMFS PIRO to facilitate communication during RIMPAC. The Navy will coordinate with the NMFS Stranding Coordinator for any unusual marine mammal behavior, including stranding, beached live or dead cetacean(s), floating marine mammals, or out-of-habitat/milling live cetaceans that may occur at any time during or shortly after RIMPAC activities. After RIMPAC, NMFS and the Navy (CPF) will prepare a coordinated report on the practicality and effectiveness of the protocol that will be provided to Navy/NMFS leadership.*

Assessment: This measure documents what is standard procedure.

Operational Impact of this mitigation measure:
None.

Recommendation
This requirement documents Navy's standard procedure.

SECTION 2 SUMMARY

During RIMPAC 06, there were 472 total hours of mid-frequency active sonar (MFAS) use. There were no reported observations of behavioral disturbance of marine mammals during the exercise. The Navy's previously developed and used mitigation measures from PMAP, as modified for RIMPAC 06, appeared to be effective in protecting marine mammals observed near exercise ships. Mitigation measures agreed to for issuance of the IHA that went beyond standard Navy measures had no observable effect on protection of marine mammals in this exercise, and their application unnecessarily increased the cost of the exercise or had a negative effect on the fidelity of training.

As the first major exercise for which Navy applied for an authorization under MMPA, RIMPAC '06 presented unique challenges from the perspective of regulatory requirements and public perception. We anticipate that future authorizations for exercises and operating area coverage will recognize the differences in those areas as well as how developing science will inform our understanding of the role of mitigation measures.

SECTION 3: Monitoring Results

The IHA requires this report contain, “Results of the marine species monitoring (real-time monitoring from all platforms, independent aerial monitoring, shore-based monitoring at chokepoints, etc.) before, during, and after the RIMPAC exercises”. This section of the report, therefore, provides a summary of the detections of marine species from all exercise participants, the aerial reconnaissance survey, and shore-based monitoring efforts associated with the RIMPAC 06 exercise.

Figure 2. Location of marine mammals sighted by exercise participants depicted in red. Locations with multiple sightings are depicted by a single box. The line of longitude shown is 160˚ West and the latitude is 20˚ North.

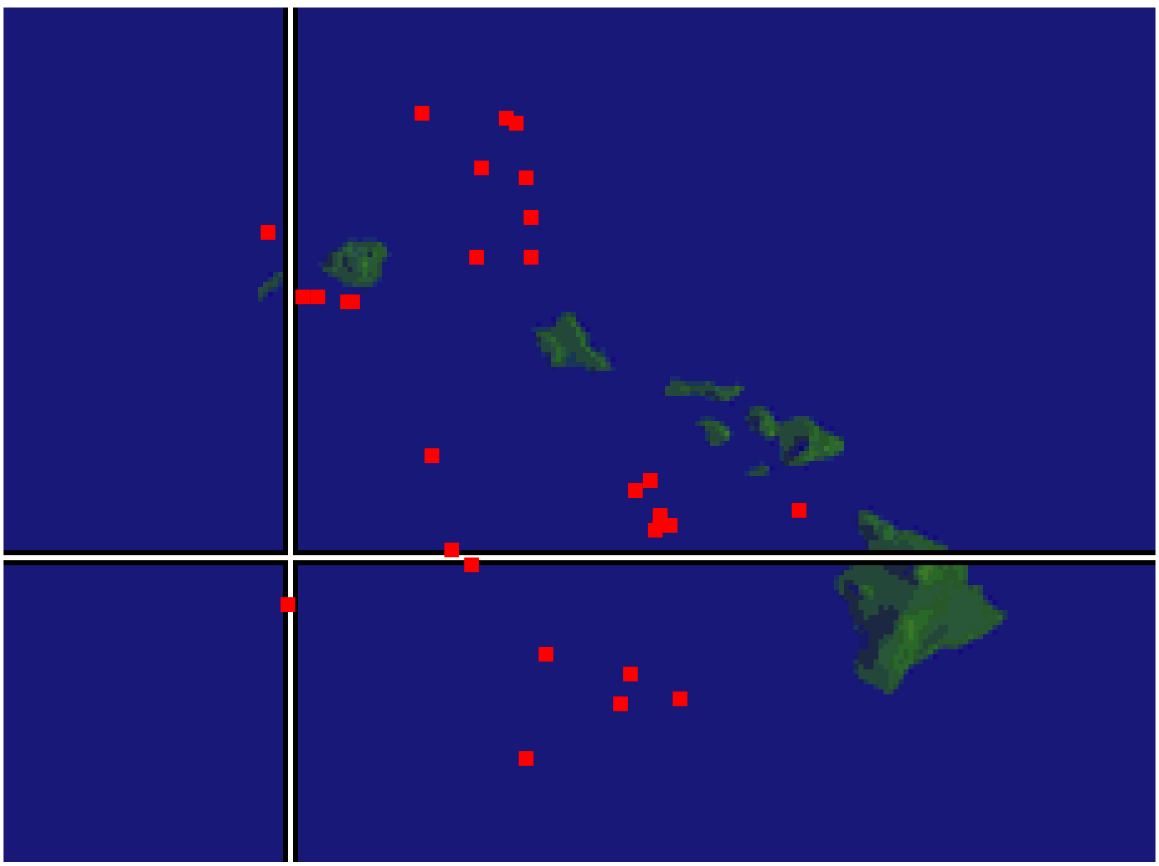

Figure 2 depicts the approximate location of marine mammals that were sighted by exercise participants. This is a skewed sample since there were no attempts made to detect marine mammals by other means in areas not being used by exercise participants. In addition to these sightings, marine species detections occurred as a result of two other

IHA mandated measures consisting of an aerial reconnaissance effort and shore-based monitors.

As noted previously, the additional monitoring requirements consisting of aerial and shipboard monitoring, and shore-based observations before, during, and after choke-point events. These monitoring efforts were required by NMFS as a sampling strategy to determine if there was any observable effect on marine mammals during ASW training events taking place in the channels between two sets of islands. These measures arose from a precautionary concern that MFAS use in the channels could possibly have greater potential to impact marine mammals, despite the lack of evidence suggestive of any problems in this regard from any of the previous 19 RIMPAC exercises. The cost to implement these monitoring requirements was approximately $66,000 for RIMPAC 06

A separate report providing details from the shore-based monitors' observations is presented in Appendix B and summarized here. These shore-based observations took place centered on two channels between the islands. The first of these monitoring efforts took place at Kekaha on Kauai. This is the approximate mid point along the Kaulakahi Channel between Kauai and Niihau, and spanned five consecutive days before, during, and after two choke point exercises taking place in that channel. Each morning of the five days, a pod of spinner dolphins were present 300-400 meters offshore. There were no unusual or abnormal behaviors observed. Sea turtles were also observed on two days.

Additional observations made on a daily basis by range vessels while enroute from Port Allen through the channel to the range at PMRF and surveillance of the beach shoreline and nearshore waters bounding PMRF did not result in any marine mammal detections.

Shore-based observation also took place on the Kohala Coast of Hawaii Island for three full days occurred around a choke-point exercise taking place in the Alenuihaha Channel between Hawaii Island and Maui. A pod of bottlenose dolphins was observed feeding during the first day of observation. There were no unusual or abnormal behaviors observed. Sea turtles were also observed on two days.

Aerial surveys covered these same channels over six days (approximately 18 hours flight time) as detailed in Appendix C. This aerial survey effort was generally hampered by rough sea state conditions. Two days of aerial survey had to be cancelled due to safety requirements concerning the use of unmanned drones and weapon firing on the range at PMRF on those days. There were a total of 13 sightings of marine mammals over the six days with no unusual behavior or activity observed.

Navy also authorized the presence of two experienced marine mammal observers (non-Navy personnel) to embark on a Navy ship for observation during a choke-point exercise. NMFS did not have any marine mammal observers available and alternatively embarked two Fisheries Program observers on 19 July to an available CVN during one of the Kaulakahi choke-point events. This ship was chosen since it served as a superb viewing platform with a large height of eye and unobstructed visibility in the approximate center of ASW operations. These observers detected no marine mammals.

In summary, there were 13 sightings of marine mammals from the air over approximately 18 hours of flight time. Shore based observation for 80 hours of effort by two people produced five sightings of a resident pod of spinner dolphins over five consecutive days on Kauai and a pod of bottlenose dolphins offshore of Hawaii Island. The results of these monitoring efforts provided no evidence of indicating there were any effects on the detected marine mammals as a result of the ASW exercises, which took place in the adjacent channels.

SECTION 4: Sonar Usage and Marine Mammals

The IHA requires that this report contain, "As much information (unclassified and, to appropriately cleared recipients, classified “secret”) as the Navy can provide including, but not limited to, where and when sonar was used (including sources not considered in take estimates, such as submarine and aircraft sonars) in relation to any measures received levels (such as sonobuoys or on PMRF range), source levels, numbers of sources, and frequencies so it can be coordinated with observed cetacean behaviors." Section 4 of the report provides information on the location and hours of active MFAS used during RIMPAC 06. The IHA also required as much data as could be provided on measured received levels, source levels, numbers of sources and frequencies so it could be coordinated with observed cetacean behaviors. Typically, there are no measurements (calibrated or otherwise) of actual sound levels made during an exercise and none were made during RIMPAC 06. Source levels, numbers of sources, and frequencies are classified since that information would provide potential adversaries with important tactical data. The observance of marine mammals by Navy assets only occurred as very brief encounters given the mitigation measures are designed to limit interaction to a minimum.

Observations of marine species and their behaviors resulting from the aerial reconnaissance and shore-based monitoring (as previously detailed in Section 3) observed no unusual behaviors for coordination with MFAS use. There were no indications from the observations that the presence of exercise participants had any affect on any marine mammals.

The requirement to report where and when sonar was used so it can be coordinated with observed cetacean behaviors can not be completed since no animals were observed doing anything unusual or behaving in any overt manner. Information presented previously in Table 1 provides a list of instances when marine mammals were detected and sonar was being used.

As noted previously, during RIMPAC 06, there were 199 anti-submarine warfare (ASW) events and 472 total hours of hull mounted MFAS. This was less than the anticipated number of hours (532) presented in the RIMPAC 2006 Supplemental Environmental Assessment as a result of a temporary restraining order (TRO) restricting the use of MFAS arising from a lawsuit (NRDC v. Winter) in effect for the first days of the exercise. During the period of this TRO, three days of scheduled MFAS training (25 events) were lost including 4 live fire events, 14 P-3 ASW events, and 7 surface ASW events.

In addition to the 472 hours of hull mounted MFAS use, there were approximately 115 hours of operations involving both passive DIFAR and active DICASS sonobuoys reported for RIMPAC 06. This quantity of operational hours does not equate to 115 hours of active sonar use since only approximately 10% of the sonobuoys expended[4] were active DICASS and they are commanded to transmit an active ping only as required by the tactical situation. In short, an individual DICASS sonobuoy, even though deployed, may never be activated during an event. In other instances, DICASS buoys are not deployed until a possible contact is identified and the need to localize the target arises. There is no standard data collection reporting that would serve as a means to determine how much actual active sonar time resulted from DICASS sonobuoy use during RIMPAC.

Finally, there were approximately 45 hours of operations involving the use of dipping sonars deployed from helicopters. Similar to the case for sonobuoys, there is no standard data collection reporting that would serve as a means to determine how much actual active sonar time resulted from this number of hours of dipping sonar operation. During RIMPAC, dipping sonars were not in a search capacity but instead used for localization or confirmation of suspected contacts. In can be estimated that in this capacity dipping sonars, which are used very briefly (2-5 pulses a few hundred msec in duration) approximately every 10 minutes, would have resulted in approximately 11-12 minutes of active sonar over a 20 day period spread across the RIMPAC exercise area.

4 There were 2,713 passive and 292 active sonobuoys expended in RMPAC 06.

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Appendix (A)

PROPOSED MITIGATION MEASURES FOR MFAS DURING MAJOR ASW EXERCISES

I. General Maritime Protective Measures: Personnel Training:

1. All lookouts onboard platforms involved in ASW training events will review the NMFS approved Marine Species Awareness Training (MSAT) material prior to MFAS use.

2. All Commanding Officers, Executive Officers, and officers standing watch on the Bridge will have reviewed the MSAT material prior to a training event employing the use of MFAS.

3. Navy lookouts will undertake extensive training in order to qualify as a watchstander in accordance with the Lookout Training Handbook (NAVEDTRA 12968-B).

4. Lookout training will include on-the-job instruction under the supervision of a qualified, experienced watchstander. Following successful completion of this supervised training period, Lookouts will complete the Personal Qualification Standard program, certifying that they have demonstrated the necessary skills (such as detection and reporting of partially submerged objects). This does not forbid personnel being trained as lookouts counted as those listed in previous measures so long as supervisors monitor their progress and performance.

5. Lookouts will be trained in the most effective means to ensure quick and effective communication within the command structure in order to facilitate implementation of protective measures if marine species are spotted.

II. General Maritime Protective Measures: Lookout and Watchstander Responsibilities:

6. On the bridge of surface ships, there will always be at least three people on watch whose duties include observing the water surface around the vessel.

7. All surface ships participating in ASW exercises will, in addition to the three personnel on watch noted previously, have at all times during the exercise at least two additional personnel on watch as lookouts.

8. Personnel on lookout and officers on watch on the bridge will have at least one set of binoculars available for each person to aid in the detection of marine mammals.

9. On surface vessels equipped with MFAS, pedestal mounted “Big Eye” (20x110) binoculars will be present and in good working order to assist in the detection of

marine mammals in the vicinity of the vessel.

10. Personnel on lookout will employ visual search procedures employing a scanning methodology in accordance with the Lookout Training Handbook (NAVEDTRA 12968-B).

11. After sunset and prior to sunrise, lookouts will employ Night Lookouts Techniques in accordance with the Lookout Training Handbook.

12. Personnel on lookout will be responsible for reporting all objects or anomalies sighted in the water (regardless of the distance from the vessel) to the Officer of the Deck, since any object or disturbance (e.g., trash, periscope, surface disturbance, discoloration) in the water may be indicative of a threat to the vessel and its crew or indicative of a marine species that may need to be avoided as warranted.

III. Operating Procedures

13. A Letter of Instruction, Mitigation Measures Message or Environmental Annex to the Operational Order will be issued prior to the exercise to further disseminate the personnel training requirement and general marine mammal protective measures.

14. Commanding Officers will make use of marine species detection cues and information to limit interaction with marine species to the maximum extent possible consistent with safety of the ship.

15. All personnel engaged in passive acoustic sonar operation (including aircraft, surface ships, or submarines) will monitor for marine mammal vocalizations and report the detection of any marine mammal to the appropriate watch station for dissemination and appropriate action.

16. During MFAS operations, personnel will utilize all available sensor and optical systems (such as Night Vision Goggles to aid in the detection of marine mammals.

17. Navy aircraft participating in exercises at sea will conduct and maintain, when operationally feasible and safe, surveillance for marine species of concern as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties.

18. Aircraft with deployed sonobuoys will use only the passive capability of sonobuoys when marine mammals are detected within 200 yards of the sonobuoy.

19. Marine mammal detections will be immediately reported to assigned Aircraft Control Unit for further dissemination to ships in the vicinity of the marine species as appropriate where it is reasonable to conclude that the course of the

ship will likely result in a closing of the distance to the detected marine mammal.

20. Safety Zones - When marine mammals are detected by any means (aircraft, shipboard lookout, or acoustically) within 1,000 yards of the sonar dome (the bow), the ship or submarine will limit active transmission levels to at least 6 dB below normal operating levels.

    (i) Ships and submarines will continue to limit maximum transmission levels by this 6-dB factor until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 1,000 yards beyond the location of the last detection.

    (ii) Should a marine mammal be detected within or closing to inside 500 yards of the sonar dome, active sonar transmissions will be limited to at least 10 dB below the equipment's normal operating level. Ships and submarines will continue to limit maximum ping levels by this 10-dB factor until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 1,000 yards beyond the location of the last detection.

    (iii) Should the marine mammal be detected within or closing to inside 200 yards of the sonar dome, active sonar transmissions will cease. Sonar will not resume until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 1,000 yards beyond the location of the last detection.

    (iv) Special conditions applicable for dolphins and porpoises only: If, after conducting an initial maneuver to avoid close quarters with dolphins or porpoises, the Officer of the Deck concludes that dolphins or porpoises are deliberately closing to ride the vessel's bow wave, no further mitigation actions are necessary while the dolphins or porpoises continue to exhibit bow wave riding behavior.

    (v) If the need for power-down should arise as detailed in “Safety Zones” above, Navy shall follow the requirements as though they were operating at 235 dB - the normal operating level (i.e., the first power-down will be to 229 dB, regardless of at what level above 235 sonar was being operated).

21. Prior to start up or restart of active sonar, operators will check that the Safety Zone radius around the sound source is clear of marine mammals.

22. Sonar levels (generally) - Navy will operate sonar at the lowest practicable level, not to exceed 235 dB, except as required to meet tactical training objectives.

23. Helicopters shall observe/survey the vicinity of an ASW exercise for 10 minutes before the first deployment of active (dipping) sonar in the water.

24. Helicopters shall not dip their sonar within 200 yards of a marine mammal and shall cease pinging if a marine mammal closes within 200 yards after pinging has

begun.

25. Submarine sonar operators will review detection indicators of close-aboard marine mammals prior to the commencement of ASW operations involving active mid-frequency sonar.

26. Increased vigilance during major ASW training exercises with tactical active sonar when critical conditions are present.

    Navy should avoid planning major ASW training exercises with MFAS in areas where they will encounter conditions which, in their aggregate, may contribute to a marine mammal stranding event. Of particular concern are beaked whales, for which strandings have been associated, in theory, with MFAS operations.

    The conditions to be considered during exercise planning include:

    (1) Areas of at least 1000 m depth near a shoreline where there is a rapid change in bathymetry on the order of 1000-6000 meters occurring across a relatively short horizontal distance (e.g., 5 nm).

    (2) Cases for which multiple ships or submarines (≥ 3) operating MFAS in the same area over extended periods of time (≥ 6 hours) in close proximity (≤ 10NM apart).

    (3) An area surrounded by land masses, separated by less than 35 nm and at least 10 nm in length, or an embayment, wherein operations involving multiple ships/subs (≥ 3) employing MFAS near land may produce sound directed toward the channel or embayment that may cut off the lines of egress for marine mammals.

    (4) Though not as dominant a condition as bathymetric features, the historical presence of a strong surface duct (i.e. a mixed layer of constant water temperature extending from the sea surface to 100 or more feet).

    If the major exercise must occur in an area where the above conditions exist in their aggregate, these conditions must be fully analyzed in environmental planning documentation. Navy will increase vigilance by undertaking the following additional protective measure:
    A dedicated aircraft (Navy asset or contracted aircraft) will undertake reconnaissance of the embayment or channel ahead of the exercise participants to detect marine mammals that may be in the area exposed to active sonar. All safety zone power down requirements described above apply.

IV. Coordination and Reporting

27. Navy will coordinate with the local NMFS Stranding Coordinator for any unusual marine mammal behavior and any stranding, beached live/dead or floating marine mammals that may occur at any time during or within 24 hours after completion of mid-frequency active sonar use associated with ASW training activities.

28. Navy will submit a report to the Office of Protected Resources, NMFS, within 120 days of the completion of a Major Exercise. This report must contain a discussion of the nature of the effects, if observed, based on both modeled results of real-time events and sightings of marine mammals.

29. If a stranding occurs during an ASW exercise, NMFS and Navy will coordinate to determine if MFAS should be temporarily discontinued while the facts surrounding the stranding are collected.

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Appendix (B)

RIMPAC 2006
NEARSHORE MONITORING
FIELD REPORT

JULY 2006

Prepared by:
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INTRODUCTION

In support of RIMPAC 2006, nearshore monitoring for marine mammals and sea turtles was conducted during July 16-20 from Kekaha Beach, Kauai, Hawaii and July 24-26 from Mahukona and Kapa`a Beach Park, Kohala Coast, Hawaii. The locations were chosen based upon their proximity to the Kalaukahi (between Kauai and Ni`ihau) and Alanuihaha (between Hawaii and Maui) Channels. The purpose of the monitoring was to 1) provide the Navy ships with information on species in the nearshore waters, 2) provide observations of marine mammal behavior before, during and after swept-channel (choke point) exercises, and 3) to monitor the beach and nearshore waters for marine species exhibiting abnormal behavior (offshore animals nearshore, congregations of offshore animals, strandings, etc).

METHODS

Shore-based monitoring was conducted from 0700 to 1830 hours with two observers using hand-held 10x42 binoculars and un-aided eye. Monitoring schedule corresponds to one day before and after each planned swept-channel exercise, two in the Kalaukahi channel and one in the Alanuihaha Channel. All observations were conducted by one experienced Navy marine mammal observer and one field assistant.

Kekaha Beach observations were conducted essentially at sea level. The sandy beach allowed for observers to walk the length of the beach north to the PMRF, Barking Sands Boundary and south to the end of Kehaka Beach (3 miles). Walks were conducted between two and four times per day. One observer would remain on station (near the lifeguard tower) as the other walked up the beach. The horizon from sea level is a distance of approximately 5 km.

Observations were conducted from Mahukona on July 23rd from 0700 to 1200 hours, but Kapa`a Beach Park was chosen for the rest of the 2.5 days since it offered a better view of the Alanuihaha Channel. Kapa`a Beach Park is a boulder beach, and observations were conducted at approximately 7m above sea level (horizon distance approximately 5 miles). A point to the north of the beach park resulted in a consistently lower sea state close to shore than in the open channel. On two days, portions of the coastline to the north of Kapa`a Beach Park (between Upolu Point and Mo`okini Heiau) was driven using a 4x4 vehicle to check the boulder beaches for stranded or distressed animals.

Data were collected on visibility, Beaufort sea state, marine mammals observed, sea turtles observed, and Navy ships/operations observed. While at Kehaka, data were also collected on commercial tour boats that were observed interacting with resident spinner dolphins.

RESULTS

Table 1 provides daily observation information. Only two species of marine mammals were observed, spinner dolphins (*Stenella longitrostris*) and bottlenose dolphins (*Tursiops aduncus*). Both are typically nearshore species. Two species of sea turtles were observed – green (*Chelonia mydas*) and leatherback (*Dermochelys coriacea)*. All were observed exhibiting normal behaviors.

The following is provided as a summary of marine mammals and sea turtles observed during the two nearshore monitoring periods.

Kekaha:

16 July 2006: A school of approximately 100 spinner dolphins (*Stenella longirostris*) are observed approximately 300m offshore (0747 hrs). Animals are slowly heading south and are being followed by a catamaran. When first vessel leaves, a series of RHIBs and catamarans stop and follow animals, one after the other. Animals are last seen at 0826 hrs approximately 0.5 miles offshore. Behavior overall is slow travel to south, with several spins. This is largest group that was seen during the five day period.

16 July 2006: A turtle (presumed green) is seen surfacing approximately 100m offshore.

17 July 2006: A school of approximately fifteen spinner dolphins is observed heading slowly south (0830 hrs) being followed by a tour catamaran. Dolphins are last observed at 0910 hrs. Behavior overall is slow travel to south, with several aerial spins.

17 July 2006: Green sea turtle is observed approximately 4 m offshore.

18 July 2006: A small school of ten to fifteen spinner dolphins are observed approximately 0.25 miles offshore, with two tour boats (0835 hrs). Dolphins are very low in the water and would be very difficult to see without boats as “cue”. Dolphins not seen after boats leave at 0845 hrs.

19 July 2006: Unidentified dolphins, cue is splash and idling tour boat, at horizon (0715 hrs.).

19 July 2006: Unidentified dolphins (presumed spinners) observed at southwestern horizon splashing, heading north (0858 hrs.).

19 July 2006: Spinner dolphins observed heading north towards Barking Sands (0922 hrs.). They continue to north out of view.

20 July 2006: Spinner dolphins observed in resting mode about 400m off southern shore of Kekaha Beach. Group size is approximately 20 animals, and they are milling at 0730 hrs. At 0745 hrs, they are traveling slowly to the north towards Barking Sands. They bowride as a boat approaches and follows them. Dolphins last seen at 0847 hrs.

Mahukona:

(0730 hrs to 1300 hrs.)

24 July 2006: Leatherback turtle (*D. coriacea)* observed approximately 300m offshore. Turtle is identified as a leatherback based upon very large carapace size (estimated 5-6 ft across) and huge rounded head. Back and head were seen simultaneously at the animal breathed. Turtle was observed at the surface for 1-2 minutes then dove (0759 hrs).

Kapa`a Beach Park:

24 July 2006: Group of approximately 20 bottlenose dolphins (*Tursiops aduncus*) are observed, first seen heading southwest (1630 hrs). A third of the group are calves. Animals travel steadily to the SW, except stopping to mill for about 3 minutes near a group of shearwaters and tuna feeding on bait fish. Dolphins contour shoreline to the south and disappear from view at 1646 hrs.

Bottlenose dolphins reappear from the south, heading west (1725 hrs). The dolphins are much more surface-active during this sighting, porpoising and leaping out of the water. At 1749 hrs, after a long dive (5 minutes), they resurface with obvious blows and change direction to the southwest and appear to be feeding along the edge of a large aggregation of shearwaters, tuna and bait fish.

25 July 2006: Small turtle (green?) observed just offshore (0858 hrs).

26 July 2006: Small green turtle observed hugging coastline and “riding” the surge (1415 hrs).

DISCUSSION AND CONCLUSIONS

All marine mammals and turtles were observed exhibiting normal behavior. No adverse behavior, strandings, or offshore species were observed.

Land based, stationary monitoring has known deficiencies. The low height of eye above water provides a limited distance to the horizon and species identification can be difficult as there is no option to approach animals. However, given the purpose of this project, the goals were achieved. This monitoring gathered adequate data on the lack of behavioral change exhibited by resident groups of spinner dolphins at Kekaha, Kauai and Kohala, Hawaii. Additionally, we were able to monitor the length of Kekaha Beach, by foot, for stranded or distressed animals. The Kohala coast presented more of a challenge as it was comprised of boulder beaches. However, a 4x4 vehicle was utilized to access areas to the North (towards the channel) from the monitoring station at Kapa`a Beach.

Additionally, anecdotal data collected on interactions between commercial tour catamarans and RHIBs might prove to be useful to regulatory agencies such as the State of Hawaii and National Oceanographic and Atmospheric Association.

TABLE 1

Date 2006	**Location**	**Time (24 hr)**	**Beaufort Sea State**	**Species**	**Observations**
7/16	Kekaha	0700	2		Begin watch. Great visibility, overcast skies
	Kekaha	0747		*S. longirostris*	Spinners with catamaran. Slowly bowriding on vessel (Aladin?). Couple of spins seen after cat leaves. Located about 300m offshore, moving south. Group size ~100.
7/16	Kekaha	0750		*S. longirostris*	Catamaran leaves dolphins
7/16	Kekaha	0755		*S. longirostris*	RHIB runs up to animals and follows them
7/16	Kekaha	0759		*S. longirostris*	RHIB leaves dolphins
7/16	Kekaha	0809		*S. longirostris*	Still heading slowly S
7/16	Kekaha	0826			Two new RHIBs with S.l., about 0.5 mile offshore
7/16	Kekaha	0850		*C. mydas*	Green turtle seen about 100m offshore
7/16	Kekaha	1230	3		Sea state change
7/16	Kekaha	1430	4		Occasional rain squalls passing over
7/16	Kekaha	1600	3		Squalls clear. Navy ship seen on horizon heading from N coast to the S
7/16	Kekaha	1655	2		Sea state change
7/16	Kekaha	1745			Complete watch
7/17	Kekaha	0700	3		Begin watch, sunny skies, good visibility
7/17	Kekaha	0745			Two helicopters and 3 Navy ships seen on horizon. Helos ahead of ships along with three small red RHIBs inshore of ships
7/17	Kekaha	0815			Three Navy ships seen N of Barking Sands and head SW

Date 2006	Location	Time (24 hr)	Beaufort Sea State	Species	Observations
					through the channel, one right after the other.
7/17	Kekaha	0830		*S. longirostris*	Spinners seen bowriding on catamaran. Cat is heading N but stops and does u-turn through spinners and follows them south for ~ 5 min.
7/17	Kekaha	0835		*S. longirostris*	Just as cat leaves dolphins, a RHIB goes through them while heading N.
7/17	Kekaha	0850	4	*S. longirostris*	Na Pali Kai III catamaran seen doing u-turn and following dolphins to S. They stay with the dolphins heading S until 0910 hrs. Few spins from dolphins. Visibility changes to moderate due to higher Beaufort.
7/17	Kekaha	1015	4		Glare, moderate visibility. Have lost sight of dolphins due to sea conditions.
7/17	Kekaha	1053	3=inshore 4=offshore		Visibility improves as wind dies down.
7/17	Kekaha	1345	4		Sea state change
7/17	Kekaha	1612	4	*C. mydas*	Turtle seen at surface about 4 m offshore.
7/17	Kekaha	1830			Complete watch
7/18	Kekaha	0700	1		Begin watch
7/18	Kekaha	0835		*S. longirostris*	Small group of spinners (~15 animals) observed ~.25 miles offshore. One RHIB and one cat stop with dolphins and proceed slowly through them.
7/18	Kekaha	0845		*S. longirostris*	Boats leave dolphins and head N
7/18	Kekaha				Catamaran seen stopping ~ 0.5 miles offshore towards N. Can't see dolphins but assume that is why they are stopping.
7/18	Kekaha	1005	3		Still sunny…
7/18	Kekaha	1700			Cruise ship comes from N, heads through channel and continues to the S over horizon

Date 2006	**Location**	**Time (24 hr)**	**Beaufort Sea State**	**Species**	**Observations**
7/18	Kekaha	1830			Complete watch
7/19	Kekaha	0700	1		Begin watch, swell 2-3 ft.
7/19	Kekaha	0715		Unidentified dolphin	Catamaran and two RHIBs are stopped on horizon. Appear to be slowly following marine mammals, but other than one splash, I cannot identify them to species.
7/19	Kekaha	0858		Unidentified dolphin	School of dolphins (presumed spinners) seen at SW horizon, splashing, heading N
7/19	Kekaha	0922		*S. longirostris*	Spinners seen heading N off Kekaha. Catamaran comes up to them and slowly moves through them. Group size ~20.
7/19	Kekaha	0955	3		Sea state change
7/19	Kekaha	1515			Three red RHIBs head out of Portlock heading N through channel (we are later told these are part of RIMPAC ops).
7/19	Kekaha	1530	2		Swell 1-2 ft.
7/19	Kekaha	1644			1st Navy destroyer enters channel. Second one ~1 mile behind it. Helo overhead and doing sweeps ahead of ships (and has been for about an hour over the horizon). Ships appear to be moving slowly through channel.
7/19	Kekaha	1703			Second ship leaves channel. Helo has been dipping sonar ahead of 2nd ship. 1st ship N of Lehua and over horizon.
7/19	Kekaha	1706			2nd ship passes Lehua heading N and goes over horizon.
7/19	Kekaha				3 red Navy RHIBs pass Kekaha.
7/19	Kekaha	1800			Complete watch
7/20	Kekaha	0700	1		Begin watch with great visibility, partly cloudy.
7/20	Kekaha	0715		*S. longirostris*	Spinners in resting mode about 400m offshore, off southern shore of beach. Milling

Date 2006	**Location**	**Time (24 hr)**	**Beaufort Sea State**	**Species**	**Observations**
					behavior, group size ~20. No boats with dolphins, the boats appear to not see them.
7/20	Kekaha	0730		*S. longirostris*	Spinners are now just N of lifeguard tower heading N.
7/20	Kekaha	0753		*S. longirostris*	Tour boat Makana stops with dolphins and they slowly bowride.
7/20	Kekaha	0800	0		Sea state change
7/20	Kekaha	0804		*S. longirostris*	Makana still slowly following spinners to the N, then S. They are really staying with them longer than most boats do, following the milling dolphins back and forth.
7/20	Kekaha	0811		*S. longirostris*	Makana leaves dolphins
7/20	Kekaha	0814		*S. longirostris*	Tour RHIB runs up on dolphins, then u-turns and follows them.
7/20	Kekaha	0820		*S. longirostris*	As RHIB leaves, catamaran "Lucky Lady" comes slowly up to them and sits with dolphins.
7/20	Kekaha	0828		*S. longirostris*	"Lucky Lady" leaves dolphins
7/20		0840		*S. longirostris*	Another cat on spinners, N of Kehaka. Does u-turns and runs through them a few times at slow speed.
7/20	Kekaha	0847	1	*S. longirostris*	Cat leaves dolphins, heads N
7/20	Kekaha	1234	2		Overcast skies, great visibility
7/20	Kekaha	1800			Complete watch. Total beach monitored with 2-3 beach walks daily is 3 miles (includes all of Kekaha Beach to Barking Sands boundary)
7/24	Mahukona	0730	2=inshore 3=offshore		Begin watch. Walked up to point north of harbor for better view of channel and Maui. Partly cloudy skies, good visibility.

Date 2006	Location	Time (24 hr)	Beaufort Sea State	Species	Observations
7/24	Mahukona	0759		*D. coriacea*	Leatherback turtle observed. Carapace was 5-6 ft across and a huge rounded head, which is seen simultaneously during surfacing. (There is a kayaker offshore of turtle which we used for a size comparison). Turtle is observed breathing at surface for about 1 minute, then dives.
7/24	Mahukona	0951	4=offshore 3=inshore		Sea state change
7/24	Kapa`a Beach Park	1330	2=inshore 4=offshore		Change monitoring station to Kapa`a Beach Park, which is just N of Mahukona towards Hawi. It offers a better view of the channel, Maui and provides a protected inshore area with better viewing conditions. Cloud cover is 90%.
7/24	Kapa`a	1630		*T. aduncus*	Group of ~ 20 bottlenose dolphins are observed heading SW, about 400m offshore. Does not appear to be mixed species, however, about 1/3 of the group are calves. Group is traveling slowly and steadily to the SW, except for stopping for about 3 minutes near a group of shearwaters and tuna feeding on bait fish. Group stayed about the same distance offshore and heads SW out of view (at 1646 hrs.)
7/24	Kapa`a	1725		*T. aduncus*	Group of ~20 bottlenose dolphins are observed again, coming from around the point where they were last seen. They are heading to the W. They are moving more quickly this time, porpoising out of the water. As they lift heads higher to prepare for a dive, several of

Date 2006	Location	Time (24 hr)	Beaufort Sea State	Species	Observations
					them flip their tails up. Reappear after five minutes with very visible blows.
7/24	Kapa`a	1749		*T. aduncus*	Ta change direction to SW and appear to be feeding. They are working the margin of a large school of tuna and shearwaters which feeding on bait fish. The dolphins behavior includes direction change, leaps out of the water, and a few tail slaps. The group is a little more spread out too, than before. They continue this behavior for about 5 minutes, then regroup and head slowly offshore to the SW out of sight.
7/24	Kapa`a	1800			Complete watch. Drive up 4x4 road towards Hawi to check coastline for any strandings or other animals that might be out of sight.
7/25	Kapa`a Beach Park	0715	2=inshore 4=offshore		Begin watch. Three Navy ships and one other unid ship are observed over horizon towards Maui, in the channel. They are heading W.
7/25	Kapa`a	0745			Ships have disappeared over W horizon
7/25	Kapa`a	0858		*C. mydas* ?	Small turtle (green?) seen just off cove, about 100m offshore.
7/25	Kapa`a	0917	3=inshore 4=offshore		Sea state change
7/25	Kapa`a	1200			Leave beach park to drive up to Upolu Point and down to Mookini Heiau and Kam I birthplace to monitor other boulder beaches closer to channel.
7/25	Kapa`a	1300			Return to Kapa`a Beach Park
7/25	Kapa`a	1400	4=inshore 5=offshore		Sea state change

Date 2006	**Location**	**Time (24 hr)**	**Beaufort Sea State**	**Species**	**Observations**
7/25	Kapa`a	1830			Complete watch for the day.
7/26	Kapa`a	0700	2=inshore 3/4offshore		Begin watch, excellent visibility inshore. Mostly sunny skies.
7/26	Kapa`a	1200	3=inshore 4=offshore		Sea state change
7/26	Kapa`a	1415		*C. mydas*	Small green turtle observed hugging coastline. Observed for about 30 minutes riding the surge back and forth around the rocks. Last seen at 1445 hrs. Lots of glare inshore.
7/26	Kapa`a	1630	4=inshore 5=offshore		Continues to be lots of glare, covering approximately 1/3 of viewing range.
7/26	Kapa`a	1800			Complete watch (head to airport).

Appendix C

Results of 2006 RIMPAC Surveys of Marine Mammals in Kaulakahi and Alenuihaha Channels

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Date:

August 25, 2006

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Results of 2006 RIMPAC Surveys of Marine Mammals in Kaulakahi and Alenuihaha Channels

Abstract

A total of six aerial surveys of marine mammals were performed on dates corresponding with scheduled dates for “choke point” maneuvers of the “Rim of the Pacific” (RIMPAC) joint military exercises in Hawaiian waters. Three surveys were performed in the vicinity of the Kaulakahi Channel (between Kauai and Niihau) (July 16, 17 and 20) and three were performed in the Alenuihaha Channel (between Hawaii and Maui) (July 24-26). The mission of the surveys was to detect, locate and identify all marine mammal species in the target areas using methods consistent with modern distance sampling theory. Marine mammals were sighted on four of the six surveys, comprising a total of 13 groups. All sightings consisted of small to medium-sized odontocetes (toothed cetaceans), including one sighting each of bottlenose dolphins, spotted dolphins, Cuvier’s beaked whale, false killer whale, unidentified beaked whale and eight sightings of unidentified delphinid species. Encounter rates of odontocete sightings (sightings/km surveyed) in this series were identical to those seen during earlier survey series (1993-03) albeit at different times of the year. No unusual observations (e.g., sightings of stranded or dead animals) were noted during the total of ca. 18 hrs of survey effort.

Background

During the summer of 2006, The United States Pacific Command hosted the joint “Rim of the Pacific Exercises” (RIMPAC) military exercises in the Hawaiian Islands. Due to concerns over possible responses of marine mammal species to sonar and other aspects of the naval operations (e.g., ICES, 2005), aerial surveys were scheduled for dates before, during and after scheduled “choke point” maneuvers. Specifically this involved the Kaulakahi Channel, between the islands of Kauai and Niihau, on July 16, 17 and 20; and the Alenuihaha Channel, between the islands of Hawaii and Maui, on July 24, 25 and 26. The mission of the surveys was to detect, locate and identify all marine mammals in these channel areas, as well as to report any unusual behavior, including sightings of stranded or dead cetaceans.

Since the month of July falls outside the normal seasonal residency of humpback whales (Jan-Apr) (Mobley 2004), the less abundant odontocete species (toothed cetaceans) were the target species in the present survey series. Shallenberger (1981) described 15 odontocete species as resident in Hawaii. Based on aerial surveys conducted between 1993-98, Mobley et al. (2000) estimated abundance for 11 odontocete species for the waters within 25 nautical miles (nmi) of the major Hawaiian Islands based on surveys conducted during Jan-Apr of 1993-98. An updated summary of aerial survey results for near-shore Hawaiian waters conducted from 1993-2003 identified a total of 15 odontocete species (Mobley, unpublished data, Appendix A). Barlow (2006) provided abundance estimates for 21 cetacean species, including 18 odontocetes, based on shipboard transect surveys conducted in Aug-Nov 2002 in the Hawaiian Exclusive Economic Zone (EEZ).

Method

Three surveys were performed in each of the Kaulakahi (July 16, 17 and 20) and Alenuihaha (July 24, 25, 26) channels for a total of six surveys. Survey protocol was based on distance sampling methods, which is the standard accepted approach for estimating abundance of free ranging animal populations (Buckland et al. 2001).

Surveys in both regions followed pre-determined tracklines constructed to optimize area sampled within range limits of the aircraft (Figures 1 & 2). For the Kaulakahi Channel surveys, tracklines ran mostly north-south and were spaced 7.5 km apart comprising a total length of ca 556 km.[1] For the Alenuihaha surveys, tracklines ran from northeast to southwest and were spaced 15 km apart and comprised a total length of ca. 740 km. Starting longitudes in both regions were randomly chosen per distance sampling methodology (Buckland et al. 2001) so that the exact trackline configuration varied slightly for each survey.

The survey aircraft for the first survey (July 16) was a single-engine Cessna 177RG Cardinal[1]. For the remaining five surveys a twin-engine Piper PA34 Seneca was used. Both aircraft flew at a mean ground speed of 100 knots and an average altitude of 244m (800 ft). Two experienced observers made sightings of all marine mammal species, one on each side of the aircraft. Sightings were called to a data recorder who noted the species sighted, number of individuals, presence or absence of a calf, angle to the sighting (using hand-held Suunto clinometers), and any apparent reaction to the aircraft. Additionally, GPS locations and altitude were automatically recorded onto a laptop computer at 30-sec intervals, as well as manually whenever a sighting was made. Environmental data (seastate, glare and visibility) were manually recorded at the start of each transect leg and whenever conditions changed. The two data sources (manual and computer) were later merged into a single data file. Species identifications were typically made by orbiting an initial sighting until sufficient diagnostic features were discernible to permit positive identification. When the initial sighting could not be recaptured upon orbiting, the species was recorded as “unidentified.”

[1] Due to PMRF Range Ops on July 16, 2006, flying in the Kaulakahi Channel region was not permitted. We therefore surveyed an adjacent region off the central and southwest coast of Kauai in order to avoid the warning area on that date.

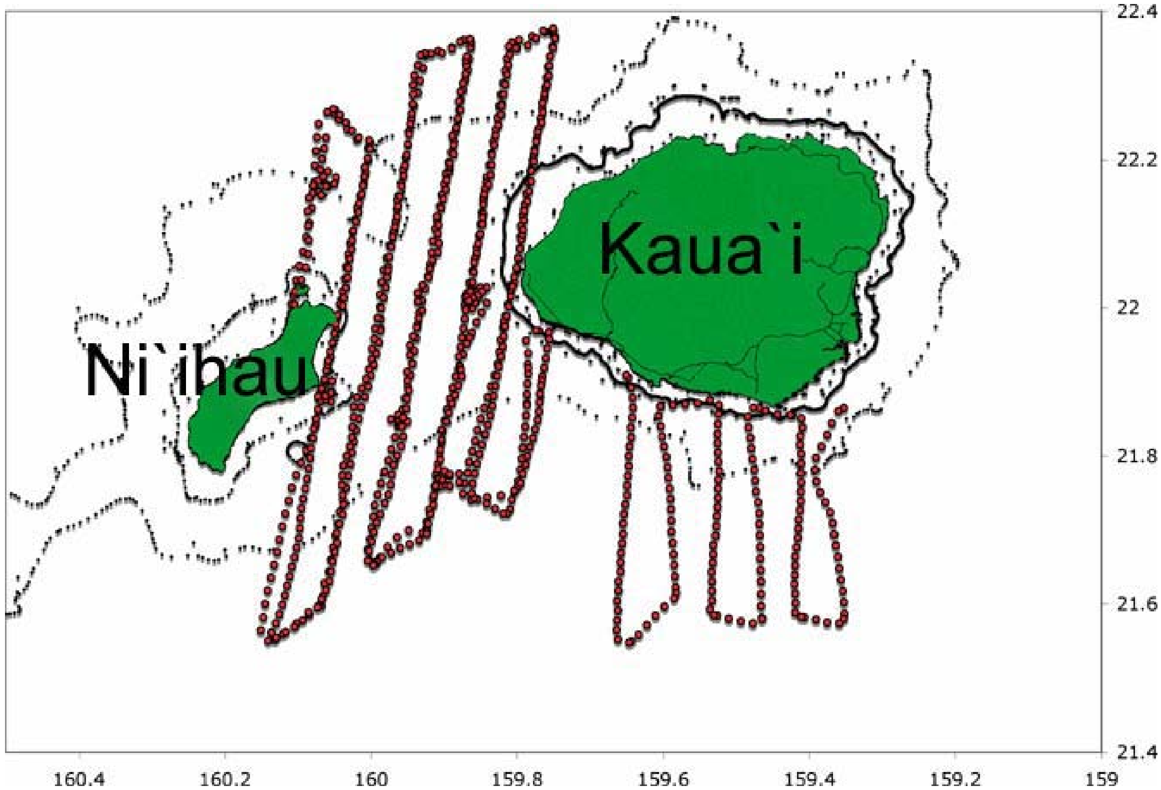

Figure 1. Survey effort for Kaulakahi Channel. GPS data (red lines) for surveys performed on July 16,17 and 20. Tracklines were 7.5 km apart and extended 13 km past the 1000 fathom contour. Total transect length was ca. 556 km. The tracklines to the south of Kauai were flown on July 16 only, when the waters of Kaulakahi Channel were closed due to scheduled operations of the Pacific Missile Range Facility (PMRF) at Barking Sands, Kauai.

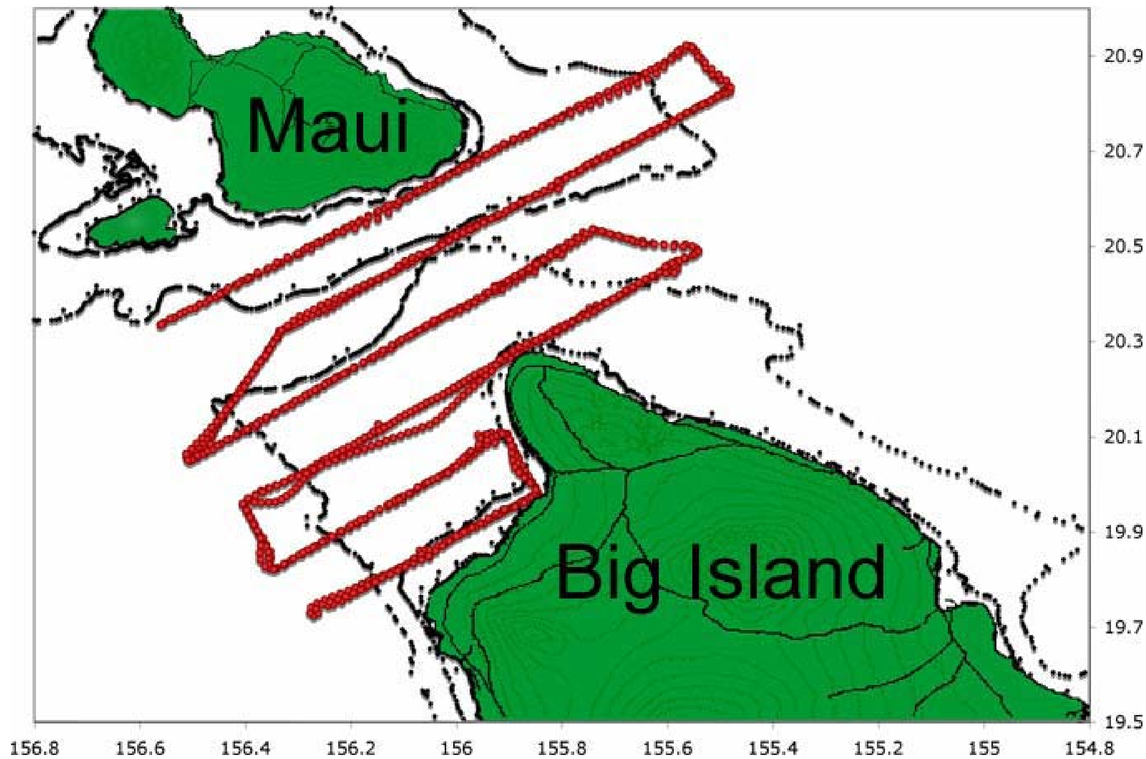

Figure 2. Survey effort for Alenuihaha Channel. GPS position data (red lines) are shown for July 24-26 surveys. Tracklines were 15 km apart and extended 13 km past the 1000 fathom limit. Total trackline distance for each survey was approximately 740 km.

Results

Overview. The six surveys comprised a total of ca. 18 hrs and ca. 3300 km of linear survey effort (Table 1). The number of sightings as well as the ability to identify species was generally hampered by poor seastate conditions that prevailed on all but one of the survey dates (July 20) (Table 1, Figure 3). Seastate is the primary factor affecting the ability to detect marine mammals (Buckland et al. 2001).

Summary of sightings. Cetacean species were detected on five of the six surveys (Table 1), including four identified species (bottlenose dolphins, spotted dolphins, false killer whales and Cuvier's beaked whale), one unidentified beaked whale species (likely *Mesoplodon densirostris*) and eight unidentified delphinid species (Table 2, Figures 4 & 5). All four of the identified species are among those typically seen in nearshore Hawaiian waters (Mobley et al. 2000; Shallenberger 1981). No unusual behavior or activity (e.g., stranded or dead animals) was observed during the six surveys.

Encounter rate comparison. One method of normalizing sightings for performing comparisons is to calculate encounter rates (groups sighted/km surveyed) (Buckland et al.

2001). In the present series a total of 13 sightings were made across ca. 3,334 km of survey effort which corresponds to an encounter rate of .0004 sightings/km. This rate is identical with the encounter rate for all odontocetes combined observed during the 1993-2003 survey series for inshore waters around the main Hawaiian Islands during the months Jan-Apr (Mobley, unpublished data, Appendix A). Therefore, the densities of marine mammal species reported here is identical with that normally seen for the Hawaiian Islands, albeit at different times of the year.

Table 1. Summary of Survey Effort and Sightings

Region	Date	No. of sightings	Survey effort (hrs)	Mean Beaufort seastate
Kaulakahi Channel	July 16	0	1.25	4.38
	July 17	2	3.96	4.06
	July 20	3	3.08	1.47
Alenuihaha Channel	July 24	1	3.28	4.36
	July 25	5	3.33	4.17
	July 26	2	3.02	4.80
	Total:	13	17.92	

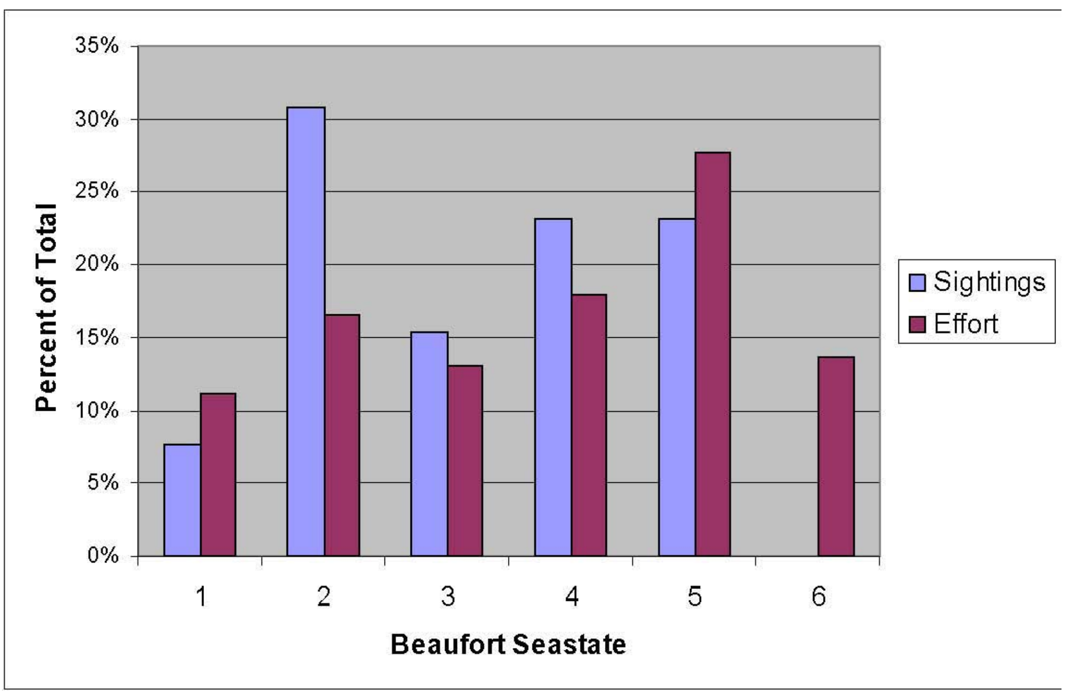

Figure 3. Summary of Beaufort Seastate Conditions. Beaufort seastate is one of the main factors affecting the ability to detect marine mammals. Normally, the ability to detect drops substantially beyond Beaufort 3. As shown, the majority of survey effort occurred in Beaufort 5, whereas the greater number of sightings occurred in Beaufort 2.

Table 2. Summary of Species Sightings by Region

Region / Species	No. groups	No. individuals
Kaulakahi Channel:		
Spotted dolphins (*Stenella attenuata*)	1	14
Unidentified delphinid species	4	21
Alenuihaha Channel:		
Bottlenose dolphin (*Tursiops truncatus*)	1	1
False killer whales (*Pseudorca crassidens*)	1	4
Cuvier's beaked whale (*Ziphius cavirostris*)	1	1
Unidentified beaked whale	1	1
Unidentified delphinid species	4	29

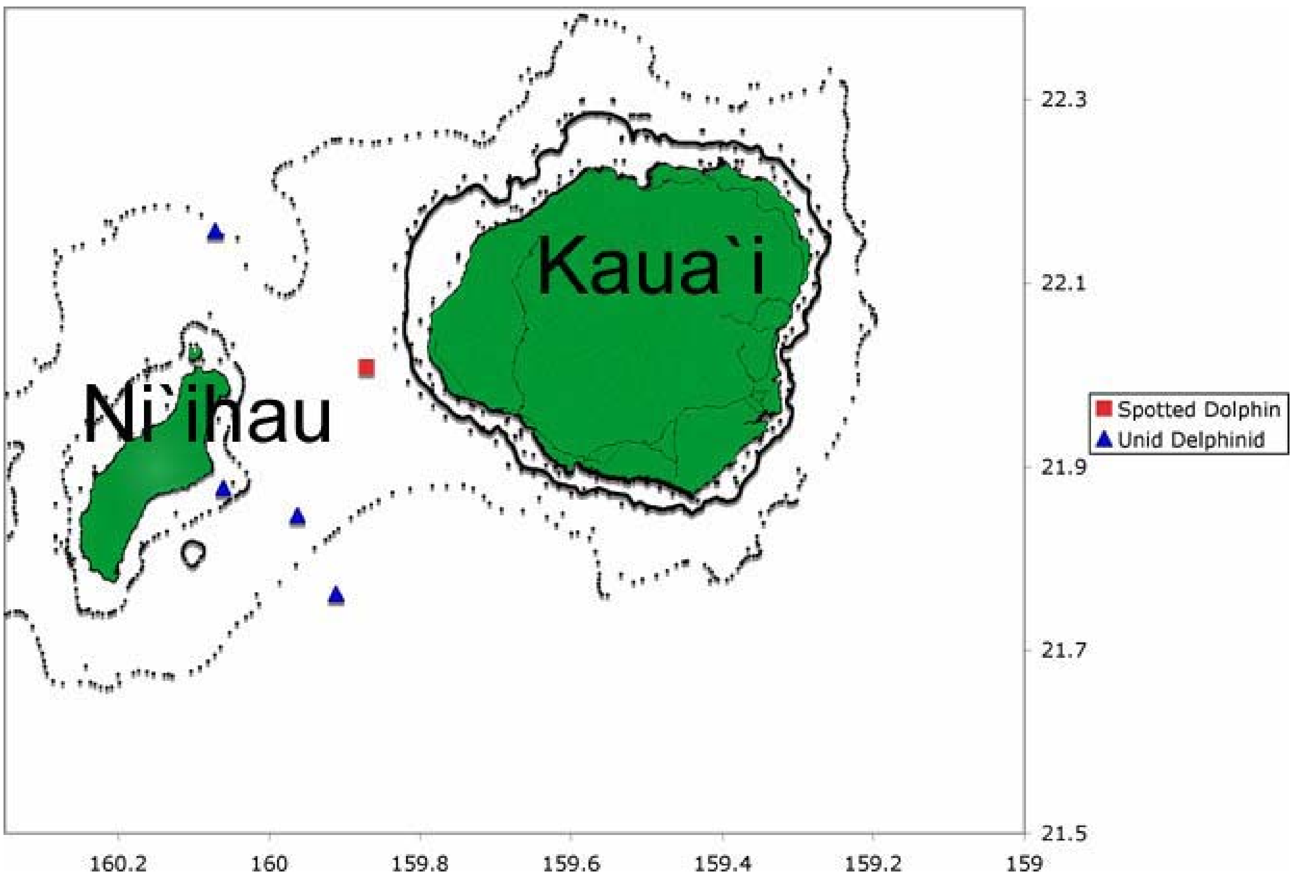

Figure 4. Kaulakahi Channel sightings. A total of five sightings occurred in the Kaulakahi Channel including one pod of spotted dolphins and four of unidentified delphinid species. Inner and outer bathymetry lines refer to 100 and 1000 fathom contours, respectively.

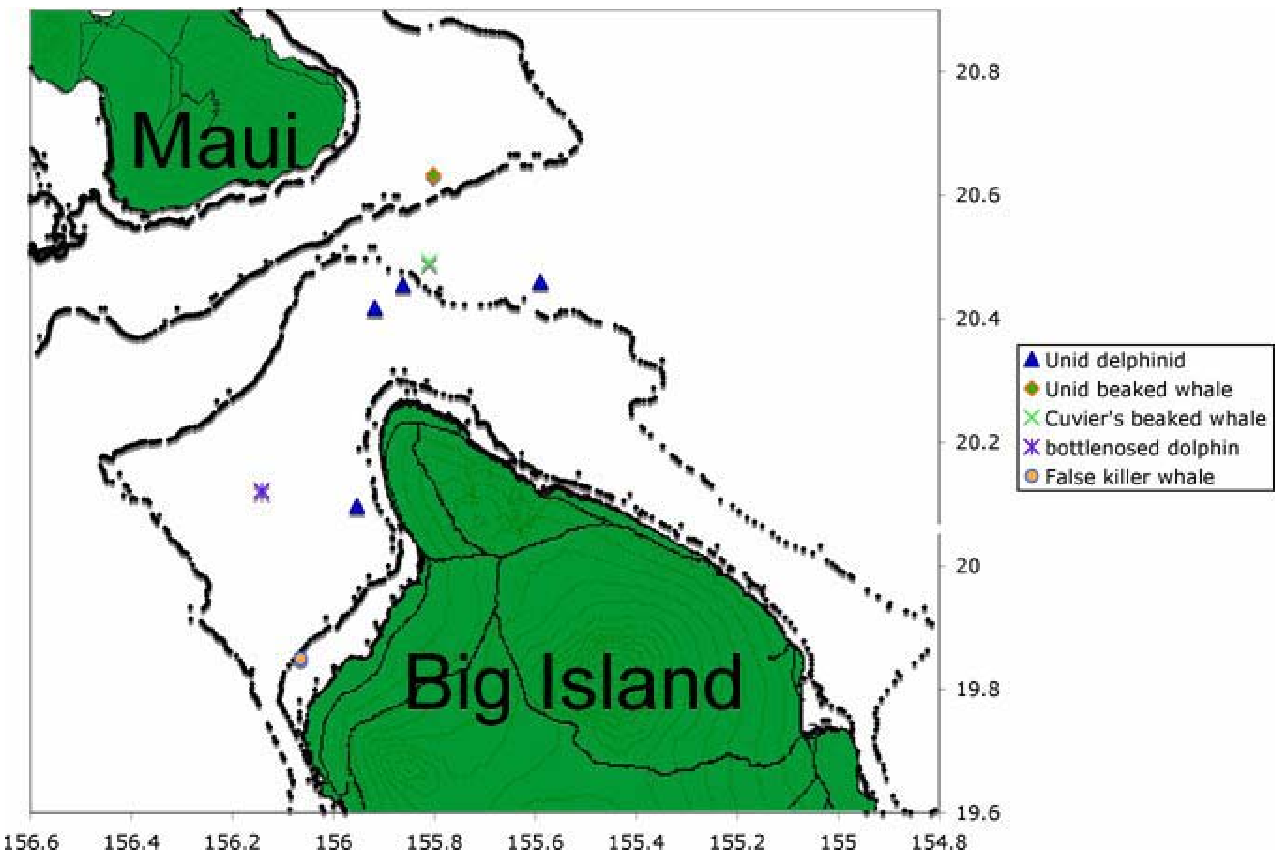

Figure 5. Alenuihaha Channel sightings. A total of 8 sightings occurred in the Alenuihaha Channel, including one pod of each of the following species: bottlenose dolphin, false killer whale, Cuvier's beaked whale and an unidentified beaked whale species (likely *Mesoplodon densirostris*). Additionally four pods of unidentified delphinids were sighted. Inner and outer bathymetry lines refer to the 100 and 1000 fathom contours, respectively.

Discussion

From the total of 13 sightings only four (31%) were positively identified to species. One sighting in the Alenuihaha Channel was identified as a beaked whale (likely Blainville's beaked whale, *M. densirostris*) but was not resighted upon orbiting, thus obviating positive species identification. The low rate of species identification was likely due to the poor seastate conditions that prevailed on all but one of the six surveys (Table 1, Figure 3) thereby making it difficult to recapture the sighting when orbiting.

The sighting of a group of four false killer whales (*Pseudorca crassidens*) was significant given recent concerns over the possible decline in their population around the Hawaiian Islands, possibly due to fisheries interactions (Baird and Gorgone 2005). In the 1993-03 aerial survey series, false killer whales were not seen after 1998 (Mobley, unpublished data), so the current sighting is the first aerial sighting since that time, though shipboard observations have been recorded (e.g., Barlow 2006).

Similarly, the sighting of a single Cuvier's beaked whale (*Ziphius cavirostris*), also in the Alenuihaha Channel, was significant given the fact that previous reports of adverse reactions to mid-range sonar primarily involved this species (ICES, 2005). It was sighted on 25July when RIMPAC activities were scheduled to occur in the channel, and was sighted mid-channel in waters deeper than 1000 fathoms (Figure 5).

As noted, the encounter rate for sightings in the present survey series (.0004 sightings/km surveyed) was identical to that recorded for odontocete species during the 1993-03 aerial survey series for the months Jan-Apr (Mobley 2004). This suggests that densities in the Kaulakahi and Alenuihaha Channels were no more or less than those normally seen throughout Hawaiian waters, albeit at different times of the year. Barlow (2006) commented on the low densities of odontocete species noted during 2002 shipboard surveys of the Hawaiian Exclusive Economic Zone (EEZ), noting them to be lower than most warm-temperate and tropical locations worldwide. He attributed this low density to the low productivity of the subtropical gyre that affects Hawaiian waters.

In conclusion, these surveys provided no evidence of impact of RIMPAC activities on resident populations of cetaceans in the Kaulakahi and Alenuihaha Channels. No differences in cetacean densities were detected, and no unusual behavior or event (e.g., unusual aggregations or near strandings) was observed. This statement should not be interpreted as evidence of no impact, merely that no such evidence was detected during these 18 hrs of surveys.

Acknowledgements

Data reported here were collected under Scientific Collecting Permit No. 642-1536-00 issued by NOAA Office of Protected Resources to the author. I would like to thank our competent crew of observers including Lori Mazzuca, Michael Richlen, Terri Krauska and Robert Uyeyama. Thanks also to John Weiser for his superb piloting.

References

Baird, R.W. and Gorgone, A.M. (2005). False killer whale dorsal fin disfigurements as a possible indicator of long-line fishery interactions in Hawaiian waters. *Pacific Science, 59*:593–601.

Barlow, J. (2006). Cetacean abundance in Hawaiian waters estimated from a summer/fall survey in 2002. *Marine Mammal Science, 22*:446-464.

Buckland, S.T., Anderson, D.R., Burnham, K.P, Laake, J.L., Borchers, D.L. and Thomas, L. (2001). *Introduction to distance sampling: Estimating abundance of biological populations*. New York: Chapman and Hall.

International Council for the Exploration of the Sea (ICES) (2005), "*Report of the Ad-Hoc Group on the Impact of Sonar on Cetaceans.*" 50 pp. Available at: http://socrates.uhwo.hawaii.edu/SocialSci/jmobley/ICES.pdf

Mobley, Jr., J. R. (2004). Results of marine mammal surveys on U.S. Navy underwater ranges in Hawaii and Bahamas. Final Report to Office of Naval Research, 27 pp. Available as downloadable pdf file at: http://socrates.uhwo.hawaii.edu/SocialSci/jmobley/ONRfinal.pdf

Mobley, Jr., J.R., Spitz, S.S., Forney, K.A., Grotefendt, R.A. and Forestell, P.H. (2000). Distribution and abundance of odontocete species in Hawaiian waters: Preliminary results of 1993-98 aerial surveys. Report to Southwest Fisheries Science Center, Administrative Report LJ-00-14C. 26 pp. Available as downloadable pdf file at: http://socrates.uhwo.hawaii.edu/SocialSci/jmobley/SWFSC.pdf

Mobley, Jr., J.R., Spitz, S.S., Grotefendt, R, Forestell, P.H., Frankel, A.S. and Bauer, G.A. (2001). Abundance of humpback whales in Hawaiian waters: Results of 1993-2000 aerial surveys. Report prepared for the Hawaiian Islands Humpback Whale National Marine Sanctuary, Nov. 26, 2001.

Shallenberger, E.W. (1981). The status of Hawaiian cetaceans. Final report to the U.S. Marine Mammal Commission, Washington, DC. Report No. MMC-77/23. 79 pp.

Appendix A

1993 - 2003 Hawaiian Islands Aerial Survey Results

Species Name	No. pods	No. indiv.
Humpback whale (*Megaptera novaeangliae*)	2352	3907
Spinner dolphin (*Stenella longirostris*)	52	1825
Spotted dolphin (*Stenella attenuata*)	31	1021
Short-finned pilot whale (*Globicephala macrorhynchus*)	73	769
Melon-headed whale (*Peponocephala electra*)	6	770
Bottlenosed dolphin (*Tursiops truncatus*)	54	492
False killer whale (*Pseudorca crassidens*)	18	293
Sperm whale (*Physeter macrocephalus*)	23	106
Rough-toothed dolphin (*Steno bredanensis*)	8	90
Blainville's beaked whale (*Mesoplodon densirostris*)	9	32
Pygmy or dwarf sperm whale (*Kogia* spp.)	4	28
Striped dolphin (*Stenella coeruleoalba*)	1	20
Pygmy killer whale (*Feresa attenuata*)	2	16
Cuvier's beaked whale (*Ziphius cavirostris*)	7	13
Risso's dolphin (*Grampus griseus*)	1	8
Killer whale (*Orcinus orca*)	1	4
Fin whale (*Balaenoptera physalus*)	1	3
Unid. Dolphin	96	452
Unid. Stenella spp.	11	196
Unid. Whale	28	39
Unid. beaked whale	9	23
Unid. Cetacean	14	27
Totals:	2801	10134

Prepared for
National Marine Fisheries Service
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Prepared by
Department of the Navy

In accordance with
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Biological Opinion 23 January 2007

Department of the Navy
HAWAII
UNDERSEA WARFARE TRAINING EXERCISE (USWEX)
After Action Report
For Exercises in April 2007

FINAL

10 August 2007

Abstract

This report presents an analysis of the effectiveness of the mitigation and monitoring measures as required under the Biological Opinion on the U.S. Navy's Proposed Undersea Warfare Training Exercises In the Hawai'i Range Complex From January 2007 to January 2009

AND

Discussion of the nature of effects, if observed, under the National Defense Exemption from the Requirements of the Marine Mammal Protection Act (MMPA) for Mid-Frequency Active Sonar

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INTRODUCTION

This report is presented to fulfill Navy and Pacific Fleet written reporting requirements conditional to the 23 January 2007 National Defense Exemption (NDE) from the Requirements of the MMPA for Certain DoD Military Readiness Activities That Employ Mid-Frequency Active Sonar (MFAS) or Improved Extended Echo Ranging Sonobuoys. In addition, as these NDE mitigation measures are included in the 23 January 2007 *Biological Opinion (BO) on the U.S. Navy's Proposed Undersea Warfare Training Exercises (USWEX) In The Hawai'i Range Complex From January 2007 to January 2009*, reporting under the BO also fulfills reporting requirements for the NDE.

REPORT ORGANIZATION

This report, which contains only unclassified material, provides the information and analyses for two Hawaii Range Complex at-sea major exercises, and is submitted in fulfillment of NDE and BO written requirements.

The report is organized by section in the following order:

Section 1 Exercise Summaries provides exercise specific summary including the starting and ending dates, the number of ships and aircraft participating, and the number of hours of active sonar used.

Section 2 Observations and Mitigation Effectiveness provides an estimated number of marine mammals observed during Undersea Warfare Training Exercise (USWEX) 07-02, and USWEX 07-03 potentially affected or not affected by Anti-submarine Warfare (ASW) operations, noting the nature of any observed effects where possible. In addition, Section 2 assesses the effectiveness of the NDE and BO mitigation and monitoring measures required during exercises with regard to minimizing the use of MFAS in the vicinity of marine mammals.

Appendices contain tables and figures (**Appendix A**), and other supplementary information (**Appendix B**).

BACKGROUND

USWEXs are advanced ASW exercises conducted by the U.S. Navy's Carrier Strike Groups (CSG) and Expeditionary Strike Groups (ESG) while in transit from the west coast of the United States to the western Pacific Ocean. As a combined force, submarines, surface ships, and aircraft will conduct anti-submarine warfare exercises (ASW) against submarine targets representing an opposing force. Submarine targets would include real submarines, target drones that simulate the operations of an actual submarine, and virtual submarines interjected into the training events by exercise controllers. The primary event of each exercise involves from one to five surface ships equipped with sonar, with one or more helicopters, and a P-3 aircraft searching for one or more submarines.

Two USWEXs were conducted in the waters off Hawaii on 10-11 April and 17-18 April 2007 (**Table A-1 Appendix A**). The types of ASW training conducted during USWEX involved the use of ships, submarines, aircraft, non-explosive exercise weapons, and other training related devices within portions of the Hawaii Range Complex (**Figure A-1 Appendix A**).

USWEX 07-02 and USWEX 07-03 were planned and prepared by the U.S. Navy prior to receiving the Terms and Conditions of the BO on 23 January 2007. This includes coordinating the logistical arrangements for these advanced training events, ensuring marine species awareness training was provided to exercise participants, and preparation and distribution of the Letter of Instruction (LOI) (**Appendix B**) which reiterates the applicable mitigation measures and explains procedures for reporting marine mammal sightings discussed in Section 2.

The U.S. Navy continues to make improvements to its Fleet instructions to collect relevant data to more fully address the exact language of the Terms and Conditions of the USWEX BO. The Office of Protected Resources (OPR), National Marine Fisheries Service (NMFS) and the U.S. Navy have been coordinating to improve data objectives, data quality, and reporting requirements to assist in the analysis for future USWEXs. This has been a continual, iterative dialog leading to integration of additional monitoring techniques and procedures that will help to advance the state of knowledge on marine mammal distribution and potential MFAS effects or, lack of effects, within the Hawai'i Range Complex. The U.S. Navy will explore establishment of new metrics and processes based on these enhancements to the exercise monitoring program, and plans to integrate new results into future reports.

MFAS equipped platforms participating in USWEX include Ticonderoga-class guided missile cruisers (CG) and Arleigh Burke-class guided missile destroyers (DDG) surface combatants with AN/SQS-53C sonar and associated aviation assets (SH-60B/F/R with AN/AQS-13F or AQS-22 dipping sonar, and AN/SSQ-62B/C/D/E Directional Command Activated Sonobuoy System -DICASS), and P-3 Maritime Patrol Aircraft (MPA) (DICASS sonobuoy).

Total numbers of ASW capable aviation assets participating in a given exercise varies based on maintenance ready aircraft and ship configuration. For instance, early versions of the DDG destroyers, the newest Navy surface combatant, do not have onboard hangers for helicopters. Later versions have hangars and up to two SH-60B/F/Rs. Of more importance than actual aircraft numbers however, is that active sonar use by aviation assets is captured and added to sonar totals reported in this document. MFAS on Los Angeles-class (SSN) submarines (AN/BQQ-5) is seldom used in tactical training scenarios, where passive sonar use is the preferred system in order to maximize the stealth aspects of undersea operations.

SECTION 1 EXERCISE SUMMARIES

EXERCISE SPECIFICS

USWEX 07-02 was conducted from 10-11 April 2007 and involved a CSG (**Table A-1 Appendix A**). Ships assigned to this CSG included: (1) non-MFAS equipped ship and (5) MFAS equipped ships. Other participating units representing support and opposition forces included (2) submarines and (3) MFAS equipped ships, although there was no active sonar use by these supporting platforms. Based on the DDG ships participating in JTFEX 07-03, there were approximately of 8-12 ASW SH-60s helicopters available.

USWEX 07-03 was conducted from 17-18 April 2007 and involved an ESG (**Table A-1 Appendix A**). Ships assigned to this ESG included: (3) non-MFAS equipped ships and (3) MFAS equipped ships. Other participating units representing support and opposition forces included (2) submarines and (2) MFAS equipped ships, although there was no active sonar use by these supporting platforms. Based on DDG ships participating in USWEX 07-03, there were approximately six ASW SH-60s helicopters participating.

MITIGATION MEASURES PERFORMED

All mitigations measures as stated in the 23 January 2007 NDE were adhered both of the Hawaii USWEXs. These 29 NDE measures include specific details for Personnel Training, establish Lookout and Watchstander Responsibilities, mandate specific Operating Procedures, and describe Coordination and Reporting requirements. Observation data from Navy lookout sightings for each exercise is described in Section II.

SECTION 2 OBSERVATIONS AND MITIGATION EFFECTIVENESS

MARINE MAMMALS AND OCEANOGRAPHIC CONDITIONS

Section 2 provides estimated numbers of marine mammals observed in Hawaii waters during USWEX 07-02 and USWEX 07-03. This information is based on analysis of actual events and sightings of marine mammals reported by exercise participants noting the nature of any observed effects. **Table A-2** lists sighting information and **A-4 Appendix A** lists possible marine mammal species occurring in Hawaii waters, highlights the Endangered Species Act (ESA) listed species described in the BO, and shows results for both annual acoustic exposure estimates from DoN (2007) and single USWEX estimated potential exposures.

All detections were made by standard Navy surface ship lookout reporting procedures as detailed in a Commander, THIRD Fleet LOI issued to each CSG and ESG prior to participation in a USWEX (**Appendix B**). No marine mammal sightings were reported by helicopters or P-3s.

Ocean Sea Surface Temperatures (SST) ranged from 22-26°C and general ocean currents in the vicinity of the main Hawaiian Islands were typical for this season (**Figures A-2** and **A-4 in Appendix A**).

The National Data Buoy Center maintains an oceanographic monitoring buoy 170 nm northwest of Kauai (http://mob.ndbc.noaa.gov). Based on data reported from this buoy, wind speeds during the day from 10 to 11 April 2007 (USWEX 07-02) were between 5.6 and 9.2 meters/sec (m/s) (11-18 knots). Wave heights were between 1.9 to 2.4 m (6 to 8 feet). During the day from 17 to 18 April 2007 (USWEX 07-03), wind speeds were between 7.8 to 11.5 m/s (15-22 knots) and wave heights between 2.8 to 3.5 m (9 to 11 feet).

EXERCISE MARINE MAMMAL SIGHTINGS

USWEX 07-02 Observations

During the two days of USWEX 07-02, there were no reported sightings of marine mammals. There were no sightings of floating dead animals, nor reports of concurrent strandings.

A Navy contractor marine mammal biologist was allowed to fly onto the aircraft carrier for USWEX 07-02 as an additional monitoring protocol. While MFAS is only installed on CG and DDG class vessels, the carrier does serve as the information hub for the exercise. The biologist was able to observe the Navy lookouts and procedures over eight non-consecutive hours from 10 to 11 April. Weather conditions during this period were clear with approximately 12 miles (19 km) visibility, swell was about eight feet (2.5 meters), wind was 17.5-22.4 knots (7.1-9.2 meter/second). Air temperature was 74.5-79.2°F (23.6-26.2°C). Neither Navy watchstanders on the carrier nor the biologist reported any marine mammal sightings during this period (**Appendix C**).

USWEX 07-03 Observations

Table A-2 provides a detailed timeline of marine mammal observations made by Navy exercise participants for USWEX 07-03. During the two days of USWEX 07-03, there was only one marine mammal sightings for an estimated total of one large whale. While not geographically plotted, the sighting location was approximately 30 nm northwest of the island of Kauai. There were no sightings of floating dead animals, nor reports of concurrent strandings.

MITIGATION AND MONITORING ASSESSMENT

OVERVIEW

The NDE calls for the U.S. Navy to submit a report to NMFS that includes a discussion of the nature of the effects, if observed, based on modeling results and marine mammal sightings. In addition, the BO Terms and Conditions require a report that evaluates the mitigation measures and details results from the U.S. Navy's exercise monitoring program. In this case, the mitigation measure under the BO are the NDE measures, therefore the discussion is presented together in this section.

This section of the report, therefore, provides an assessment of the effectiveness of the mitigation and monitoring measures. It must also be recognized that ASW proceeds slowly and requires careful development of a tactical frame of reference over time as data is integrated from a number of sources and sensors. Once MFAS is turned off for a period of time, turning it back on later does not usually allow a Commander to simply continue from the last frame of reference. Thus, lost MFAS time not only equates to lost exercise time but should be considered in the fuller context of its overall impact on the tempo and development of a "tactical picture" shared among exercise participants as they trained toward the goal of improving ASW skills in general.

Passive Sonar

Passive sonar involves acoustic listening to underwater sounds and does not involve transmitting active sound into the water column. Passive sonar use is driven by the tactical nature of an ASW or training event, and should be assumed to be employed whenever possible. Given the nature of passive sonar technology and underwater sound propagation, localizing or determining absolute position of an object is more difficult than active sonar.

The U.S. Navy does not have a reporting system to capture the amount of passive sonar employed within a given geographic region. For USWEX 07-02 and USWEX 07-03, there were no reports of passive acoustic detections of marine mammals by exercise participants. Future reports will explore whether metrics for passive acoustic use can be generated, and if marine mammal detections are occurring.

PMRF Acoustic Monitoring

Underwater acoustic recordings of marine mammal vocalization were conducted for a limited time set at the Pacific Missile Range Facility north of Kauai after USWEX 07-03. **Appendix D** contains a detailed description of the program and data results from April 2007 monitoring. The science behind the use of underwater hydrophones for localizing marine mammal is relatively new, and the technologies and techniques described in **Appendix D** will continue to be refined in collaboration with other academic and NMFS-Navy efforts.

Active Sonar

Typically, there are no measurements (calibrated or otherwise) of actual sound levels made during an exercise and none were made during USWEX 07-02 and USWEX 07-03. Source levels, numbers of sources, and frequencies are classified since that information would provide potential adversaries with important tactical data. An explanation of sonar hours as presented in this report is also warranted. Total active sonar hours represent a sum of the total time from a number of individual training events during an USWEX. This value does not represent actual total sonar ping hours. In other words, the ship logs when the sonar was turned on at the beginning of a training event, and reports time until the event is finished. During this period, the MFAS only puts active sound into the water at discrete intervals. Sonar signals are not a continuous source of acoustic energy. For example, surface ship sonar signal consists of a pulse (i.e.

ping) less than two seconds long with approximately a minimum of 30 seconds between successive pings (NMFS 2007).

Given that mitigation measures are designed to minimize interactions between Navy assets and marine mammals, the observations of marine mammals by Navy assets only occurred as infrequent and very brief encounters, the majority of which occurred when there was no MFAS in use.

USWEX 07-02 Assessment

During USWEX 07-02, 265.5 hours of MFAS use was reported.

MFAS is only used during carefully reviewed scenarios and for only a small subset of any given exercise time frame.

There were no reports of ship strikes on marine mammals, and no reports of a vessel maneuvering to avoid the path of a marine mammal.

There was one report of a stranded marine mammal four days after the exercise, but this event can not be associated with MFAS nor other Navy operations. In an email dated 05 July 2007 received from Mr. David Schofield, Marine Mammal Response Network Coordinator NOAA Pacific Islands Regional Office, National Marine Fisheries Service, Mr. Schofield asked if any "naval activities" occurred prior to or on 15 April when a pygmy sperm whale was found stranded at a remote beach off Lanai City, Lanai. While USWEX 07-02 was conducted from 10 to 11 April, this was at least four days prior to the pygmy sperm whale stranding. The closest MFAS use was actually on 10 April, and greater than 100 nm away from the stranding site and geographically closer to Kauai. **No other Navy MFAS was operating within the Hawaiian operating area after 12 April. Finally, pygmy sperm whales and spinner dolphins are the most commonly stranded species within the Hawaiian Islands, and the islands of Oahu, Maui, and Lanai, have the highest reported proportion of these cetacean strandings** (Mazzuca et al., 1999; Maldini et al., 2005).

Therefore sonar use can not be associated with this reported Hawaii stranding based on both time and distance considerations mentioned previously, as well as given typical marine mammal stranding patterns for the region.

USWEX 07-03 Assessment

During USWEX 07-03, 50.1 hours of MFAS use was reported.

MFAS is only used during carefully reviewed scenarios and for only a small subset of any given exercise time frame. During USWEX 07-03 there were no reported sightings of marine mammals concurrent with MFAS operation, and no reports of MFAS having to be secured due to the presence of marine mammals.

Based on limited visual sightings, there were no reported potential marine mammal exposures at 200, 500, 1,000 yards (**Table A-3**).

There were no instances where marine mammals behaved in any erratic, unusual, or anything other than apparently normal manner. There were no reports of ship strikes on marine mammals, and one report of a vessel maneuvering to avoid the path of a marine mammal.

Modeling Estimates Applicable to USWEX 07-02 and 07-03

Table A-4 in **Appendix A** shows estimated marine mammal acoustic exposures from model derived calculations based on regional marine mammal densities, USWEX operational parameters, sound transmission loss, and potential energy accumulated (DoN, 2007). The left hand columns in **Table A-4** are from the USWEX OEA for Alternative 1, which forecast annual impacts from six USEWXs (Table 4- in DoN, 2007). Species order was changed from the original table to highlight ESA listed species first, followed by an alphabetical list of remaining species. The columns to the right in **Table A-4** are a rough approximation of predicted exposures from a single exercise calculated for this report (i.e. animal exposure # divided by 6). In total, acoustic impact modeling predicts an estimated 5,116 Level B sub-TTS and an estimated 37 Level B TTS exposures. However, these numbers of animals were not observed within the Hawaiian Islands operating area by exercise participants.

NDE AND BO ASSESSMENT

All 23 Jan 2007 NDE measures promulgated in the *Mid-Frequency Active Sonar Mitigation Measures during Major Training Exercises or within Established DoD Maritime Ranges and Established Operating Areas* (NDE) section were implemented for COMPTUEX 07-02, JTFEX 07-03, and JTFEX 07-05.

In addition to the above assessment of the NDE, the BO calls for a report that evaluates the effectiveness of the U.S. Navy's exercise mitigation measures. As described previously, the three categories of measures, Personnel Training, Lookout and Watchstander Responsibilities, and Operating Procedures as outlined in the NDE, appear effective in detecting and responding appropriately to the presence of marine mammals, when observed. For instance, one BO Term and Condition requests the U.S. Navy to estimate the number of ESA listed marine mammals that may have been exposed to received energy level equal to or greater than 173 dB re 1 $\mu Pa^2 \cdot s$.

Since there was only one marine mammal observation during two separate USWEX, and MFAS was not in use at that time, then it would be accurate to state that no observed marine mammal or ESA species were exposed to received energy levels greater than 173 dB re 1 $\mu Pa^2 \cdot s$.

The U.S. Navy acknowledges that this discussion does not account for potential marine mammal species not observed, which is a difficult determination even for the marine mammal scientific community, and is seeking to address this issue as discussed below.

As to the effect of MFAS power reduction and securing due to the presence of marine mammals, there is no additional information that can be added at this time as to the operational effect of these events. There is an effort underway within the operational community to try and articulate exactly what kind of relative effect MFAS mitigation measures have on ASW training.

In regards to impacts not associated with MFAS such as ship strikes, the U.S. Navy has a robust ship strike reporting program and reports from USWEX 07-02 and 07-03 of no ship strikes and of maneuvering to avoid animals provides some evidence that these avoidance measures are effective.

Data Limitations and Improvements

The U.S. Navy is committed to development of robust exercise and long-term range complex monitoring plans that will integrate multiple tools in order to provide better assessment of marine mammal occurrence and possible MFAS effects, or lack of effects.

There may be several reasons for the limited number of marine mammal sightings during the two USWEXs. Actually, the two groups involved in USWEX 07-02 and 07-03, a CSG and an ESG, were the exact same ones in the recently submitted SOCAL AAR report, so the participating vessel count should be similar and individual ships familiar with marine mammal mitigation and reporting requirements.

Reasons for fewer sightings in USWEX (1 sighting) than reported for SOCAL exercises (28-61 sightings) can include:

1) Duration- The shorter duration of each USWEX (2-days) vice the longer JTFEX and COMPTUEX in SOCAL (1-week and 2-3 weeks) means that less time was available for reporting marine mammal sightings. Even for the longer Southern California exercises (two JTFEX and one COMPTUEX), typically only about two to 12 sightings per day were reported during each exercise.

2) Density- There may be potentially lower marine mammal densities, in general, within the Hawaiian operating area. However, fewer Hawaii marine mammal density surveys have been conducted compared to the greater frequency of marine mammal surveys within Southern California waters. The fine-scale distribution of Hawaii's marine mammal populations is less well detailed although some populations are under study (Baird et al. 2005, NCCOS 2005, Baird et al. 2006, Barlow 2006, Chivers et al. 2007, Forney 2007, McSweeney 2007). There is, of course, a significant body of information on the broad seasonal movements of the humpback whales between northern feeding areas and Hawaiian breeding grounds. Although late in the season, April is within the time for humpback whales to be present. Many of the documents toothed whale species in Hawaii seem to be year-round, where in SOCAL there are general seasonal species composition shifts due to water temperature preference and prey availability.

3) Weather- Weather conditions, at least as can be determined from the monitoring buoy northwest of Kauai, indicated that it was possible that moderate sea states during the two USWEX may in some cases made visual sighting of marine mammals more difficult due to sea states conditions. Small deep-diving and cryptic species are typically more difficult to observe when sea states get to and above sea state 3 (Barlow and Gisiner 2006, Taylor et al. 2007). Wind speed and wave heights for 10-11 April were between 11-18 knots and 6-8 feet, while for 17-18 April wind speed and wave heights were between 15-22 knots and 9-11 feet). Given these values, approximate sea states were likely between 2 to 4. **Appendix E** shows the relationships between wind speeds and ocean conditions.

Future reporting requirements will collect more detailed descriptions on marine mammal behavioral observations by Navy lookouts for validation by NMFS. Improvements to reporting requirements are planned for the remaining 2007 and 2008 exercises to better incorporate non-subjective categories of behavioral description, and instead report "what the observer saw", and how long the observation continued. Adding sea state and visibility reports at the time of sighting may result in a better determination of the effective visual monitoring ranges being reported. While identification to species-level would be optimal, that level of detail may not be immediately obtainable from U.S. Navy lookout reports without further training and testing of alternative methodologies to supplement existing shipboard reports. In accordance with the BO, data collection needs to address these questions will be incorporated into future exercises as the U.S. Navy's exercise monitoring program evolves.

There is no information from which to assess how many, if any, animals not observed by Navy lookouts may or may not have been exposed to MFAS received levels greater than 173 dB re 1 $\mu Pa^2 \cdot s$. Data collection needs to address this question. It remains a problematic science issue for even non-Navy marine mammal surveys.

Although not conducted specifically for these April 2007 exercises, ship based and aerial monitoring designed in support of future exercise monitoring and future range complex monitoring is being developed by the U.S. Navy. The USWEX Monitoring Plan is being reviewed and enhanced for FY08 implementation. New information on the scope and results from any exercise monitoring will be provided in subsequent U.S. Navy After Action Reports. The U.S. Navy is looking to integrate additional monitoring tools and techniques in future exercises as the exercise and range complex monitoring plans are designed and implemented.

CONCLUSIONS AND SUMMARY

- Marine mammals were sighted only one time for a total of one large whale over two separate USWEX events of two-days each.
- The one sighting event was during a period when no MFAS was operating, and therefore no exposures to marine mammals occurred based on visual sightings.
- In the one reported sighting, the marine mammal was detected by Navy watchstanders in accordance with Navy standard operational procedures and as reiterated by NDE mitigation measures.
- There were no ship strikes on marine mammals during these exercises and one instance where U.S. Navy vessel maneuvered to avoid crossing a marine mammal's path and increase the separation between the ship and animal.
- Since MFAS was not secured in USWEX 07-02 or 07-03, there were no lost ASW training opportunities.
- Improvements to the U.S. Navy lookout reporting procedures will be implemented for future exercises to better capture metrics on weather conditions during the sighting, and more detailed observations of animal behavior.
- The U.S. Navy is committed to development of robust exercise and long-term range complex monitoring plans that will integrate multiple tools in order to provide better assessment of marine mammal occurrence and possible MFAS effects, or lack of effects. FY08 plans may include various mixes of ship and aerial surveys independent of exercise participants, validation by experienced biologist(s) on lookout effectiveness in observing marine mammals, and use of new research and development technologies to advance the state of marine mammal monitoring.

REFERENCES

Baird, R.W., Webster, D.L., McSweeney, D.J., Ligon, A.D., Schorr, G.S. and Barlow, J. 2006. Diving behaviour of Cuvier's *(Ziphius cavirostris)* and Blainville's (*Mesoplodon densirostris*) beaked whales in Hawai'I, Canadian Journal of Zoology 84:1120-1128.

Baird, R.W. 2005. Sightings of dwarf (*Kogia sima*) and pygmy (*K. breviceps*) sperm whales from the main Hawaiian Islands. Pacific Science 59:461-466

Barlow, J. 2006. Cetacean Abundance in Hawaiian Waters Estimated from a Summer/Fall Survey in 2002. Marine Mammal Science 22:446-464.

Barlow, J., and R. Gisiner. 2006. Mitigating, monitoring and assessing the effects of anthropogenic sound on beaked whales. Journal of Cetacean Research and Management 7:239-249.

Chivers, S.J., R.W. Baird, D.J. McSweeney, D.L. Webster, N.M. Hedrick, and J.C. Salinas. 2007. Genetic variation and evidence for population structure in eastern North Pacific false killer whales (*Pseudorca crassidens*). Canadian Journal of Zoology 85:783-794.

DoN. 2007. Undersea Warfare Exercise (USWEX) Programmatic Environmental Assessment/Overseas Environmental Assessment (EA/OEA)- January 2007. Prepared for: Commander, U.S. Pacific Fleet, Department of the Navy. Prepared by: Parsons Infrastructure & Technology, Washington, DC/Kaya Associates, Inc., Huntsville, AL/SRS Technologies, San Diego.

Forney, K. 2007. Preliminary Estimates Of Cetacean Abundance Along The U.S. West Coast And Within Four National Marine Sanctuaries During 2005. National Marine Fisheries Service,NOAA Southwest Fisheries Science Center, La Jolla, CA. NOAA-TM-NMFS-SWFSC-406. 35 p.

Maldini, D., L. Mazzuca, S. Atkinson. 2005. Odontocete Stranding Patterns in the Main Hawaiian Islands (1937-2002): How Do They Compare with Live Animal Surveys? Pacific Science 59(1):55-67.

Mazzuca, L., S. Atkinson, B. Keating, and E. Nitta. 1999. Cetacean mass strandings in the Hawaiian Archipelago, 1957-1998. Aquatic Mammals 25(2):105-114.

McSweeney, D.J., R.W. Baird and S.D. Mahaffy. 2007. Site fidelity, associations and movements of Cuvier's (*Ziphius cavirostris*) and Blainville's (*Mesoplodon densirostris*) beaked whales off the island of Hawai'i. Marine Mammal Science 23:666-687.

NCCOS, N. 2005. A Biogeographic Assessment of the Channel Islands National Marine Sanctuary: A Review of Boundary Expansion Concepts for NOAA's National Marine Sanctuary Program, Prepared by: NOAA's National Centers for Coastal Ocean Science (NCCOS) in cooperation with the National Marine Sanctuary Program. Silver Spring, MD. 215 p.

NMFS, 2007. Biological Opinion (BO) on the U.S. Navy's Proposed Undersea Warfare Training Exercises (USWEX) In The Hawai'i Range Complex From January 2007 to January 2009- 23 January 2007. Office of Protected Resources, National Marine Fisheries Service, Silver Springs, MD.

Taylor, B.L., M. Martinez, T. Gerrodette, J. Barlow, and Y.N. Hrovat. 2007. Lessons from monitoring trends in abundance of marine mammals. Marine Mammal Science 23:157-175.

APPENDIX A- TABLE AND FIGURES

INTRODUCTION

This Appendix contains material supporting the discussion in the U.S. Navy's combined USWEX After Action Report. It is divided into two Appendices. Appendix A contains tables and figures referred to in the main Report. Appendix B contains the THIRD FLEET Letter of Instruction (LOI) directing exercise participants to comply with NDE and BO conditions, and specifies the exact marine mammal sighting reporting language ships are responsible for providing after the exercise.

Table A-1. Hawaii USWEXs in April 2007.

CSG/ESG	Event Name	Dates	MFAS Use Reported (hours)
CSG	USEX 07-02	10-11 Apr 2007	265.5 hrs
ESG	USWEX 07-03	17-18 Apr 2007	50.1 hrs

Table A-2. Marine mammal sightings and actions by exercise participants during USWEX 07-03. Text in red **Bold** indicate events when MFAS was in use and secured due to marine mammal mitigation. Red text in *Italics* indicates when MFAS was in use, but mitigation other than securing sonar enacted.

Date-Time (local)	Ship Type	Description of Actions Taken	# of animals	MFAS status
04/17-1345	MFAS ship	Surface ship sights 1 "large whale" traveling at 300 yards. **Ship changes course** to open distance between whale and vessel.	1	Not in Use
	1	= total sighting events total number of animals =	**1**	

Table A-3. Sightings during USWEX 07-03 where MFAS mitigation occurred.

Assessment by Range			
Range	**ESA species (potential)**	**MMPA species**	**Comments**
200 yards- Sonar secured (turned off)	0	0	
500 yards- Sonar reduced -10 dB	0	0	
1000 yards- Sonar reduced -6 dB	0	0	

Table A-4. Total annual exposures for sonar and underwater detonations (*left*) from DoN 2007 based on 6 exercise per year (USWEX EA/OES Table 4.3), and estimated exposures per exercise (*right*).

Species	Occurrence Status Within Hawaiian Waters	Annual USWEX potential exposures n =6 exercises (DoN, 2007)		Estimated singe exercise exposures	
		Level B Sub TTS	Level B TTS	Level B Sub TTS	Level B TTS
ESA-listed					
Blue whale	Rare	0	0	0	0
Fin whale	Rare	48	0	8	0
Humpback whale	Seasonal, Nov-Apr	10,273	49	1,712	8
Sei whale	Rare	21	0	4	0
Sperm whale	Regular, Year round	905	3	151	1
Non-ESA listed				0	0
Blainville's beaked whale	Regular, Year round	285	1	48	0
Bottlenose dolphin	Regular, Year round	775	7	129	1
Bryde's whale	Regular, Year round	96	0	16	0
Cuvier's beaked whale	Regular, Year round	1,490	6	248	1
Dwarf sperm whale	Regular, Year round	2,182	12	364	2
False killer whale	Regular, Year round	109	2	18	0
Fraser's dolphin	Regular, Year round	2,045	20	341	3
Killer whale	Infrequent, Year round	71	1	12	0
Longman's beaked whale	Regular, Year round	85	0	14	0
Melon-headed whale	Regular, Year round	408	2	68	0
Minke whale	Seasonal, Nov-Apr	0	0	0	0
Pygmy killer whale	Regular, Year round	106	2	18	0
Pygmy sperm whale	Regular, Year round	839	5	140	1
Pantropical spotted dolphin	Regular, Year round	2743	26	457	4
Risso's dolphin	Regular, Year round	276	2	46	0
Rough-toothed dolphin	Regular, Year round	2,832	41	472	7
Short-finned pilot whale	Regular, Year round	1,849	12	308	2
Spinner dolphin	Regular, Year round	1,957	18	326	3
Striped dolphin	Regular, Year round	1,303	13	217	2
Monk seal	Regular, Year round	0	0	0	0
TOTAL:		30,699	222	5,116	37

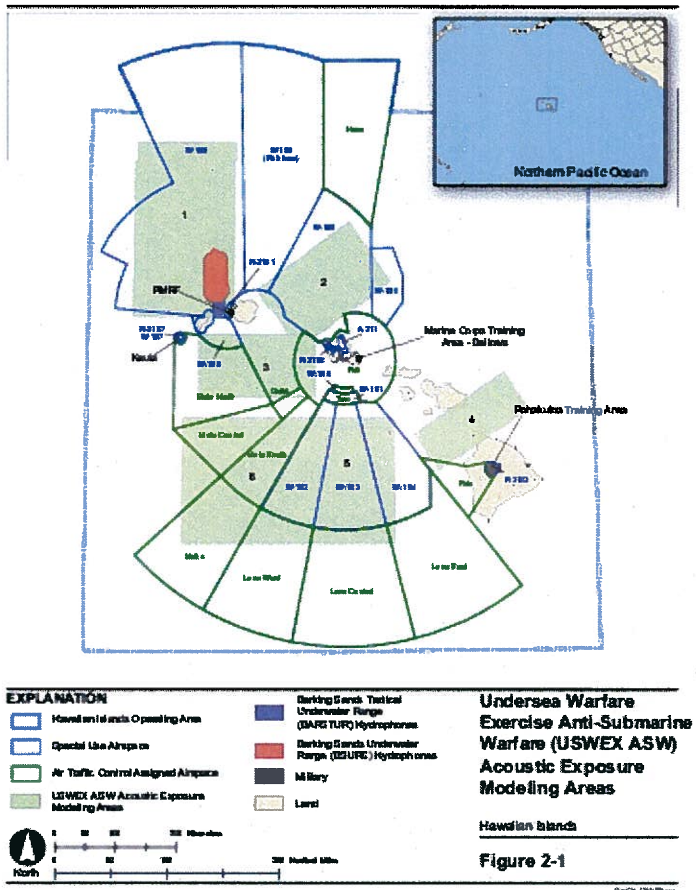


Figure A-1. Hawaii Range Complex and ocean areas associated with USWEX (figure from DoN 2007).

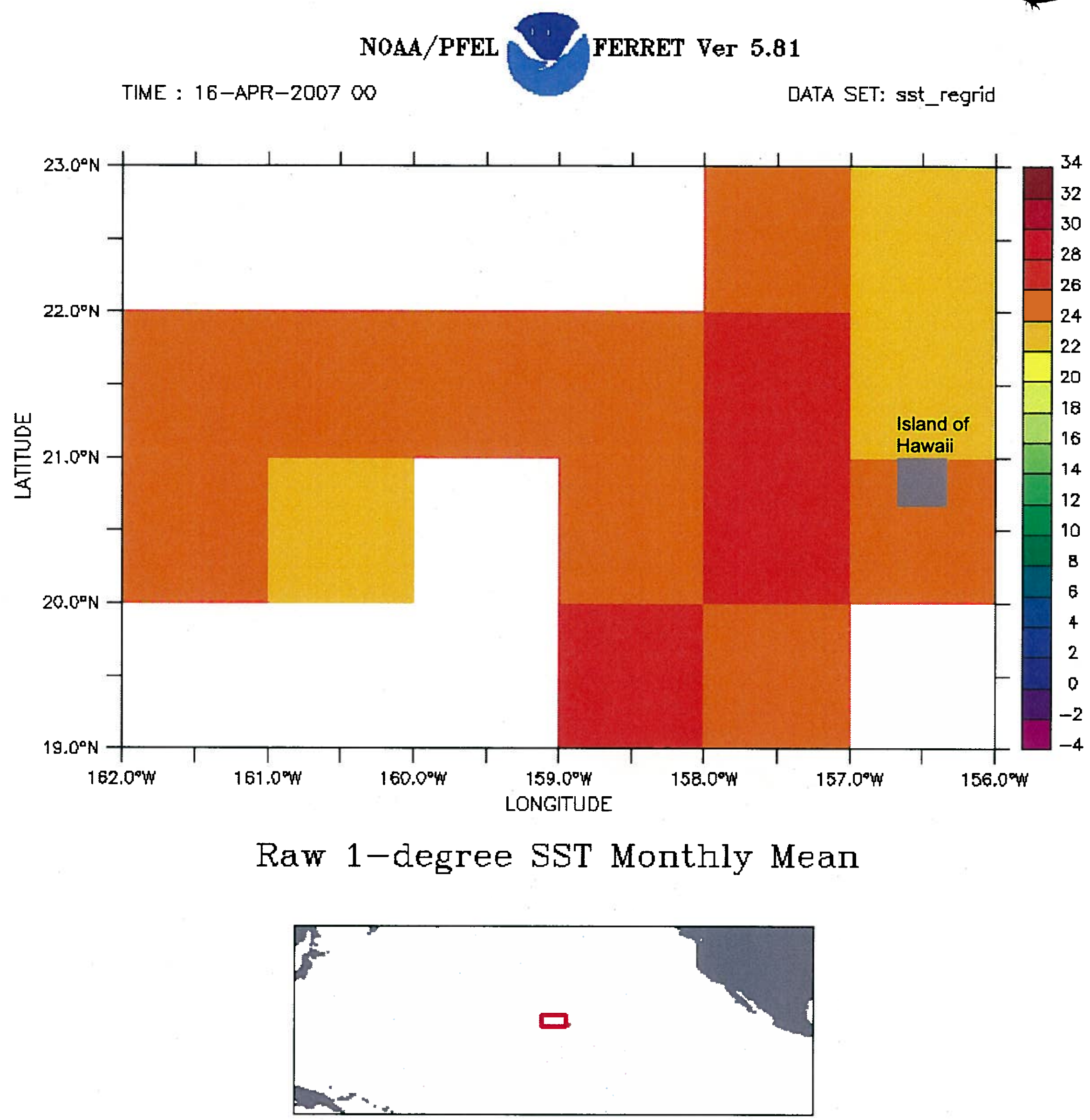


Figure A-2. Monthly mean Sea Surface Temperature (SST) by 1°-latitude increments near the main Hawaiian Island for period of 16 April 2007.
Source: Pacific Fisheries Environmental Laboratory Live Access Server
http://www.pfeg.noaa.gov

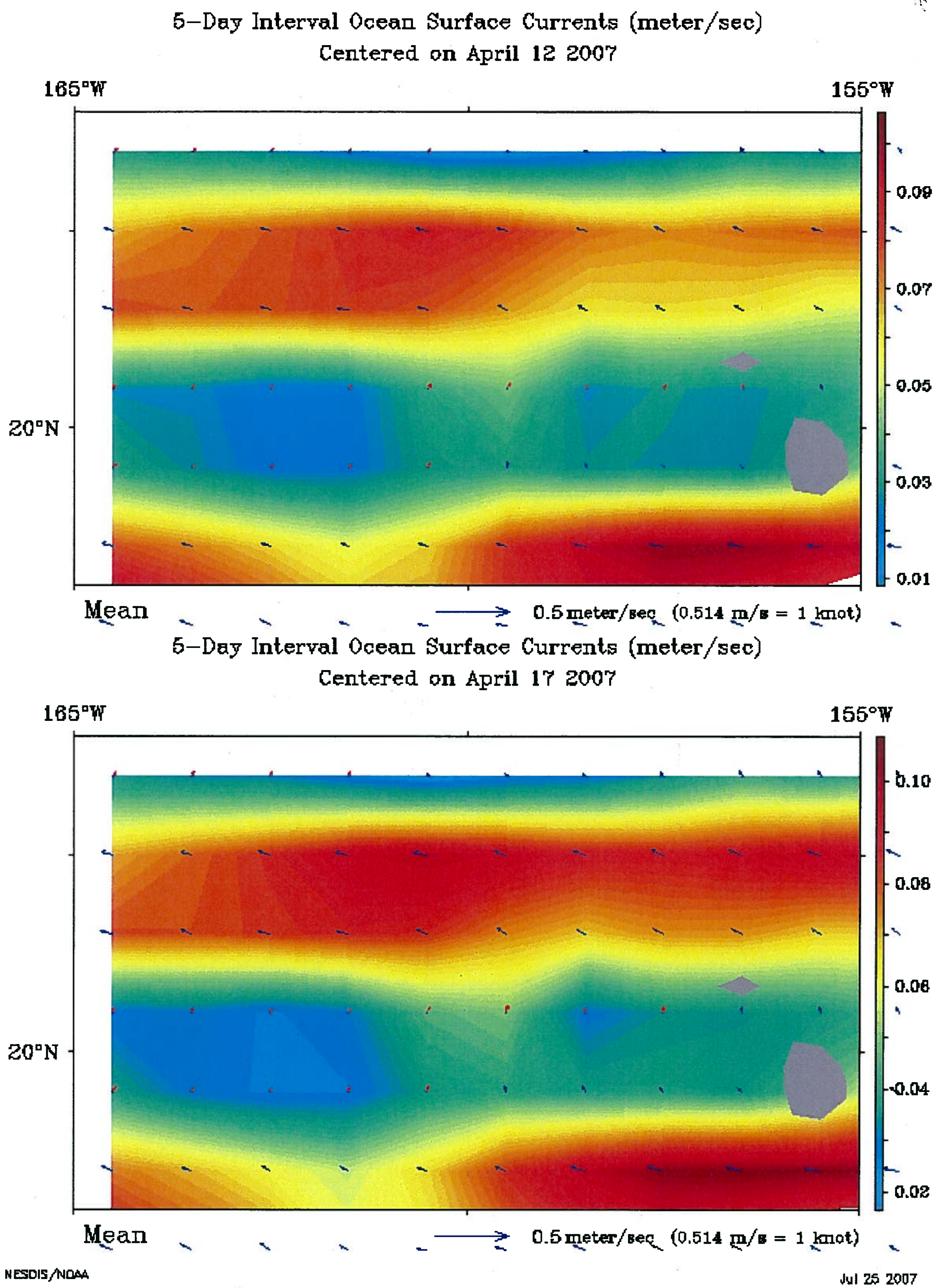


Figure A-4. Ocean surface currents (5-day interval) in vicinity of main Hawaiian Islands for 12 April 2007 (top) and 18 April 2007 (bottom).

APPENDIX B- NDE CONDITIONS AND LETTER OF INSTRUCTION

NDE

NDE mitigation measures include:

I. General Maritime Protective Measures: Personnel Training:

1. All lookouts onboard platforms involved in ASW training events will review the NMFS approved Marine Species Awareness Training (MSAT) material prior to use of mid-frequency active sonar.
2. All Commanding Officers, Executive Officers, and officers standing watch on the bridge will have reviewed the MSAT material prior to a training event employing the use of MFAS.
3. Navy lookouts will undertake extensive training in order to qualify as a watchstander in accordance with the Lookout Training Handbook (NAVEDTRA 12968-B).
4. Lookout training will include on-the-job instruction under the supervision of a qualified, experienced watchstander. Following successful completion of this supervised training period, Lookouts will complete the Personal Qualification Standard program, certifying that they have demonstrated the necessary skills (such as detection and reporting of partially submerged objects). This does not preclude personnel being trained as lookouts counted as those listed in previous measures so long as supervisors monitor their progress and performance.
5. Lookouts will be trained in the most effective means to ensure quick and effective communication within the command structure in order to facilitate implementation of protective measures if marine species are spotted.

II. General Maritime Protective Measures: Lookout and Watchstander Responsibilities:

6. On the bridge of surface ships, there will always be at least three people on watch whose duties include observing the water surface around the vessel.
7. In addition to the three personnel on watch noted previously, all surface ships participating in ASW exercises will have at all times during the exercise at least two additional personnel on watch as lookouts.
8. Personnel on lookout and officers on watch on the bridge will have at least one set of binoculars available for each person to aid in the detection of marine mammals.
9. On surface vessels equipped with MFAS, pedestal mounted "Big Eye" (20x110) binoculars will be present and in good working order to assist in the detection of marine mammals in the vicinity of the vessel.
10. Personnel on lookout will employ visual search procedures employing a scanning methodology in accordance with the Lookout Training Handbook (NAVEDTRA 12968-B).
11. After sunset and prior to sunrise, lookouts will employ Night Lookouts Techniques in accordance with the Lookout Training Handbook.
12. Personnel on lookout will be responsible for reporting all objects or anomalies sighted in the water (regardless of the distance from the vessel) to the Officer of the Deck, since any object or disturbance (e.g., trash, periscope, surface disturbance, discoloration) in the water may be indicative of a threat to the vessel and its crew or indicative of a marine species that may need to be avoided as warranted.

III. Operating Procedures

13. A Letter of Instruction, Mitigation Measures Message or Environmental Annex to the Operational Order will be issued prior to the exercise to further disseminate the personnel training requirement and general marine mammal protective measures.

14. Commanding Officers will make use of marine species detection cues and information to limit interaction with marine species to the maximum extent possible consistent with safety of the ship.

15. All personnel engaged in passive acoustic sonar operation (including aircraft, surface ships, or submarines) will monitor for marine mammal vocalizations and report the detection of any marine mammal to the appropriate watch station for dissemination and appropriate action.

16. During MFAS operations, personnel will utilize all available sensor and optical systems (such as Night Vision Goggles to aid in the detection of marine mammals.

17. Navy aircraft participating in exercises at sea will conduct and maintain, when operationally feasible and safe, surveillance for marine species of concern as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties.

18. Aircraft with deployed sonobuoys will use only the passive capability of sonobuoys when marine mammals are detected within 200 yards of the sonobuoy.

19. Marine mammal detections will be immediately reported to assigned Aircraft Control Unit for further dissemination to ships in the vicinity of the marine species as appropriate where it is reasonable to conclude that the course of the ship will likely result in a closing of the distance to the detected marine mammal.

20. Safety Zones - When marine mammals are detected by any means (aircraft, shipboard lookout, or acoustically) within 1,000 yards of the sonar dome (the bow), the ship or submarine will limit active transmission levels to at least 6 dB below normal operating levels.

    (i) Ships and submarines will continue to limit maximum transmission levels by this 6 dB factor until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.

    (ii) Should a marine mammal be detected within or closing to inside 500 yards of the sonar dome, active sonar transmissions will be limited to at least 10 dB below the equipment's normal operating level. Ships and submarines will continue to limit maximum ping levels by this 10 dB factor until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.

    (iii) Should the marine mammal be detected within or closing to inside 200 yards of the sonar dome, active sonar transmissions will cease. Sonar will not resume until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.

    (iv) Special conditions applicable for dolphins and porpoises only: If, after conducting an initial maneuver to avoid close quarters with dolphins or porpoises, the Officer of the Deck concludes that dolphins or porpoises are deliberately closing to ride the vessel's bow wave, no further mitigation actions are necessary while the dolphins or porpoises continue to exhibit bow wave riding behavior.

(v) If the need for power-down should arise as detailed in "Safety Zones" above, Navy shall follow the requirements as though they were operating at 235 dB - the normal operating level (i.e., the first power-down will be to 229 dB, regardless of at what level above 235 sonar was being operated).

21. Prior to start up or restart of active sonar, operators will check that the Safety Zone radius around the sound source is clear of marine mammals.

22. Sonar levels (generally) – The ship or submarine will operate sonar at the lowest practicable level, not to exceed 235 dB, except as required to meet tactical training objectives.

23. Helicopters shall observe/survey the vicinity of an ASW exercise for 10 minutes before the first deployment of active (dipping) sonar in the water.

24. Helicopters shall not dip their sonar within 200 yards of a marine mammal and shall cease pinging if a marine mammal closes within 200 yards after pinging has begun.

25. Submarine sonar operators will review detection indicators of close-aboard marine mammals prior to the commencement of ASW operations involving active mid-frequency sonar.

26. Increased vigilance during major ASW training exercises with tactical active sonar when critical conditions are present.

Based on lessons learned from strandings in Bahamas 2000, Madeiras 2000, Canaries 2002, and Spain 2006, beaked whales are of particular concern since they have been associated with MFAS operations. Navy should avoid planning major ASW training exercises with MFAS in areas where they will encounter conditions which, in their aggregate, may contribute to a marine mammal stranding event.

The conditions to be considered during exercise planning include:

(1) Areas of at least 1000 m depth near a shoreline where there is a rapid change in bathymetry on the order of 1000-6000 meters occurring across a relatively short horizontal distance (e.g., 5 nm).

(2) Cases for which multiple ships or submarines (≥ 3) operating MFAS in the same area over extended periods of time (≥ 6 hours) in close proximity (≤ 10NM apart).

(3) An area surrounded by land masses, separated by less than 35 nm and at least 10 nm in length, or an embayment, wherein operations involving multiple ships/subs (≥ 3) employing MFAS near land may produce sound directed toward the channel or embayment that may cut off the lines of egress for marine mammals.

(4) Although not as dominant a condition as bathymetric features, the historical presence of a significant surface duct (i.e. a mixed layer of constant water temperature extending from the sea surface to 100 or more feet).

If the major exercise must occur in an area where the above conditions exist in their aggregate, these conditions must be fully analyzed in environmental planning documentation. Navy will increase vigilance by undertaking the following additional protective measure:

A dedicated aircraft (Navy asset or contracted aircraft) will undertake reconnaissance of the embayment or channel ahead of the exercise participants to detect marine mammals that may be in the area exposed to active sonar. Where practical, advance survey should occur within about two hours prior to MFA sonar use, and periodic surveillance should continue for the duration of the exercise. Any unusual conditions (e.g., presence of sensitive species, groups of species milling out of habitat, any stranded animals) shall be reported to the Officer in Tactical Command (OTC), who should give consideration to delaying, suspending or altering the exercise.

All safety zone requirements described in Measure 20 apply.

The post-exercise report must include specific reference to any event conducted in areas where the above conditions exist, with exact location and time/duration of the event, and noting results of surveys conducted.

IV. Coordination and Reporting

27. Navy will coordinate with the local NMFS Stranding Coordinator for any unusual marine mammal behavior and any stranding, beached live/dead or floating marine mammals that may occur at any time during or within 24 hours after completion of mid-frequency active sonar use associated with ASW training activities.

28. Navy will submit a report to the OPR, NMFS, within 120 days of the completion of a Major Exercise. This report must contain a discussion of the nature of the effects, if observed, based on both modeled results of real-time events and sightings of marine mammals.

29. If a stranding occurs during an ASW exercise, NMFS and Navy will coordinate to determine if MFAS should be temporarily discontinued while the facts surrounding the stranding are collected.

LETTER OF INSTRUCTION FOR USWEX EXERCISES

SUBJ/MARINE MAMMAL AND ENDANGERED SPECIES LETTER OF INSTRUCTION (LOI) /IN SUPPORT OF xxxxx07-xx//

REF/A/DOC/16USC1361-1372/-/1972//

REF/B/DOC/16USC1531-1544/-/1973//

REF/C/INST/OPNAVINST 5090.1B CH-3/01NOV1994//
REF/D/MSG/SECNAV/181634ZNOV2005//

REF/E/LTR/DOD/23JAN2007//

NARR/REF A IS THE MARINE MAMMAL PROTECTION ACT. REF B IS THE ENDANGERED SPECIES ACT. REF C IS THE ENVIRONMENTAL AND NATURAL RESOURCES PROGRAM MANUAL. REF D IS ALNAV REQUIRING RETENTION OF ALL MID-FREQUENCY ACTIVE SONAR USE LOGS AND MATERIALS RELATED TO MID-FREQUENCY ACTIVE SONAR DUE TO ONGOING LITIGATION IN US FEDERAL COURT. REF E IS NATIONAL DEFENSE EXEMPTION FROM REQUIREMENTS OF THE MARINE MAMMAL PROTECTION ACT FOR CERTAIN DOD MID-FREQUENCY ACTIVE SONAR ACTIVITIES.//

GENTEXT/REMARKS/1. (U) DUE TO POSSIBLE PRESENCE OF PROTECTED MARINE SPECIES WITHIN xxxxx 07-xx OPERATING AREA AND POTENTIAL EFFECTS ON THESE SPECIES FROM USE OF MID-FREQUENCY ACTIVE SONAR, THE FOLLOWING GUIDANCE IS PROVIDED FOR EXERCISE CONDUCT AND REPORTING. THE MAJORITY OF THE GUIDANCE AND INFORMATION IN THIS MESSAGE IS COMPILED FROM EXISTING LAWS AND REGULATIONS FOUND IN REFS A-E.

1.A. (U) MARINE MAMMALS. REF A PROHIBITS HARASSING, CAPTURING, INJURING OR KILLING ANY MARINE MAMMAL (INCLUDING WHALES, DOLPHINS, SEALS AND PORPOISES) IN U.S. WATERS OR ON THE HIGH SEAS. THE TERM HARASS IS INTERPRETED BROADLY AND INCLUDES ACTS OF PURSUIT, TORMENT OR ANNOYANCE WHICH HAVE THE SIGNIFICANT POTENTIAL TO INJURE A MARINE MAMMAL IN THE WILD OR WHICH DISTURBS OR IS LIKELY TO DISTURB A MARINE MAMMAL IN THE WILD BY CAUSING DISRUPTION OF NATURAL BEHAVIORAL PATTERNS, INCLUDING, BUT NOT LIMITED TO, MIGRATION, SURFACING, NURSING, BREEDING, FEEDING OR SHELTERING, TO A POINT WHERE SUCH BEHAVIORAL PATTERNS ARE ABANDONED OR SIGNIFICANTLY ALTERED.

1.B. (U) ENDANGERED SPECIES. REF B PROHIBITS THE TAKING (HARASSING, HARMING, PURSUING, HUNTING, SHOOTING, WOUNDING, KILLING, TRAPPING, CAPTURING OR COLLECTING OR TO ATTEMPT TO DO SO) OF ANY FEDERALLY PROTECTED ENDANGERED OR THREATENED SPECIES UPON THE HIGH SEAS, WITHIN THE UNITED STATES OR IN THE TERRITORIAL SEA OF THE UNITED STATES.

2. (U) REF E SPECIFIES NEW REQUIREMENTS EFFECTIVE THROUGH 23 JANUARY 2009 WHEN USING MID FREQUENCY ACTIVE (1kHz-10kHz) SONAR (MFAS) (E.G. SHIP AND SUB HULL MOUNTED SONAR, HELO DIPPING SONAR AND DICASS SONOBUOYS) DURING MAJOR EXERCISES OR WHEN TRAINING OR CONDUCTING MAINTENANCE WITHIN ESTABLISHED OPERATING AREAS.

2.A. (U) THESE REQUIREMENTS APPLY:

2.A.1. (U) DURING XXXXX 07-0X TRAINING EXERCISES.

2.A.2. (U) TO THE USE OF MFAS SYSTEMS FOR THE PURPOSE OF SEARCHING FOR AND TRACKING OF SUBMARINES AND MINES.

2.B. (U) THESE REQUIREMENTS DO NOT APPLY TO:

2.B.1. (U) OPERATIONAL USE, INCLUDING FORCE PROTECTION AND SAFETY OF NAVIGATION.

2.B.2. (U) UNDERWATER COMMUNICATION SYSTEMS AND FATHOMETERS.

3. (U) A COORDINATED CUSFFC/CPF GUIDANCE MESSAGE WILL BE RELEASED IN THE NEAR FUTURE TO ENSURE COMPLIANCE WITH REF E REQUIREMENTS. IN THE INTERIM, FOR THE PURPOSES OF xxxxxx 07-xx, THE FOLLOWING ACTIONS ARE DIRECTED.

3.A. (U) PERSONNEL TRAINING.

3.A.1 (U) ALL SURFACE SHIP LOOKOUTS AND TOPSIDE WATCHSTANDERS (I.E., OODS, JOODS) AS WELL AS MPA AIRCREWS AND ASW/MIW HELICOPTER AIRCREWS MUST COMPLETE MARINE SPECIES AWARENESS TRAINING (MSAT) BY VIEWING THE U.S. NAVY MSAT DVD. MSAT TRAINING MUST BE REVIEWED PRIOR TO USE OF MFA SONAR. THESE PERSONNEL ARE NOT SOLELY MARINE MAMMAL OBSERVERS AND CAN PERFORM OTHER DUTIES (E.G., LOOKOUT, JOOD).

UNITS SHOULD ALREADY HAVE A COPY OF THE MSAT DVD, WHICH WAS DISTRIBUTED IN AUGUST 2006. IF NOT RECEIVED, CONTACT xxxxxx, TEL: xxx-xxx-xxxx, NIPRNET EMAIL: xxxxxxxxx TO OBTAIN A COPY. THE MSAT TRAINING CAN BE FOUND ON HTTPS:/MMRC.TECQUEST.NET/. IN ADDITION, MARINE MAMMAL TRAINING SLIDES ARE AVAILABLE ON THE xxxxxxx WEBSITE AT xxxxxxx.

3.B. (U) AVIATION UNITS.

3.B.1 (U) MPA AND OTHER AIRCRAFT PARTICIPATING IN ASW EVENTS AND FLYING LOW ENOUGH TO REASONABLY SPOT MARINE MAMMALS SHALL MONITOR FOR MARINE MAMMALS PRIOR TO AND DURING THE EVENT AND REPORT SIGHTINGS TO xxxxxx. IF SONAR IS SECURED (I.E. DICASS SONOBUOY) DUE TO PRESENCE OF MARINE MAMMALS WITHIN 200 YARDS, THEN REPORTING REQUIREMENT DESCRIBED IN PARA 4.A.2 APPLY.

3.C. (U) SONAR OPERATORS.

3.C.1 (U) SUB OPERATORS WILL CHECK FOR PASSIVE INDICATION OF MARINE MAMMALS CLOSE ABOARD PRIOR TO USE OF MFAS. CLOSE ABOARD IS DEFINED AS VISIBLE BEARING RATE ON DIMUS DISPLAY. SHIP OPERATORS WILL CHECK FOR PASSIVE INDICATION OF MARINE MAMMALS ON THE UNDERWATER TELEPHONE IOT ALERT LOOKOUTS PRIOR TO USE OF MFAS. IF MFAS SONAR IS SECURED DUE TO PRESENCE OF MARINE MAMMALS, THEN REPORTING REQUIREMENTS DESCRIBED IN PARA 4.A.2 APPLY AS APPLICABLE AND CAN BE DETERMINED.

3.D. (U) MFAS OPERATIONS.

3.D.1. (U) OPERATE MFAS AT LOWEST PRACTICABLE LEVEL, NOT TO EXCEED 235 DB, EXCEPT FOR OCCASIONAL SHORT PERIODS OF TIME TO MEET TACTICAL TRAINING OBJECTIVES. USE OF MFAS AT SOURCE LEVELS ABOVE 235 DB SHALL BE LOGGED AND REPORTED IAW PARA 4.

3.D.2. (U) PRIOR TO START-UP OR RESTART OF ACTIVE SONAR, OPERATORS WILL CHECK THAT THE BUFFER ZONE DESCRIBED BELOW IN PARA. 3.E IS CLEAR OF MARINE MAMMALS.

3.D.3. (U) HELICOPTERS SHALL OBSERVE/SURVEY THE VICINITY OF EACH ASW EVENT LOCATION FOR 10 MINS PRIOR TO COMMENCEMENT OF THE PROSECUTION (BEFORE DEPLOYING ACTIVE (DIPPING) SONAR). HELICOPTERS SHALL NOT DEPLOY THEIR SONAR WITHIN 200 YARDS OF A MARINE MAMMAL AND WILL SECURE ACTIVE TRANSMISSIONS IF A MARINE MAMMAL CLOSES WITHIN 200 YARDS. IF SONAR IS SECURED DUE TO PRESENCE OF MARINE MAMMALS WITHIN 200 YARDS, THEN REPORTING REQUIREMENT DESCRIBED IN PARA 4.A.2 APPLY.

3.E. (U) HULL MOUNTED MFAS BUFFER ZONES.

3.E.1. PRIOR TO START-UP OR RESTART OF MFAS, OPERATORS WILL CHECK THAT SAFETY ZONES IN PARA 3.E.2-4 ARE CLEAR OF MARINE MAMMALS.

3.E.2. (U) 1000 YARDS. WHEN MARINE MAMMALS ARE DETECTED BY ANY MEANS (AIRCRAFT, LOOKOUT, OR AURALLY) WITHIN 1000 YARDS OF THE SONAR DOME, THE SHIP OR SUBMARINE WILL LIMIT ACTIVE TRANSMISSION LEVELS TO AT LEAST 6 DB BELOW THE EQUIPMENT NORMAL OPERATING LEVEL FOR SECTOR SEARCH MODES. SHIPS AND SUBMARINES WILL CONTINUE TO LIMIT MAXIMUM PING LEVELS BY THIS 6 DB FACTOR UNTIL THE ANIMAL HAS BEEN SEEN TO LEAVE THE AREA, HAS NOT BEEN SEEN FOR 30 MINUTES, OR THE VESSEL HAS TRANSITED MORE THAN 2000 YARDS BEYOND THE LOCATION OF THE LAST SIGHTING.

3.E.3. (U) 500 YARDS. SHOULD THE MARINE MAMMAL BE DETECTED WITHIN OR CLOSING TO INSIDE 500 YARDS OF THE SONAR DOME, ACTIVE SONAR TRANSMISSIONS WILL BE LIMITED TO AT LEAST 10 DB BELOW THE EQUIPMENT'S NORMAL OPERATING LEVEL FOR SECTOR SEARCH MODES. SHIPS AND SUBMARINES WILL CONTINUE TO LIMIT MAXIMUM PING LEVELS BY THIS 10 DB FACTOR UNTIL THE ANIMAL HAS BEEN SEEN TO LEAVE THE AREA, HAS NOT BEEN SEEN FOR 30 MINUTES, OR THE VESSEL HAS TRANSITED MORE THAN 2000 YARDS BEYOND THE LOCATION OF THE LAST SIGHTING.

3.E.4. (U) 200 YARDS. SHOULD THE MARINE MAMMAL BE DETECTED WITHIN OR CLOSING TO INSIDE 200 YARDS OF THE SONAR DOME, ACTIVE SONAR TRANSMISSIONS WILL CEASE. WHEN A MARINE MAMMAL IS DETECTED CLOSING TO INSIDE APPROXIMATELY 200 YARDS OF THE SONAR DOME, THE PRINCIPAL RISK BECOMES POTENTIAL PHYSICAL INJURY FROM COLLISION. ACCORDINGLY, IF THE MARINE SPECIES CLOSES WITHIN 200 YARDS, SHIPS AND SUBMARINES SHALL MANEUVER TO AVOID COLLISION TO THE GREATEST EXTENT POSSIBLE, WITH SAFETY OF THE VESSEL BEING PARAMOUNT. ACTIVE SONAR WILL NOT RESUME UNTIL THE ANIMAL HAS BEEN SEEN TO LEAVE THE AREA, HAS NOT BEEN SEEN FOR 30 MINUTES, OR THE VESSEL HAS TRANSITED MORE THAN 2000 YARDS BEYOND THE LOCATION OF THE LAST SIGHTING.

3.E.5. (U) SPECIAL CONDITIONS APPLICABLE TO DOLPHINS AND PORPOISES

ONLY: IF, AFTER CONDUCTING AN INITIAL MANEUVER TO AVOID CLOSE QUARTERS WITH DOLPHINS OR PORPOISES, THE OFFICER OF THE DECK CONCLUDES THAT DOLPHINS OR PORPOISES ARE DELIBERATELY CLOSING TO RIDE THE VESSEL BOW WAVE, NO FURTHER MITIGATION ACTIONS ARE NECESSARY WHILE THE DOLPHINS OR PORPOISES CONTINUE TO EXHIBIT BOW WAVE RIDING BEHAVIOR.

3.F. (U) LOOKOUTS

3.F.1. (U) ON THE BRIDGE OF SURFACE SHIPS, THERE WILL BE AT LEAST THREE PEOPLE ON WATCH WHOSE DUTIES INCLUDE OBSERVING THE WATER SURFACE AROUND THE VESSEL. IN ADDITION TO THE THREE PERSONNEL ON WATCH, ALL SURFACE SHIPS PARTICIPATING IN ASW EXERCISES WILL HAVE AT ALL TIMES DURING THE EXERCISE AT LEAST TWO ADDITIONAL PERSONNEL ON WATCH AS LOOKOUTS. EACH PERSON ON WATCH WILL HAVE A SET OF BINOCULARS TO AID IN DETECTION OF MARINE MAMMALS. ON SURFACE VESSELS EQUIPPED WITH MFAS, PEDESTAL-MOUNTED BIG EYE (20 X 110) BINOCULARS WILL BE USED TO ASSIST IN DETECTION OF MARINE MAMMALS IN THE VICINITY OF THE VESSEL.

3.F.2. (U) DURING MFAS OPERATIONS, PERSONNEL WILL UTILIZE ALL AVAILABLE SENSOR AND OPTICAL SYSTEMS (SUCH AS NIGHT VISION GOGGLES) TO AID IN DETECTION OF MARINE MAMMALS.

3.F.3. (U) PERSONNEL ON LOOKOUT WILL EMPLOY VISUAL SEARCH PROCEDURES EMPLOYING A SCANNING METHODOLOGY IAW LOOKOUT TRAINING HANDBOOK (NAVEDTRA 12968-B).

3.F.4 (U) AFTER SUNSET AND PRIOR TO SUNRISE, LOOKOUTS WILL EMPLOY NIGHT LOOKOUT TECHNIQUES IN ACCORDANCE WITH LOOKOUT TRAINING HANDBOOK.

4. (U) REPORTS AND DATA COLLECTION.

4.A. (U) ALL UNITS WILL CONTINUE TO SEND SPORTS MESSAGES.

4.A.1. (U) ALL UNITS EMPLOYING MFAS ARE REQUIRED TO SUBMIT AN AFTER ACTION REPORT (AAR), CLASSIFIED AS CONFIDENTIAL. XXXX STRIKE GROUP COMMANDER SHALL CONSOLIDATE ALL REPORTS INTO A FINAL REPORT AND FORWARD TO xxxxxxx, INFO CHAIN OF COMMAND, WITHIN 10 DAYS OF COMPLETION OF THE EXERCISE. THIS TIMELINE IS REQUIRED DUE TO REGULATORY REQUIREMENTS THAT NAVY VERBALLY REPORT MARINE MAMMAL SIGHTING INFORMATION AND IMPACTS TO MFAS OPS TO NATIONAL MARINE FISHERIES SERVICES WITHIN 15 BUSINESS DAYS FROM EXERCISE COMPLETION.

4.A.2. (U) THE FINAL REPORT (SUBJ: MFA MARINE MAMMAL REPORT FOR EXERCISE xxxxx 07-xx) WILL BE COMPRISED OF TWO PARTS. PART ONE WILL REPORT ALL MARINE MAMMALS SIGHTED DURING THE EXERCISE, AND WILL INCLUDE THE DATA LISTED BELOW:

A.DTG OF INITIAL SIGHTING.

B. UNIT AND POSIT (UNIT NAME AND LAT/LONG). NOTE, IF REPORT IS FOR ASW HELO ASSIGNED TO VESSEL, THIS MUST BE REPORTED SEPARATELY FROM SURFACE SHIP REPORTS.

C. DESCRIPTION OF ANIMAL BY SPECIES IF KNOWN, OTHERWISE SPECIFY: DOLPHIN, SM WHALE (SMALL WHALE), LG WHALE (LARGE WHALE), SEAL/SEALION.

D. ESTIMATED NUMBER OF ANIMALS.

E. TRUE BEARING AND RANGE FROM UNIT.

F. ANIMALS BEHAVIOR AT TIME OF SIGHTING: RESTING, TRAVELING (NOTE DIRECTION IN RELATION TO SHIP COURSE), BOW-RIDING, FEEDING/ERRATIC, MILLING (I.E., STAYING IN SAME AREA), JUMPING CLEAR OUT OF WATER, FLIPPER/TAIL SLAPPING, OTHER, OR UNKNOWN).

G. ACTION TAKEN: NONE, ALTER COURSE TO AVOID, MFAS POWER DOWN, MFAS SECURED (I.E. CEASE ACTIVE SONAR TRANSMISSION).

ONLY IN CASES WHERE MFAS IS POWERED DOWN OR SECURED, THE FOLLOWING ADDITIONAL INFORMATION IS REQUIRED IN ORDER TO FORWARD POST-EXERCISE IMPACT ASSESSMENT TO CPF AND NATIONAL MARINE FISHERIES SERVICE:

H. UNIT COURSE AND SPD.

I. ANIMAL COURSE AND EST SPD.

J. ACTION TIMELINE: LENGTH OF TIME MFAS POWERED DOWN, OR SECURED.

K. ACTION IMPACT (I.E. TACTICAL DEGRADATION ASSESSMENT): NONE, SLIGHT, MODERATE, SEVERE.

- REPEAT PARAS. A-L AS NECESSARY TO REPORT ADDITIONAL SIGHTINGS.

SIGHTING SHALL BE IN FORMAT:

A. DTG/ B. UNIT-POSIT/C. DESCRIPT/ D. # ANIMAL/ E. BRNG-RNG/ F. BEHAV/ G. ACTION TAKEN/H. UNIT CRS-SPD/ I. ANIMAL CRS/ J. ACTION TIME/

PART TWO OF THE REPORT WILL PROVIDE A COMMANDER'S ASSESSMENT OF EFFECTIVENESS OF THE MITIGATION MEASURES IMPLEMENTED IN REF E, MAKE RECOMMENDATIONS TO IMPROVE THESE MEASURES, AND REPORT ANY IMPACT TO TRAINING FIDELITY CAUSED BY THESE MEASURES (E.G., SONAR POWER REDUCTION

CAUSED BY MARINE MAMMAL ENTERING BUFFER ZONE). IT IS PARTICULARLY IMPORTANT TO CAPTURE THE IMPACT THAT THESE MEASURES MAY HAVE ON OPERATIONS AND TRAINING.

5. (U) ENSURE WATCHSTANDERS ARE BRIEFED ON THE POSSIBLE PRESENCE OF MARINE MAMMALS AND THAT ALL SIGHTINGS ARE REPORTED TO THE BRIDGE. NOTE, WHALES OFTEN TRAVEL IN GROUPS AND A SIGHTING INDICATES THE POSSIBILITY OF OTHER WHALES IN THE VICINITY.

5.A. (U) UPON SIGHTING A WHALE, ADJUST COURSE AND SPEED AS NECESSARY TO MAINTAIN A SAFE DISTANCE CONSISTENT WITH PRUDENT SEAMANSHIP.

5.B. (U) SIGHTINGS OF ALL WHALES SHALL BE PASSED VIA CHAIN OF COMMAND TO THE CFMCC BATTLE WATCH CAPTAIN IOT ALERT OTHER SHIPS IN THE AREA TO THE POSSIBILITY OF THE WHALES' PRESENCE.

5.C. (U) IN THE EVENT OF A WHALE COLLISION. IF POSSIBLE, TAKE VIDEO AND/OR PHOTOGRAPHS OF THE STRICKEN WHALE.

5.C.1. (U) ATTEMPT TO IDENTIFY DISTINGUISHING CHARACTERISTICS OF THE WHALE INVOLVED. THE "WHALE WHEEL," A DEVICE THAT LISTS VARIOUS SPECIES OF WHALES AND THEIR IDENTIFYING FEATURES, CAN ASSIST IN THIS REGARD.

5.D. (U) REPORTING REQUIREMENTS FOR A WHALE COLLISION. CHAPTER

19-11.3.2 OF REF C PROVIDES GUIDANCE CONCERNING WHALE STRIKES.

5.D.1. (U) IN THE EVENT OF A COLLISION WITH A WHALE OR ON SIGHTING A MARINE MAMMAL FLOATING CARCASS DURING xxxxxx 07-0X, AN APPROPRIATE UNIT SITREP/OPREP MESSAGE MUST CONTAIN THE FOLLOWING ADDRESSEES AND INFORMATION:

A. DATE, TIME AND LOCATION.

B. VESSEL'S COURSE AND SPEED.

C. OPERATIONS BEING CONDUCTED BY THE VESSEL.

D. WEATHER CONDITIONS, VISIBILITY AND SEA STATE.

E. DESCRIBE THE ANIMAL IN AS MUCH DETAIL AS POSSIBLE; E.G., LENGTH, COLOR, CONDITION OF BODY, OTHER DISTINGUISHING FEATURES. DO NOT SPECULATE.

F. NARRATIVE OF INCIDENT, INCLUDING RELATIVE POSITION AND MOVEMENTS OF SHIP AND WHALE.

G. INDICATE IF PICTURES/VIDEOS WERE TAKEN FROM FLIGHT DECK CAMERAS OR OTHER INSTALLED OR PORTABLE CAMERAS.

5.D.2. (U) A VOICE REPORT (VIA ISIC) TO xxxxxx IS ALSO REQUIRED. IF VOICE COMMUNICATIONS ARE NOT AVAILABLE, MAKE REPORT VIA CHAT.

6. (U) ALL UNITS THAT EMPLOY MFAS SHALL ENSURE THEY FULLY UNDERSTAND AND IMPLEMENT THE MITIGATION AND REPORTING REQUIREMENTS PROMULGATED IN THIS MESSAGE.

6.A. (U) COMMANDING OFFICERS SHALL THOROUGHLY REVIEW THIS GUIDANCE WITH KEY PERSONNEL AND WATCHSTANDERS TO ENSURE FULL SITUATIONAL AWARENESS AND COMPLIANCE.

7. (U) REMINDER, NOTHING IN THIS MESSAGE RESTRICTS THE AUTHORITY OF A COMMANDING OFFICER FROM TAKING SUCH MEASURES DEEMED NECESSARY FOR OPERATIONAL FORCE PROTECTION AND SAFETY OF NAVIGATION PURPOSES.//

APPENDIX C- REPORT OF NAVY CONTRACTOR BIOLOGIST EMBARKED ABOARD CVN DURING USWEX 07-02 10-11 APRIL

10 April 2007

10:45 (all times are given as local Hawaii Standard Time): Arrived USS Nimitz aboard C2 Grayhound. Circled for about 20 minutes near the Nimitz prior to landing. No marine mammals or sea turtles observed from the aircraft.

10:45-12:00: Orientation, meeting with the Captain

12:00-17:30: Tour of the watch stander positions with the ANAV officer.

Observations were conducted from the flag bridge using Zeiss 10x42 binoculars. Several big eye binoculars (25x150) were available for use and two watchstander look outs were at approximately the same location with one on the port side and one on the starboard side of the ship. Two watchstander look outs were also stationed on the stern of the ship. Aircraft operations were conducted through most of this time, mostly consisted of F/A 18 launch and recovery with some helicopter operations.

Weather conditions were clear with approximately 12 miles (19 km visibility, swell was about eight feet (2.5 meters), wind was 17.5-22.4 knots (7.1-9.2 meter/second) for a Beaufort sea state of 4-5. Air temperature was 74.5-79.2°F (23.6-26.2°C).

No marine mammals or sea turtles were observed by myself or the watchstander look outs, including the watchstander look outs on the stern of the ship.

17:30-19:50: Observations made from the navigation bridge and "Vultures Row" until darkness. No marine mammals observed by myself and the watchstanders.

At times, the ships conducting ASW activities and surrounding the carrier, were visible in the distance. The ship several hundred miles south-west of Oahu but due to security the exact location was not given.

11 April 2007

07:00-10:15: Observations from the same location as 10 April, the flag bridge using Zeiss 10x42 binoculars. Several big eye binoculars (25x150) were available for use and two watchstanders were at approximately the same location with one on the port side and one on the starboard side of the ship.

Weather conditions were clear with approximately 12 miles (19 km) visibility, swell was about eight feet (2.5 meters), wind was 17.5-25.1 knots (7.1-10.2 meters/second) for a Beaufort sea state of 4-6. Air temperature was 74.5-79.2°F (23.6-26.2°C).

No marine mammals observed by myself and the watchstander look outs.

At times, the ships conducting ASW activities and surrounding the carrier, were visible in the distance. Air operations were being conducted through most of the observation period.

11:15: Departed the USS Nimitz and returned to Hickam Air Force Base.

APPENDIX D- ACOUSTIC SNAPSHOP ANALYSIS FOR MARINE MAMMALS USING PACIFIC MISSILE RANGE FACILITY BOTTOM MOUNTED HYDROPHONES FOR APRIL 2007 AND APRIL 2006

Initial acoustic snapshot analysis results for marine mammal species using Pacific Missile Range Facility bottom mounted hydrophones for April 2007 and April 2006.

Summary:
There is a growing body of research on the use of passive acoustics, both alone and in conjunction with traditional visual surveys, for density estimation for cetaceans. The bulk of this research has been focused on towed hydrophones which are increasingly being used in conjunction with visual line transect surveys. Fixed, bottom mounted hydrophones, such as those at US Navy instrumented ranges; pose different challenges in estimating densities using the accepted distance sampling methodology. A new research effort, described in the next section, is underway to develop sound statistical methods for estimating cetacean densities using bottom mounted hydrophones, which will utilize acoustic hydrophone data from two US Navy instrumented ranges in case studies. Bottom mounted Pacific Missile Range Facility (PMRF) hydrophones operate from as low as 60 Hz to up to 48 kHz and are well suited for detection of multiple species, genera, or families of cetaceans with relatively well understood characteristic acoustic signatures (e.g. humpback whales via their song, Minke whales via their 'boing' sound, and sperm and beaked whales via their echolocation clicks). Other cetacean species are present at PMRF (Baird et. al. 2006, Barlow 2006, Barlow et. al. 2004), but are more difficult to identify solely by acoustic techniques (i.e. various species of *Delphinidae*, *Kogia* and other Mysticeti).

Currently, limited information is available relative to marine mammal species present on, or near, the PMRF underwater ranges at the various times of the year. The best estimates for marine mammal species present in the area come from aerial surveys (Mobley 2005), however minke whales were never sighted during the aerial surveys, while they have been acoustically detected and localized. Acoustic data has been collected from PMRF hydrophones for selected days every year since 2002 and continues today at the rate of two days of acoustic recordings every month. Prior reporting (Tiemann et. al. 2006) dealt with sperm whale localization and automatic (not species specific) detection results. To gain more insight into species present in the area, manual aural and spectrographic analysis of limited amounts of acoustic data has been conducted. Manual analysis is employed, as current automated techniques do not provide reliable species identification. This analysis is being conducted by a US Navy trained acoustic intelligence specialist with over 42 years of experience in sonar analysis. Various automation tools are currently being utilized (e.g. spectrograph display and localization software) and additional efforts are underway to obtain time difference of arrival data via an automated system output (Moretti et. al. 2002). These efforts are being pursued to make the manual analysis more efficient, and eventually allow fully automated analysis for large amounts of data when sufficient marine mammal species classifiers are available.

The current analysis are termed 'acoustic snapshots' with the goal of determining the numbers of, and when possible locations of, readily acoustically identifiable marine mammal species in an area using two dozen or more bottom mounted hydrophones. Snapshot refers to a short duration time window (Buckland et. al. 2001), such that movement of observed species over the duration of the time window is not a major factor. The current manual analysis process is very laborious in nature and requires significant effort to generate results for each 10-minute acoustic snapshot. The short 10 minute snapshot temporal window is known to under-sample the foraging dive patterns of both Sperm and Beaked whales, however if these signals are detected it does confirm presence of a species in the area. While results from a handful of these 'acoustic snapshots' do provide some new information, such as numbers of different species present in the snapshot, the results are insufficient to understand normal variations in species present. Larger sample sizes are needed to gain some level of understanding of what constitutes normal variations (within a day, over days, weeks, months, seasons and years).

Results for three of these ten-minute 'acoustic snapshots' for multiple range hydrophones (either 24 or 31 phones) are presented. A single snapshot is provided for 15 April 2007 and two snapshots (taken 90 minutes apart) for 18 April 2006, all occurring late in the afternoon. Keeping in mind the very limited sample size and uncertainty in what constitutes normal variations, initial results of the analysis show three species, and a member of the Ziphiidae family, of marine mammals detected on 15 April 2007 (humpback, minke, sperm and beaked whales) and for 18 April 2006 the three species were detected (humpback, minke, and sperm whales). Localized humpback whale individuals are shown overlaid on charts for each of the three acoustic snapshots, along with localization of minke whales and a local area indicated for a single beaked whale for the 15 April 2007 snapshot. Tabular data of vocalizations logged for each species are also presented. Description of the data and analysis methods are provided, along with discussion of the results.

Introduction:

The Pacific Missile Range Facility (PMRF), located off of the western coast of Kauai, Hawaii, is one of the US Navy's instrumented test ranges. Part of PMRF's mission is to utilize passive acoustics to detect, localize and track objects of interest. PMRF's organic assets of bottom mounted underwater hydrophones allow the tracking of objects of interest in real time to support US Navy Pacific Fleet training requirements.

Twenty-four broad bandwidth PMRF hydrophones have been recorded as part of an 2002 – 2006 acoustic monitoring program under Office of Naval Research sponsorship. This ONR effort was concentrated during the winter months of February and March, which coincides with the peak of the humpback whales wintering in the area (Au et. al. 2000). In addition, the ONR effort acoustic data was specifically recorded simultaneously with aerial surveys conducted by Dr. J. Mobley (Mobley 2005) as part of separate ONR effort (North Pacific Acoustic Laboratory). Several days of acoustic recordings are available for a typical year with a limited effort at obtaining out of season acoustic data in the year 2002. The ONR funded acoustic recordings were comprised of the 24 broadband hydrophones available on the range sampled at 44.1 kHz (preserving approximately 20 kHz of bandwidth). At the conclusion of the ONR effort, Pacific Fleet sponsorship continued the acoustic data collection effort at a rate of up to two recordings per month for 2006 and 2007. In 2006 the recordings were sampled at a higher rate (96 kHz) in order to obtain bandwidths of up to 48 kHz on six of the twenty-four hydrophones specifically in response to new information regarding beaked whale echolocation signal frequencies (Johnson et. al. 2004). The twenty-four broadband hydrophones have spacing which vary from no closer than two nautical miles apart to over nine nautical miles separation. This spacing is significantly more than hydrophones available at the US Navy Atlantic Undersea Test and Evaluation Center (AUTEC) instrumented range in the Bahamas. In March 2007 an additional 7 high pass filtered (8 kHz) hydrophones, with response up to 48 kHz, were added in an attempt to improve the opportunity of detecting beaked whale echolocation signals. These additional seven hydrophones were concentrated (spacing less than 2 nautical miles) in areas around broadband hydrophones on which beaked whales were previously detected and fit with known beaked whale habitat information (MacLeod et. al. 2006, McSweeney et. al. 2007).

Each day of recorded data consists of from 4 hours per day (early year efforts to coincide with aerial over flights) to over 22 hours of continuous monitoring (post 2006) of acoustic data. This data is streamed in real-time to hard disk drives for later duplication, archiving and analysis.

Many marine mammal species are known to reside in the areas around the Hawaiian Islands (Barlow 2004 and 2006). These include species which are recognizable from their known acoustic signatures: Humpback whale song (Payne and McVay 1971); Minke 'boing' sound (Rankin and Barlow 2005); Sperm whale echolocation clicks (Watkins and Schevill 1977); and two species of beaked whale echolocation clicks (Johnson et. al. 2004 and 2006). Other species of marine mammals are more difficult to acoustically identify (e.g. the various dolphins and other small toothed whales) which are also known to occupy the waters around the Hawaiian Islands.

The accepted method for determining marine mammal species densities is based upon distance sampling (Buckland 2001), and typically utilized in visual surveys from surface ships and aircraft. This method is based upon the statistics of the probability of detection function being a known, monotonically decreasing function of distance (horizontal distance off of a track line for line transects or radial distances for point transects). There is no standardized, accepted statistical method current existent for acoustically determining the relative, or possibly even absolute, abundance from multiple fixed, bottom mounted acoustic sensors. However, in 2007 a new start National Oceanographic Partnership Program titled "Density Estimation for Cetaceans from Passive Acoustic Fixed Sensors (DECAF)" is being lead by Dr. Len Thomas, of the University of St. Andrews. The DECAF efforts include co-principal investigators from US Academia (Tyack and Mellinger) and the US Navy (Moretti and Martin), with well-known advisors (Buckland, Barlow and Zimmer). The three-year DECAF effort will be addressing many open issues in dealing with the statistics of marine mammal density estimation using fixed acoustic sensors.

This analysis utilizes what are termed 'acoustic snapshots' for initial investigation. This entails analysis of relatively short period of time, 10 minutes in this case, to obtain a 'snapshot' picture of marine mammal species present as sensed by the hydrophones. Snapshot methods are used for density estimates of terrestrial animals (Buckland et. al. 2001) and 5 to 10 minute windows typically employed. By using the snapshot method, one is able to minimize complications such as accounting for animal movement over observation time. The disadvantage of snapshots are that it only provides indication of the situation at that point in time, and requires many snapshot results in order to say anything about changes over time (short, mid and long term time periods).

The 10-minute 'acoustic snapshot' analysis window is known to temporally under sample sperm, and beaked whale deep foraging dive cycles. These whales utilize echolocation to find prey, such as squid, during these dives. Recent tagging data (Johnson et. al. 2004 and 2006) has shown two species of beaked whales producing clicks during each deep foraging dive, and very low (essentially no) click production when either on the surface, or while performing shallow dives. Deep dive cycle times average 121 minutes for the Cuvier's beaked whale (*Ziphius cavirostris*) with 58 min average dive time off the coast of Italy, and 139 minutes for the Blainville's beaked whale (*Mesoplodon densirostris*) with 47 minute average dive time in the Canary Islands (Tyack et. al. 2006). Tagged data (no acoustics) for these two species measured in the Hawaiian Island waters agrees favorably with these dive times, with average deep dive times of 68 min for Cuvier's beaked whales and 48 minutes for Blainville's beaked whales (Baird et. al. 2006). Sperm whale deep dives times have been reported from 30 to 50 minutes with a nine-minute inter dive interval (Watwood et. al. 2006). Thus, one can easily miss detection of these species (false dismissal) with a single, or small sample size of, 10-minute snapshot(s). The 10-minute analysis window is currently driven by: the preference to utilize snapshot type analysis until better methods are developed; the high cost of manual analysis; and the desire to get insight into multiple days of acoustic analysis results. As automation efforts improve and the analysis effort continues, additional 10-minute acoustic snapshots will become available which should allow some statistical inferences. Increasing the analysis window to longer periods of time, to better sample the foraging dives would introduce new issues such as animal movement over time.

Humpback whales (one of the more extensively studied whale species) are known to winter in the Hawaiian waters but little is known of many of the other species found in the general area. Beaked whales have been studied off of the big island (Hawaii) using time/depth tags (no acoustics) and are known to have deep dive cycles similar to those reported elsewhere (Baird et. al. 2006). A photographic analysis of ten years of beaked whale data off of the island of Hawaii (McSweeney et. al. 2007) suggests resident populations of beaked whales in the area. The Minke whale is difficult to visually observe and typically found far offshore which accounts for limited knowledge of this species. A visual transect survey utilizing passive acoustics (Rankin et. al. 2005) recently coupled the long known, but unidentified source of, the 'boing' sound to the Minke whales. Subsequent surveys have detected many more Minke acoustically well offshore of the Hawaiian Islands (Rankin et. al. 2007). However, the purpose of the Minke 'boing' sound is still unknown, as is much about the Minke whale in general. Data from the PMRF analysis effort also show that the Minke whales are commonly acoustically detected in the deeper, more offshore, hydrophones via the 'boing' sound during the winter months. Humpbacks detected using the PMRF hydrophones are more commonly found more near shore in shallower waters. Sperm whales appear to be detected throughout the year, while beaked whales have, to date, only been detected a few times.

Methods:

A personal computer based data acquisition system was developed late in 2001 to record up to 32 channels of analog data at sample rates up to 1 MHz. A COTS (Commercial Off-The-Shelf) A/D (Analog to Digital) board samples all 32 channels simultaneously to 16 bits of resolution and data is streamed to hard drive for storage. Recordings conducted from 2002 through 2005 were sampled at 44,100 Hz, while subsequent recordings are sampled at 96,000 Hz. The increase in sample rate was done primarily in effort to better detect Beaked whale echolocation signals, which are now known to have primary energy peaks over 20 kHz (Johnson 2004).

Recordings through 2006 consisted of the twenty-four broadband hydrophones and an IRIG B time signal. Sixteen of the twenty-four broadband hydrophones provide a bandwidth of between approximately 60 Hz up to 20 kHz, while the remaining six hydrophones have an upper receive limit of 48 kHz. In 2007, an additional seven high pass filtered (8 kHz) hydrophones with an upper receive limit of 48 kHz were added to the data collection effort to better sample for beaked whale echolocation signals.

The acoustic analysis is conducted by an individual with 20 years of service in the US Navy, including duty as a qualified Acoustic Intelligence (ACINT) Specialist certified by the Office of Naval Intelligence (Navy enlisted classification 0416 of which very few individuals have been qualified). The ACINT Specialist worked an additional 22 years after retiring from active duty, as a civilian contractor conducting research for various Navy advanced acoustic programs. The analyst is extremely qualified in infrasonic, sonic, ultrasonic acoustic signals analysis and has had to deal with bioacoustics throughout his career.

Acoustic data is continuously recorded (no gaps) to hard disk drive, along with IRIG time code, for a single recording session conducted in a day. For data management purposes, the data are organized as sequential 10-minute files (to keep each file size under 4Gbytes). Each 10-minute file contains either 24 hydrophones of data (2002 through 2006), or 31 hydrophones of data beginning in 2007. Several computerized tools are utilized in the analysis of the recorded acoustic data. Commercial off the shelf software for audio and spectrogram review of single channels of data (Adobe Audition), and custom developed software for review of 32 channels of data at once. A spreadsheet log is created for each 10-minute file containing the following for each hydrophone; Time of the detected event, Species (or unidentified), Type of sound, Spectral Characteristics, Temporal Characteristics and Comments. The analyst then reviews adjacent hydrophones searching for that identical sound. If the sound is present on at least two additional hydrophones a TDA (time-difference-of-arrival) is then calculated for that sound. The TDAs, to the nearest millisecond resolution, are inserted into a MATLAB based tool to compute the location of the individual which generated the sound. The MATLAB routine was provided by the Naval Undersea Warfare Center, Newport, Rhode Island and includes precise hydrophones locations in x, y, and z, and utilizes a historic sound velocity profile. Source depth is modeled to be at 30 feet for the localization (reasonable for humpbacks, but significantly off for deep diving echo locators such as sperm whales and beaked whales). The longitude, latitude and PMRF Range Coordinates from the localizations are also inserted into the spreadsheet.

For each hydrophone, the analyst must review the same single channel of acoustic data at least three times in order to fully search the spectral data between 60 Hz and up to 48 kHz. Current practice requires nominally 80 hours of analyst effort for each 10 minutes of data for 24 or 31-hydrophone format (including documentation into the spreadsheet). As additional automated techniques become available and are utilized, it will continue to make this process more efficient. Adding to the complexity of this analysis is the fact that when humpbacks are most prevalent, such as in Feb, March and April months, the background noise is essentially the humpback whales song (Au et. al. 2000) being over 15 dB louder than other times of the year. This makes the process of locating the identical sounds of individual humpback whales on adjacent phones difficult, and could also mask other sounds in the same frequency bands.

Results:

Acoustic snapshot results are provided for two separate days, 15 April 2007 and 18 April 2006. The acoustic snapshot for 15 April 2007 was centered at 16:58 Hawaiian standard time (16:53-17:03). Two separate acoustic snapshots were analyzed on 18 April 2006 – one centered at 17:04 and one 90 minutes later at 18:34. This analysis is providing insight into the marine mammal situation that exists on, or near, the PMRF underwater ranges for these three separate points in time during these days. This few of samples are insufficient to statistically say anything relative to normal variations, which may exist over the course of a day, let alone weeks, months or years.

Results are presented in two formats. First, nautical charts of the area are utilized to overlay locations of the five categories (humpback, minke, sperm, beaked whales and unidentified mammals) of localized individuals. Beaked whale detections are also plotted on the charts, as this species is expected to have a detection distance on the order of 4 km from bottom-mounted hydrophones (Tyack et. al. 2006). Sperm whale detections are not plotted in a similar manner due to the fact that the Sperm whale could be tens of miles distant from the hydrophone they are detected on due to the differences in click frequency content and source levels. Sperm whale localizations are obtained occasionally, but none were obtained on these three days. Due to the fact that some marine mammal presence in areas is related to bottom depth and topography, nautical charts with bathymetry contours (soundings in fathoms with lines drawn for each 100 fathom depth increase) are utilized for plotting results. Secondly, tabular data is included to summarize the number of sounds logged in each category and number of localizations obtained for each snapshot analyzed. The tabular data captures detection of species of marine mammals not localized, and therefore not plotted on the charts.

Figure 1 provides a section of a nautical chart for the area overlaid with dots (color coded to species) indicating the location of separate individuals of three marine mammal species (humpback, minke and beaked whales) localized on 15 April 2007 at 16:58 (+/- 5minutes). The scale of the chart covers nearly 55 minutes of longitude and over a degree of latitude. Given this scale the dots indicating marine mammal locations represent an area well over one half minute in diameter (over one half of a nautical mile). There are a total of 19 separate individual humpbacks localized, the majority near the western most tip of Kauai, one localized north of Niihau and one localized south west of Kauai. Eight minke whales are localized scattered throughout the northern (BSURE) range, including localizations off range one to the north and one to the west (plotted at the edges of **Figure 1**). The single beaked whale shown actually represents un-localized data and is plotted near the single hydrophone it was detected on. The nature of the beaked whale sounds compares favorably with *Mesoplodon densirostris* (Johnson 2004, Zimmer 2005). The single localized unidentified marine mammal sound logged consisted of 82 Hz pulses of 227 milliseconds in duration. It is uncertain if these sounds are from a Humpback whale, or some other baleen whale (analysis continues). The only other cetacean species positively identified from this acoustic snapshot are sperm whales. A single detection of sperm whale echolocation clicks was logged, however as no localizations were obtained it was not plotted on figure 1 due to the large area of uncertainty associated with the sperm whale click detection (up to tens of nautical miles).

Figure 2 provides plotted results for localized humpback whale individuals on 18 April 2006 at 17:04 (+/- 5 minutes). A total of 27 humpback whales were localized for this snapshot, and no other localizations obtained. A majority of the humpback whales are within the 100-fathom contour off of the western end of Kauai. The whales are located in a few groups, with some localization posits within a few hundred yards of other individuals. Two clusters of humpbacks are observed between the 300 and 400-fathom contours (this area of the figures does show finer resolution contour lines). Three separate individuals are also seen in the area between Kauai and Niihau. Localizations, which lie within tens of yards of others, are treated as a single individual (potential negative bias on counts). Localizations, which are hundreds of yards apart and based upon the characteristics of the sounds, are treated as unique individuals. Given the scale of the figure the localization dots can significantly overlap.

Figure 3 also provides plotted results of localized humpback whale individuals localized on 18 April 2006, at 18:34 HST (+/- 5 minutes), or 90 minutes later than results shown in figure 2. While the number of humpback whales agrees favorably to that at 17:04 (26 individuals compared to 27 earlier) their spatial distribution is observed to be different. It is indeterminate from this analysis if some whales stopped vocalizing and other whales initiated vocalizations, or if the spatial distribution represents movement of the same whales, or a combination of these factors. The 18:34 distribution is such that a dozen localizations are within the 100-fathom bathymetry contour. The other 14 localizations lie between the 200 fathom and 1000 fathom contour lines, with an apparent clustering similar to the observation of clusters in figures 1 and 2. One unidentified localization is also plotted in the under 100 fathom waters offshore of Kauai in the vicinity of 4 localized humpback whales (suspect to be a tail fluke, or pectoral fin, slap).

Figures 1 through 3 provide previously unavailable information (numbers and locations of specific marine mammal species on, or near, the PMRF underwater test range). However, keep in mind this is for three snapshots in time and normal variations over time are currently unknown due to the limited sample size. It is also important to understand that these figures do not convey the fact that both minke and sperm whales were detected in all three acoustic snapshots, based upon the presence of their characteristic sounds (only Minke were localized and in only one snapshot). The presence of all species is summarized in tabular format in **Table 1**.

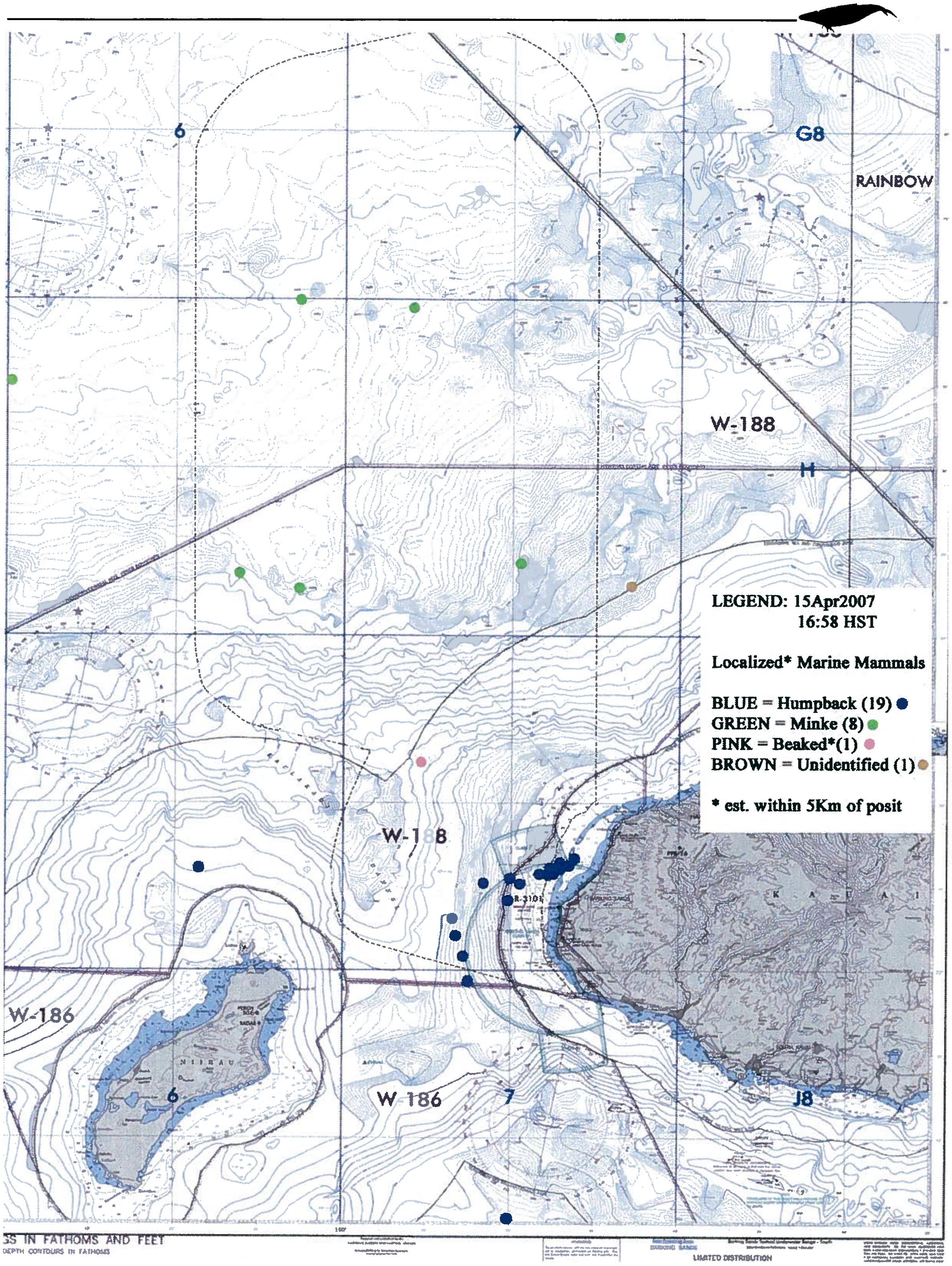


Figure 1 – Localizations using acoustic data on 15 April 2007 between 16:53 and 17:03 Hawaiian standard time using PMRF hydrophones. *The beaked whale posit was not localized, it is plotted as due to it's acoustics and it is certainly within 5 km of the hydrophone it was detected on.*

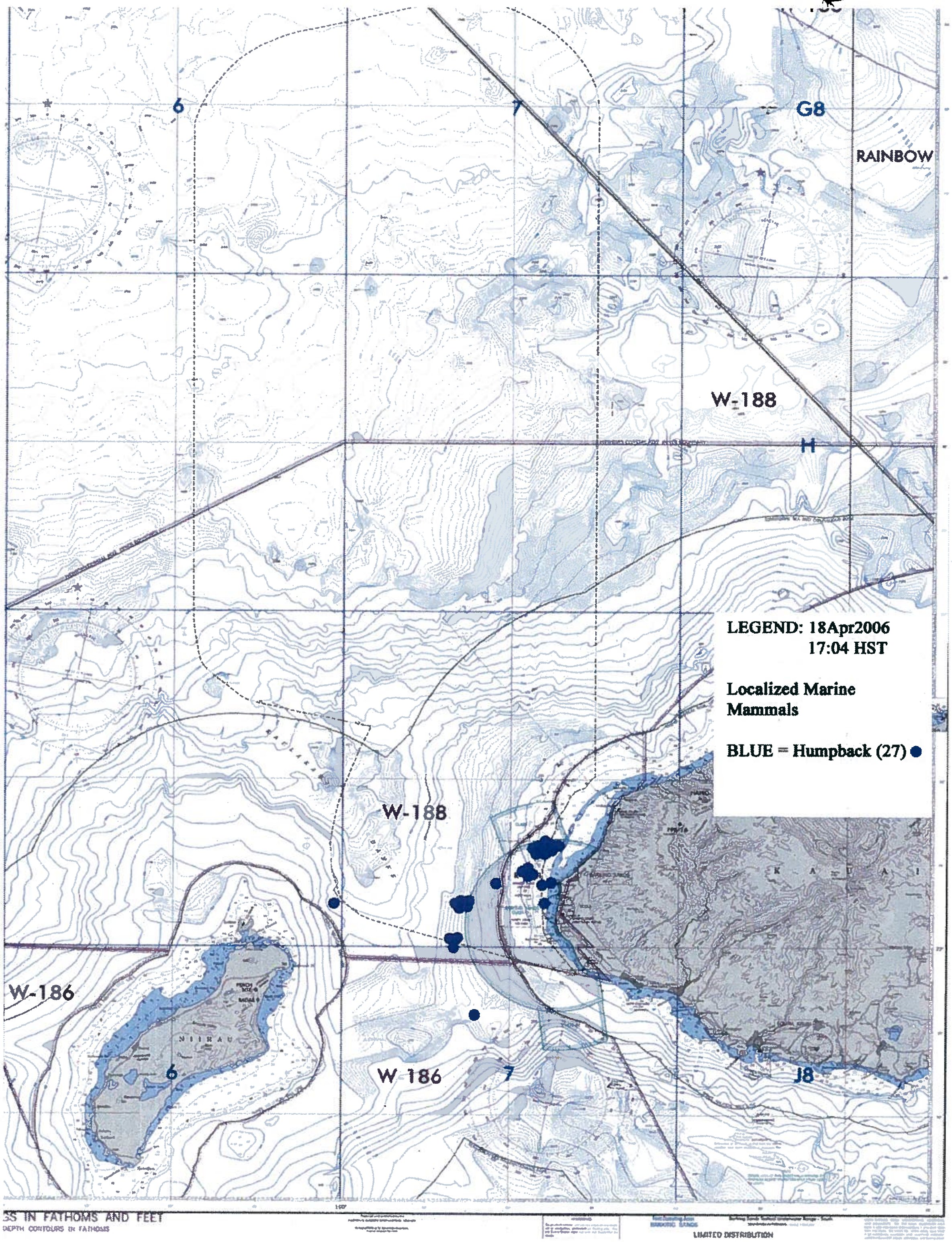


Figure 2 – Localizations using acoustic data on 18 April 2006 between 16:59 and 17:09 Hawaiian standard time using PMRF hydrophones. *Not plotted due to lack of localization are both sperm whales and minke whale characteristic sounds.*

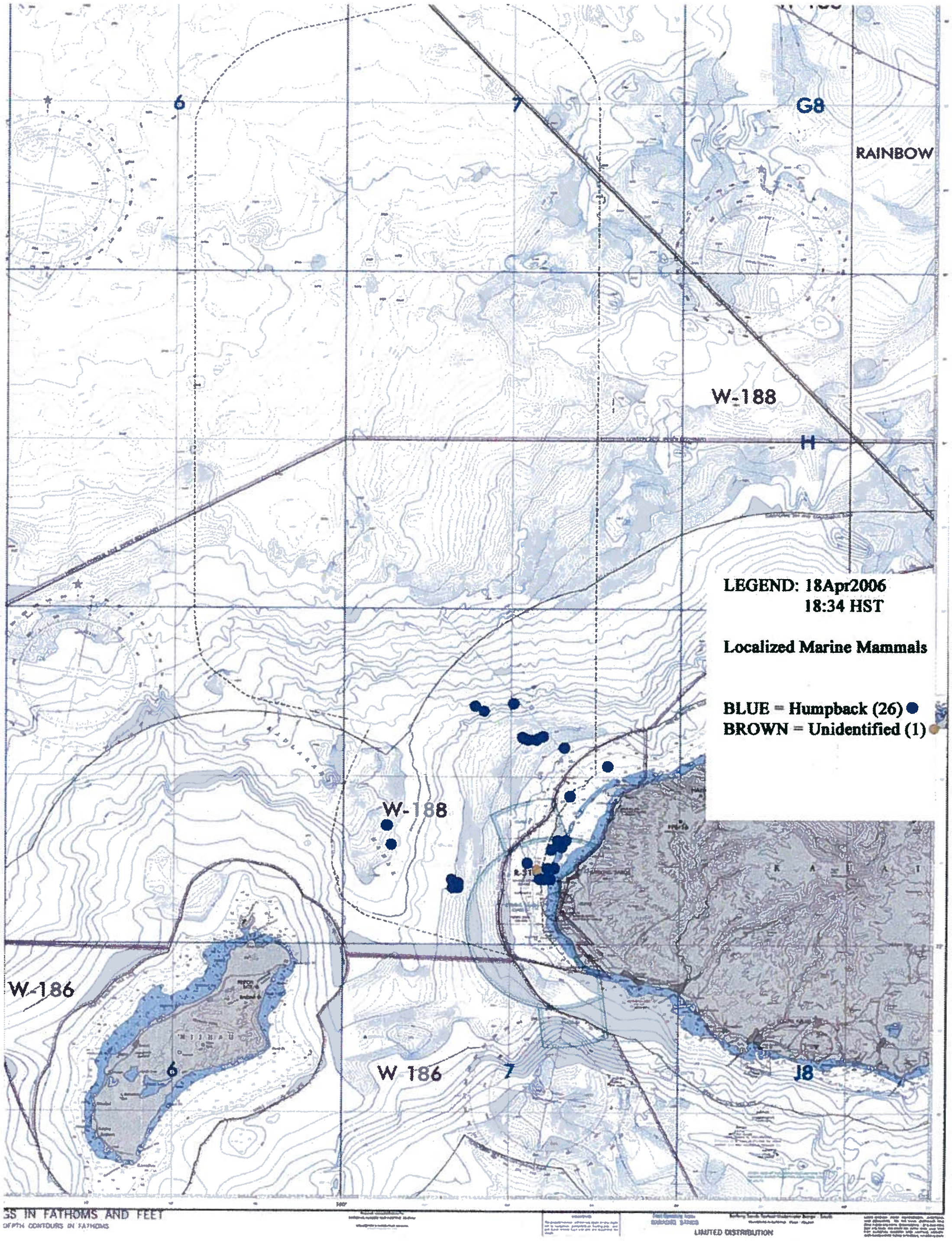


Figure 3 – Localizations using acoustic data on 18 April 2006 between 18:29 and 18:39 Hawaiian standard time using PMRF hydrophones. *Not plotted due to lack of localization are both sperm whales and minke whale characteristic sounds. The unidentified single point is believed to be a tail slap.*

Table 1 provides a summary for each of the three acoustic snapshots reported herin. The analysis results are summarized into five categories (humpback, minke, sperm, beaked whale and unidentified mammal). The numbers of sounds attributed to each category (acoustic cues) logged in the analysis are provided along with the number of individuals localized. The sperm and beaked echolocation clicks are logged as sequences, vice individual clicks. The minke 'boing' call count for the two time periods on 18 April 2006 show an increase of 79% at 18:34 vice 17:04. Insufficient information is currently available to base any hypothesis for this increase in 90 minutes, as the normal variations are unknown. The 102 minke 'boing' sounds logged, with eight individuals localized, on 15 April 2007 is higher than observed for either snapshot on 18 April 2006. While snapshot sample sizes are to small to understand normal variations, the analyst did comment that the 15 April 2007 boing sounds were not only more prevalent, but also of higher signal to noise ratio. This is logical in that the 15 April 2007 Minke boing situation would allow more localizations, indicating the animals are closer to the range, while the lower signal to noise ratio situation in April 2006 are consistent with the animals located off range at greater distances (lower signal to noise ratios and unable to localize individuals).

The humpback results in table 1 show the largest numbers of calls, 107, were logged on 18 April 2006 @ 18:34, while the largest number of individuals localized, 27, occurred on 18 April 2006 @ 17:04. The April 2007 call count (72) and localized individuals (19) are lower than numbers for April 2006. Humpbacks are known to begin their outward migration back to feeding grounds around this timeframe, which should be taken into consideration. It must be reiterated that these three snapshots in time are insufficient to allow any level of understanding of the normal variations. More results are needed to understand short term, mid-term and long term variations.

Table 1 – Summary results for two separate days (15 April 2007 @ 16:53-17:03, 18 April 2006 @ 16:59-17:09 and @ 18:29-18:39). Five categories provided (minke, humpback, sperm, beaked whale and un-identified mammals). Call counts logged (acoustic cues) and number of localized individuals shown. Future efforts may better identify some of the currently unidentified species sounds logged.

Sound source / Date & time	15-Apr-2007 16:53-17:03	18-Apr-2006 18:29-18:39	18-Apr-2006 16:59-17:09
Minke Whale (*Balaenoptera acutorostrata*)			
Call count logged in 10 minute period	102	29	16
Number of localized individuals	8	-	-
Humpback Whale (*Megaptera novaeangliae*)			
Call count logged in 10 minute period	72	107	87
Number of localized individuals	19	26	27
Sperm Whale (*Physeter macrocephalus*)			
Call count logged in 10 minute period	1	10	2
Beaked Whale (*Ziphiidae*)			
Call count logged in 10 minute period	2	-	-
Number of individuals located to specific area	1	-	-
Un-identified Mammal			
Call count logged in 10 minute period	30	23	22
Number of localized individuals	1	1	-

Table 1 also shows the very small detection numbers for both sperm whale and beaked whale echolocation click sequences. The limited amount of temporal data analyzed (three 10 minute snapshots) only provides confirmation of the presence of these species at these times due to their signals being detected. Sperm whales have been localized on other days data analysis, indicating that with enough snapshots the under sampling of their acoustic echolocation dive cycles might not be an issue. Beaked whale detections have not allowed localization to date due to the large separation of the originally sampled 24 broad band hydrophones. Some localization might be possible with the seven additional hydrophones added early in 2007 as they are spaced in two tighter clusters.

Discussion and Conclusions:

These results provide initial insight into the marine mammal presence on, or near, PMRF for three short, ten-minute, time periods on two separate days, 15 April 2007 and 18 April 2006. This sample size is extremely small and insufficient to make any generalized statements relative to numbers, and species, of marine mammals in the area on these days (only for these three snapshot points of time). Two periods of analysis were conducted on 18 April 2006 separated by only 90 minutes in time. Differences in spatial distributions are observed, but due to lack of understanding normal variations, no definitive conclusions can be made at this time.

This analysis is a start at providing new information into marine mammal density by species over time, for the waters near the Pacific Missile Range Facility. The limited amount of data analyzed does not currently lend itself to statistical analysis for making focused statements about marine mammal presence in the area. The data does inform us of the presence of three species on, or near, the range for both days with quantitative numbers for calls logged and individuals localized. The acoustic detection of a single beaked whale (suspect to be Blainville's) on 15 April 2007 is also significant, confirming presence of beaked whales in the area.

Additional data collections, and analysis, are required to gain more understanding of the normal variations of marine mammal presence at PMRF. Current methods can be utilized to analyze more acoustic snapshots. Future efforts are both underway, and planned for exploring more efficient ways to analyze data (develop and employ more automation). A close relationship also exists with the 2007 NOPP DECAF new start effort, which is focused on developing the statistical methodology for analysis of this type of data (PMRF humpback whale data is planned to serve as a test case for the DECAF effort).

It cannot be stressed enough that there are a number of caveats, which must be kept in mind when utilizing acoustic techniques such as this, for monitoring for marine mammal species. These caveats include:

1) Passive acoustic detection is only able to detect marine mammals which are emitting acoustic sound, and in the case of the PMRF hydrophones, specifically between 60 Hz and either 20 kHz or 48 kHz (hydrophone and PMRF system limitations) with sufficient acoustic energy to be detected.
2) Some species, such as the humpback whales, which are prevalent in this area between the months of Jan and April, typically only have males making sounds (mating song).
3) Each species has different frequency regions for various sounds, different acoustic beam patterns for emitted sounds, and different source levels. Thus, some sounds can be detected on many hydrophones (e.g. sperm whale slow clicks), while other sounds (such as beaked whale echolocation signals) may only be detected on a single hydrophone.
4) Movement, over time, confounds the technical issues in dealing with estimating species densities using distance sampling methodology. In part, this is one reason 'acoustic snapshots' are utilized in this analysis.
5) Species presence in the area may be seasonal (such as humpbacks), transitory, or they could be resident to the area.

Appendix C References:

Au, W.W.L., Mobley, J., Burgess, W.C., Lammers, M.O. and Nachtigall, P.E. (2000). "Seasonal and diurnal trends of chorusing Humpback whales wintering in waters off western Maui", Marine Mammal Science, 16(3):530-544 (July 2000).

Baird, R.W., Webster, D.L., McSweeney, D.J., Ligon, A.D., Schorr, G.S. and Barlow, J. (2006). "Diving behaviour of Cuvier's (*Ziphius cavirostris*) and Blainville's (*Mesoplodon densirostris*) beaked whales in Hawai'I", Can. J. Zool. 84:1120-1128.

Baird, R.W., Schorr, G.S., Webster, D.L., McSweeney, D.J. and Mahaffy, S.D. (2006). "Studies of beaked whale diving behavior and Odontocete stock structure in Hawaii in March/April 2006", Cascadia Research Collective, Olympia, WA.: 31pp.

Barlow, J. (2006). "Cetacean Abundance in Hawaiian Waters Estimated from a Summer/Fall Survey in 2002". Marine Mammal Science. 22:446-464.

Barlow, J., Rankin, S., Zele, E., and Appler, J. (2004). "Marine mammal data collected during the Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS) conducted aboard the NOAA ships McArthur and David Starr Jordan, July - December 2002". NOAA Technical Memorandum NMFS-SWFSC-362:1-39.

Buckland, S. T., D. R. Anderson, K. P. Burnham, J. L. Laake, D. L. Borchers and L. Thomas. (2001). Introduction to distance sampling: Estimating abundance of biological populations. Oxford University Press, Oxford, UK.

Johnson, M., Madsen, P.T., Zimmer, W.M.X., Auguila deSoto, N., and Tyack, P.L., (2004). "Beaked whales echolocate on prey". Proc. R.Soc. London, Ser. B271, S383-S386.

Johnson, M., Madsen, P.T., Zimmer, W.M.X., Auguila deSoto, N., and Tyack, P.L., (2006). "Foraging Blainville's beaked whales (*Mesoplodon densirostris*) produce distinct click types matched to different phases of echolocation". J. Exp. Biol. 209, 5038-5050.

MacLeod, C.D. and D'Amico, A.D. (2006) "A review of beaked whale behaviour and ecology in relation to assessing the mitigating impacts of anthropogenic noise." Journal of Cetacean Management and Research 7(3): 211-221.

McSweeney, D.J., Baird, R.W. and Mahaffy, S.D. (2007). "Site fidelity, associates and movements of Cuviers's (*Ziphius cavirostris*) and Blainville's (*Mesoplodon densirostris*) beaked whales off the island of Hawaii". Marine Mammal Science, 23(3): 666-687.

Mobley, Jr., J.R. (2005). "Assessing responses of humpback whales to North Pacific Acoustic Laboratory (NPAL) transmissions: Results of 2001-2003 aerial surveys north of Kauai." J. Acoust. Soc. Am. 117: 1666-1673.

Moretti, D., Ward, J., Jarvis, S., DiMarzio N., Morrissey, R., and Kennedy, S. (2002). "Open ocean marine mammal monitoring using widely spaced bottom mounted hydrophones". U.S. Navy Journal of Underwater Acoustics 52(3), 651-668.

Payne, R.S. and McVay, S., "Songs of Humpback Whales". Science 173:585-597.

Rankin, S. and Barlow, J. (2005). "Source of the North Pacific 'boing' sound attributed to minke whales", J. Acoust. Soc. Am. 118(5), November 2005.

Rankin, S. and Barlow, J. (2007). "Sounds recorded in the presence of Blainville's beaked whales, *Mesoplodon densirostris*, near Hawaii". J. Acoust. Soc. Am. 122(1), 42-45.

Tiemann, C., Martin, S. and Mobley, Jr., J.R. (2006). "Aerial and acoustic marine mammal detection and localization on Navy ranges". IEEE Journal of Oceanic Engineering,31:107-119.

Tyack, P.L., Johnson, M.P., Zimmer, W.M.X., Auguila deSoto, N., and Madsen, P.T. (2006), "Acoustic behavior of beaked whales, with implications for acoustic monitoring", 2006 IEEE.

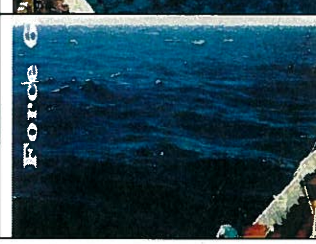
Tyack, P.L., Johnson, M.P., Auguila deSoto, N., Sturlese, A., and Madsen, P.T. (2006), "Extreme diving of beaked whales", J. Exp. Biol. 209, 4238-4253.

Watkins, W.A. and Schevill, W.E. (1977), "Sperm whale codas", J. Acoust. Soc. Am. 62(6), December 1977.

Watwood, S. L., et. al. (2006). WHOI web report, http://www.whoi.edu/hpb/viewPage.do?id=2691&cl=1.

Zimmer, W.M.X., Johnson, M.P., Madsen, P.T., and Tyack, P.L., (2005) "Echolocation clicks of free-ranging Cuvier's beaked whales (*Ziphius cavirostris*)", J. Acoust. Soc. Am. 117(6), 3919-3927.

APPENDIX E- U.S. NAVY AND BEAUFORT SEA STATE CODES

Sea State	Beaufort Number	Wind Speed (kts)	Wind description	Beaufort Number Picture
0	0	< 1	Calm	
0	1	1-3	Light air	
1	2	4-6	Light breeze	
2	3	7-10	Gentle breeze	
3	4	11-16	Moderate breeze	
4	5	17-21	Fresh breeze	
5	6	22-27	Strong breeze	

Sea State	Beaufort Number	Wind Speed (kts)	Wind description	Beaufort Number Picture
6	7	28-33	Near gale	
7	8	34-40	Gale	
8	9	41-47	Strong gale	
9	10	48-55	Storm	
9	11	56-63	Violent storm	
9	12	>64	Hurricane	

* Photographs from National Weather Service Observing Handbook No. 1, US National Weather Service.

Prepared for
National Marine Fisheries Service
Office of Protected Resources

Prepared by
Department of the Navy

In accordance with
Biological Opinion 26 September 2007
National Defense Exemption 23 January 2007

U.S. Navy HAWAII UNDERSEA WARFARE EXERCISE After Action Report 13-15 November 2007

SUBMITTED TO
Office of Protected Resources, National Marine Fisheries Service

10 March 2008

Abstract

This report presents an analysis of the effectiveness of the mitigation and monitoring measures as required under the Biological Opinion on the U.S. Navy's Proposed Undersea Warfare Training Exercises In the Hawaii Range Complex From January 2007 to January 2009

AND

Discussion of the nature of effects on marine mammals, if observed, under the National Defense Exemption (NDE) from the requirements of the Marine Mammal Protection Act (MMPA) for Mid-Frequency Active Sonar

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EXECUTIVE SUMMARY

- This report summarizes marine mammal sightings and provides an assessment of mitigation effectiveness for the U.S. Navy's Undersea Warfare Training Exercise conducted by the USS Tarawa Expeditionary Strike Group (ESG) from 13 to 15 November 2007 within the offshore waters of Hawaii.

- Over 216 hours of visual survey were conducted by U.S. Navy lookouts assigned to3 Mid-Frequency Active Sonar (MFAS)-equipped surface ships over the entire course of the exercise (3 days x 24 hrs/day = 72 hrs x 3 ships = 216). Of the 216 hours, 77 hours of MFAS time was reported from all sources including hull-mounted AN/SQS-53C, helicopter dipping sonar, and DICASS sonobuoys. These hours are reflective of MFAS use by various units including three MFAS-equipped ships geographically dispersed throughout the entire exercise area, and are not an indication of consecutive and continuous use.

- There were no sightings of marine mammals within NDE safety zones by U.S. Navy ships during USWEX 08-1. Sea states were high during some of the exercise period which may have limited sightings of smaller marine mammals.

- A dedicated USWEX monitoring program, separate from, but complimentary to the exercise participants, was used during USWEX 08-1. Two civilian (i.e. non-Navy) science teams conducted aerial surveys and a shipboard survey for marine mammals before, during, and after USWEX 08-1.

  - A pre- and post-exercise aerial survey was conducted by a civilian science crew from 11 to 12 November and 15 to 17 November. Over 17 hours of survey time was conducted, involving a linear distance of approximately 1,701 nm, as well as a circumnavigation survey around Oahu and Molokai. There were 26 marine mammal sightings, but only six of these sightings were at sea with the remaining 20 observed nearshore. There were no observations of any stranded or floating dead marine mammals.

  - A civilian science based research vessel conducted a visual monitoring survey for cetaceans and sea turtles from 11 to 17 November 2007. A total of 66 hours and approximately 492 nm were visually surveyed over seven days with a total of eight cetacean groups sighted. One whale was followed and observed during a time when it could have been exposed to MFAS transmission, but no unusual behavior was observed by the trained marine mammal observers on the research vessel.

- Based on the lack of marine mammal sightings from U.S. Navy lookouts during USWEX 08-1, the U.S. Navy's USWEX Environmental Assessment/Overseas Environmental Assessment (EA/OEA) acoustic modeling appears to very conservatively over-estimate the amount of potential acoustic exposures, including those to ESA-listed species. The degree of variability and over-predictive nature inherent within the acoustic impact model is based largely on the significant natural variability within the science of at-sea marine mammal surveys used to derive density estimates, and other model limitations.

INTRODUCTION

This report is presented to fulfill U.S. Navy and U.S. Pacific Fleet written reporting requirements conditional to the 23 January 2007 National Defense Exemption (NDE) from the Requirements of the Marine Mammal Protection Act (MMPA) for Certain DoD Military Readiness Activities that Employ Mid-Frequency Active Sonar (MFAS) or Improved Extended Echo Ranging Sonobuoys. In addition, these NDE mitigation measures are included in the 26 September 2007 *Biological Opinion (BO) on the U.S. Navy's Proposed Undersea Warfare Training Exercises (USWEX) In The Hawaii Range Complex From January 2007 to January 2009*. This report fulfills both the NDE and BO reporting requirements.

Language from USWEX BO (NMFS 2007).

5. Within 120 calendar days of completing an exercise the U.S. Navy shall provide the Chief, Endangered Species Division, Office of Protected Resources (with a copy provided to the Assistant Regional Administrator for Protected Resources in NMFS' Pacific Islands Regional Office) with a written report that shall include the following information:

a. Summary of the exercise (starting and ending date of the exercise, number of ships and aircraft involved in the exercise, and number of hours passive and active sonar was used during the exercise)

b. Specific mitigation measures Navy implemented during exercise;

c. Number of fin whales, humpback whales, sei whales, and sperm whales that (i) **had been detected within 500, 1,000 and 2,000 yards of a sonar dome during an active transmission** and (ii) the Navy's estimate of number of fin whales, humpback whales, sei whales, and sperm whales that had been exposed to MFAS at received levels equal to or greater than 173 dB and 190 dB.

d. Reports of the activity or activities that fin whales, humpback whales, sei whales, and sperm whales had been observed to exhibit while they were within 500, 1,000, and 2,000 yards of a sonar dome that was actively transmitting during exercise. (for example, a report should not identify "playing"; it should identify the behavior that allowed the observer to conclude the animal was "playing")

Reports of observations shall identify date, time, and visual conditions associated (for example, if the observation is produced from a helicopter, the report should identify the speed, vector, and altitude of the airship; the sea state, and lighting conditions) with observation; and how long an observer or set of observers maintained visual contact with a marine mammal;

e. an evaluation of the effectiveness of those mitigation measures at avoiding exposing endangered whales to ship traffic and endangered whales to mid-frequency active sonar. This evaluation shall identify the specific observations that support any conclusion U.S. Navy reaches about the effectiveness of the mitigation measures;

f. an evaluation of monitoring program's ability to detect marine mammals that occur within 500, 1,000, and 2,000 yards of a sonar dome, during an active transmission (or close enough to an exercise to be exposed to mid-frequency sonar at received levels equal to or greater than 173 dB re 1 $\mu Pa^2 \cdot s$) with specific evidence that supports any conclusions U.S. Navy reaches.

REPORT ORGANIZATION

This report contains only unclassified material, provides information and analysis for Undersea Warfare Exercise (USWEX) 08-1, and is submitted in fulfillment of NDE and BO written requirements.

The report is organized by section in the following order:

Section 1- Exercise Summary: provides exercise specific information including the starting and ending dates, the number of ships and aircraft participating, and the number of hours of MFAS used from all emitters.

Section 2- Biological Observations: provides an overview of marine mammal observations, and post-exercise derived remote sensing of potential oceanographic conditions.

Section 3- Mitigation Assessment: provides an estimated number of marine mammals observed during USWEX 08-1 potentially affected or not affected by Anti-submarine Warfare (ASW) operations, noting the nature of any observed effects where possible. Under the BO, this analysis is focused on marine mammal observations within 2,000 yards of a MFAS transmission. In addition, Section 3 assesses the effectiveness of the NDE and BO mitigation and monitoring measures required during the exercise with regard to power down and shut down zones when marine mammals are sighted within the vicinity of ships using MFAS.

Appendix A: lists the 29 NDE mitigation measures.

Appendix B: presents results of an aerial monitoring survey.

Appendix C: presents results of a ship monitoring survey.

BACKGROUND

USWEXs are ASW exercises conducted by the U.S. Navy's Carrier Strike Groups (CSG) and Expeditionary Strike Groups (ESG) while in transit from the west coast of the United States to the western Pacific Ocean. As a combined force, submarines, surface ships, and aircraft conduct ASW against submarine targets representing an opposing force. Submarine targets include real submarines, target drones that simulate the operations of an actual submarine, and virtual submarines interjected into the training events by exercise controllers. The primary event of each exercise involves between one to five surface ships equipped with sonar, with one or more helicopters, and a P-3 aircraft searching for one or more submarines.

Prior to the exercise marine species awareness training was provided to exercise participants. A Letter of Instruction (LOI) which reiterated the applicable NDE mitigation measures was also distributed to participants and explains procedures for reporting marine mammal sightings discussed in Section 2. The NDE measures are presented in **Appendix A**.

MFAS use by surface ships and aviation assets (dipping sonar and DICASS sonobuoys) is captured and added to the total sonar hours reported in this document. MFAS on Los Angeles-class (SSN) submarines is seldom used in tactical training scenarios.

SECTION 1 EXERCISE SUMMARY

EXERCISE PARTICIPANTS

USWEX 08-1 was conducted from 13 to 15 November 2007, and involved the USS Tarawa ESG (**Table 1 and Figure 1**). Participating units included ESG assigned ships (surface combatants, amphibious transport ships, submarines, and supply ships), and MFAS-equipped opposition forces (including submarines). Two SQS-53C MFAS-equipped ships and one SQS-56 MFAS-equipped ship participated in USWEX 08-1. However, there was minimum MFAS use by non-ESG assigned platforms because of either tactical considerations for surface ships and submarines or lack of MFAS capability (amphibious transport ships, supply ships). There were between two to four ASW-capable helicopters with dipping sonar available for training during the exercise on any given day, depending on maintenance availability. The number of helicopters used in any given exercise event is driven by tactical and training objectives. Depending upon the training scenario there were also one or two P-3 maritime patrol aircraft participating.

MITIGATION MEASURES FOLLOWED

All 29 mitigations measures as stated in the 23 January 2007 NDE (**Appendix A** were adhered to during USWEX 08-1. Those NDE measures include specific details for personnel training, established lookout and watchstander responsibilities, specific operating procedures, and described coordination and reporting requirements. Observation data from Navy lookout sightings for USWEX 08-1 is described in Section 2.

Total MFAS Use

During USWEX 08-1, a total 77 hours of MFAS time was reported from all sources including hull mounted, helicopter dipping, and DICASS sonobuoys. Key caveats to the derivation of this total are presented in Section 3.

Table 1. Exercise summary for USWEX 08-1 conducted within Hawaiian water from 13 to 15 November 2007.

Participants	Event Name	Dates	MFAS Use Reported (hours)
USS Tarawa ESG	USWEX 08-1	13-15 Nov 2007	77 hrs
Number of MFAS equipped surface ships:			3
Estimated number of ASW helicopters:			2-4: upper estimate assumes no helicopters down for maintenance; not all helicopters used at same time

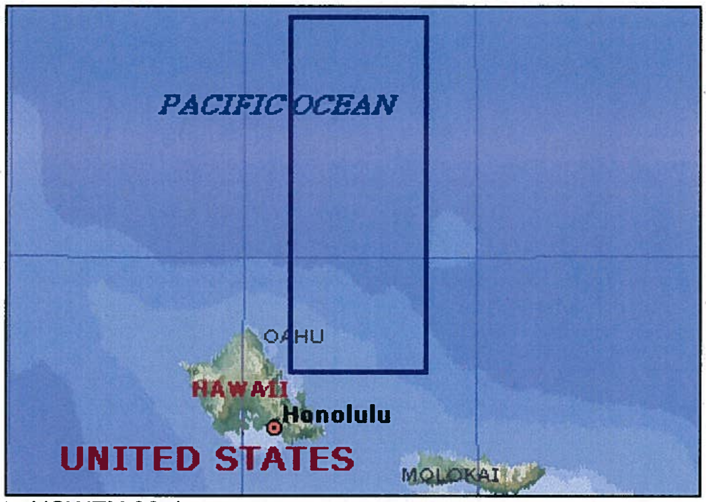

Figure 1. Approximate USWEX 08-1 area. Note: this area represents regions with U.S. Navy visual survey during exercise and does not imply full operational area. Base figure from Microsoft Encarta Map: http://encarta.msn.com/encnet/features/mapcenter/map.aspx

SECTION 2 BIOLOGICAL OBSERVATIONS

Section 2 provides an overview of marine mammal observations that require reporting under the Terms and Conditions of the National Marine Fisheries Service BO (NMFS 2007).

The biological summary in this section includes counts of the total numbers of marine mammals sighted and species guilds, estimates of the number of marine mammals observed within 2,000 yards of sonar source during MFAS transmission, and a science-based discussion on the likely species present in Hawaii during the time of year of this exercise.

USWEX 08-1 BIOLOGICAL OBSERVATIONS

There were no marine mammal sightings by USWEX participants.

Figure 1 shows the approximate area covered by U.S. Navy exercise participants using ship-board lookouts during USWEX 08-1. Given the time of year this exercise occurred (November) likely ESA species present in Hawaii include humpback whales, sei whales, and sperm whales. Blues whales are rare, with only one confirmed fall/winter sighting in Hawaiian waters. Fin whales are not present in high densities, but appear to be seasonal migrants.

MARINE MAMMAL SURVEYS

A dedicated USWEX monitoring program, separate from but complementary to the observations conducted by the exercise participants, was used during USWEX 08-1. Two civilian (non-Navy) science teams conducted aerial surveys and a ship survey for marine mammals before, during, and after USWEX 08-1. Results are described below and in more detail in **Appendix B** and **C**.

Aerial survey- Aerial surveys were performed in support of USWEX 08-1 on November 11 and 12 and from 15 to 17, 2007 (**Figure 2** and **Appendix B**). The purpose of these surveys was to detect, locate, and identify all marine mammals and sea turtles observed within a 2,384 square mile (6,174 km^2) grid; and during circumnavigation of the islands of Oahu and Molokai. For marine mammal species, additional observation time was spent characterizing behavior at the time of sighting. Target species were observed on two of the five survey days, primarily corresponding to those days with more favorable seastate conditions. Some species (e.g., sea turtles) were more easily detected during circumnavigation. For marine mammal species, additional observation time was spent characterizing behavior at the time of sighting. Aerial survey effort comprised of 17 hours of survey time and involved a linear distance of approximately 1,701 nm (3,150 km). A total of 26 sightings of five identified species (green sea turtles, short-finned pilot whales, Hawaiian spinner dolphins, bottlenose dolphins, and Hawaiian monk seals) and four unidentified species (*Stenella* species, unidentified turtle, dolphin, and whale) were recorded. Based on behavioral observation of the marine mammal species, no indications of distressed or unusual behavior were documented. The circumnavigation survey (Nov. 15) yielded no evidence of stranded or near stranded animals.

Ship survey- A civilian research vessel visual survey for cetaceans and sea turtles was conducted from 11 to 17 November 2007 in Hawaiian waters East and Northeast of Oahu (**Figure 3** and **Appendix C**). The purpose of these surveys was to monitor, identify, and report surface behavior of marine mammals observed before, during, and after the scheduled training exercise; particularly any injured or harmed marine mammals and/or any unusual behavior or changes in behavior, distribution, and numbers of animals. Another goal was to attempt to remain within view of any opportunistically encountered Navy vessels while conducting surveys and focal sessions. The ship survey effort was focused in a designated survey box approximately 30 nm wide by 70 nm long (~55 km by ~130 km). To meet the survey's goals, systematic line-transect surveys and focal animal behavior sessions were conducted. The ship survey effort focused on priority species including beaked whales, and federally listed species (e.g., sperm, blue, fin, humpback, and sei whales). Experienced marine mammal observers conducted visual observations in the Survey Box using the naked eye, handheld binoculars, and two sets of "Big Eyes" binoculars. The primary objectives were to collect location data and scan samples of behavior of all cetaceans encountered, and to locate, in particular, priority cetaceans for the purposes of conducting focal behavior follows. Another objective was to collect bathythermograph (XBT) data during the survey.

The survey totaled 66 hours and covered a distance of 492 nm (911 km). Most (90% or 817 km) consisted of line transect survey effort, 57 nm (105 km) of which occurred while Navy vessels were within view. A total of 34 nm (7 % of 63 km) of the total 492 nm consisted of focal animal observations. Navy vessels were opportunistically encountered on 13 and 14 November and were within view for a total of 8 hours at distances of over 3 nm (5.6 km). Beaufort (Bf) sea state ranged from 1 to 6, with most observations conducted in a Bf 5 (40%), followed by Bf 3 (27%) then Bf 4 (23%). A total of eight cetacean groups were sighted during the entire seven-day cruise. No sea turtles were sighted. Five cetacean species were confirmed during the entire survey period: sei whales, Brydes' whale, humpback whales, Risso's dolphins, and spinner dolphins. One unidentified small whale was observed and considered to be a probable Cuvier's beaked whale. In addition, a small group of medium-sized delphinids (considered to be probable pygmy killer whales) were sighted. A total of two sightings of sei whales were made on two different days. Extended focal follows were conducted on four cetacean sightings: a single sei whale, a single Bryde's whale, a group of three subadult sei whales, and a group of three humpback whales. Focal sessions ranged in duration from 50 - 145 minutes, with the longest continuous observation session of 145 minutes occurring with a single sei whale. Because sei and Bryde's whales can easily be confused, the survey team stayed with these focal animals until a positive identification was made and documented with photographs and detailed survey observations on natural history characteristics by senior observers. This included the first verified sighting of a Bryde's whale in the main Hawaiian Islands and sightings of a rare sei whale and subadult sei whales.

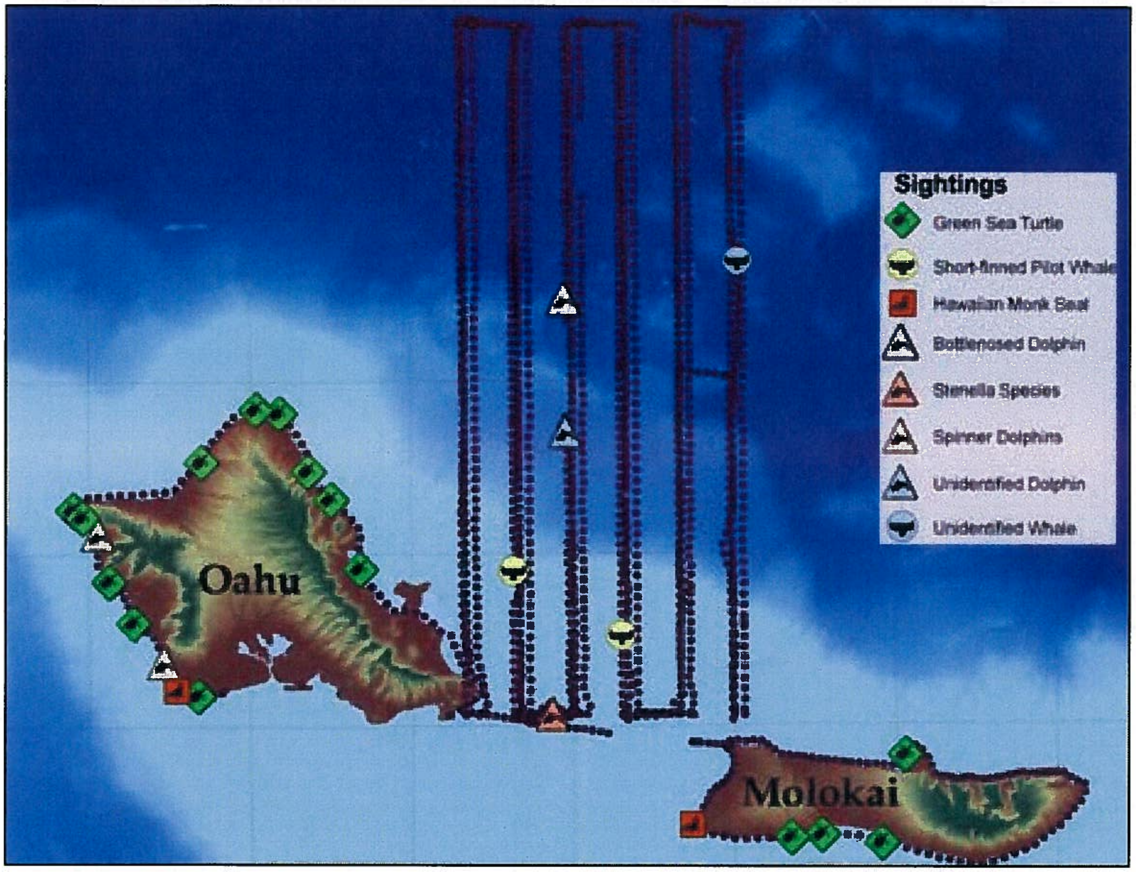

Figure 2. Plot of marine mammal sightings conducted by civilian aerial survey during 11-12 and 15-17 November 2007.

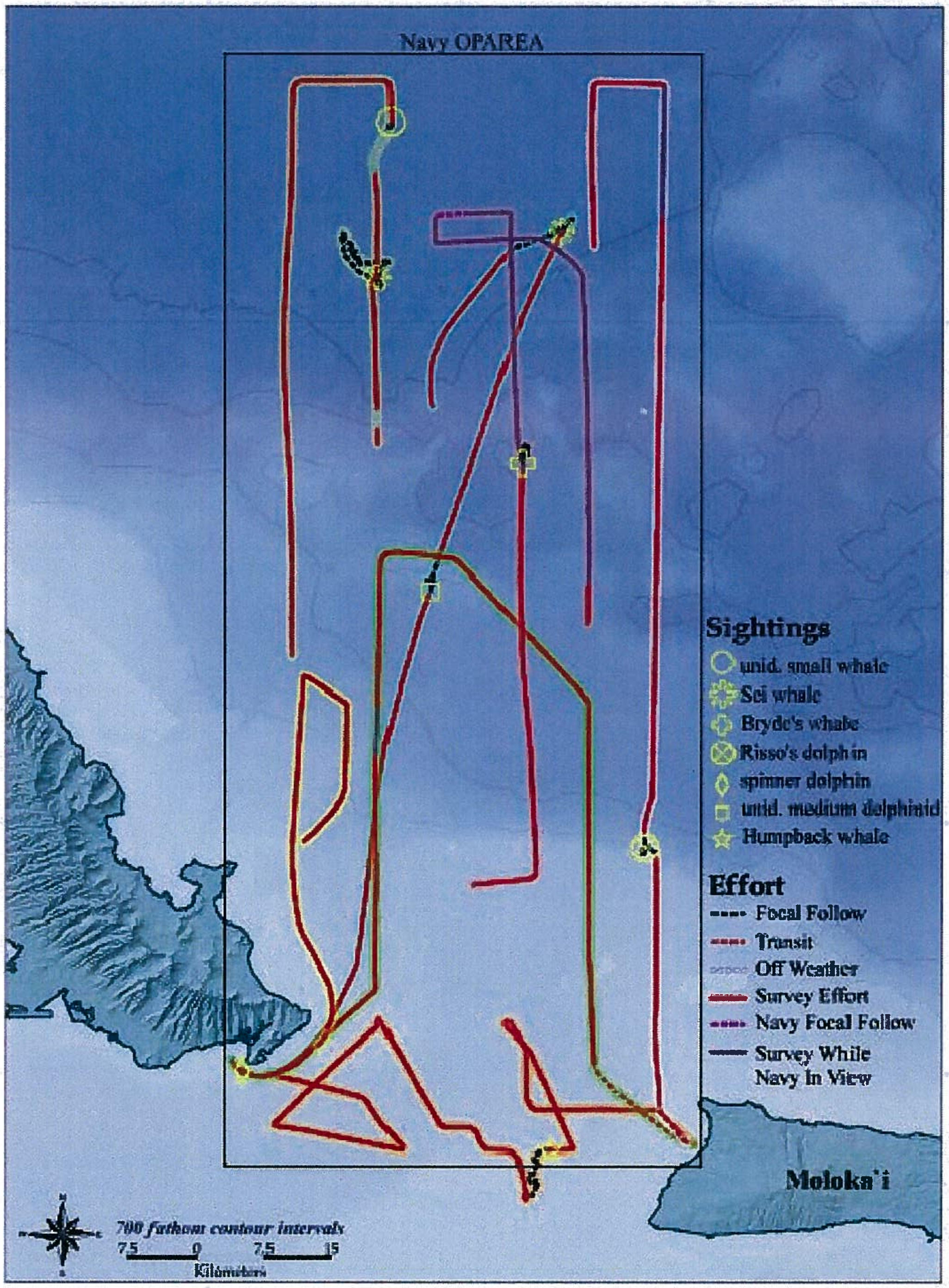

Figure 3. Plot of marine mammal sightings conducted by civilian ship survey during11-17 November 2007.

SECTION 3 MITIGATION ASSESSMENT

USWEX 08-1 ASSESSMENT

OVERVIEW

The NDE calls for the U.S. Navy to submit a report to NMFS that includes a discussion of the nature of any effects or lack of effects based on modeling results and marine mammal sightings. In addition, the BO Terms and Conditions require a report that evaluates the mitigation measures and details results from the U.S. Navy's exercise monitoring and reporting program. In this case, the mitigation measures under the BO are the NDE measures, therefore the discussion is presented together in this section.

This section provides an assessment of the effectiveness of the mitigation and monitoring measures. The section includes discussion of observations during MFAS transmission, limitations of passive sonar detection, other effects (i.e. vessel strikes), comparison of pre-exercise acoustic model impact predictions with actual USWEX 08-1 observations, and NDE and BO conclusions.

ASW proceeds slowly and requires careful development of a tactical frame of reference over time. Data is integrated from a number of sources and sensors. Once MFAS is turned off for a period of time, turning it back on later does not usually allow a commander to simply continue from the last frame of reference. Lost MFAS time not only equates to lost exercise time, but has a broader, overall impact on the tempo and development of a "tactical picture" shared among exercise participants as they train toward the goal of improving ASW skills in general.

Mitigation measures were designed to minimize interactions between marine mammals and Navy assets employing MFAS levels that have potential to result in a Temporary Threshold Shift (TTS) or Permanent Threshold Shift (PTS) as described in DoN 2007. Navy ships were not tasked nor expected to maintain contact with marine mammals sighted for purposes of monitoring requirements. To do so would have unnecessarily interfered with military readiness activities and ma result in concerns that Navy ships were intentionally harassing marine mammals.

MFAS TRANSMISSION

As in any review of the operational aspects of U.S. Navy ASW operations using MFAS, specific source levels, numbers of sources, and frequencies of sonars used during USWEX 08-1 are classified since this information provides potential adversaries with critical tactical data. The following discussion is focused on the 1) amount of time spent visually searching the ocean for marine mammals, 2) the amount of time conducting MFAS (as required to be reported under the NMFS BO), and 3) a discussion of individual events when MFAS was active and marine mammals were spotted within 2,000 yards.

1) Visual sighting effort: Visual sighting effort by ship for USWEX 08-1 can be approximated given the numbers of days this major exercise occurred (3 days), the number of hours per day (24 hours), the normal standard operating procedure for all vessels to have at least 3 lookouts on watch and scanning the ocean at all times (24/7), and the presence of 3 MFAS-equipped vessels. Therefore, 216 hours of MFAS surface ship visual survey effort for marine mammals occurred during USWEX 08-1 (3 days x 24 hrs/day = 72 hrs x 3 ships = 216). This accounts for time conducting both MFAS and non-MFAS events .

2) MFAS use: During USWEX 08-1, 77 hours of MFAS time were reported from all sources including hull-mounted 53C, helicopter dipping sonar, and DICASS sonobuoys (**Table 1**). These hours are reflective of MFAS use by various units geographically dispersed over the entire exercise area (**Figure 1**), and are not an indication of consecutive and continuous use (i.e. NOT 77 hours/24 hours (per day) = 3.2

days; A closer approximation would have to account for potential concurrent use by several units including up to three MFAS ships and aviation units).

It should be noted that MFAS is only used for a relatively small subset of any given major exercise. A USWEX's major focus is short-duration undersea warfare training. Seventy-seven hours of MFAS use represents less than 36% of the total ship visual observation effort (77/216 = 36%). In addition, total active sonar hours, as presented in this report, represent a sum of the total MFAS time from a number of individual training events during USWEX 08-1. Individual units record when MFAS is first used at the beginning of a training event and the time the event is finished. The sonar "on period" is conservative in that it does not account for the time MFAS is to in transmit mode due to tactical or maintenance reasons. Therefore, based on standardized reporting protocols the number of MFAS hours does not represent actual total sonar ping hours. Furthermore, during periods when there is an active transmission, MFAS puts sound into the water at discrete intervals. Sonar signals are not a continuous source of acoustic energy. A surface ship sonar signal consists of a pulse (i.e. ping) significantly less than one to two seconds long with time between successive pings as much as 30 seconds (NMFS 2007). During typical active sonar use, MFAS is silent for the vast majority of the time. This was the case for USWEX 08-1.

Biological Observations During MFAS: The civilian research vessel marine mammal survey described previously and in **Appendix C** followed a Bryde's whale on 13 November while a U.S. Navy ship was visible from the survey ship. However, based on MFAS reports from exercise participants on 13 November, there were NO MFAS transmissions from the ship observed by the survey authors.

There was another exercise participant not visible to the survey ship along a different bearing that did conduct two hours of MFAS transmission on 13 November at approximately the same time as the Bryde's whale sighting. This MFAS-equipped vessel was approximately 50 nm away. Using a VERY CONSERVATIVE approach to open ocean sonar propagation derived from Urick 1983, an estimation of potential transmission loss and therefore potential receive level (RL) at the whale can be made:

TL = 10Log(Range in meters) + 30 + (absorption coefficient in dB/meter x Range in meters)

(see: http://www.fas.org/man/dod-101/navy/docs/es310/SNR_PROP/snr_prop.htm)

Given the nominal 235 dB source level for U.S. Navy hull mounted MFAS and based on the formula above, estimated RL at the animal under observation by the survey ship may have been around 141 dB. It should be noted that this calculation would potentially represent the maximum RL and is not reflective of actual real world oceanographic conditions and their effects on propagation on the 13th. However, no adverse or unusual behavior by the Bryde's whale was observed by the trained marine mammal observers on the civilian survey ship.

3) MFAS Events: There were no instances of MFAS having to be powered down or secured due to sightings of marine mammals within NDE safety zones.

PASSIVE SONAR

Passive sonar involves acoustic listening to underwater sounds and does not involve transmitting active sound into the water column. Passive sonar use is driven by the tactical nature of an ASW or training event, and should be employed whenever possible. Given the nature of passive sonar technology and underwater sound propagation, localizing or determining range and absolute position of a marine mammal is generally not possible or exceedingly difficult with any single ship-based passive sonar.

Also, there is no current technology on U.S. Navy MFAS-equipped ships to easily localize marine mammals in real time using passive detection.

In addition, passive sonar can only detect marine mammals that are actually vocalizing (i.e. making underwater sound as part of communication and echolocation). Marine mammals do not always vocalize based on individual needs at a particular moment, species-level foraging and mating strategies, and other oceanographic or biological factors. Depending on oceanographic conditions and animal source levels, when marine mammals do vocalize, sounds can easily travel 1 to several 10s of kilometers (km) (0.5 nautical mile (nm) to 10s of nm) for some mid-to-low frequency animals, and 10s to 100s of km for very low frequency baleen whales (i.e. blue and fin whales). These ranges demonstrate that even if the marine mammal vocalization can be detected, it does not mean the mammal is necessarily close to a ship or bottom-mounted range hydrophone.

MODELING ESTIMATES APPLICABLE TO USWEX 08-1

For the USWEX EA/OEA (DoN 2007) an estimate of potential acoustic exposures to marine mammals was generated in support of the NEPA process. **Table 2** lists possible marine mammal species occurring in Hawaii based solely on *estimated* distribution and abundance, but does not take into account potential seasonal distribution. This table highlights the ESA-listed species described in the USWEX BO (NMFS 2007), and shows estimated potential acoustic exposures derived from acoustic impact modeling (DoN 2007 USWEX EA/OEA). **Table 2** shows estimated marine mammal acoustic exposures from model-derived calculations based on estimated marine mammal densities, operational parameters, sound transmission loss, and potential energy accumulated based strictly on pre-exercise acoustic impact modeling (DoN 2007). The exercise-specific model estimated total potential exposures over two years of Hawaii USWEXs. Extrapolating for a single exercise as in Table 2 estimates 5,153 Level B potential exposures for all marine mammals (5,116 sub-TTS Level B, 37 TTS Level B).

Given that no marine mammals were visually sighted during USWEX 08-1, no assessment of species exposures can be made, but in comparison with pre-exercise predictions, it's apparent that pre-exercise predictions are exceedingly high and not reflective of actual animal occurrence in the USWEX 08-1 exercise area during November. This is evidenced by the lack of U.S. Navy ship sightings (n= 0 over 3 days) and low at-sea sightings by concurrent civilian science surveys (ship based: n= 9 sightings over 7 days, however, 2 of these 9 sightings were made close to shore where U.S. Navy exercise participants did not travel; aerial based: n= 6 sightings, of which 1 was coastal).

FINAL NDE AND BO ASSESSMENT

1) All measures promulgated in the 23 January 2007 *Mid-Frequency Active Sonar Mitigation Measures during Major Training Exercises or within Established DoD Maritime Ranges and Established Operating Areas* (NDE) were implemented before and during USWEX 08-1.

2) In addition to the above assessment of the NDE, the BO calls for a report that evaluates the effectiveness of the U.S. Navy's exercise mitigation measures. The three categories of measures (Personnel Training, Lookout and Watchstander Responsibilities, and Operating Procedures), as outlined in the NDE, are effective in detecting and responding appropriately to the presence of marine mammals, when visually observed. Fleet commanders and ship watch teams continue to improve individual awareness and enhance reporting through various pre-exercise conferences, lessons learned, and after action reports. The NDE safety zones are adhered to and vessels apply mitigation when marine mammals are visually observed within a zone. The U.S. Navy acknowledges that this discussion does not account for potential marine mammal species not visually observed, which is a difficult determination even within the marine mammal scientific survey community. Deep diving animals, if exposed, may not be exposed to significant sound levels for long periods of time, given the moving nature of ship MFAS use and the limited pings from lower power aviation deployed MFAS systems (dipping sonar, sonobuoys). For instance, during a one hour dive by a beaked whale or sperm whale, a MFAS ship moving at a nominal 10

knot speed would cover about 10 nm from its original location, well beyond ranges predicted to have significant exposures. For cryptic, hard to spot species when at the surface such as beaked whales, real-time detection is difficult given any U.S. Navy or non-Navy science tool presently available.

3) NMFS (2007) USWEX BO Terms and Conditions require the U.S. Navy to estimate the number of ESA-listed marine mammals that may have been exposed to received energy level equal to or greater than 173 dB and 190 dB re 1 $\mu Pa^2 \cdot s$. No estimate can be provided given lack of marine mammal observations from MFAS transmitting ships.

There was a single instance when a Bryde's whale was under direct and continuous observation by observers on board a civilian marine mammal research vessel while MFAS transmission was occurring during USWEX 08-1. At the time of this observation, the research vessel observed a Navy ship in the area. Post-exercise analysis revealed that the ship observed by the research vessel was not transmitting MFAS. However, additional post-exercise analysis indicated that ships not observed by the research vessel were transmitting resulting in a potential exposure of this Bryde's whale to a received level of approximately 141 dB re 1 $\mu Pa^2 \cdot s$. No adverse or abnormal behavioral reactions were noted by the marine mammal observers on board the research vessel.

4) From **Table 2**, a single USWEX would be expected to potentially expose 1,884 ESA-listed marine mammals from all MFAS sources to potential Level B exposures based solely on pre-exercise predicted impact models. However, no potential ESA-listed marine mammals were actually observed during USWEX 08-1 at ranges that may have exposed them to Sound Exposure Level (SEL) greater than 173 dB and 190 dB re 1 $\mu Pa^2 \cdot s$. Humpback whales had the largest pre-exercise predicted exposures, yet November is early for their summer migration to the Hawaii wintering ground. While there was a single humpback whale sighting by the civilian ship visual survey, the location of this sighting was significantly greater than 50 nm from the nearest MFAS use during USWEX 08-1. Given one confirmed humpback shale sighting, the low population density early in the humpback whale season, their typical shallow-water distribution, and the at-sea distances between exercise participants, it is improbable that humpback whales were exposed to MFAS during USWEX 08-1. Blue whales and fin whales in Hawaii are rarer and likewise were potentially not present in the waters north of Oahu during USWEX 08-1 and likely not exposed (**Figure 1**).

5) For all of USWEX 08-1 marine mammal sightings from pre, during, and post-exercise civilian monitoring, there was no obvious indication or report that any animal behaved in a manner not associated with normal movement, or foraging.

Data Limitations and Improvements

There is no information from which to assess how many, if any, animals not observed by Navy lookouts may or may not have been exposed to MFAS received levels greater than 173 dB and 190 dB re 1 $\mu Pa^2 \cdot s$.

Data collection needed to address this question will be reviewed as they become available for potential incorporation into future exercises, although this remains a problematic science issue for even non-Navy marine mammal surveys. Real-time passive sonar systems used by the U.S. Navy, and to some degree by most of the marine mammal science community, lack the ability to automatically classify detected species, although there is substantial academic research into improving this capability. Most current passive data sets rely on extensive post-collection analysis by skilled subject matter experts to conclusively establish species identification. In addition to species classification, range detection using moving passive acoustic systems on U.S. Navy ships is limited in real time to the typical 8-10 knot speeds at which many ASW training events occur. Indeed, if passive range detection of any submerged contacts (submarines or marine mammals) was more advanced and easier, then there would be less tactical reliance on active sonar systems. Also, non-vocalizing marine mammals cannot currently be detected using passive systems.

The U.S. Navy continues conducting robust and realistic exercises, and development of long-term range complex monitoring plans. The goal of these plans is to integrate multiple tools such as surveys in an effort to generate better assessments of marine mammal occurrence and possible MFAS effects, or lack thereof. In accordance with the USWEX BO, data collection needs to address unresolved questions regarding likely area-specific species composition and the potential for alternative detection technologies to be incorporated into future exercises as the U.S. Navy's exercise monitoring program evolves.

Table 2. Total estimated annual exposures based on pre-exercise modeling for MFAS sonar from DoN 2007 (USWEX EA/OES) based on six exercise per year ((*left two columns*), and estimated exposures per exercise (estimated total exposures divided by six) (*right two columns*).

Species	Occurrence Status Within Hawaiian Waters	Annual USWEX potential exposures n =6 exercises (DoN, 2007)		Estimated singe exercise exposures	
		Level B Sub TTS	Level B TTS	Level B Sub TTS	Level B TTS
ESA-listed					
Blue whale	Rare	0	0	0	0
Fin whale	Rare	48	0	8	0
Humpback whale	Seasonal, Nov-Apr	10,273	49	1,712	8
Sei whale	Rare	21	0	4	0
Sperm whale	Regular, Year round	905	3	151	1
Non-ESA listed				0	0
Blainville's beaked whale	Regular, Year round	285	1	48	0
Bottlenose dolphin	Regular, Year round	775	7	129	1
Bryde's whale	Regular, Year round	96	0	16	0
Cuvier's beaked whale	Regular, Year round	1,490	6	248	1
Dwarf sperm whale	Regular, Year round	2,182	12	364	2
False killer whale	Regular, Year round	109	2	18	0
Fraser's dolphin	Regular, Year round	2,045	20	341	3
Killer whale	Infrequent, Year round	71	1	12	0
Longman's beaked whale	Regular, Year round	85	0	14	0
Melon-headed whale	Regular, Year round	408	2	68	0
Minke whale	Seasonal, Nov-Apr	0	0	0	0
Pygmy killer whale	Regular, Year round	106	2	18	0
Pygmy sperm whale	Regular, Year round	839	5	140	1
Pantropical spotted dolphin	Regular, Year round	2743	26	457	4
Risso's dolphin	Regular, Year round	276	2	46	0
Rough-toothed dolphin	Regular, Year round	2,832	41	472	7
Short-finned pilot whale	Regular, Year round	1,849	12	308	2
Spinner dolphin	Regular, Year round	1,957	18	326	3
Striped dolphin	Regular, Year round	1,303	13	217	2
Monk seal	Regular, Year round	0	0	0	0
TOTAL:		30,699	222	**5,116**	**37**

REFERENCES

Barlow, J. 2006. Cetacean Abundance in Hawaiian Waters Estimated from a Summer/Fall Survey in 2002. Marine Mammal Science 22:446-464.

DoN. 2007. Undersea Warfare Exercise (USWEX) Programmatic Environmental Assessment/Overseas Environmental Assessment (EA/OEA)- January 2007. Prepared for: Commander, U.S. Pacific Fleet, Department of the Navy. Prepared by: Parsons Infrastructure & Technology, Washington, DC/Kaya Associates, Inc., Huntsville, AL/SRS Technologies, San Diego

NMFS, 2007. Biological Opinion (BO) on the U.S. Navy's Proposed Undersea Warfare Training Exercises (USWEX) In The Hawaii Range Complex From January 2007 to January 2009- 26 September 2007. Office of Protected Resources, National Marine Fisheries Service, Silver Springs, MD.

APPENDIX A- NDE MEASURES

NDE

NDE mitigation measures include:

I. General Maritime Protective Measures: Personnel Training:

1. All lookouts onboard platforms involved in ASW training events will review the NMFS approved Marine Species Awareness Training (MSAT) material prior to use of mid-frequency active sonar.
2. All Commanding Officers, Executive Officers, and officers standing watch on the bridge will have reviewed the MSAT material prior to a training event employing the use of MFAS.
3. Navy lookouts will undertake extensive training in order to qualify as a watchstander in accordance with the Lookout Training Handbook (NAVEDTRA 12968-B).
4. Lookout training will include on-the-job instruction under the supervision of a qualified, experienced watchstander. Following successful completion of this supervised training period, Lookouts will complete the Personal Qualification Standard program, certifying that they have demonstrated the necessary skills (such as detection and reporting of partially submerged objects). This does not preclude personnel being trained as lookouts counted as those listed in previous measures so long as supervisors monitor their progress and performance.
5. Lookouts will be trained in the most effective means to ensure quick and effective communication within the command structure in order to facilitate implementation of protective measures if marine species are spotted.

II. General Maritime Protective Measures: Lookout and Watchstander Responsibilities:

6. On the bridge of surface ships, there will always be at least three people on watch whose duties include observing the water surface around the vessel.
7. In addition to the three personnel on watch noted previously, all surface ships participating in ASW exercises will have at all times during the exercise at least two additional personnel on watch as lookouts.
8. Personnel on lookout and officers on watch on the bridge will have at least one set of binoculars available for each person to aid in the detection of marine mammals.
9. On surface vessels equipped with MFAS, pedestal mounted "Big Eye" (20x110) binoculars will be present and in good working order to assist in the detection of marine mammals in the vicinity of the vessel.
10. Personnel on lookout will employ visual search procedures employing a scanning methodology in accordance with the Lookout Training Handbook (NAVEDTRA 12968-B).
11. After sunset and prior to sunrise, lookouts will employ Night Lookouts Techniques in accordance with the Lookout Training Handbook.
12. Personnel on lookout will be responsible for reporting all objects or anomalies sighted in the water (regardless of the distance from the vessel) to the Officer of the Deck, since any object or disturbance (e.g., trash, periscope, surface disturbance, discoloration) in the water may be indicative of a threat to the vessel and its crew or indicative of a marine species that may need to be avoided as warranted.

III. Operating Procedures

13. A Letter of Instruction, Mitigation Measures Message or Environmental Annex to the Operational Order will be issued prior to the exercise to further disseminate the personnel training requirement and general marine mammal protective measures.

14. Commanding Officers will make use of marine species detection cues and information to limit interaction with marine species to the maximum extent possible consistent with safety of the ship.

15. All personnel engaged in passive acoustic sonar operation (including aircraft, surface ships, or submarines) will monitor for marine mammal vocalizations and report the detection of any marine mammal to the appropriate watch station for dissemination and appropriate action.

16. During MFAS operations, personnel will utilize all available sensor and optical systems (such as Night Vision Goggles to aid in the detection of marine mammals.

17. Navy aircraft participating in exercises at sea will conduct and maintain, when operationally feasible and safe, surveillance for marine species of concern as long as it does not violate safety constraints or interfere with the accomplishment of primary operational duties.

18. Aircraft with deployed sonobuoys will use only the passive capability of sonobuoys when marine mammals are detected within 200 yards of the sonobuoy.

19. Marine mammal detections will be immediately reported to assigned Aircraft Control Unit for further dissemination to ships in the vicinity of the marine species as appropriate where it is reasonable to conclude that the course of the ship will likely result in a closing of the distance to the detected marine mammal.

20. Safety Zones - When marine mammals are detected by any means (aircraft, shipboard lookout, or acoustically) within 1,000 yards of the sonar dome (the bow), the ship or submarine will limit active transmission levels to at least 6 dB below normal operating levels.

    (i) Ships and submarines will continue to limit maximum transmission levels by this 6 dB factor until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.

    (ii) Should a marine mammal be detected within or closing to inside 500 yards of the sonar dome, active sonar transmissions will be limited to at least 10 dB below the equipment's normal operating level. Ships and submarines will continue to limit maximum ping levels by this 10 dB factor until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.

    (iii) Should the marine mammal be detected within or closing to inside 200 yards of the sonar dome, active sonar transmissions will cease. Sonar will not resume until the animal has been seen to leave the area, has not been detected for 30 minutes, or the vessel has transited more than 2,000 yards beyond the location of the last detection.

    (iv) Special conditions applicable for dolphins and porpoises only: If, after conducting an initial maneuver to avoid close quarters with dolphins or porpoises, the Officer of the Deck concludes that dolphins or porpoises are deliberately closing to ride the vessel's bow wave, no further mitigation actions are necessary while the dolphins or porpoises continue to exhibit bow wave riding behavior.

    (v) If the need for power-down should arise as detailed in "Safety Zones" above, Navy shall follow the requirements as though they were operating at 235 dB - the normal operating level (i.e., the first power-down will be to 229 dB, regardless of at what level above 235 sonar was being operated).

21. Prior to start up or restart of active sonar, operators will check that the Safety Zone radius around the sound source is clear of marine mammals.

22. Sonar levels (generally) – The ship or submarine will operate sonar at the lowest practicable level, not to exceed 235 dB, except as required to meet tactical training objectives.

23. Helicopters shall observe/survey the vicinity of an ASW exercise for 10 minutes before the first deployment of active (dipping) sonar in the water.

24. Helicopters shall not dip their sonar within 200 yards of a marine mammal and shall cease pinging if a marine mammal closes within 200 yards after pinging has begun.

25. Submarine sonar operators will review detection indicators of close-aboard marine mammals prior to the commencement of ASW operations involving active mid-frequency sonar.

26. Increased vigilance during major ASW training exercises with tactical active sonar when critical conditions are present.

Based on lessons learned from strandings in Bahamas 2000, Madeiras 2000, Canaries 2002, and Spain 2006, beaked whales are of particular concern since they have been associated with MFAS operations. Navy should avoid planning major ASW training exercises with MFAS in areas where they will encounter conditions which, in their aggregate, may contribute to a marine mammal stranding event.

The conditions to be considered during exercise planning include:

(1) Areas of at least 1000 m depth near a shoreline where there is a rapid change in bathymetry on the order of 1000-6000 meters occurring across a relatively short horizontal distance (e.g., 5 nm).

(2) Cases for which multiple ships or submarines ($\geq$ 3) operating MFAS in the same area over extended periods of time ($\geq$ 6 hours) in close proximity ($\leq$ 10NM apart).

(3) An area surrounded by <u>land masses, separated by less than 35 nm and at least 10 nm in length</u>, or an <u>embayment</u>, wherein operations involving multiple ships/subs ($\geq$ 3) employing MFAS near land may produce sound directed toward the channel or embayment that may cut off the lines of egress for marine mammals.

(4) Although not as dominant a condition as bathymetric features, the historical presence of a <u>significant surface duct</u> (i.e. a mixed layer of constant water temperature extending from the sea surface to 100 or more feet).

If the major exercise must occur in an area where the above conditions exist in their aggregate, these conditions must be fully analyzed in environmental planning documentation. Navy will increase vigilance by undertaking the following additional protective measure:

A dedicated aircraft (Navy asset or contracted aircraft) will undertake reconnaissance of the embayment or channel ahead of the exercise participants to detect marine mammals that may be in the area exposed to active sonar. Where practical, advance survey should occur within about two hours prior to MFA sonar use, and periodic surveillance should continue for the duration of the exercise. Any unusual conditions (e.g., presence of sensitive species, groups of species milling out of habitat, any stranded animals) shall be reported to the Officer in Tactical

Command (OTC), who should give consideration to delaying, suspending or altering the exercise.

All safety zone requirements described in Measure 20 apply.

The post-exercise report must include specific reference to any event conducted in areas where the above conditions exist, with exact location and time/duration of the event, and noting results of surveys conducted.

IV. Coordination and Reporting

27. Navy will coordinate with the local NMFS Stranding Coordinator for any unusual marine mammal behavior and any stranding, beached live/dead or floating marine mammals that may occur at any time during or within 24 hours after completion of mid-frequency active sonar use associated with ASW training activities.

28. Navy will submit a report to the OPR, NMFS, within 120 days of the completion of a Major Exercise. This report must contain a discussion of the nature of the effects, if observed, based on both modeled results of real-time events and sightings of marine mammals.

29. If a stranding occurs during an ASW exercise, NMFS and Navy will coordinate to determine if MFAS should be temporarily discontinued while the facts surrounding the stranding are collected.

APPENDIX B- RESULTS FROM USWEX 08-1 AERIAL MONITORING

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Final Report: Aerial Surveys of Marine Mammals Performed in Support of USWEX Exercises

Nov. 11-17, 2007

Photo by J. Mobley, NOAA Permit No. 810

Submitted to:

Environmental Division

Commander, U.S. Pacific Fleet

Submitted by:

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dba: Marine Mammal Research Consultants

Date: January 28, 2008

Summary

Aerial surveys were performed in support of the US Navy Undersea Warfare Exercise (USWEX) on November 11-12 and 15-17, 2007. The mission was to detect, locate and identify all marine mammal and sea turtle species observed within a specified 6,174 km^2 grid (Figure 1) and during circumnavigation of the islands of Oahu and Molokai. For marine mammal species, additional observation time was spent characterizing behavior at the time of sighting. Target species were observed on two of the five survey days, primarily corresponding to those days with more favorable seastate conditions and the greater visibility of some species (e.g., sea turtles) during circumnavigation (Table 1). Effort comprised 17.15 hrs of survey time, involving a linear distance of approximately 3,150 km. A total of 26 sightings were recorded involving five identified species (Green sea turtles, short-finned pilot whales, Hawaiian spinner dolphins, bottlenose dolphins and Hawaiian monk seals) and four unidentified species (*Stenella* species, unidentified turtle, dolphin and whale) (Tables 2-3). Based on behavioral observation of the marine mammal species, no indications of distressed or unusual behavior were seen. The circumnavigation survey (Nov. 15) yielded no evidence of stranded or near stranded animals.

Background

The US Navy Undersea Warfare Exercise (USWEX) was proposed as an advanced Anti-Submarine Warfare Exercise to be conducted by U.S. Navy Carrier Strike Groups (CSGs) and Expeditionary Strike Groups (ESGs) within the Hawaii Range Complex. Since the exercise involved deployment of mid-frequency active sonar, concerns over possible impacts on protected marine species dictated that a parallel monitoring program be conducted. For the Nov. 07 USWEX, this monitoring involved systematic surveys using both shipboard as well as aerial platforms. This report is specific to the aerial monitoring portion only. Aerial surveys of a pre-determined 56 x 111 km grid as well as coastal areas of the islands of Oahu and Molokai were conducted on five days during the period November 11-12 and 15-17, 2007. The mission was to document incidence, location, and species identity of all marine mammal and sea turtle species within those regions. Additionally, for marine mammal species, additional observation time was spent characterizing behavior at time of sighting.

Method

Three aircraft were utilized. For the transect grid surveys a twin-engine Partenavia Observer (P68) (Nov. 11-12) and Britten Norman Islander (Nov. 16-17) were used. For the circumnavigation portion (Nov. 15), a Robinson 44 helicopter was used. The transect surveys utilized design and methods prescribed by accepted distance sampling theory (Buckland et al., 2001). Survey crew and pilot were not informed as to the status or location of navy exercises to minimize observational bias. Six north-south transect lines 111 km long were placed 9 km apart to cover the 6,174 sq km target area (Figure 1). Random longitudinal startpoints were used so that the exact trackline configuration varied on each survey. Aircraft flew at 100 knots ground speed and altitude of 244 m (800 ft). Survey crew consisted of two experienced observers, one on each side of the plane, and a data recorder. When target species were detected, an angle was taken to the sighting using hand-held Suunto clinometers, typically followed by orbiting to identify species and in the case of marine mammals, to characterize behavior. Environmental data (Beaufort seastate, glare, visibility) were taken at the start of each transect leg or when conditions changed. Positional data via GPS were automatically recorded every 30-sec and manually when sightings occurred.

Table 1. Summary of USWEX aerial surveys

Date	Survey Type	Hrs Effort	No. Sightings	Mean Seastate
Nov. 11	Transect grid	3.85	0	3.7
Nov. 12	Transect grid	4.15	7	2.7
Nov. 15	Circumnavigate Oahu & Molokai	2.53	19	3.7
Nov. 16	Transect grid	2.92	0	5.5
Nov. 17	Transect grid	3.70	0	4.1
	Totals:	17.15	26	3.84

Results and Discussion

The five days of aerial surveys consisted of a total of 17.15 hrs effort, comprising approximately 3,150 km of linear distance. Target species were observed on two of the five days surveyed (Table 2), corresponding to days with more favorable seastate conditions as well as the greater visibility of some species (sea turtles) during circumnavigation of inshore waters (Tables 1 & 2). The total of 26 sightings included three identified species of odontocetes (Hawaiian spinner dolphin, short-finned pilot whale, and bottlenose dolphin), one pinniped species (Hawaiian monk seal) and one sea turtle species (green sea turtle) (Table 3). The only baleen whale sighting was an unidentified species sighting on Nov. 12 that occurred in the eastern portion of the grid (Figure 1). The animal was seen diving but from the body outline it did not appear to be a humpback whale. The three positively identified odontocete species represent ubiquitous species that are among the top five most commonly seen in Hawaiian waters based on the 1993-03 Hawaii survey results (Appendix). The two Hawaiian monk seal sightings included one of a single seal swimming in the waters off Barbers Pt as well as two seals observed resting on a southwestern Molokai beach. These two sightings are noteworthy since sightings of monk seals in the main Hawaiian Islands are relatively rare.

The total of 7 odontocete species observed across the 3,150 km of linear effort corresponded to an average encounter rate of .002 sightings/km. This is considerably less than noted in previous surveys of Hawaiian waters. For the 2005 summer RIMPAC exercises, odontocetes were seen at a rate of .004 sightings/km (Mobley, 2006) and during the 1993-03 Hawaii statewide surveys (period Feb-Apr) they were observed at a rate of .005 sightings/km (Mobley, 2004). The lower encounter rate observed during the USWEX surveys is likely attributable to two factors: a) the average seastate conditions during the present surveys were less favorable than prevailing conditions during the other series mentioned; and b) a greater portion of effort during the

USWEX surveys was spent in deep water greater than 1829 m (1000 fathoms) where odontocetes may be less abundant.

Notes regarding the general behavior of the marine mammal sightings are summarized in Table 2. None of the behavioral descriptions indicated the presence of unusual or distressed behavior (e.g., tight or unusual aggregations, strandings or near strandings).

Overall there were no indications of any deleterious effects of the USWEX exercise on the indigenous marine species observed. It should be noted of course that the absence of such indications does not necessarily imply the absence of any negative effects, merely that no overt indications of such effects were detected.

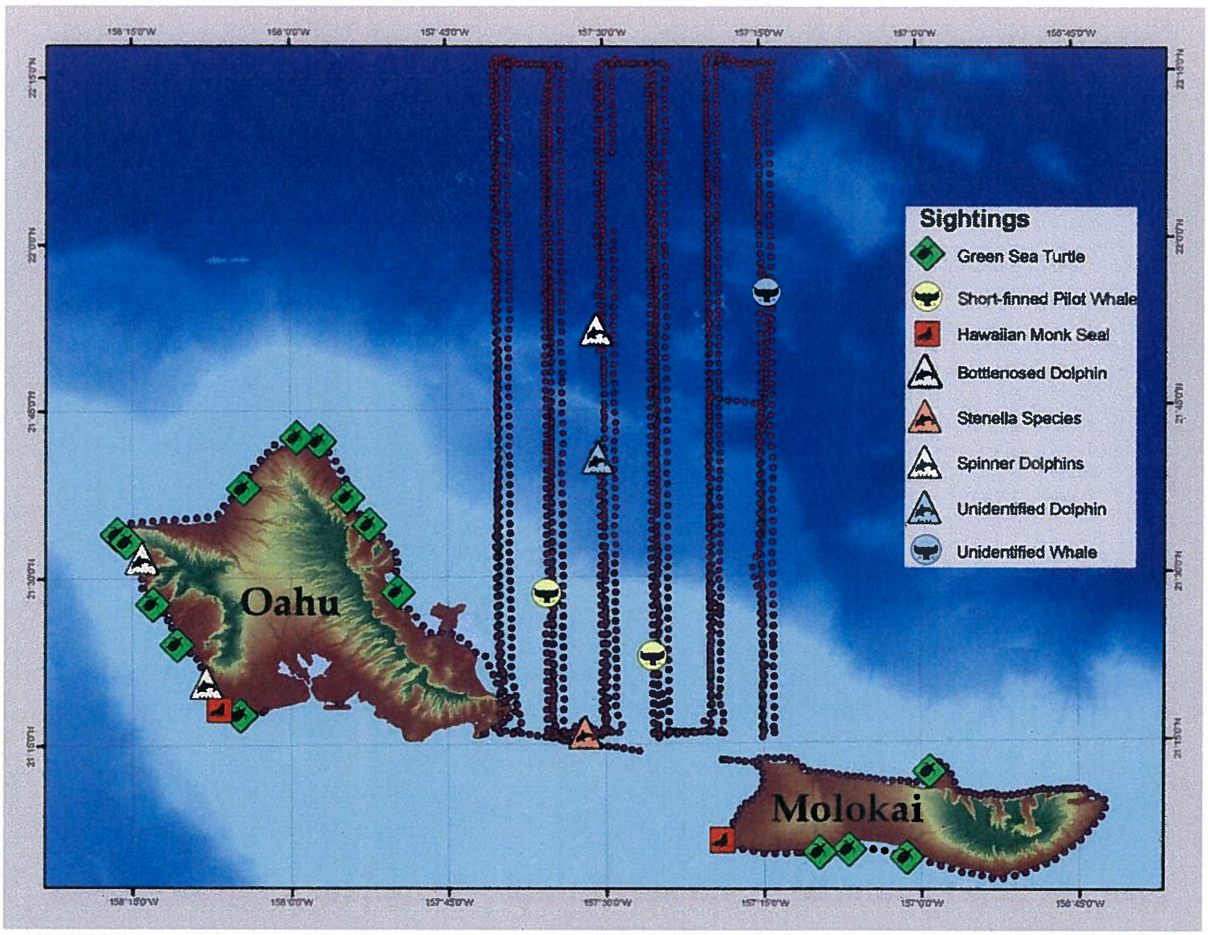

Figure 1. Summary of Effort and Species Sightings. Based on GPS data. For transect grid, random longitude start points were used so the exact trackline varied on each survey date. Note: South shore of Oahu not covered due to Class B airspace restrictions.

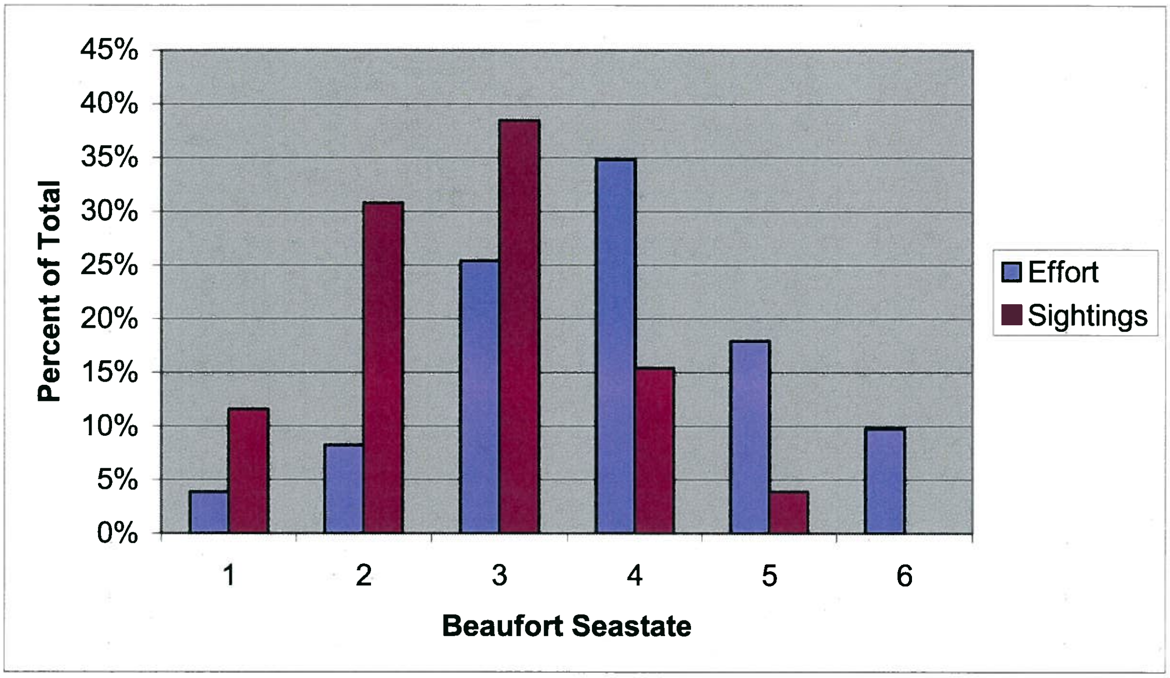

Figure 2. Summary of Beaufort Seastate. As shown, the majority of effort was spent in Beaufort seastate greater than 3 (63%) whereas the majority of sightings occurred in Beaufort seastate 3 or less (81%). Seastate is the primary factor affecting sighting probability of free-ranging marine mammals.

Table 2. Summary of individual sightings

Date	Number	Spp	Time	Seast	Londec	Latdec	Behavioral Description
11/15/2007	14	CM	9:49:31	3	157.8291	21.4781	
11/15/2007	6	CM	9:55:52	3	157.8741	21.5792	
11/15/2007	1	CM	9:57:31	3	157.9093	21.6202	
11/15/2007	1	CM	10:00:43	3	157.9536	21.7047	
11/15/2007	1	CM	10:01:53	3	157.9898	21.7104	
11/15/2007	2	CM	10:05:45	3	158.0747	21.6336	
11/15/2007	3	CM	10:13:02	2	158.2733	21.5659	
11/15/2007	2	CM	10:13:49	2	158.2590	21.5542	
11/15/2007	1	CM	10:24:06	2	158.2176	21.4611	
11/15/2007	1	CM	10:27:04	2	158.1800	21.4006	
11/15/2007	1	CM	10:39:42	3	158.0800	21.2950	
11/15/2007	1	CM	13:05:03	5	156.9861	21.2047	
11/15/2007	1	CM	13:33:24	4	157.0240	21.0772	
11/15/2007	2	CM	13:36:01	4	157.1159	21.0898	
11/15/2007	1	CM	13:37:21	4	157.1626	21.0857	
11/12/2007	1	UT	12:21:44	1	157.4183	21.3762	
11/12/2007	12	GM	10:37:50	1	157.5927	21.4753	scattered; milling
11/12/2007	19	GM	12:19:12	1	157.4252	21.3810	slow travel
11/15/2007	1	MS	10:35:33	3	158.1111	21.3031	slow swimming
11/15/2007	2	MS	13:44:24	4	157.3142	21.1048	sunning on beach
11/15/2007	24	SL	10:15:19	2	158.2321	21.5304	slow swimming
11/15/2007	60	SL	10:30:02	2	158.1310	21.3440	milling; slow swimming
11/12/2007	31	SS	10:55:42	2	157.5298	21.2667	scattered; milling
11/12/2007	5	TT	11:27:12	3	157.5087	21.8691	fast swimming
11/12/2007	1	UD	11:17:38	2	157.5071	21.6769	Dove
11/12/2007	1	UW *	15:56:27	3	157.2400	21.9230	submerged swimming

<u>Species code</u>: CM = green sea turtle; UT = unidentified turtle; GM = short-finned pilot whale; MS = Hawaiian monk seal; SL = spinner dolphin; SS = unidentified *Stenella* species; TT = bottlenose dolphin; UD = unidentified dolphin; UW = unidentified whale

Table 3. Summary of sightings by species

Species	No. Sightings	No. Individuals
Green sea turtle (*Chelonia mydas*)	15	38
Short-finned pilot whale (*Globicephala macrorhynchus*)	2	31
Hawaiian spinner dolphin (*Stenella longirostris*)	2	84
Bottlenose dolphin (*Tursiops truncatus*)	1	5
Stenella species	1	31
Hawaiian monk seal (*Monachus schauinslandi*)	2	3
Unidentified turtle	1	1
Unidentified dolphin	1	1
Unidentified whale	1	1

Acknowledgements

I would like to thank our observers Lori Mazzuca, Julie Oswald, Michael Richlen, and Robert Uyeyama for their excellent work. Mahalo also to our pilot John Weiser for his usual superb piloting. These data were obtained under NOAA permit no. 642-1536-03 issued to the author (JRM).

References

Buckland, S.T., Anderson, D.R., Burnham, K.P., Laake, J.L., Borchers, D.L., and Thomas, L. 2001. *Introduction to distance sampling: Estimating abundance of biological populations*, Oxford University Press.

Mobley, Jr., J. R. (2004). Results of marine mammal surveys on U.S. Navy underwater ranges in Hawaii and Bahamas. Final Report to Office of Naval Research, 27 pp. Available as downloadable pdf file at: http://socrates.uhwo.hawaii.edu/SocialSci/jmobley/ONRfinal.pdf

Mobley, Jr., J. R. (2006). Results of 2006 RIMPAC aerial surveys of marine mammals in Kaulakahi and Alenuihaha Channels. Final report submitted to Environmental Division, Commander, U.S. Pacific Fleet, 12 pp.
http://socrates.uhwo.hawaii.edu/SocialSci/jmobley/2006RIMPAC.pdf

Appendix:
Summary of 1993 - 2003 Hawaiian Islands Aerial Survey Results

Species Name	No. pods	No. indiv.
Humpback whale (*Megaptera novaeangliae*)	2352	3907
Spinner dolphin (*Stenella longirostris*)	52	1825
Spotted dolphin (*Stenella attenuata*)	31	1021
Short-finned pilot whale (*Globicephala macrorhynchus*)	73	769
Melon-headed whale (*Peponocephala electra*)	6	770
Bottlenose dolphin (*Tursiops truncatus*)	54	492
False killer whale (*Pseudorca crassidens*)	18	293
Sperm whale (*Physeter macrocephalus*)	23	106
Rough-toothed dolphin (*Steno bredanensis*)	8	90
Blainville's beaked whale (*Mesoplodon densirostris*)	9	32
Pygmy or dwarf sperm whale (*Kogia* spp.)	4	28
Striped dolphin (*Stenella coeruleoalba*)	1	20
Pygmy killer whale (*Feresa attenuata*)	2	16
Cuvier's beaked whale (*Ziphius cavirostris*)	7	13
Risso's dolphin (*Grampus griseus*)	1	8
Killer whale (*Orcinus orca*)	1	4
Fin whale (*Balaenoptera physalus*)	1	3
Unid. Dolphin	96	452
Unid. Stenella spp.	11	196
Unid. Whale	28	39
Unid. beaked whale	9	23
Unid. Cetacean	14	27
Totals:	2801	10134

APPENDIX C- RESULTS FROM USWEX 08-1 VESSEL MONITORING

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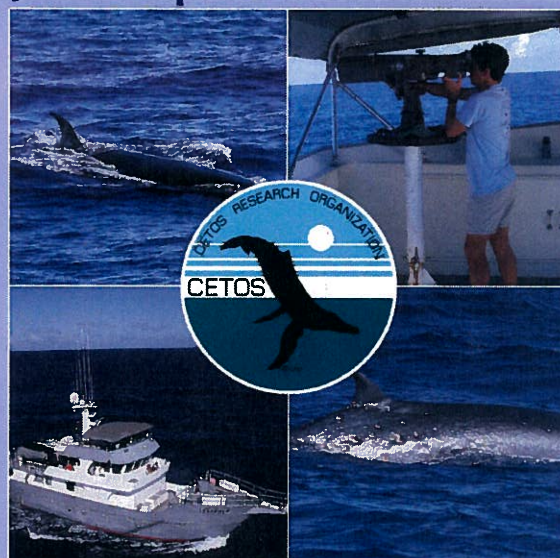
Marine Mammal and Sea Turtle Monitoring Survey in Support of Navy Training Exercises in the Hawai'i Range Complex

November 11-17, 2007 - Field Summary Report

**Authors: Mari A. Smultea,
Julia L. Hopkins and Ann M. Zoidis**



January 2008 - Final Report
Contract # N62742-07-P-1915

Submitted to:
NAVFAC Pacific
EV3 Environmental Planning
258 Makalapa Drive, Ste. 100
Pearl Harbor, HI 96860-3134

Submitted by:
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Appendix

EXECUTIVE SUMMARY

ES.1 INTRODUCTION

A visually based monitoring survey for cetaceans and sea turtles was conducted by Cetos Research Organization from 11 through 17 November 2007 in Hawaiian waters E and NE of Oahu, in portions of the Hawaii Range Complex, from aboard the 96-ft M/V *Searcher*.

The goals of this project were to monitor, identify, and report surface behavior of marine mammals observed before, during and after the scheduled training exercise, particularly any injured or harmed marine mammals and/or any unusual behavior or changes in behavior, distribution, and numbers of animals. A complimentary goal was to attempt to remain within view of any opportunistically encountered Navy vessels while conducting surveys and focal sessions. Effort was focused in a designated Survey Box ~30 nm wide by ~70 nm long (~55 km by ~130 km).

To meet the project goals, systematic line-transect surveys and focal animal behavior sessions were conducted. Effort focused on priority species including beaked whales, and federally listed species (e.g., sperm, blue, fin, humpback, and sei whales). Experienced marine mammal observers conducted visual observations in the Survey Box using the naked eye, handheld binoculars, and two sets of "Big Eyes" binoculars. The primary objectives were to collect location data and scan samples of behavior of all cetaceans encountered, and to locate in particular, priority cetaceans for the purposes of conducting focal behavior follows. Another objective was to collect bathythermograph (XBT) data during the survey.

ES.2 RESULTS

Surveys were conducted in all four sub-areas within the Survey Box on seven consecutive days, 11-17 November 2007. A total of 65.95 hours (h) or 911 km were visually surveyed. Most (90% or 817 km) of this effort consisted of line transect survey effort, 105 km while Navy vessels were within view. A total of 63 km (7%) of the total 911 km consisted of focal animal observations. Navy vessels were opportunistically encountered on 13 and 14 November and were within view for a total of 8.1 h at distances of over 3 nm (5.6 km). Beaufort sea state ranged from 1 to 6, with most observations conducted in a Bf 5, followed by Bf 3 (27%) then Bf 4 (23%).

A total of eight cetacean groups were sighted during the entire 7-day cruise. No sea turtles were sighted. Five cetacean species were confirmed during the entire survey period: sei whales, Brydes' whale, humpback whales, Risso's dolphins, and spinner dolphins (Table 3, Figure 4). One unidentified small whale was observed and considered to be a probable Cuvier's beaked whale. In addition, a small group of medium-sized delphinids (considered to be probable pygmy killer whales) were sighted. A total of two sightings of sei whales were made on two different days.

Extended focal follows were conducted on four cetacean sightings: a single sei whale, a single Bryde's whale, a group of three subadult sei whales, and a group of three humpback whales. Focal sessions ranged in duration from 50 - 145 minutes, with the longest continuous observation session of 145 minutes occurring with a single sei whale. Longer time was spent with those species with federal listing under the Endangered Species Act (ESA), i.e. the sei whales and humpback whales. Because sei and Bryde's whales can easily be confused, we stayed with these focal animals until a positive identification was made as documented with photographs and detailed survey observations on natural history characteristics by senior observers. Photographs were taken during all focal follows.

ES.3 CONCLUSIONS

Systematic vessel-based survey effort is limited and scant in the Survey Box E and NE of Oahu. Our research effort was successful despite both marginal weather and sea conditions on most days. We were able to collect new and important information on a variety of species in a little-studied area in a relatively short period of time. This included the first verified sighting of a Bryde's whale in the main Hawaiian Islands. In addition, the two sei whale sightings we made represent the first such sightings off Oahu. The presence of three subadult sei whales combined with past rare reports of sei whales off Maui and the Big Island of Hawaii suggest that the main Hawaiian Islands may be an important breeding area for the little-known N Pacific sei whale. The use of Big Eyes binoculars improved the effectiveness of our observations. Successfully remaining within view of Navy vessels, including while following cetaceans, suggests that this monitoring approach is a feasible consideration on an opportunistic basis with respect to monitoring relative to Navy training exercises. Finally, the *Searcher* proved to be a useful and tenable platform from which to conduct visual observations, including under marginal conditions, and has potential for use in multi-day offshore survey efforts.

Information collected during this Cetos survey sponsored by the U.S. Navy contributes to the limited database existing on offshore Hawaiian cetaceans. This information can be used towards efforts to effectively mitigate, monitor, and manage protected marine resources relative to Navy exercises. The survey also provided a platform for evaluating the feasibility of potential monitoring approaches, including in combination with concurrent aerial surveys. Suggestions and recommendations for future monitoring-related efforts have been collected, including comparisons with previous Cetos Research Navy monitoring surveys. Topics identified include holding a workshop to discuss the pros and cons and coordination of past and future monitoring efforts, as well as evaluating protocols that may improve the effectiveness of related vessel-based, aerial, and acoustic survey efforts.

The results of this study illustrate the effectiveness of visual methods, and were successful due to support from the U.S. Navy, the expertise and broad experience of our scientific team, our qualifications gained from conducting previous surveys in conjunction with naval training exercises, and because of the unique capabilities of the research platform (M/V *Searcher*) and crew.

Citation for this report is as follows:

Cetos 2007c. Final Field Summary Report. *Marine Mammal and Sea Turtle Monitoring Survey in Support of Navy Training Exercises in the Hawai'i Range Complex November 11-17, 2007.* Prepared by: Cetos Research Organization, Oakland, CA, under Contract No. N62742-07-P-1915, Naval Facilities Engineering Command Pacific. EV2 Environmental Planning, Pearl Harbor, HI. Authors: Smultea, M.A., J.L. Hopkins, A.M. Zoidis. January 30, 2008.

Photo Credits on Cover: Vessel Photo: Lori Mazzuca; Whale Photos: Cetos Research Observer Team

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SECTION 1
INTRODUCTION

Cetos Research Organization (Cetos) was contracted by the U.S. Navy (Navy) to conduct a monitoring survey for marine mammals and sea turtles concurrent with naval exercises in Hawaiian waters, in the Hawaii Range Complex (HRC), from aboard the vessel (M/V) *Searcher.* Marine mammal monitoring surveys were performed in conjunction with USWEX exercises from November 11 – 17, 2007.

This report focuses on our visual survey results from HRC waters north and east of Oahu from November 11-17, 2007. In addition to presenting results, we evaluate the effectiveness of survey techniques and provide recommendations by Cetos for improving methods of monitoring and for surveying marine species relative to the short- and long-term goals summarized in the BO for the USWEX (NMFS 2007). All data gathered are included in this document as requested by the Navy Scope of Work (SOW).

SECTION 2 METHODS

We conducted modified line transect vessel surveys and opportunistic behavioral sampling for priority cetaceans and sea turtles from aboard the M/V *Searcher* from November 11 – 18, 2007 (including transits). Data collection protocols and forms are provided in Appendix A. The primary study area surveyed was north of Oahu in a rectangular box (referred to herein as the Box) of approximately 30 nm by 70 nm (55 km by 130 km), with the southern border encompassing the northern end of the Kaiwi channel which lays between the eastern tip of Oahu and northwestern Molokai and within the Navy operational area (OPAREA).

The primary goals of this project were to monitor, identify, and report surface behavior of marine mammals and sea turtles observed during the training exercise. Of particular interest were any potentially injured or harmed marine mammals and/or any unusual behavior or changes in behavior, distribution, and numbers of animals observed during the training exercise. Additionally, the research vessel was directed to observe any marine mammal interactions with Navy ships from a safe distance (>3 nm [> 5.5 km]). To meet these goals, six experienced marine mammal observers conducted line transect surveys and focal cetacean behavior sessions in the study area. Our observer team included three senior [>15 years visual marine mammal survey experience and experienced in identification of tropical Pacific species and marine mammal behavior] members. Our primary objectives were to collect location data and scan samples of behavior of all cetaceans and sea turtles encountered, and to locate in particular, "priority" cetaceans for the purposes of conducting focal behavior follows.

Priority species for this project are those identified in the project SOW. These include five ESA-listed species known to occur in Hawaiian waters and beaked whales. According to the SOW, special consideration was to be given to the following species if encountered: "beaked whales and federally listed species including sperm whales, blue whales, humpback whales, fin whales, and sei whales."

Data to be gathered included information on marine mammal species and location, group size and composition, surface behavior and "disposition" (e.g. alive, injured, stranded), and direction of travel. All species were considered for data collection. When possible, photographs and/or video data were to be collected, especially of any unusual circumstances.

To meet survey goals, modified line transect surveys were conducted throughout the study area to locate focal animals for extended behavioral observations, preferably while within view of Navy operations. The methodology and sampling design for this survey were submitted and approved in advance, per the SOW, to the NTR (Cetos 2007b). Once a species of interest was located, "focal animal follows" were opportunistically conducted to monitor behavior, occurrence, and distribution of marine mammals or sea turtles before, during, and after the Navy exercise. Pre- and post-exercise observations were conducted for baseline and comparative purposes with observations during the exercise. The primary goal was to monitor behavior of marine mammals or sea turtles within approximately 3-5 nm (5.5- 9 km) of a Navy vessel (but no closer than 3 nm) as feasible (i.e., when weather and conditions allowed). Focal animal follows involved monitoring animals with "big eyes" binoculars, observing and recording their behavior, and collecting photo-identification and species verification photographs as possible. If any marine mammals were deemed to exhibit unusual behaviors, they were to be monitored by spending extra time with the animal(s) to quantify the behavior with detailed behavioral logs, including descriptions of why and how they were thought to be unusual. The survey was to remain in the designated Survey Area Box unless a sighted animal exhibited anomalous behavior outside the Box or if a focal follow effort led outside the Box. Any marine mammal found to be injured or in distress was to be immediately reported to the COMPACFLT Environmental Representative.

In addition, oceanographic data was recorded using T-7 XBTs, launched twice daily. Information was recorded on sea surface temperature, Beaufort sea state and temperature profiles (Appendix B).

VISUAL OPERATIONS

Visual surveys were conducted to meet the Navy goals outlined in the SOW and were adapted to both the in-situ and predicted weather conditions, as well as to naval activities.

Survey Design

The survey transect design was based on general standard distance sampling methodology and techniques described in Buckland et al. (2001). As indicated above, the survey was designed to systematically locate and monitor marine mammals and sea turtles in conjunction with the Navy's USWEX Training Exercise November 2007 within the designated Survey Area "box" (Box). This was accomplished by conducting line transect surveys until animals of interested were located, then breaking off the survey line to follow and conduct focal animal behavioral sampling of these animals and/or to remain within view of Navy operations. For surveys, the Box was divided into four equal-sized, replicate sub-areas (Cetos 2007b) (Figure 1). Three north-south transect lines were located and surveyed within each sub-area in the Box. Lines were spaced equidistant from each other (approximately 4 nm [7 km]) and the edges of the Box (approximately 3 nm [5.5 km]). Equal coverage of each sub-area following pre-set transect lines was attempted. However, real time and prevalent weather conditions (e.g., large swells, high winds, strong sun glare) sometimes necessitated modifying survey line orientation in conjunction with direction on safest routes from the Captain of the vessel. Survey line position was also modified by up to 30 degrees when needed to improve sighting conditions and effectiveness (see Table 1). In addition, effort deviated occasionally from pre-set lines to a) conduct focal animal follows, to b) remain within view of Navy operations, and to c) transit to and from lines between protected nighttime anchorages. Wind and swell conditions also sometimes made it difficult to maintain a specific line position.

Using the above approach, the study area was monitored. We documented occurrence, distribution, numbers, surface behavior, and/or disposition (injured or dead) of marine mammal and sea turtle species Additional observation effort was focused to the extent practical near and where Navy training exercises were occurring or had occurred, ideally while within view of active Navy vessels (but no closer than 3 nm [5.5 km]) as feasible during the days when training exercises were noted.

Observation Platform

Visual survey effort was conducted from the M/V *Searcher*, a 96-ft. American Bureau of Shipping classed vessel (see http://www.searcherhawaii.com/searcher/index.html for further description). This vessel includes a flying bridge platform located at an eye-level elevation of 7.97m above sea level (ASL). On this deck two pedestal-mounted 25x big eyes binoculars supplied by the Navy were located at each forward (bow) corner. Visual distance to the horizon from approximate observer standing eye height was ~8 nm (15 km). To the maximum extent practicable considering observer safety, three visual observers were posted on the flying bridge during all "on transect effort" visual survey periods.

Two observers scanned the water with the big eyes binoculars during survey efforts. Each observer scanned an approximate 90° arc from dead ahead (0 degrees) to just past the beam on their respective side of the vessel. A third observer scanned the region nearest the vessel and out to the horizon area with the unaided eye or with 7x50 West Marine reticle binoculars. The third observer also functioned as the dedicated data recorder. Observers rotated between watch positions every 20-30 minutes to reduce observer fatigue. A typical observer rotation consisted of 30 min as right big eyes

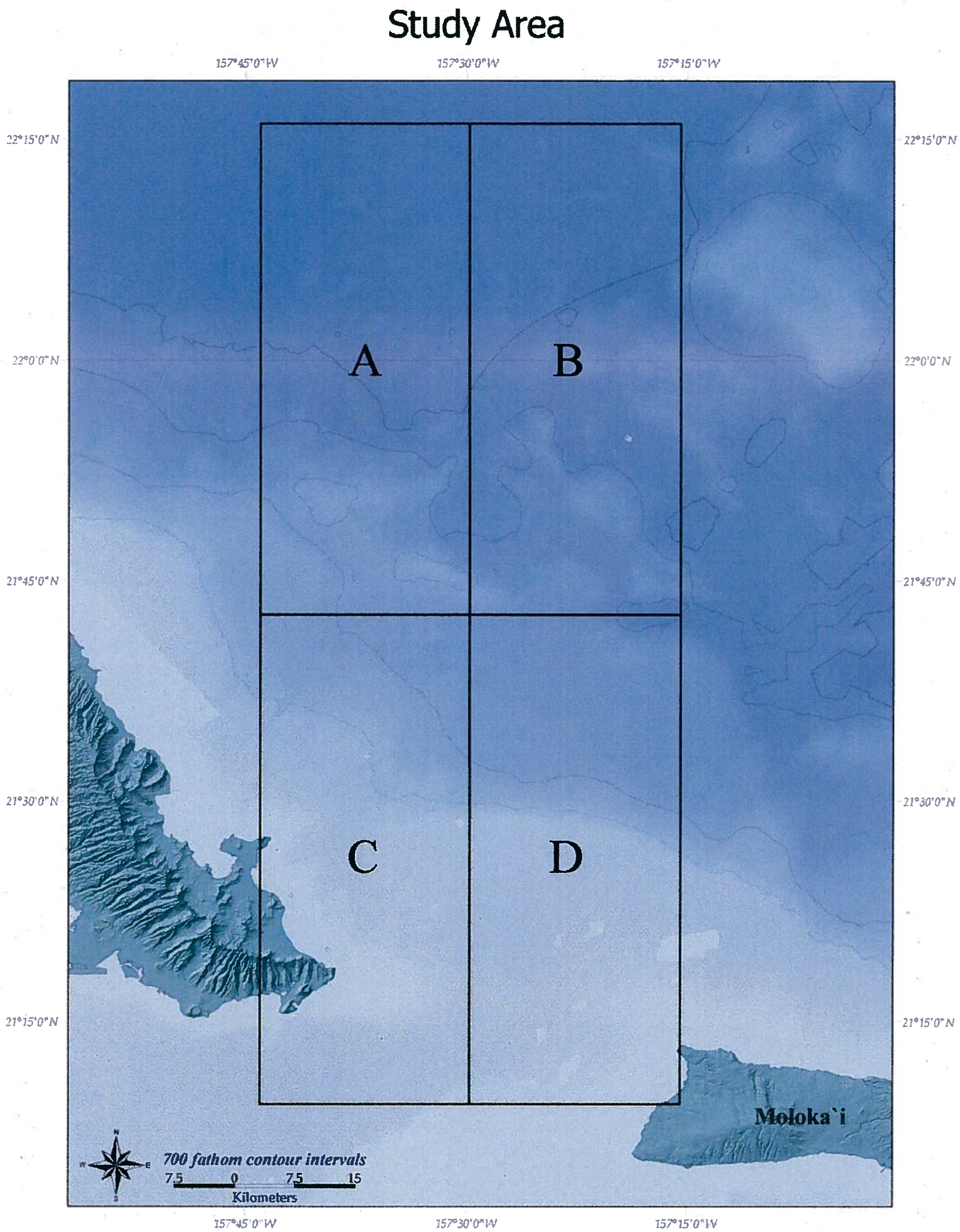

Figure 1. Study Area

observer, followed by 30 min as center observer with naked eye or 7 x 50 binoculars, and 30 min as left big eyes observer, then one hour off.

Data Collection Protocol

When a cetacean sighting was made, the distance and horizontal bearing to the center of the group or individual were estimated using reticle binoculars or the naked eye. In addition, the time, species identification (or lowest taxonomic level that could be confidently discerned), estimated group size, sighting cue, and other associated information were entered by a dedicated recorder into WinCruz, a Windows-based data logging program for recording line-transect data for marine mammals (developed by NOAA Fisheries' Southwest Fisheries Science Center [SWFSC], La Jolla, CA). WinCruz acquires GPS-derived latitude and longitude data to plot sighting and ship-track data. Additional details regarding this program are available online at the following website: http://swfsc.nmfs.noaa.gov/PRD/software/WinCruz.pdf. A WinCruz User's Guide is available in the appendix of our previous Final Field Summary Report (Cetos 2007a).

We used a Garmin GPS Map 76 handheld GPS to collect location data at 1-2 minute intervals throughout the sighting. Weather, swell, Beaufort wind force (sea state), visibility conditions, observers and observer positions, and observation effort status were recorded in WinCruz on every change of observers and at any other time that conditions changed. At the end of each day, a summary of the day's activities and observations were recorded in a field journal kept by the survey leader and a daily sighting log data sheet was filled out.

Visual data collected using WinCruz were reviewed and edited daily while in the field by one assigned visual observer experienced with WinCruz. These data were later exported to a custom-designed (under Cetos contract) summary program specifically created for post processing WinCuz data for the purposes of these surveys. Data then were imported into an Excel database where they were quality-checked twice. GPS data and sighting locations were plotted geographically using GIS software to produce maps. For the purposes of this report, sighting locations were plotted at the location on the ship track where they were initially sighted (Figure 4).

A detailed sighting form was filled out for all sightings by the observer(s) who sighted the animal(s). The sighting form was the same as that used by NOAA Fisheries on their cruises for marine mammals in the Pacific Ocean (NMFS/SWFSC http://www.corporateservices.noaa.gov/~foia/asdhome/frmscat.pdf). The information recorded included a detailed description and sketch(es) of the diagnostic features of the animal(s), a description of the animal's general behavior, speed, and direction of movement, closest observed point of approach to the vessel, whether photographs or video were taken, a standardized questionnaire as to any observed reactions to the vessel, etc., and as delineated in the SOW.

Behavioral Sampling

Behavioral sampling was conducted in two formats. First, we employed focal animal sampling (Altmann 1974) on selected cetacean groups with the intent of focusing on the Navy's prioritized species (beaked whales and sperm, blue, humpback, fin and sei whales). Secondly, for all cetaceans encountered, we used scan-sampling protocol (Altmann 1974) to record behavioral information as described below.

Notably, close approaches to, or behavioral harassment of, certain cetacean species were permitted under the auspices of Cetos' NOAA/NMFS federal and Hawai'i state scientific research permits; however, this permit did not cover sperm, beaked, sei, or fin whales. Any cetacean behavior considered potential harassment as defined under the MMPA or ESA was recorded.

Focal Animal Sampling

Focal animal behavioral sampling was undertaken on selected priority cetacean species using a standard behavioral observation form designed for this survey (Appendix A). Information was collected on species, group size, number of calves, start and end times of observations, unusual and/or surface active (i.e., splash-creating) individual behaviors (e.g., spyhop, breach, head slap, tail slap, etc.), blow and dive times for large whales, distance from the vessel, direction and speed of travel relative to vessel, position of cetaceans relative to vessel, observers/recorders, photos/video taken, and visibility conditions. Ad libitum (Altmann 1974) detailed notes were also taken in the comments column of the form on school configuration, unusual behaviors or circumstances (e.g. birds feeding nearby), and/or any observed reactions to the vessel. A summary was also recorded and described for all focal animal encounters on the SWFSC sighting forms, as explained above.

Scan Sampling

A modified scan sampling protocol (Altmann 1974; Smultea 1994) was used to collect behavioral information on all cetacean groups encountered during the survey, as possible. This information included behavioral state and/or individual behavior, estimated speed of movement, and heading/orientation relative to the vessel. The first datum was recorded in the comment format of WinCruz; the second and third data were also recorded in WinCruz in prompted data entry boxes.

Ancillary Research Activities

Oceanography

One observer with prior related experience was the designated oceanographer and collected subsurface oceanographic data using expendable bathythermograph (XBT) probes provided by the Navy. Two XBT T-7 launches were made per day at 0900 and

1500 hours local ship time and after focal follow sessions. Data were recorded for each drop using WinMK21 SURFACE (Lockhead Martin Sippican, v2.7.1 2006) software.

Photography/Videography

Photo-identification (Photo ID) of animals was conducted opportunistically using a Canon EOS 20D camera with 70-200 mm zoom (f 2.8) lens and a Canon L series 300 mm zoom (f 2.8), with a Canon 1.4X converter and a Canon EOS 30D camera with a 100-400 mm (f 2.8) lens. Data forms were used to track the information (see Appendix A). Photographs were attempted for close encounters with cetaceans in order to both facilitate species identification and to document any deemed unusual behaviors. Photographs also facilitate re-identifying individuals in these waters during past or future Navy exercises or studies.

In addition, video recordings were made for encounters where behavioral sampling occurred using a Sony DCR-PC330 3 mega pixel digital video camera.

SECTION 3
RESULTS

SURVEY EFFORT

Surveys were conducted in all four sub-areas within the Box on seven consecutive days, 11-17 November 2007. A portion of 11 November (5.08 hours [h]) was spent in transit to the survey location. A full chronology of events is given below in Table 1. A total of 65.95 h were spent conducting visual observations. In general, survey effort occurred from sunrise to sunset, averaging approximately 10 h (10.30 h) of effort per day. An exception was 11 November, when a portion of the day was spent in transit and 4.3 h was spent on visual survey. However, poor weather conditions interrupted surveys for short periods on 12 November (0.58 h) and November 14 (0.04 h), totaling 0.62 h off effort. No survey effort occurred on 18 November due mainly to weather. In addition, the vessel was located at the southern tip of the Box at day break, so the vessel was only in the survey area for a limited time that day. Sea state was a Beaufort 6+ and there was a preponderance of wind and rain on the 18th; it was determined to not be conducive to any systematic effort. Nonetheless, one person was kept on watch. Eventually it was determined that effort was ineffective due to high winds and prevailing weather.

Given the size of the survey Box, observers were not always able to locate Navy ships/activities. Surveys conducted on 11-12 November occurred prior to observing Naval exercises in the Box. However, Navy vessels were observed in the Box on 13-14 November. On these days, the Navy was in view (including near and over the horizon) for a total of 8.12 h. The longest day of visual contact with Navy vessels (~6.75 h) was 13 November during which time we conducted survey line effort, a focal follow on a Bryde's whale, and attempted to "shadow" (i.e., follow at a safe distance) a Navy ship (Table 1). At one point we were within 5 nm (9 km) of a Navy ship near where a sei whale sighting had been made the previous day. We took that opportunity to actively follow/ shadow the Navy ship to observe for marine mammals and sea turtles. We followed at a >3 nm (> 5.5 km) distance for 0.25 h. The Navy ship changed its course and we moved away to maintain the >3 nm (> 5.5 km) distance. Shortly thereafter, we opted to return to our survey trackline both as the Navy vessel was headed in a direction

Table 1: Chronology of events during the 11 - 17 November 2007 Marine Mammal and Sea Turtle Survey near the Island of Oahu.

Date	Time	Event
11 Nov	8:20	Depart Ko Olina Marina, Koonelani Harbor to transit along south shore of Oahu to Survey Box ENE of Oahu.
11 Nov	13:25 - 17:43	Conduct observations.
12 Nov	7:08 - 17:44	Conduct observations.
12 Nov	12:25- 12:45	Sighting #1: 1 unid. small whale (possible beaked whale), one blow seen, attempted focal follow, unable to re-sight for positive identification.
12 Nov	13:45- 16:00	Sighting #2: 1 sei whale, focal follow.
13 Nov	7:04 - 17:52	Conduct observations.
13 Nov	10:15- 17:00	Navy vessels in view.
13 Nov	10:30- 11:20	Sighting #3: 1 Bryde's whale, focal follow.
14 Nov	7:15 - 17:40	Conduct Observations
14 Nov	9:24- 9:34	Sighting # 4: 6 Risso's dolphins, attempted focal follow, unable to re-sight.
14 Nov	~14:00 - 15:22	Navy vessels in view: 4 ships, helicopters and plane.
15 Nov	7:37- 17:02	Conduct observations.
15 Nov	13:23 – 13:44	Apparent Navy helicopter circled *Searcher*. Two vessels and possibly a submarine detected by Searcher's radar (potentially related to Navy activities but not confirmed visually).
15 Nov	16:55- 17:03	Sighting #5: 10 spinner dolphins, did not attempt focal follow as darkness imminent.
16 Nov	7:31 - 17:45	Conduct observations, headed directly to previous locations of Navy vessels on 13 Nov.
16 Nov	11:15 - 11:35	Sighting #6: 5 unid. small delphinid (probable blackfish, possible pygmy killer whale), attempted focal follow, unable to re-sight for positive identification.
16 Nov	14:30- 15:34	Sighting # 7: 3 subadult sei whales, focal follow.
17 Nov	6:57 - 16:54	Conduct observations.
17 Nov	10:09- 11:19	Sighting #8: 5 humpback whales, focal follow, obtained photos for ID.
18 Nov		Outside Survey Area Box at day break and Beaufort 6 conditions. In transit back to Ko Olina Marina. No Survey conducted.

away from our vessel and as it was travelling at a fast speed which our vessel could not keep up with; we observed them until they headed over the horizon. On November 14, we headed N on survey effort along the far E edge of the Box. In the afternoon, Navy ships came into view while we remained on our transect headed towards the NE corner of the Box (Table 1). The Navy vessels remained in view as we finished that survey line and headed W to start the adjacent survey line headed S. After ~1.37 h with the Navy vessels in view, the Navy vessels then headed quickly out of sight at a speed at which we could not keep up, so we continued our on-line survey effort headed S. No marine mammal sightings were made while within view of the Navy vessels on this day.

On November 15, a helicopter believed to be associated with the Navy circled our vessel at 5-8 nm (9-15 km); two other unknown vessels appeared on the ship's radar near this time at distances of ~1.7 to 3.5 nm (3-6km), respectively, but were not seen visually at any point (Table 1). These vessels then appeared to increase speed and head away from us over the horizon, again at a speed at which we could not keep up. The *Searcher*'s radar occasionally detected an object which may have been a submarine near the water surface for a short time. The total duration of the latter activities was 0.35 h.

The final two days (16-17 November) of survey were done with no observations of Navy vessels or activities. Survey effort on 16 November was directed toward the location near where Navy vessels were observed on 13 November. On 17 November, we attempted to fill in the gaps in survey line effort at the southern end of the Box. Difficulties with competing swell direction and prevailing winds, in addition to sun glare, made the transect lines more irregular than previous days in order to marginally improve sighting conditions.

Visual effort occurred during most daylight periods (weather permitting) on each of the seven days. Periods when WinCruz operated were categorized as either "on effort" or "off effort" Figure 2. The former portion consisted of two sub-categories: *(1) Survey Effort*, when the visual transect survey protocol was followed with at least three dedicated observers on continuous search effort during a transect within the Box (see Methods) *(2) Survey while Navy in View*, same as Survey Effort but with Navy ships in view on the days during the Navy's exercises. "Off Transect Effort" observations were divided into four categories: *(1) Focal Follows*, when scanning effort was suspended for focal animal behavior follows, *(2) Transit*, when the ship was transiting to the start of a transect line within the Box *(3) Off Weather*, when rain squalls precluded visual surveys, and *(4) Navy Focal Follow*, when the ship attempted to shadow a Navy vessel at a distance of 5 nm (9 km) to observe for any marine mammals or turtles. A total of 491 nm (911 km) were visually surveyed during the seven-day period. Overall, observations occurred during 489 nm (905 km) of this area, representing approximately 99% of the total available daylight watch periods within the Box (Table 2). A summary of visual survey effort (km) by effort type is presented in Table 2.

Sea state conditions ranged from 1 to 6 on the Beaufort (Bf) scale (Table 2). Most (40%) visual observations were conducted in a Bf 5, followed by Bf 3 (27%) then Bf 4 (23%). Sighting of marine mammals and sea turtles is greatly hampered above Bf 5 conditions. Additionally, on several occasions the direction and height of sea swell made observations with the big eyes binoculars impossible. In these cases, hand-held binoculars (7x25 or 7x10) were substituted until observers could return to the big eyes. Beaufort 4 and above conditions were encountered on each day, except 12 November, which was calmer (Figure 3). Conditions of Bf 5 and 6 were encountered on three of the seven days (14 – 16 November).

Table 2. Summary of survey effort (km) and Beaufort sea state (Bf) during the 11 - 17 November 2007 Marine Mammal and Sea Turtle Survey near the Island of Oahu.

Effort Type:	**Total (km)**
Survey Effort	712.3
Survey while Navy in View	104.6
Focal Follow	63.4
Transit	25.5
Off due to Weather	5.8
Total	**911.6**
Beaufort	
1-2	47.0
3	248.0
4	211.5
5	361.3
6	42.2
>6	0.0
Total	**910.0***

* Beaufort readings were recorded within a few minutes after going "on effort" leading to the discrepancy between total km of effort and total km of Beaufort.

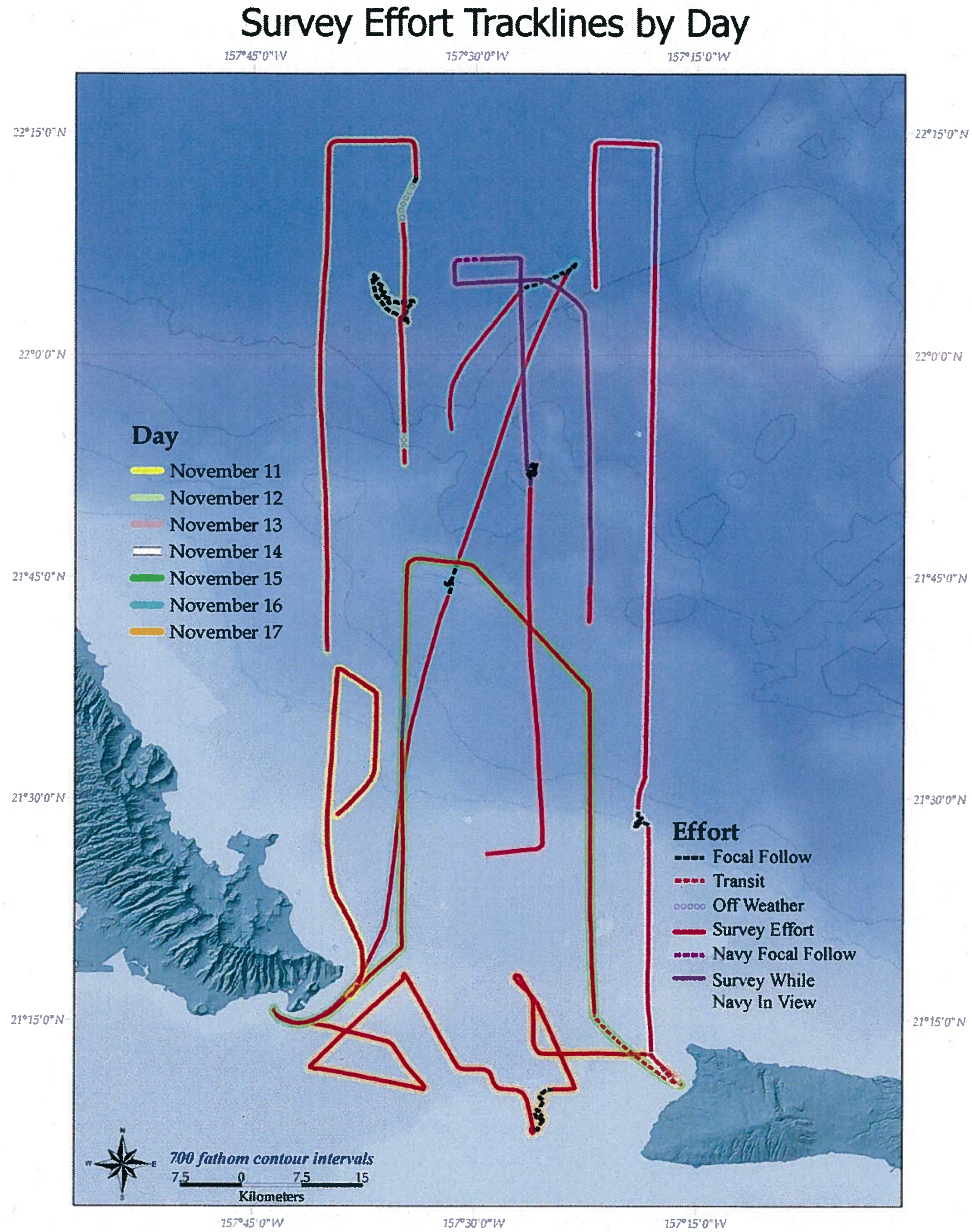

Figure 2. Map Summary of Survey Effort including "On Effort" Transect Survey Tracklines Aboard the M/V Searcher During the 11 - 17 November 2007 Marine Mammal and Sea Turtle Survey Near the Island of Oahu.

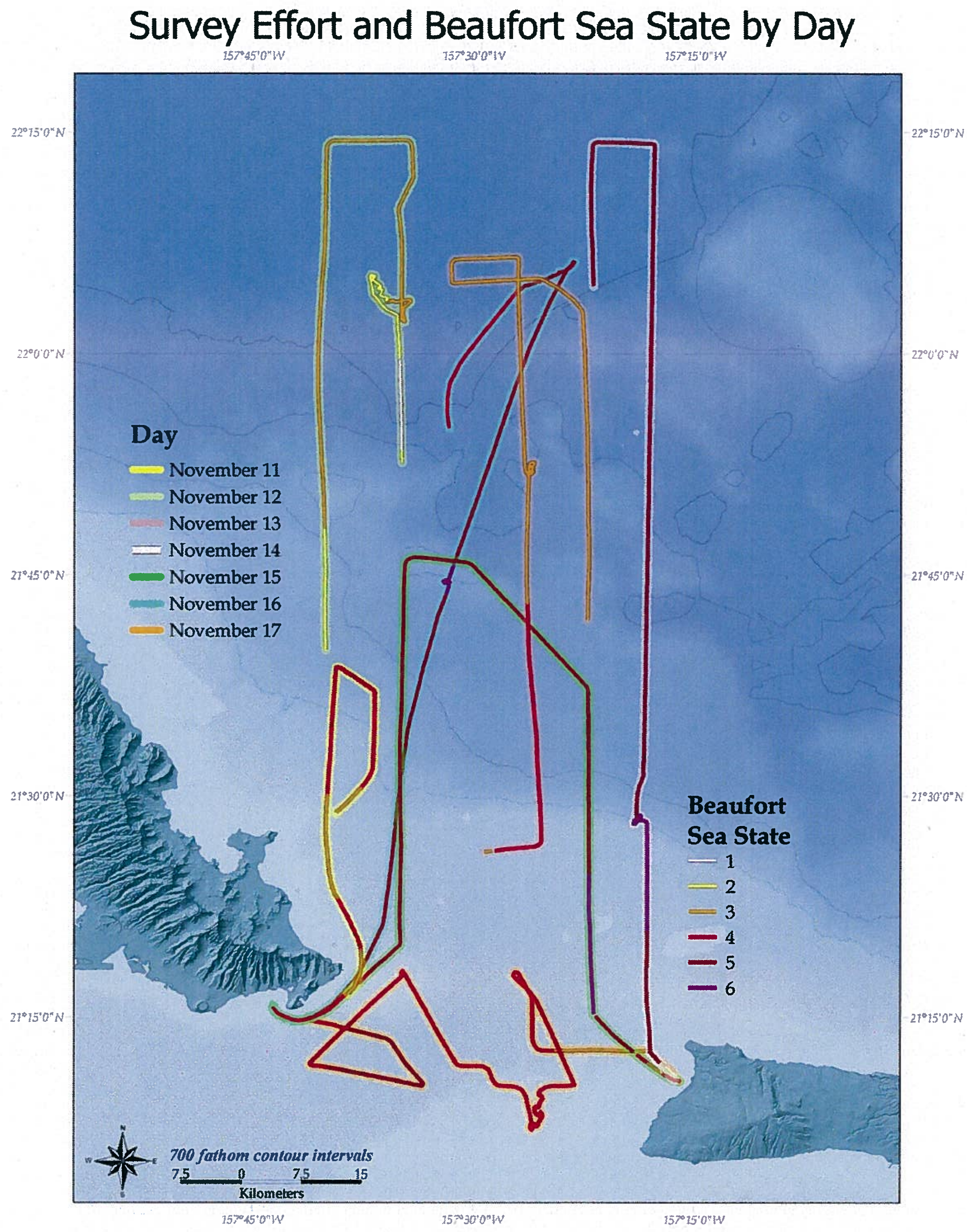

Figure 3. Map Summary of Beaufort Sea States aboard the M/V Searcher During the 11 - 17 November 2007 Marine Mammal and Sea Turtle Survey Near the Island of Oahu.

VISUAL RESULTS

A total of eight cetacean groups were sighted during the entire 7-day cruise (Table 3, Figure 4). No sea turtles were sighted. Five cetacean species were confirmed during the entire survey period: sei whales, Bryde's' whale, humpback whales, Risso's dolphins, and spinner dolphins (Table 3, Figure 4). In addition, one unidentified small whale was observed (probable Cuvier's beaked whale) as was a small group of medium-sized delphinids (probable pygmy killer whales).

In the best judgment of the team of experienced, seasoned observers, no "harassment" under the MMPA or ESA occurred during this survey. Close encounters with cetaceans typically resulted from the animals approaching the survey vessel and no "flee" or avoidance type behavior was observed.

Unidentified Small Whale

Sighted 12 November. Single blow sighted at initial distance of 2 nm (4 km) (Table 3) in the NE quarter of subarea A (22°09.66 N, 155°37.21 W) (Figures 1 and 4). Appeared to be a single animal. After 20 minutes we were not able to resight to confirm species, number of animals, or group composition. Water depth and blow characteristics with back lighting led the observer to an initial unconfirmed identification of Cuvier's beaked whale (*Ziphius cavirostris*). No photo or video were taken.

Sei whale (*Balaenoptera borealis*)

Sighted 12 November. Initial sighting was made of 12-15 ft blow at 1.8 nm(3.2 km), at 200 degrees to right of bow heading to the south near the center portion of Box subarea A (22°02.53 N, 157°34.95 W). We moved closer to the single adult whale to conduct a focal follow (see Behavioral Results). The whale seemed unconcerned with the ship and repeatedly closely (~20 to 30 m) approached the *Searcher* as it was maneuvered in order for observers to take photos and video. The whale repeatedly surfaced to breathe, two times in succession, every 8-12 min while maintaining slow surface travel of 3-4 kts. A total of 145 min were spent with this whale during which time it made occasional no-blow rises, logged just under the surface, and traveled at a slow speed parallel to the ship. Positive identification was made through photos and visual cues.

Table 3. Cetacean species sighted during visual survey 2007 during the Marine Mammal and Sea Turtle Survey near the Island of Oahu. There were no sea turtle sightings. See Figure 4 for a map of all sighting locations. The groups followed for extended periods to conduct focal behavioral sessions are indicated in boldface type. See Table 4 for further details on these focal groups.

Date	Species	Initial Sighting Distance (km)	Beaufort Sea State	Group Size/ Composition	Photos/Video Taken	Summary of Observed Behavior
12 Nov	Unid. small whale (possible *Ziphius cavirostris*)	4.0	3	1/unk	No	Unable to resight. Probable beaked whale.
12 Nov	**Sei whale (*Balaenoptera borealis*)**	3.2	2-3	1/A	Yes/Yes	26 resights of 1 sei whale in 2.25 h. It repeatedly approached boat; blows every 6-12 min.
13 Nov	**Bryde's whale (*Balaenoptera edeni*)**	<1.6	3	1/A	Yes/Yes	11 resights of 1 Bryde's whale. Whale approached boat to within ~65 m.
14 Nov	Risso's dolphin (*Grampus griseus*)	0.05	6	5/A	No/No	Sighting made near bow in proximity to previous location of yellow-fin tuna school.
15 Nov	Spinner dolphins (*Stenella longirostris*)	0.32	4	10/A	No/No	Three subgroups totaling ~10 dolphins swam close and parallel to shore as we headed into mouth of bay at dusk; approached and crossed our bow.
16 Nov	Unid. medium delphinid (possible *Feresa attenuata*)	0.8	6	5/unk	No/No	Unable to re-sight. Probable pygmy killer whales.
16 Nov	**Sei whale (*Balaenoptera borealis*)**	2.9	4	3/SA	Yes/Yes	Appeared to be ~1-2 year old whales.
17 Nov	**Humpback whale (*Megaptera novaeangliae*)**	1.6	3	3/1SA, 2A	Yes/Yes	May have been up to 5 different animals, seen 1-2 at a time. Other blows seen near horizon on Penguin Bank.

unid. = unidentified
unk. = unknown composition
A = adult
SA = subadult

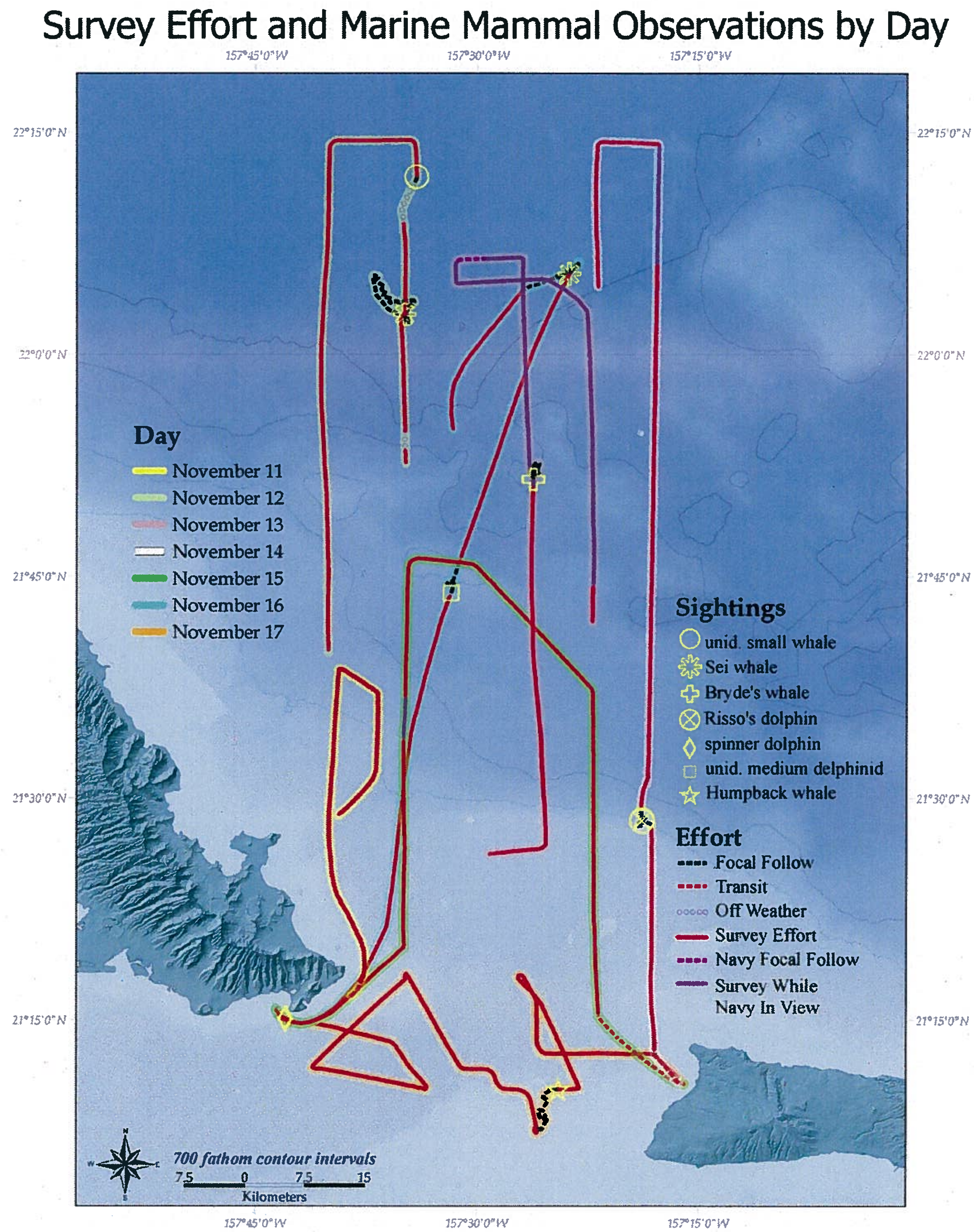

Figure 4 Map Summary of Visual Detections of Marine Mammals during Visual Observations from Aboard the M/V Searcher During the 11 - 17 November 2007 Marine Mammal and Sea Turtle Survey Near the Island of Oahu.

Bryde's Whale (*Balaenoptera edeni*)

Sighted November 13. A whale blow was seen at the initial distance of <0.86 nm (1.6 km), in the SW quarter of Box subarea B (21°51.90 N, 157°26.20 W), and was re-sighted 13 min later at a distance of 0.06 nm (0.11 km). During a 50-min focal follow the whale was observed swimming at slow speeds (3-5 kts), blowing and remaining submerged from 4-14 min. The whale exhaled underwater at least three times. The whale did not seem to actively avoid the ship and approached the ship maintaining its behavior state of slow travel on numerous occasions. We noted 12 cookie cutter shark marks/bites on this single adult. During this encounter, a Navy vessel was in sight over the horizon to our NW (320 degrees magnetic) at approximately 15 nm (28 km) at which time the whale was traveling to the NNE. Positive identification was made with photographs.

Risso's Dolphins (*Grampus griseus*)

Sighted 14 November. These dolphins were sighted just off the bow of the ship (.003 nm [6 m]) in the NE quarter of Box subarea D (21°28.60 N, 157°18.60 W). Initial sighting was 2 animals crossing the bow heading ESE at a moderate speed. The second sighting at 0.22 nm (400 m) indicated 6 adults traveling at a moderate speed continuing to head SE. The sighting was made in Bf 5-6, while the ship was traveling at 8 kts. We were not able to resight for photo/video or focal follow. This sighting was made in the vicinity of previously sighted yellow-fin tuna school and feeding birds.

Spinner Dolphins (*Stenella longirostris*)

Sighted 15 November. Three subgroups totaling ~10 dolphins (minimum of 5, 3 and 2 adults in each subgroup) seen near dusk in the SW quarter of Box subarea C (21°15.34 N, 157°42.74 W). The first subgroup was seen within .05 nm (100 m) of the ship at 60 degrees off the starboard bow. They were re-sighted as two subgroups traveling slowly parallel to the vessel with a heading of 0 degrees relative to the bow. As they approached to within 0.14 nm (250 m) they increased their speed and changed their heading to 350 degrees (relative). A third group was seen at 330 degrees off the port bow moving away from the ship. In the 8 minutes spent sighting and resighting no photos or video were acquired.

Unidentified Medium Delphinid

Sighted 16 November. A group of 5 delphinids was seen traveling slowly (1-3 kts) in rough Bf 6 conditions within ~0.14 nm (250 m) ahead of the ship, traveling to the east. Three dorsal fins were initially seen as they slowly rolled at the surface; another animal was sighted as its head broke the water surface. Identified characteristics were similar to pygmy killer whales (*Feresa attenuata*). No unusual behavior was seen; the animals were not resighted despite 20 minutes of searching in the SE quarter of Box subarea A where they were initially seen (21°49.00 N, 157°22.29 W). No photo or video was obtained.

Sei whales (*Balaenoptera borealis*)

Sighted 16 November. This was our second sighting of sei whale, and at a similar latitude (22 ° 05.70 N) as the sighting on 12 November (22 ° 02.53 N) (~20 km apart; Fig. 4). This time the sighting was in the NW quarter of Box subarea B (22 ° 05.70 N, 157 ° 22.59 W). Initial sighting was a blow at 1.5 nm (2.9 km) to the north. Group consisted of three subadult sei whales estimated to be about the same size at ~8 to 11 m long. Throughout the total 64 min of observations, the three subadult sei whales traveled slowly (1-3 kts) and appeared to be "riding" or "surfing" the swells. They usually traveled just below the surface taking visible breaths every 8-10 minutes, sometimes logging at the surface. On numerous occasions, they crossed the bow, approaching the *Searcher* to within 15 m. Their general travel direction was south. Two of the whales generally remained within approximately 1-3 body lengths of one another. All three whales seemed unconcerned with the movements of the ship and did not exhibit any fleeing or evasive movement or behavior. Numerous photos (n = 337) were taken, many showing confirmational identifying characteristics for sei whales.

Humpback Whale (*Megaptera novaeangliae*)

Sighted 17 November. A blow identified this group of 2 adults and 1 subadult initially traveling fast headed south toward Penguin Bank in the southern end of Box subarea D (21 ° 09.60 N, 157 ° 25.36 W). Part-way through the observations near the time a breach was observed, one of the adults left the group. The next time humpbacks surfaced, we were not sure if they were the same individuals. However, close examination of photo-identification photographs may reveal the fluke identification and/or the actual number of individuals we followed. We observed typical respiratory and non-respiratory behaviors (breaching, peduncle and flipper splashing, tail swishing) and obtained underside fluke and dorsal photos for individual identification. The subadult breached three times and was recorded on video. Two to three other humpback pods were seen near the horizon. During the course of the focal follow, we moved SW out of the Box to continue behavioral observations.

BEHAVIORAL SAMPLING

Focal follows were conducted on four cetacean sightings: a single sei whale, a single Bryde's whale, a group of three subadult sei whales, and a group of three humpback whales. Details of these focal pod follows are described in Table 4. Focal follows were conducted in three of the four subareas in subareas A, B, and D (Figure 2) Focal behavioral sessions ranged in duration from 50 - 145 minutes, with the longest continuous observation session of 145 minutes occurring with the first sei whale. Longer time was spent with those species with federal listing under the ESA, i.e. the sei whales and humpback whales.

Sei whales and Bryde's whales can easily be confused. We spent additional time on the focal follow of the Bryde's in order to make a positive identification of the animal. Photographs were taken during all focal follows. Video was obtained during the sei

Table 4. Behavioral sampling results of focal animal follows 11 - 17 November 2007 Marine Mammal and Sea Turtle Survey near the Island of Oahu.

Date	Species	Total Time With Animal/s	Depth (m)	Group Size/ Composition	Behavior State	Individual Non-Blow Behavior	Comments
12 Nov	Sei whale (*Balaenoptera borealis*)	145 min	2500	1/ adult	Slow travel	No blow rise.	Maintained slow travel throughout observations, often logging just below water surface; repeatedly approached/paralleled *Searcher*.
13 Nov	Bryde's whale (*Balaenoptera edeni*)	50 min	4500	1/ adult	Slow travel	No blow rise, underwater blow.	Maintained slow travel speed throughout observations; approached Searcher several times. Navy vessel in view over the horizon during encounter.
16 Nov	Sei whale (*Balaenoptera borealis*)	64 min	5000	3/subadults	Logging, slow travel	No blow rise, "surfing swells", "bow riding"	Repeatedly followed vessel, crossed bow and "surfed" bow wave and swells. Whale movement appeared to be propelled by swells.
17 Nov	Humpback whale (*Megaptera novaeangliae)*	70 min	40	3/2 adult, 1 subadult, may have been as many as 5 animals.	Fast and medium travel, surface-active travel	Breach, peduncle slap, pectoral fin slap, tail swish, fluke up, peduncle arch, no blow rise	Frequently changed travel directions in apparent response to other nearby humpbacks; appeared to be a disaffiliation then an affiliation of humpbacks associated with surface-active behaviors.

whale focal follow on 12 November and the humpback whales focal follow on 17 November.

Ad libitum continuous sampling was conducted on all focal follows of baleen whales. This resulted in continuous or nearly continuous records of all blows, surfacings, and conspicuous individual behaviors (e.g., breaches, pectoral fin slaps, tail swishes, etc.). In addition, closest inter-individual spacing (estimated in relative body lengths), distance and bearing from the observation vessel, behavioral state, speed of travel, and orientation of whales relative to the vessel were recorded at least once during each surfacing sequence. The latter typically was recorded at the beginning and sometimes the end of the surfacing. The presence, number, distance and activity of all vessels and aircraft within view at the time of focal observations were also regularly noted. Five to 11 observers, including the Cetos team of professional marine mammal observers and additionally up to five crewmembers, were involved in extended focal sessions of baleen whales typically from the flying bridge. Additional observers aided in the resightings of whales between surfacing bouts. Two to three professional marine mammal observers focused on logging behaviors, one or two of which observed the animals and the other whom recorded information on data sheets and Wincruz (the latter for successive lat/long positions). Another professional marine mammal observer took video, while one to two other professional marine mammal observers took digital photographs. The photographer also called out behavioral-related data in the case of multiple whales in a group.

This protocol approach as described allowed us to obtain continuous or nearly continuous, detailed data on the small groups of baleen whales encountered and followed for extended periods. In all cases, focal observation sessions ended at the discretion of the lead scientist in order to meet other goals of the study. Furthermore, none of the whales followed during focal sessions exhibited any notable evasive or disturbance behavior related to the observation vessel or as defined under the MMPA. Other than the repetitive "bow riding" and "surfing" behavior exhibited by the three subadult sei whales, no "unusual" behavior was noted. The former behavior was deemed unusual because very little is known about sei whale behavior as reported in available literature, particularly of subadults/juveniles (e.g., Reeves et al. 2002; Jefferson et al. 2008). It was the opinion among the assembled professional observers (with an average field experience of 24 years) that such continuous, repetitive, "leisurely" "surfing" behavior among sei whales has not been commonly observed either by any of them nor has it been reported to occur in the literature. This behavior was considered attributable to the relatively large swells that day (0.9 to 1.5 m [3 to 7 ft] swells) and the movement of the observation vessel through the water and swells. Again, the whales did not exhibit any distress or otherwise recognizable evasive or adversely disturbed behavior. In contrast, they appeared to be attracted to the vessel and the bow waves/swells/currents it generated at its bow as it traveled at approximately 1-3 kt.

Ancillary Research Activities

Oceanography

A total of 13 bathythermograph (XBT) launches were successfully conducted during the Marine Mammal and Sea Turtle Monitoring Survey 11-17 November 2007 as launched from the stern of the *Searcher*. Related results, figures, and discussion are provided in Appendix B.

Photography/Videography

Photographs were taken during all focal follows (see Behavioral Sampling). Certain photos assisted with positive identification in 3 of 4 focal follows. Sei and Bryde's whales can easily be confused and are frequently misidentified. The photos were definitive in these cases. Photos taken of the humpback whale focal group may be of use in identifying individuals using existing photo ID databases. Both cameras produced photos on all focal follows. The photographic data obtained is presented in Table 5.

Table 5. Photo/video results from 11 - 17 November 2007 Marine Mammal and Sea Turtle Survey near the Island of Oahu.

Date	Species Sighting	Total Photos	# Frames utilized for Species ID	Min of Video
12 Nov	Sei whale (*Balaenoptera borealis*)	124	14	4:04
13 Nov	Bryde's whale (*Balaenoptera edeni*)	67	9	-
16 Nov	Sei whale (*Balaenoptera borealis*)	337	7	-
17 Nov	Humpback whale (*Megaptera novaeangliae)*	143	-	2:29

Video was taken during two of the four focal encounters. Technical difficulties with the equipment during the focal follow on 16 November, were resolved and video recording was resumed for the focal follow on 17 November. Video on 12 November produced limited useful footage. Video on 17 November recorded a near full breach by the sub-adult humpback whale, two dives, and footage of dorsal hump, back and caudal peduncle of the humpback whales.

SECTION 4
DISCUSSION

The occurrence of cetacean species is not well documented in the HRC off the windward-facing NE shore of Oahu, particularly in waters >25 nm (46 km) from shore. This is due to predominant strong NE tradewind and wave conditions that typically preclude effective visual observations as well as minimal survey effort in waters >25 nm (46 km) from shore. Prior to our survey, the most recent and comprehensive systematic survey that included waters of the HRC was a NOAA Fisheries-sponsored line-transect vessel-based survey of the U.S. Exclusive Economic Zone (EEZ) and an area outside the EEZ around the Hawaiian Islands chain including the Northwest Hawaiian Islands from August to November 2002 (Barlow 2003, 2006; Barlow et al. 2004). The latter survey was focused on odontocetes (toothed whales), primarily delphinids (dolphin species), in pelagic waters near some of the islands; very little effort occurred in the HRC (Barlow 2003, 2006; Barlow et al. 2004). While some aerial survey transects have occurred in the HRC, relatively few cetacean sightings have been made in the usually rough sea conditions encountered there (e.g., Mobley et al. 1999a, 1999b, 2000, 2001, 2004). It is not known, however, whether this is because the density is truly low, or whether it is a factor of poor observation conditions. Thus, there is a considerable data gap in the distribution and occurrence of cetaceans in the HRC off the NE coast of Oahu.

Despite relatively poor weather and sea conditions during much of the survey, our research effort was successful on several fronts, as follows:

- We documented the first occurrence of the Bryde's whale near the main Hawaiian Islands. Previous verified sightings from the Hawaiian Islands region have occurred only in the leeward Northwestern chain of the Hawaiian Islands at least ~1160 km WNW of Kauai (Barlow 2003, 2006; Barlow et al. 2004).

- We documented two rare sightings of sei whales composed of 4 individuals NE of Oahu. Sei whales were only recently (in 2002) documented and confirmed to occur in waters surrounding the Hawaiian Islands (Shallenberger, 1981; Mobley et al. 2000; Mobley 2002; Barlow 2003, 2006; Barlow et al. 2004; Rankin and Barlow 2007). Within the main Hawaiian Islands, previous sei whale sightings occurred ENE of Molokai and off the E side of the Big Island of Hawaii, with no sei whale sightings near Oahu (Barlow et al. 2004; Rankin and Barlow 2007). Another important factor from our survey related to sei whales is that one of our sei whale sightings consisted of three juveniles estimated to be 1-2 years old. Winter breeding/calving grounds of North Pacific sei whales have not been located, although they are known from whaling data to breed and calve during fall (Reeves et al. 2002; Jefferson et al. 2008). The latter sighting of young sei whales combined with other sei whale sightings during fall suggests that some sei whales use the offshore waters of the Hawaiian Islands during the fall breeding season.

- We demonstrated that opportunistically "shadowing" / "following" Navy exercise vessels at a safe distance (>3 nm [> 5.5 km]) for an extended period (up to ~8 hours) is possible, at least under the circumstances we encountered. It was also possible, under the circumstances we encountered, to conduct a focal follow of a whale sighting while within view of Navy exercise vessels.

- We demonstrated that using two sets of Big Eyes in addition to a naked-eye observer from the *Searcher* improves the effectiveness of sighting cetaceans during conditions of Beaufort sea state <6 and limited swell conditions. Two of the eight total cetacean sightings were initially made with the Big Eyes (vs. six were made with the naked eye initially). However, when heading into swells over approximately 5-6 ft in height from the Searcher, the ability and efficiency of using the Big Eyes is compromised due to instability of the observation platform. This effects can be somewhat mitigated by shifting the vessel's heading. Big eyes also facilitated confirmation of species identifications by allowing for more detailed sightings.

- Data collected during this study contribute to baseline data important in developing and implementing effective marine mammal monitoring for the Undersea Warfare Exercises proposed to continue to be conducted through January 2009 in the HRC.

- This Cetos survey was also important in identifying both limitations of and recommendations for future monitoring-related efforts as discussed in the following section.

It is not possible in this report to assess potential effects of the Navy exercises on marine mammals as we were not provided with detailed information on the nature and timing of their activities. Therefore, we can not make correlations between behaviors and Navy actions.

SECTION 5
RECOMMENDATIONS

A list of recommendations for future monitoring efforts relative to the survey design and its implementation has been compiled by Cetos Research Organization for use in future monitoring efforts. These recommendations are based on results of and events relating to this survey, as well as on our previous experience with and knowledge of relevant mitigations and of monitoring surveys, including past USWEX monitoring surveys (e.g., Cetos 2005, 2007a). Below is a short summary of these recommendations.

A. Monitoring Workshop

Cetos highly recommends that a workshop be held on behalf of the Navy to identify and synthesize the effectiveness and feasibility of various monitoring approaches that could be implemented in association with USWEX Navy exercises and other such Navy activities. A brief synopsis of some of our recommendations is provided below. Greater detail could be provided and developed in a workshop as suggested above, which would be designed to address this type of survey project. A workshop on this topic would allow for the following:

- This workshop could pull together experts and professionals knowledgeable about Hawaiian cetaceans, those with considerable marine mammal monitoring experience with the species of concern, and others with relevant expertise (e.g., survey design, behavioral reactions to anthropogenic sounds, etc.) that could contribute to the goals of the workshop.

- In particular, this format could be used to develop an approach to determining the minimum sample sizes needed to address monitoring concerns, and aid in selecting approaches that are feasible given the limitations of the issue(s) of concern (e.g., species density/attainable sample size vs. ability to determine effects, etc..

B. Feasibility of Monitoring Near Navy Activities/Vessels

Based on our results, on an opportunistic basis, it is possible to remain within view and a safe distance (>3 nm [> 5.5 km]) from the USWEX Navy exercises encountered during this survey. This approach should be implemented as a potentially viable monitoring measure as part of vessel-based monitoring for marine mammals and sea turtles during future activities. Related future recommendations include:

- If the survey vessel encounters Navy vessel activities, the survey vessel should stay within view but >3 nm (> 5.5 km) from the vessels for as long as feasible. This would facilitate identification of any marine mammals and sea turtles of concern that may exhibit reactions to the Navy activities.

- If the Navy vessels move out of sight faster than the survey vessel can follow, the survey vessel should remain in the vicinity where the Navy activities occurred to identify any potential changes in animal behavior or reaction, and/or to obtain "post Navy activity" behavioral observations

- Cetos recommends using a small aircraft to monitor behavioral observations in addition to vessel-based monitoring. If the aircraft is kept at a sufficient radial distance from the animals of concern (i.e., out of hearing range given Snell's cone—see Richardson et al. 1995), then potential confounding effects of the aircraft on whale behavior can be discounted. Aerial surveys have been shown to be effective for assessing disposition of marine mammals as well as to determine abundance, and even photographic identification of individuals (Barlow and Gisiner 2006) Aerial surveys in conjunction with vessel-based surveys offers an optimal platform for monitoring. Note: for vessel-based behavioral observations, it can be problematic to separate out behavioral effects from the vessel. However, the vessel, combined with aerial surveys, remains a logical platform to identify the disposition of marine mammals (e.g., unusual behaviors, injured animals, etc.). Combined aerial and visual surveys took place during this training exercise i.e. aerial surveys were done in addition to the shipboard survey, although under separate contract.

C. Vessel-Based Survey Protocol

Based on our findings from this and other surveys, vessel based surveys are effective for monitoring during Navy training exercises. Data collection and relevant information gathering would be enhanced by incorporating our suggestions and recommendations below. These include:

- A minimum of six marine mammal visual observers as used during this survey are warranted to provide effective data gathering in various weather conditions. After experimenting with more and fewer observers, having a team that is comprised of six individuals is our recommendation. This ensures adequate coverage, and effective observations as well as data collection.

- A navigating program should be purchased and used from the observer station in conjunction with the data collecting PC. A program of this type was used by the Captain and crew of the Searcher during the survey; however, it could not be used in real time by the observers because the monitor was located in the enclosed bridge. . This necessitated that an observer would have to take several minutes to leave the observation station on the flying bridge, go below, and obtain information of interest. In order to do this, the observer in question was required to actually observe the monitor located in the bridge (i.e., the information could not be effectively communicated via radio from the bridge to the flying bridge). A real time charting program improves effectiveness of observations by:

    - Providing a real-time image of proposed, past, and recent ship tracks relative to survey design/track lines, sighting locations, locations of Navy activities, etc.;

    - Provides ability to quickly calculate distances and estimated time to arrive at destinations; this aids in survey planning that can be readily adapted to changing conditions (e.g., sighting Navy vessels, species of concern sightings, winds, currents, swells, glare, etc.); and

    - Data layers that can be displayed graphically in real time include bathymetry, bottom topography, currents, winds, other vessels, shoreline, tracks, sightings etc. Information can also be edited (e.g., shown or deleted, etc.) and printed out to provide maps for in situ adaptive survey planning purposes, data analyses, reports, etc.

- Wincruz is considered awkward and inadequate for the purposes of monitoring surveys. This has been the assessment of our monitoring team since our first survey (Cetos 2005) and we remain confidant that it is not the best program for these surveys as it was designed to be executed for different survey goals. We recommend obtaining ***Noldus***, a program designed specifically for monitoring animal behavior, and having the engineers assist in creating the program designed for these surveys. The ***Noldus*** program can be specifically tailored to meet the needs and interests of any user, in this case, the Navy's monitoring program. (http://www.noldus.com/site/nav10000). Our conclusion is based on the following:

    - In particular, it is currently impossible to collect individual data on all whales in groups of >2 animals using Wincruz and hand-taken notes/data sheets. Noldus provides a small PDA, optionally with a touch screen, that speeds up the data recorder's ability to take detailed behavioral observations, including for more animals. Noldus also reduces the need for multiple entries on different sources by combining all needed data into one program/computer.

- Noldus can be designed with specific statistic tests in mind so that various hypotheses can be addressed, with the statistical power warranted.

Noldus must be obtained with enough lead time so that the tailoring of the program could be done prior to survey start. This program would provide ongoing support to Navy exercises on a continual basis, and greatly increase the relevance and usefulness of collected data. The data gathered would be more in alignment with the goals of the monitoring study.

D. Survey Preparation

We recommend six weeks absolute minimum lead time to allow for appropriate survey preparation which in turn will allow for better collection of data. This lead time is a minimum to allow us to amass the appropriate (professional and trained in marine mammal observing) staff, who are often scheduled months in advance. It will also allow us to prepare/procure the appropriate equipment, and allow for less expensive travel (air tickets) i.e. with advance ticket purchases. Advance time will allow us to reserve charter vessels and in many cases will create the opportunity to obtain a less expensive rate which will save funds. In terms of mobilization, a minimum of two days prep time is recommended in order to set up equipment on the boat. Particularly in terms of big eyes, 2 days is a minimum and in many cases, more time will be needed especially without local onsite help which is only occasionally available. Lead time will allow us to continue to develop database programs which enhance analysis. In the case of this survey, for example, we had enough time to develop a needed program based on our experience from our last survey. We contracted a programmer to design a program to post-process the WinCruz data so that data was summarize correctly.

E. Future Vessel-Based Surveys

The Searcher and its crew are considered sufficiently safe, seaworthy, amenable, and adequate to conduct vessel-based monitoring surveys in other areas of concern to the Navy in Hawaii that are further offshore, e.g., the Navigator Seamounts.

F. Coordination with Aerial Surveys

When vessel-based and aerial surveys are to occur concurrently in the same area, they should be coordinated prior to and during the surveys for the following reasons:

- If an animal of concern is found by either team, but particularly initially by the vessel team, exhibiting unusual behavior or disposition, the aerial team is capable of following the animals over a wider range and performing a longer term case study of the animals' disposition;

- The aerial survey team can also take photographs from a different perspective that can aid in species ID and behavioral descriptions; and

- Vice versa, i.e. if the aerial team identifies a species of concern as such to the vessel, and subsequently needs to leave the area, they can inform the vessel team of the animals' exact whereabouts (possibly even staying on station until the vessel arrives) allowing the vessel continue following the animal and collecting data for the sighting.

G. Aerial Survey Recommendations to Identify Potential Strandings

Cetos recommends that aerial surveys circumnavigate nearby islands (in the vicinity of the training) to search for stranded, injured, or unusually behaving species of concern. This additional tracking should be scheduled as follows:

- First, this survey would occur once before the Navy activities begin. This would allow for the ID'ing any strandings that may exist before activities begin, to eliminate potential cause and effect links to Navy activities for such strandings;

- Subsequently this survey would occur at minimum once during Navy activities. The aerial survey should be scheduled considering the distance of the Navy activities to the nearby land, and also with the predominant current and wind speed and direction relative to the location of Navy activities addressed. By assessing these factors, the survey can be conducted with the provision for enough time to create the opportunity to sight any potentially stranded animals i.e. animals that may have had a reaction to training would have had sufficient time to potentially be stranded. For example, if the activities occur 30 nm (56 km) from shore, and the predominant current speed is 3 kt toward an island, then it could take 30 nm (56 km)divided by 3 nm (5.6 km)/h = 10 hr for a dead or injured animal to land on the beach.

- Finally, this survey should occur at minimum once after Navy activities have ended, with timing coordinated to consider factors identified above (e.g., distance to study area, currents, wind, etc.)

H. Acoustic Monitoring Via Array

We continue to believe that using acoustic research equipment would aid in monitoring for the Navy exercises. A towed acoustic array that is capable of localizing vocalizing cetaceans is recommended to be used along with associated software and hardware for the following reasons (also see Cetos 2005 and 2007a):

- It can be used to increase the detection rates of cetaceans that vocalize but are not seen, and when visual observation is not possible;

- Marine mammals can be recorded vocalizing or not vocalizing before, during, and after Navy exercises; and

- Acoustic monitoring team can assess marine mammal activity at night; we recommend monitoring should include at least two dedicated acoustics specialists who can alternate shifts over nighttime monitoring

SECTION 6
ACKNOWLEDGEMENTS

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SECTION 7
LITERATURE CITED

Altmann, J. 1974. Observational study of behavior: Sampling methods. Behav. 49:227-267.

Barlow, J. 2003. Cetacean abundance in Hawaiian waters during summer/fall 2002. Southwest Fisheries Center Administrative Report LJ-03-13:20 pp.

Barlow, J. 2006. Cetacean abundance in Hawaiian waters estimated from a summer/fall survey in 2002. Marine Mammal Science 22:446-464.

Barlow, J., S. Rankin, E. Zele, and J. Appler. 2004. Marine mammal data collected during the Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS) conducted aboard the NOAA ships McArthur and David Starr Jordan, July-December 2002. NOAA-TM-NMFS-SWFSC-362. National Marine Fisheries Service, Southwest Fisheries Science Center, La Jolla, CA. 39 pp.

Barlow J., and R. Gisiner 2006. Mitigating, monitoring and assessing the effects of anthropogenic sound on beaked whales. J. Cetacean Res. Manage. 7(3):239–249.

Buckland, S. T., D. R. Anderson, K. P. Burnham, J. L. Laake, D. L. Borchers, and L. Thomas. 2001 Introduction to Distance Sampling. Oxford University Press. 432 pp.

Cetos 2005. Final Field Summary Report. *A Preliminary Acoustic-Visual Survey of Cetaceans in Deep Waters around Ni'ihau, Kaua'i, and portions of O'ahu, Hawai'i from aboard the R/V Dariabar, February 2005.* Prepared by: Cetos Research Organization, Bar Harbor, ME, under Contract No. 2057sa05-F to Geo-Marine, Inc. for NAVFAC Pacific. Authors: Norris, T.F., Smultea, M.A., Zoidis, A.M., Rankin, S., Loftus, C., Oedekoven, C., Hayes, J.L., and Silva, E. July 14, 2005.

Cetos 2007a. Final Field Summary Report. *Marine mammal visual survey in and near the Alenuihaha Channel and the Island of Hawai'i: Monitoring in support of Navy training exercises in the Hawai'i Range Complex, January 27 – February 2, 2007.* Prepared by: Cetos Research Organization, Oakland, CA, under Contract No. N62742s-07-P-1895, Naval Facilities Engineering Command Pacific, EV3 Environmental Planning, Pearl Harbor, HI. Authors: Smultea, M.A., J.L. Hopkins, A.M. Zoidis. March 5, 2007.

Cetos 2007b. Survey Design Final Report. *Survey Design for Vessel Survey of Marine Mammals in Conjunction with USWEX Exercise November 2007.* Prepared by: Cetos Research Organization, Oakland, CA, under Contract No. N62742-07-P-1915, Naval Facilities Engineering Command Pacific. EV3 Environmental Planning, Pearl Harbor, HI. Authors: Smultea, M.A., J.L. Hopkins, A.M. Zoidis. October 24, 2007.

Jefferson, T. A., M. A. Webber, and R. L. Pitman. 2008. Marine Mammals of the World: A Comprehensive Guide to Their Identification. Academic Press/Elsevier. 573 pp.

Mobley, J. R., Jr., 2002. Results of 2002 aerial surveys of humpback whales north of Kaua'i. Report for the North Pacific Acoustic Laboratory Program, 13 pp.

Mobley, Jr., J. R., G. A. Bauer, and L. M. Herman. 1999a. Changes over a ten-year period in the distribution and relative abundance of humpback whales (*Megaptera novaeangliae*) wintering in Hawaiian waters. Aquatic Mammals, 25(2):63-72.

Mobley, J. R., Jr., R. A. Grotefendt, P. H. Forestell, and A. S. Frankel. 1999b. Results of aerial surveys of marine mammals in the major Hawaiian Islands (1993-98): Final Report to the Acoustic Thermometry of Ocean Climate Program (ATOC MMRP), 34 pp.

Mobley, J. R. Jr., K. A. Forney, R. Grotefendt, and P. H. Forestell. 2000. Distribution and abundance of odontocete species in Hawaiian waters: Preliminary
results of 1993-1998 aerial surveys, Southwest Fisheries Science Center Administrative
Report LJ-00-14C: La Jolla, California.

Mobley, Jr., J. R., S. S. Spitz, and R. A. Grotefendt. 2001. Abundance of humpback whales in Hawaiian waters: Results of 1993-2000 aerial surveys. Report to the Hawaiian Islands Humpback Whale National Marine Sanctuary, 21 pp.

Mobley, Jr. J.R. 2004. Results of 2004 aerial surveys of humpback whales north of Kauai. Annual Report submitted to: North Pacific Acoustic Laboratory

(NPAL) Program, Scripps Institution of Oceanography. Ni'ihau-Kaua'i-O'ahu pp. (Online version).

NMFS. 2007. Biological Opinion on the U.S. Navy's Proposed Undersea Warfare Training Exercises in the Hawai'i Range Complex from January 2007 through January 2009. January 23, 2007.

Rankin, S. and J. Barlow. 2007. Vocalizations of the sei whale *Balaenoptera borealis* off the Hawaiian Islands. Bioacoustics 16:137-145.

Reeves, R. R., B. S. Stewart, P. J. Clapham, and J. A. Powell. 2002. Guide to Marine Mammals of the World. Chanticleer Press, New York, NY, 527 pp.

Richardson, W. J., C. R. Greene, C.I. Malme, and D. H. Thomson. 1995. Marine Mammals and Noise. Academic Press, 576 pp.

Shallenberger, E. W. 1981. The status of Hawaiian cetaceans. Final Report to the U.S. Marine Mammal Commission. MMC-77/23. 79 pp.

Smultea, M. A. 1994. Segregation by humpback whale (*Megaptera novaeangliae*) cows with a calf in coastal habitat near the Island of Hawai'i. Canadian Journal of Zoology 72:805-811.

APPENDIX A

FORMS AND PROTOCOL

Appendix A: Forms and Protocols

1. Beaufort Sea State Criteria
2. Ethogram of Marine Mammals
3. Photo and Video Camera Log
4. Behavioral Monitoring Data Entry Form
5. Daily Sighting Summary Form
6. WinCruz Code Definition Sheet - Survey Nov. 2007
7. XBT data collection form
8. MMPA take form

1. Beaufort Sea State Criteria

(Beaufort Scale or *Beaufort Wind Force Scale)*

Beaufort number 0 - Calm

Wind speeds: less than 1 knot (<1 mph; <1 kph; <0.3 mps)

At sea: Sea like a mirror, calm

Sea disturbance number: 0

Probable wave height: flat (0 ft; 0 m)

On land: Smoke rises vertically

Beaufort number 1 - Light Air

Wind speeds: 1-3 knots (1-3 mph; 1-5 kph; 0.3-1.5 mps)

At sea: Ripples with the appearance of scales are formed but without foam crests

Sea disturbance number: 0

Probable wave height: 5-10 cm (2-4 in) (0 ft; 0 m)

On land: Direction of wind shown by smoke drift, but not by vanes

---

Beaufort number 2 - Light Breeze

Wind speeds: 4-6 knots (4-7 mph; 6-11 kph; 1.6-3.3 mps)

At sea: Small wavelets, still short but more pronounced; crests have a glassy appearance and do not break

Sea disturbance number: 1

Probable wave height: 10-15 cm (4-6 in); (0-1 ft; 0-0.3 m)

On land: Wind felt on face; leaves rustle; ordinary vane moved by wind

---

Beaufort number 3 - Gentle Breeze

Wind speeds: 7-10 knots (8-12 mph; 12-19 kph; 3.4-5.4 mps)

At sea: Large wavelets; crests begin to break; foam of glassy appearance; perhaps scattered white horses

Sea disturbance number: 2

Probable wave height: 60 cm (2 ft); (1-2 ft; 0.3-0.6 m)

On land: Leaves and small twigs in constant motion; wind extends light flag

---

Beaufort number 4 - Moderate Breeze

Wind speeds: 11-16 knots (13-18 mph; 20-28 kph; 5.5-7.9 mps)

At sea: small waves, becoming longer; fairly frequent white horses

Sea disturbance number: 3

Probable wave height: 1 m (3.5 ft); (2-4 ft; 0.6-1.2 m)

On land: Raises dust and loose paper; small branches are moved

---

Beaufort number 5 - Fresh Breeze

Wind speeds: 17-21 knots (19-24 mph; 29-38 kph; 8.0-10.7 mps)

At sea: Moderate waves taking a more pronounced long form; many white hourses are formed; chance of some spray

Sea disturbance number: 4

Probable wave height: 2 m (6-7 ft); (4-8 ft; 1.2-2.4 m)

On land: Small trees in leaf begin to sway; crested wavelets form on inland waters

---

Beaufort number 6 - Strong Breeze

Wind speeds: 22-27 knots (25-31 mph; 39-49 kph; 10.8-13.8 mps)

At sea: Large waves begin to form; the white foan crests are more extensive everywhere; probably some spray

Sea disturbance number: 5

Probable wave height: 3 m (9-10 ft); (8-13 ft; 2.4-4 m)

On land: Large branches in motion; whistling heard in telegraph wires; umbrellas used with dificulty

---

Beaufort number 7 - Near Gale / Moderate Gale

Wind speeds: 28-33 knots (32-38 mph; 50-61 kph; 13.9-17.1 mps)

At sea: Sea heaps up and white foam from the breaking waves begins to be blown in streaks along the direction of the wind

Sea disturbance number: 6

Probable wave height: 4 m (13-14 ft); (13-20 ft; 4-6 m)

On land: Whole trees in motion; inconvenience felt when walking against wind

---

Beaufort number 8 - Gale / Fresh Gale

Wind speeds: 34-40 knots (39-46 mph; 62-74 kph; 17.2-20.7 mps)

At sea: Moderately high waves of greater length; edges crests begin to break into spindrift; the foam is blown in well-marked streaks along the direction of the wind

Sea disturbance number: 6

Probable wave height: 5.5 m (18 ft); (13-20 ft; 4-6 m)

On land: Breaks twigs off trees; generally impedes progress

Beaufort number 9 - Strong Gale

Wind speeds: 41-47 knots (47-54 mph; 75-88 kph; 20.8-24.4 mps)

At sea: High waves; dense streaks of foam along the direction of wind; crests of waves begin to topple, tumble and roll over; spray may affect visibility

Sea disturbance number: 6

Probable wave height: 7 m (23 ft); (13-20 ft; 4-6 m)

On land: Slight structural damage occurs (chimney post and slates removed)

Beaufort number 10 - Storm / Whole Gale

Wind speeds: 48-55 knots (55-63 mph; 89-102 kph; 24.5-28.4 mps)

At sea: Very high waves with long overhanging crests; resulting foam in great patches is blown in dense white streaks along the direction of the wind; on the whole, the surface of the sea takes a white appearance; tumbling of the sea becomes heavy and shock-like; visibility affected

Sea disturbance number: 7

Probable wave height: 9 m (29 ft); (20-30 ft; 6-9 m)

On land: Seldom experienced inland; trees uprooted; considerable structural damage occurs

Beaufort number 11 - Violent Storm / Storm

Wind speeds: 56-63 knots (64-75 mph; 103-117 kph; 28.5-32.6 mps)

At sea: Exceptionally high waves (small and medium size ships might be for a time lost from view behind waves); sea is completely covered with long white patches of foam lying along the direction of wind; everywhere the edges are blown into froth; visibility affected

Sea disturbance number: 8

Probable wave height: 11 m (37 ft); (30-45 ft; 9-14 m)

On land: Very rarely experienced; accompanied by widespread damage

Beaufort number 12 (-17) - Hurricane

Wind speeds: 64 knots and greater (> 75 mph; >117 kph; >32.7 mps)

At sea: The air is filled with foam and spray; sea completely white with driving spray; visibility very seriously affected

Sea disturbance number: 9

Probable wave height: 11 m and more (> 37 ft); (>45 ft; >14 m)

On land: Very rarely experienced; accompanied by widespread damage

2. Ethogram of Marine Mammals
Navy Marine Mammal Monitoring Survey 003
Cetos 2007

BEHAVIORAL STATES
(FOR SURVEY SCANS AND FOCAL ANIMAL FOLLOWS)
(i.e., activities with duration that are mutually exclusive of one another,
Not individual or instantaneous behaviors)
During focal animal follows, note the behavioral state every min or at least when it changes.

TRAVEL (Fast or Slow):	point to point directed movement in one direction by the majority of a group.
MILL:	continuous changes in headings, asynchronized orientations of majority of individuals (i.e., majority of group orientation is not synchronized in one direction)
SURFACE-ACTIVE:	individual behaviors that cause conspicuous splashes (e.g., breaches, tail slaps, flipper slaps, peduncle slaps, chin rises or slaps, porpoising, etc)
SURFACE-ACTIVE/ MILL:	Mill with at least one individual in the group displaying behaviors that cause conspicuous splashes (see above)
COMPETITIVE:	Includes surface active behaviors but is more specifically about a group size>3 with males competing for female attention (humpbacks only)
REST:	remaining in one location with no forward movement; only surfacing to breath and return to depth
FEEDING:	for cetaceans other than humpbacks; visible foraging behaviors

Also Note if animals appear to be feeding, social/touching, bird presence, "play", etc. in comments

DISPOSITION
I = Injured
D = Dead
O = Ordinary

INDIVIDUAL BEHAVIORS
FOR FOCAL ANIMAL BEHAVIORAL SAMPLING/ FOLLOWS
(To be used primarily with whales or small groups of animals as possible)

BL	BLOW
FU	FLUKE UP
BR	BREACH
FS	FLUKE SLAP
PS	PECTORAL FIN SLAP
NR	NO BLOW RISE (BODY VISIBLE WITH OUT VISIBLE BLOW)
HS	HEAD SLAP
LO	LOGGING AT SURFACE
HR	HEADRISE

ALSO NOTE THE FOLLOWING INFORMATION ON FOCAL GROUPS ~1 min if possible (i.e., scan sampling):

- Largest distance between individuals in a group (in body lengths)
- Closest distance between individuals in a group (in body lengths)
- Bearing of animal/center of group in degrees L or R relative to bow of vessel where bow is 0 degrees
- Heading/orientation of animal or majority of group relative to bow of vessel in degrees L or R where bow is 0 degrees
- Any unusual behavior

3. Marine Mammal Survey Photo and Video Camera Log

Date_____________Month/day/year Camera or Video______________ Page_______of_____

List which still camera if more than 1 used

CREW:

Photographer/Videographer: _________________________ Data Taker:_______ ____________

TIME START	TIME END	FILM ROLL OR VIDEO NUMBER	FRAME OR COUNTER NUMBER	DESCRIPTION

4. Behavioral Monitoring Data Entry Form:

(only headers included).

Date:

Observer:

Lat/Long @ Start:

Lat/Long @ End:

WS/WE:

Visibility:

Species:

Focal Group #:

Wincruz ID #:

Group Size:

 # Calves

Water Depth:

Behavioral States: **T**=travel, **M**=mill, **SAT**=surface active travel, **SAM**=surface active mill, **R**=rest

Indiv. Behav. Codes: **BL**= blow, **BR**= breach, **FU**= fluke up,
FS= fluke slap, **HR**= head rise, **HS**= head slap,**NR**= no blow rise,
LO= logging, **PS**= pec fin slap,

Boat Activity (Motor, Sail, Drift)	Time			Behavior		MM Bearing relat to vessel (0=dead ahead)		Distance		Speed (S, M, F)	Comments
	Hr	Min	Sec	Behav State (1x/ min)	Indiv. Beh Code	Where At	Where To	# Ret or Eye	# m		

5. Daily Sighting Summary Form

(only headers included).

Daily Sighting Summary Form Recorder:

Sight-ing #	Date	Time (start time/ end time)	Start Lat - 3 decimal places	Start Long - 3 decimal places	End Lat - 3 decimal places	End Long - 3 decimal places	Species	# Animals (Group Size	Group comp	Depth	Behav State	Orientation	Speed	Anim Head-ing	Anim Bear-ing	Beaufo.rt	Comments

6. WinCruz Code definitions Sheet – Survey Nov. 2007

WINCRUZ CODES

P	**Observers**	**F6**		
301	Gary Friedrichsen			
302	Tom Jefferson			
303	Mari Smultea			
304	Chris Cutler			
305	Julie Hopkins			
306	Kalyn Quintin			
V	**Viewing Conditions**	**F7**		
Beaufort	1 thru 6			
Swell height	feet			
Swell Direction	degrees			
Wind Speed	mph			
N	**Navigation**	**F8**		
Course	degrees			
Speed	knots/hr			
W	**Weather**	**F9**		
Rain/fog	1=none, 2=fog, 3=rain, 4=both,			

S & A	**Sightings**	**F2**
Sighting #	assigned	
Observer	number	
First Cue	1=bird,2=splash,3=mm,4=ship,5=?,6=blow,7-helo	
Method	1=eye,2=7x,4=25x,5=not25x,6=other,7=helo	
Bearing	left is negative	
Initial ID	spp #	
Reticle	to animal	
Distance	nmi to sighting	
Course	direction of animal	
Speed	of animal	
ID Label	letter for map	
A		
Sp Code1-3	most likely to 3rd choice, spp #	
Photos	y or n	
Birds	y or n	
School size	per species estim.	

F-197

	5=haze
Wind	
Direction	degrees
Visibility	miles

Species numbers

2	Stenella Attenuata (offshore) Pantropical	70
3	Stenella longirostrus, Spinner	71
5	Delphinus spp.	72
13	Stenella coeruleoalba, Striped	73
15	Steno bredanensis, Rough-toothed	74
18	Tursiops truncatus, Bottlenose	75
21	Grampus griseus, Risso's	76
22	Lagenorhynchus obliquidens, Pac white-side	77
26	Lagenodelphis hosei, Fraser's	78
31	Peponcephala electra, Melon-headed whale	79
32	Feresa attenuata, Pygmy killer whale	80
33	Pseudorca crassidens, False killer whale	96
36	Globicephala macrorhynchus, Short-finned pilot	97
46	Physeter macrocephalus, Sperm whale	98
47	Kogia breviceps, Pygmy sperm whale	177
48	Kogia sima, Dwarf sperm whale	277
49	ziphiid whale	377
51	Mesoplodon spp.	477
53	Mesoplodon hectori, Hecto's beaked whale	
57	Mesoplodon ginkgodens, Ginkgo-toothed	
59	Mesoplodon desirostris, Blainville's beaked	
61	Ziphius cavirostris, Cuvier's beaked whale	
65	Indopaecetus pacificus, Longman's beaked	

7. XBT data collection form

(only headers included).

XBT Launch for Oceanographic data

Date	Time	Type of XBT	Routine or Focal Follow	Comments

8. MMPA take form

(only headers included; broken up into 2 sections to fit on page).

TABLE ONE: TABULATED PERMIT INFORMATION

Date (dd/mm/07)	Location (descriptive)	GPS start (3 decimal places; at encounter start)	GPS end (3 decimal places; at encounter end)	Pod #/Sighting #	Type of Species	Time Encounter Start	Time Encounter End	# animals in pod (high/med/low)	Pod Composition (HUWH = MC, MCE, etc)	Pod Behavior (note start, mid, and end behaviors)	
		Take mid encounter GPS readings if it goes on for longer than 30 minutes		*Pod # = sequential i.e. 1, 2, 3; Sighting # = wincruz #*						*rest, mill, sing, Slow Travel (ST), Fast T (FT), Surface Active, Competitive, etc.*	

Number of Animals Approached	Number of Approach Episodes Conducted	Number of Takes (total)	Number of Times Each Animal was Harassed	Observed Reactions of Animals to Research	Mitigation Measures Utilized to Minimize Reactions	Total # harrassments by species:	Total Time With Animals	Summary of Observed Behavior

APPENDIX B
XBT OCEANOGRAPHIC SUMMARY

A total of 13 bathythermograph (XBT) launches were successfully conducted during the Marine Mammal and Sea Turtle Monitoring Survey 11-17 November 2007 from the *Searcher*. Figure B-1 shows XBT launch locations overlaid with satellite-derived sea surface temperature (SST) and ocean color (chlorophyll *a*) measurements. This presentation provides a basis by which to compare and interpret the associated *in situ* expendable temperature data that were collected,

Oceanographic conditions during the survey were characterized by a moderate latitudinal, or north-south gradient in sea surface temperature (Figure B-1, left panel). SST values at the northern end of the survey area (north of 21.8°N; XBT drops 2, 3, 11, 5, 7) were approximately 0.4 – 1.0 °C cooler than surface temperatures measured near the southern end (south of 21.6 °N; XBT drops 1, 4, 6, 8, 9, 10, 12, 13). Surface-ocean color, a satellite-based measurement of chlorophyll *a* and a proxy for productivity, shows an increase in chlorophyll concentrations with increasing proximity to land (Figure B-1, right panel), with particularly high concentrations observed on the windward (eastern) sides of Oahu and Molokai. The southern end of the survey was conducted within the vicinity of these two islands, where chlorophyll *a* values were greater (~0.05 – 0.1 $\mu g\ l^{-1}$) when compared to the northern portion of the survey.

Temperature data obtained from XBT drops are plotted in Figures B-2 and B-3 with XBT locations shown in Figure B-1. Data statistics are provided in Table B-1. In general, temperature profiles extended down to ~750 m for 11 of the 13 drops; drops XBT-1 and XBT-2 ceased collecting data at ~200 m for unknown causes. When comparing all XBT drops, temperature data show a moderate separation, or spreading, between profiles, likely indicating an asymmetry in physical oceanographic forcing within the survey region (Figure B-2). Examining the upper 100 m highlights this spreading of profiles and brings attention to the substantial differences in mixed layer depth and mixed layer temperature (Figure B-3). XBT drops 2, 3, 11, 5, and 7 are all located at the northern portion of the survey area and exhibit strong vertical mixing with surface-mixed layers extending down to 92 m (range: 60 – 92 m) and mixed layer temperatures of approximately 25.5 °C (range: 25.43 – 25.53). In comparison, XBT drops performed at the southern end are highly stratified and are characterized by shallow (range: 5-62 m) and warm (25.75 – 26.6 °C) surface-mixed layers. This observed north-south difference in upper ocean stratification may also account for the patterns observed in satellite-derived chlorophyll *a* concentrations. A stratified water column, or a column of water with monotonically decreasing water temperature with depth, allows for increased nutrient retainment in the euphotic zone, eventually leading to enhanced phytoplankton growth and surface productivity. Well-mixed waters, such as those observed to the north of the survey area, have a low retainment of nutrients and therefore are typically less productive.

When comparing *in situ* sea surface temperatures with satellite SST, slightly warmer temperatures are observed in the XBT data. This bias in temperature measurements can be attributed to diurnal heating and cooling of the ocean surface. XBT drops were performed during the day, when SSTs are generally warmer, while satellite measurements are an average of day and nighttime temperatures, leading to slightly cooler measurements.

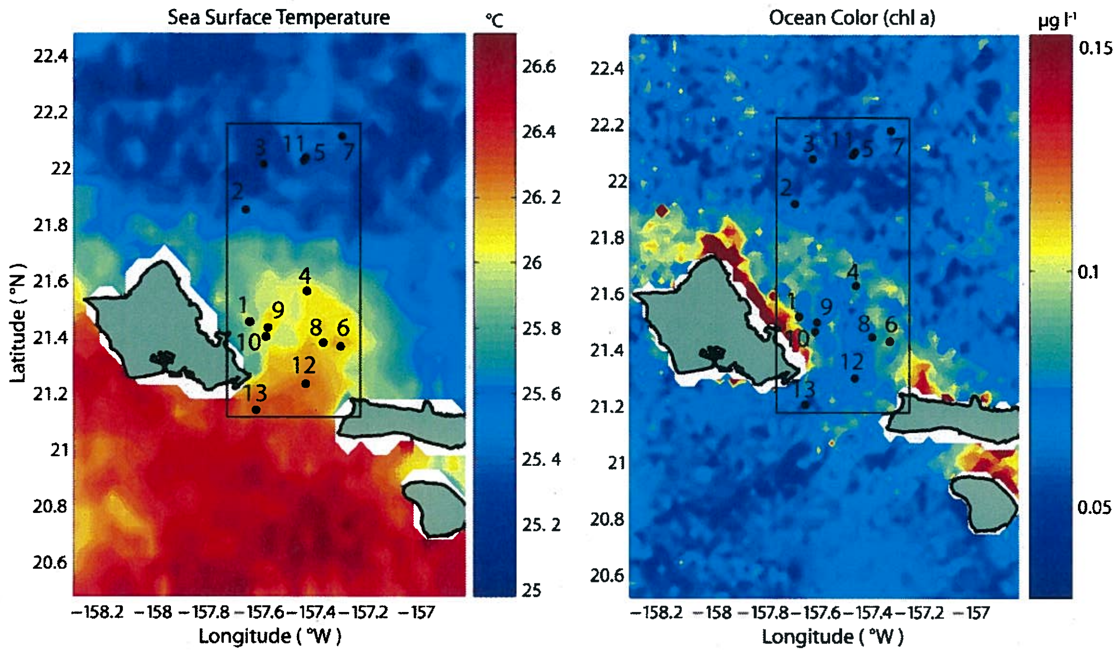


Figure B-1: Expendable Bathythermograph (XBT) drops (black dots) performed during the Marine Mammal and Sea Turtle Monitoring Survey 11-17 November 2007, overlaid with GOES 5.5 km sea surface temperature (SST) (left) and MODIS Aqua 2.5 km ocean color (chlorophyll *a*). SST and ocean color are 14 day means centered on November 15th, 2007. Data was obtained from NOAA's Coastwatch (http://coastwatch.pfel.noaa.gov). The black square indicates the area surveyed.

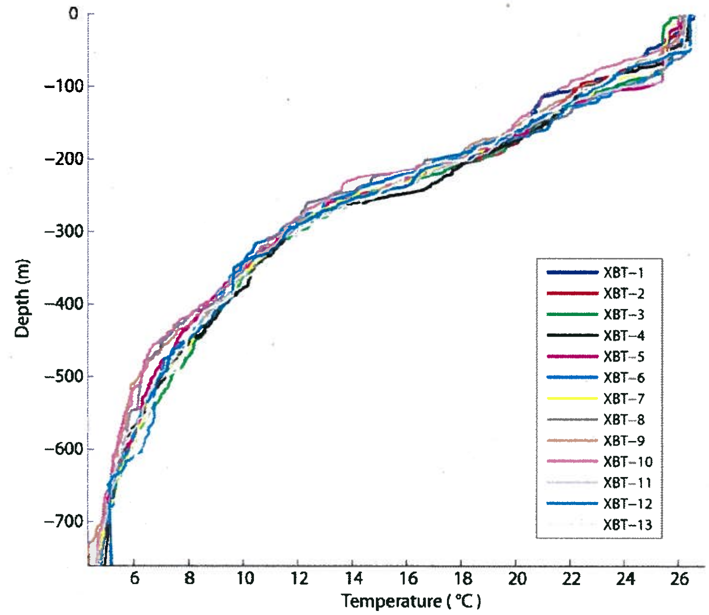


Figure B-2: Expendable Bathythermograph (XBT) profiles obtained from 11-17 November 2007 during the Marine Mammal and Sea Turtle Monitoring survey. XBT locations are shown in Figure B-1.

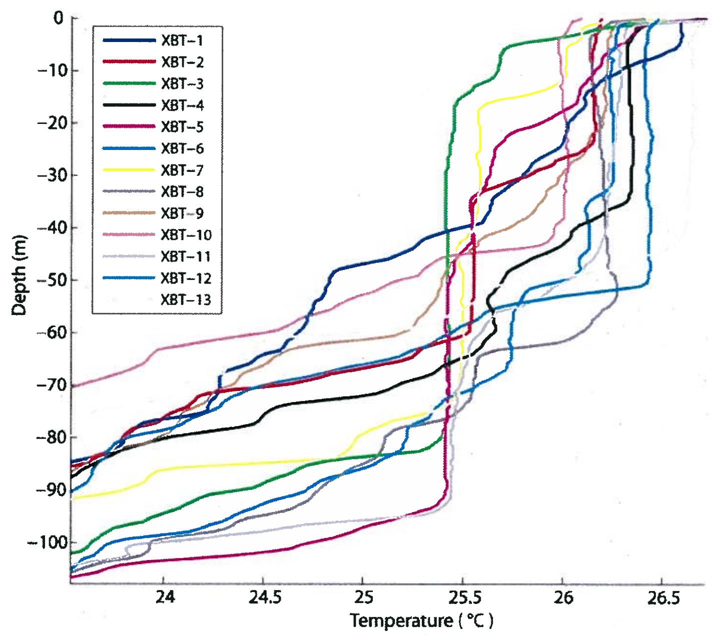


Figure B-3: Expendable Bathythermograph (XBT) profiles for first 100 m depth showing mixed layer depth and temperature profiles. Marine Mammal and Sea Turtle Monitoring survey, 11-17 November 2007. XBT locations are shown in Figure B-1.

Table B-1: Data statistics from each of the XBT drops performed during the Marine Mammal and Sea Turtle Monitoring survey 11-17 November 2007. Mixed layer depth and max depth are given in meters while mixed layer temp, surface temp, and bottom temp are measured in °C.

	Mixed Layer Depth	Mixed Layer Temp	Surface Temp	Bottom Temp	Max Depth
XBT 1	5	26.58	26.59	18.2	200
XBT 2	60	25.53	26.17	18.54	200
XBT 3	80	25.4	26.17	4.75	750
XBT 4	35	26.32	26.38	4.95	750
XBT 5	92	25.41	26.36	4.7	750
XBT 6	65	25.75	26.27	4.86	750
XBT 7	72	25.4	26.09	4.74	750
XBT 8	55	26.2	26.19	4.82	750
XBT 9	25	26.12	26.25	4.36	750
XBT 10	40	26	26.02	4.68	750
XBT 11	92	25.43	26.31	4.66	750
XBT 12	50	26.4	26.43	5.18	750
XBT 13	40	26.6	26.67	5.87	750

Appendix G
Overview of Airborne and Underwater Acoustics

APPENDIX G OVERVIEW OF AIRBORNE AND UNDERWATER ACOUSTICS

G.1 INTRODUCTION

This appendix provides additional information on the characteristics of in-air noise and underwater sound. Sound transmission characteristics are different for sounds in air versus sounds in water. Similarly, sound reception sensitivities vary for in-air sound and in-water sound. Therefore, this appendix is divided into two major subsections: Airborne Noise Characteristics and Underwater Noise Characteristics. A third subsection describes sound transmission through the air-water interface. Underwater ambient sound is partially a result of sound sources that occur outside of the Hawaii Range Complex (HRC). However, for the purposes of this Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS), the region of influence for underwater noise is limited to airborne and underwater sound sources that occur primarily within the HRC boundaries. Full citations for the literature cited in this appendix are provided in Chapter 9.0 of the EIS/OEIS.

G.2 AIRBORNE NOISE CHARACTERISTICS

Primary sources of Navy airborne noise in the HRC include aircraft and their weapons, naval gunfire, aerial targets, and airborne ordnance (e.g., missiles). Throughout this section, the F-4 aircraft is used to represent typical jet aircraft that operate in the HRC. For the purpose of noise characterization, aerial targets and airborne ordnance are essentially small-scale aircraft.

Two distinct types of noise may result from aircraft activities. When an aircraft flies slower than the speed of sound or subsonically, noise is produced by the aircraft's engine and by effects of aircraft movement through air. When an aircraft flies faster than the speed of sound, a sharply defined shock front is created, producing a distinct phenomenon called "overpressure." Noise produced by this physical phenomenon is termed "impulse noise." Thunder claps, noise from explosions, and sonic booms are examples of impulse noise. Airborne noise that originates in higher altitudes is seldom heard on the ground. This is due to the upward bending of sound that takes place in temperature inversions, where the surface temperature is warmer than the temperature at the higher altitude of the sound source. The characteristics of subsonic and supersonic noise are discussed below.

G.2.1 SUBSONIC NOISE

The physical characteristics of noise (or sound) include its intensity, frequency, and duration. Sound is created by acoustic energy, which produces pressure waves that travel through a medium, such as air or water, and are sensed by the eardrum. This may be likened to ripples in water that would be produced when a stone is dropped into it. As acoustic energy increases, the intensity or height of these pressure waves increases, and the ear senses louder noise. The ear is capable of responding to an enormous range of sound levels, from that of a soft whisper to the roar of a rocket engine.

Units of Measurement

The range of sound levels that humans are capable of hearing is very large. If the faintest sound level we can recognize (threshold of hearing) is assigned a value of one, then the highest level humans are capable of hearing (threshold of pain), measured on the same scale, would have a value of 10 million. In order to make this large range of values more meaningful, a logarithmic mathematical scale is used: the decibel [dB] scale. On this scale, the lowest level audible to humans is 0 dB and the threshold of pain is approximately 140 dB. The reference level for the decibel scale used to describe airborne sound is thus the threshold of hearing (for young adults). In physical terms, this corresponds to a sound pressure of 20 micropascals (μPa). Atmospheric pressure is about 100,000 pascals (Pa).

Noise Measurement (weighting)

The normal human ear can detect sounds that range in frequency from about 20 cycles per second or hertz (Hz) to 15,000 Hz. However, all sounds throughout this range are not heard equally well. Figure G-1 shows the in-air hearing threshold curves (audiograms) for humans and a marine mammal species that can hear well in air as well as underwater. The human ear can be seen to be most sensitive at 1 to 4 kilohertz (kHz), whereas the sensitive band for the elephant seal extends upward to at least 10 kHz. However, at most frequencies the hearing threshold for these animals listening in air is 20 to 50 dB higher (less sensitive) than that for the human.

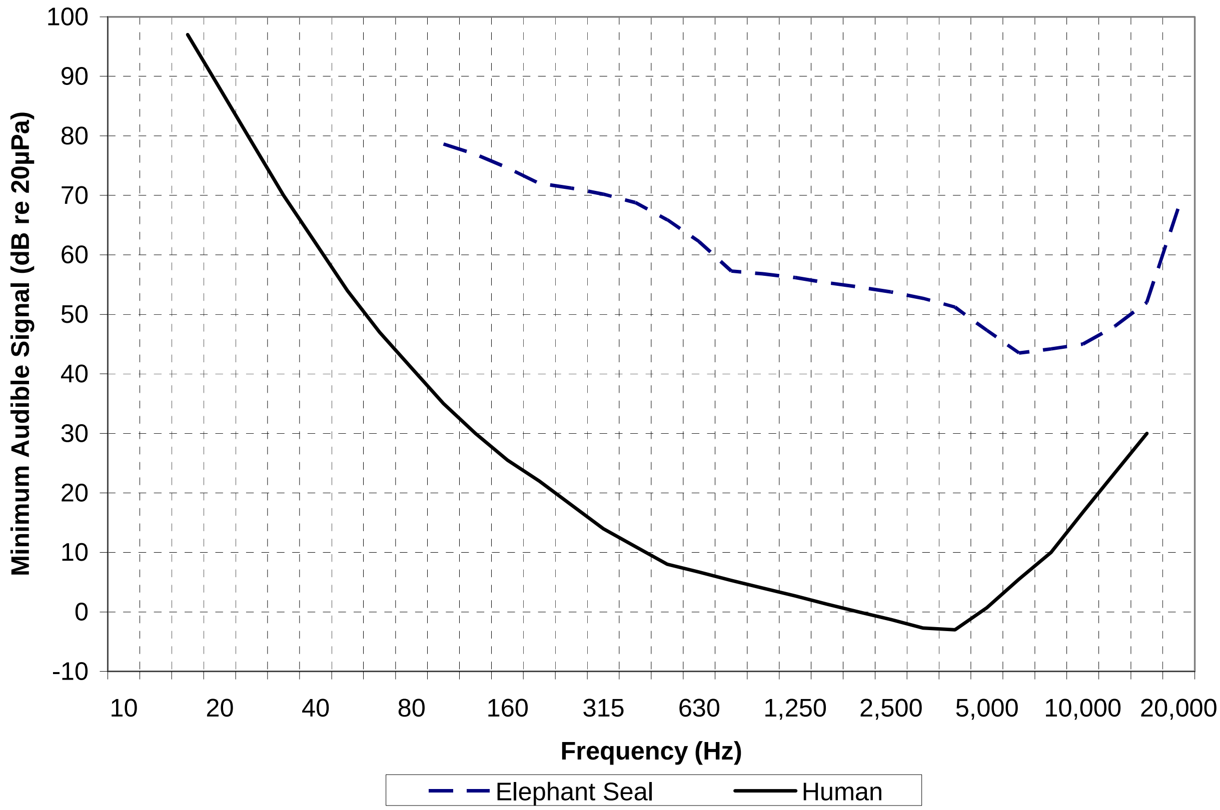


Figure G-1. Human and Marine Mammal In-Air Hearing Thresholds

Sound level meters have been developed to measure sound fields and to show the sound level as a number proportional to the overall sound pressure as measured on the logarithmic scale described previously. This is called the sound pressure level (SPL). It is often useful to have this meter provide a number that is directly related to the human sensation of loudness. Therefore, some sound meters are calibrated to emphasize frequencies in the 1 to 4 kHz range and to de-emphasize higher and especially lower frequencies to which humans are less sensitive. Sound level measurements obtained with these instruments are termed “A-weighted” (expressed in dBA). The A-weighting function is shown in Figure G-2. It is closely related to the human hearing characteristic shown previously in Figure G-1. Because other animals are sensitive to a different range of frequencies, other weighting protocols may be more appropriate when their specific hearing characteristics are known. Alternative measurement procedures such as C-weighting or flat-weighting (unweighted), which do not de-emphasize lower frequencies, may be more appropriate for various animal species such as baleen whales.

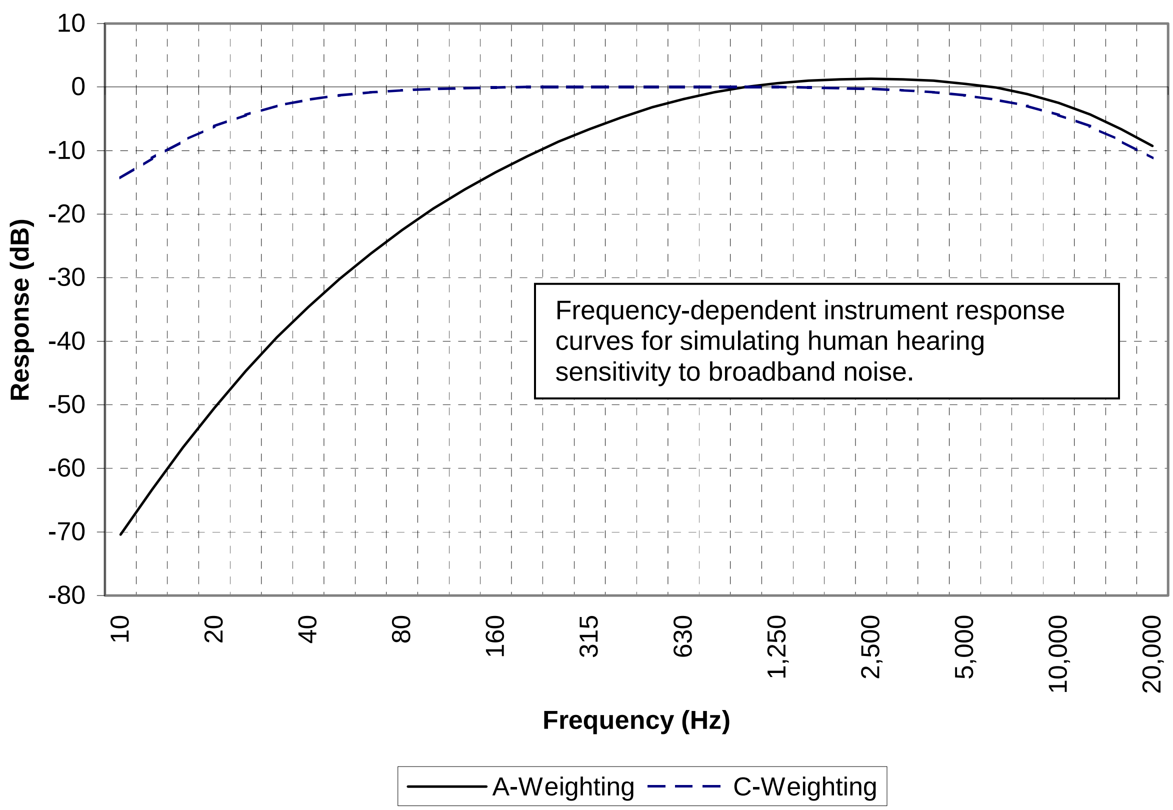


Figure G-2. Noise Weighting Characteristics

Although sound is often measured with instruments that record instantaneous sound levels in dB, the duration of a noise event and the number of times noise events occur are also important considerations in assessing noise impacts. With these measurements, sound levels for individual noise events and average sound levels, in decibels, over extended periods of hours, days, months, or years can be calculated (e.g., the daily day-night average sound level [L_{dn}] in dB).

Sound Exposure Level (Single Noise Event)

The sound exposure level (SEL) measurement provides a means of describing a single, time varying, noise event. It is useful for quantifying events such as an aircraft overflight, which includes the approach when noise levels are increasing, the instant when the aircraft is directly overhead with maximum noise level, and the period of time while the aircraft moves away with decreasing noise levels. SEL is a measure of the physical energy of a noise event, taking into account both intensity (loudness) and duration. SEL is based on the sounds received during the period while the level is above a specified threshold that is at least 10 dB below the maximum value measured during a noise event. SEL is usually determined on an A-weighted basis, and is defined as the constant sound level that provides the same amount of acoustic exposure in one second as the actual time-varying level for the exposure duration. It can also be expressed as the 1-second averaged equivalent sound level (L_{eq} 1 sec).

Table G-1 provides a brief comparison of A-weighted, C-weighted, and flat SEL (F-SEL) values for military aircraft operating at various altitudes and power settings. By definition, SEL values are normalized to a reference time of one second and should not be confused with either the average or maximum noise levels associated with a specific event. There is no general relationship between the SEL value and the maximum decibel level measured during a noise event. By definition, SEL values exceed the maximum decibel level where noise events have durations greater than 1 second. For subsonic aircraft overflights, maximum noise levels are typically 5 to 7 dB below SEL values.

Table G-1. SEL Comparison for Select Department of Defense Aircraft (in dB)

	P-3			**F-4C**			**F/A-18**		
Power Setting	2000 ESHP			100% RPM			88% RPM		
Speed (knots)	180			300			400		
Sound Exposure Level (SEL) at Ground Level									
Altitude	**A-SEL**	**C-SEL**	**F-SEL**	**A-SEL**	**C-SEL**	**F-SEL**	**A-SEL**	**C-SEL**	**F-SEL**
2,500 feet	83.5	88.4	88.4	106.7	110.6	110.4	91.3	95.3	95.2
2,000 feet	85.6	90.0	90.0	109.0	112.7	112.6	93.7	97.4	97.3
1,600 feet	87.7	91.6	91.6	111.3	114.8	114.6	96.0	99.4	99.4
1,000 feet	91.7	94.7	94.7	115.7	118.7	118.7	100.2	103.2	103.2
500 feet	97.2	99.2	99.3	122.3	124.1	124.3	105.9	108.5	108.5
315 feet	100.6	102.2	102.2	126.7	127.5	127.7	109.3	111.7	111.8
200 feet	103.9	105.1	105.2	130.9	130.6	130.9	112.5	114.8	114.9

ESHP = effective shaft horsepower
RPM = revolutions per minute

Day-Night Average Sound Level

The day-night average sound level (L_{dn} or DNL) is the energy-averaged sound level measured over a 24-hour period, with a 10 dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. L_{dn} values are obtained by summation and averaging of SEL values for a given 24-hour period. L_{dn} is the preferred noise metric of the U.S. Department of Housing and Urban Development, Federal Aviation Administration, U.S. Environmental Protection Agency, and Department of Defense insofar as potential effects of airborne sound on humans are concerned.

People are constantly exposed to noise. Most people are exposed to average sound levels of 50 to 55 L_{dn} or higher for extended periods on a daily basis. Normal conversational speaking produces received sound levels of approximately 60 dBA. Studies specifically conducted to determine noise impacts on various human activities show that about 90 percent of the population is not significantly bothered by outdoor average sound levels below 65 L_{dn} (Federal Aviation Administration, 1985).

L_{dn} considers noise levels of individual events that occur during a given period, the number of events, and the times (day or night) at which events occur. Since noise is measured on a logarithmic scale, louder noise events dominate the average. To illustrate this, consider a case in which only one aircraft flyover occurs in daytime during a 24-hour period, and creates a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The calculated sound level for this 24-hour period is 65.5 L_{dn}. To continue the example, assume that 10 such overflights occur during daytime hours during the next 24-hour period, with the same 50 dB ambient sound level during the remaining 23 hours and 55 minutes. The calculated sound level for this 24-hour period is 75.4 L_{dn}. Clearly, the averaging of noise over a given period does not suppress the louder single events.

In calculating L_{dn}, noise associated with aircraft activities is considered, and a 10 dB penalty is added to activities that occur between 10:00 p.m. and 7:00 a.m.; this time period is considered nighttime for the purposes of noise modeling. The 10 dB penalty is intended to compensate for generally lower background noise levels and increased human annoyance associated with noise events occurring between the hours of 10:00 p.m. and 7:00 a.m.

While L_{dn} does provide a single measure of overall noise, it does not provide specific information on the number of noise events or specific individual sound levels that occur. For example, as explained above, an L_{dn} of 65 dB could result from very few, but very loud events, or a large number of quieter events. Although it does not represent the sound level heard at any one particular time, it does represent total sound exposure. Scientific studies and social surveys have found L_{dn} to be the best measure to assess levels of human annoyance associated with all types of environmental noise. Therefore, its use is endorsed by the scientific community and governmental agencies (U.S. Environmental Protection Agency, 1974; Federal Interagency Committee on Urban Noise, 1980; Federal Interagency Committee on Noise, 1992).

Onset-Rate Adjusted Day-Night Average Sound Level

Aircraft operating at low altitude and in special use airspace generate noise levels different from other community noise environments. Overflights can be sporadic, which differs from most community environments where noise tends to be continuous or patterned.

Military overflight events also differ from typical community noise events because of the low altitude and high airspeed characteristics of military aircraft. These characteristics can result in a rate of increase in sound level (onset rate) of up to 30 dB per second. To account for the random and often sporadic nature of military flight activities, computer programs calculate noise levels created by these activities based on a monthly, rather than a daily, period. The L_{dn} metric is adjusted to account for the surprise, or startle effect, of the onset rate of aircraft noise on humans. Onset rates above 30 dB per second require an 11 dB penalty because they may cause a startle associated with the rapid noise increase. Onset rates from 15 to 30 dB per second require an adjustment of 0 to 11 dB. Onset rates below 15 dB per second require no adjustment because no startle is likely. The adjusted L_{dn} is designated as onset-rate adjusted monthly day-night average sound level (L_{dnmr}).

G.2.2 SUPERSONIC NOISE

A sonic boom is the noise a person, animal, or structure on the earth's surface receives when an aircraft or other type of air vehicle flies overhead faster than the speed of sound (or supersonic). The speed of sound is referred to as Mach 1. This term, instead of a specific velocity, is used because the speed at which sound travels varies for different temperatures and pressures. For example, the speed of sound in air at standard atmospheric conditions at sea level is about 772 statute miles per hour, or 1,132 feet (ft) per second. However, at an altitude of 25,000 ft, with its associated lower temperature and pressure, the speed of sound is reduced to 1,042 ft per second (approximately 710 miles per hour). Thus, regardless of the absolute speed of the aircraft, when it reaches the speed of sound in the environment in which it is flying, its speed is Mach 1.

Air reacts like a fluid to supersonic objects. When an aircraft exceeds Mach 1, air molecules are pushed aside with great force, forming a shock front much like a boat creates a bow wave. All aircraft generate two shock fronts. One is immediately in front of the aircraft; the other is immediately behind it. These shock fronts "push" a sharply defined surge in air pressure in front of them. When the shock fronts reach the ground, the result is a sonic boom. Actually, a sonic boom involves two very closely spaced impulses, one associated with each shock front. Most people on the ground cannot distinguish between the two and they are usually heard as a single sonic boom. However, the paired sonic booms created by vehicles the size and mass of the space shuttles are very distinguishable, and two distinct booms are easily heard.

Sonic booms differ from most other sounds because: (1) they are impulsive; (2) there is no warning of their impending occurrence; and (3) the peak levels of a sonic boom are higher than those for most other types of outdoor noise. Although air vehicles exceeding Mach 1 always create a sonic boom, not all sonic booms are heard on the ground. As altitude increases, air temperature normally decreases and these layers of temperature change cause the shock front to be turned upward as it travels toward the ground. Depending on the altitude of the aircraft and the Mach number, the shock fronts of many sonic booms are bent upward sufficiently that they never reach the ground. This same phenomenon also acts to limit the width (area covered) of those sonic booms that actually do reach the ground.

Sonic booms are sensed by the human ear as an impulsive (sudden or sharp) sound because they are caused by a sudden change in air pressure. The change in air pressure associated with a sonic boom is generally a few pounds per square foot, which is about the same pressure change experienced riding an elevator down two or three floors. It is the rate of change—the sudden onset of the pressure change—that makes the sonic boom audible. The air pressure in excess of normal atmospheric pressure is referred to as “overpressure.” It is quantified on the ground by measuring the peak overpressure in pounds per square foot and the duration of the boom in milliseconds. The overpressure sensed is a function of the distance of the aircraft from the observer; the shape, weight, speed, and altitude of the aircraft; local atmospheric conditions; and location of the flight path relative to the surface. The maximum overpressures normally occur directly under the flight track of the aircraft and decrease as the slant range, or distance, from the aircraft to the receptor increases. Supersonic flights for a given aircraft type at high altitudes typically create sonic booms that have low overpressures but cover wide areas if the sonic boom reaches the ground.

The noise associated with sonic booms is measured on a C-weighted scale (as shown previously in Figure G-2). C-weighting provides less attenuation at low frequencies than A-weighting. This is appropriate based on the human auditory response to the low-frequency sound pressures associated with high-energy impulses (such as those generated by sonic booms).

G.2.3 AIRBORNE NOISE EFFECTS ON WILDLIFE

The previous discussion primarily concerned the metrics that have been developed to predict human response to various noise spectral and temporal characteristics. Response prediction metrics for non-human species such as marine mammals are generally not available. Because of the limited amount of response data available for marine mammals, it is not possible to develop total sound exposure metrics similar to those applied to human population centers. Instead, the potential impacts of noise sources in the HRC need to be assessed by examining individual source-receiver encounter scenarios typical of range activities. Assessment of potential effects must consider both airborne noise on marine mammals out of the water (e.g., pinniped), and airborne noise (transmitted into the water) potentially effecting marine mammals when they are underwater (e.g., cetacea).

There have been several studies of hauled-out pinniped response to airborne noise and sonic booms from aircraft and missile flyovers, although few sound exposure data have been reported. For marine mammals underwater, one study—the Malme et al. (1984) investigation of gray whales—is the only study to provide data on reactions to aircraft sound underwater that was isolated from other potential stimuli such as visual behavioral reactions elicited from low altitude aircraft. As demonstrated by that study, the underwater received levels necessary to elicit reactions (115 dB to 127 dB SPL) would require an airborne source level at the surface of approximately 175 dB to 187 dB. This is much higher than should be expected as a result of most aircraft overflight in the HRC for reasons described later in Section G.3 involving sound transmission through the air-water interface. To assess the potential impact of airborne noise sources in the HRC on non-human species, a weighting function related to the hearing characteristics of a specific species is required, analogous to the A-weighting used for human response prediction (see Southall et al., 2007).This facilitates the application of sound level criteria based on potential avoidance behavior, potential temporary threshold shift, or some other appropriate response (refer to Section 4.1 of the EIS/OEIS, Marine Mammals).

If the hearing thresholds of a species have been measured at various frequencies, as in Figure G-1, the resulting audiogram can be used as a weighting function. An example of this is shown in Figure G-3 where the 1/3-octave spectra of two different types of aircraft are shown. (Sound levels are shown in 1/3-octave bands because in humans and some mammals, the effective filter bandwidth of the hearing process is not constant but has a proportional bandwidth of approximately 1/3-octave.) The F-4 jet noise spectrum is seen to be dominated by frequencies above 500 Hz, whereas the P-3 has dominant propeller noise bands at 63 and 125 Hz. When these radiated noise spectra are weighted by subtracting the elephant seal hearing response (see Figure G-1), the effective perceived level spectra are obtained. The difference in perceived loudness of these two aircraft, as heard by the seal, can be estimated by looking at the overall perceived levels (shown on the right edge of the graph). There is a difference of about 30 dB in the overall perceived levels even though there is only a difference of about 10 dB in the overall flat-weighted levels. Human listeners perceive a 10-dB difference in sound level as being approximately a factor of two. If the seal has a similar perception, the two aircraft would differ in perceived loudness by about eight times, but the measured difference for a flat sound level meter would be only 10 dB.

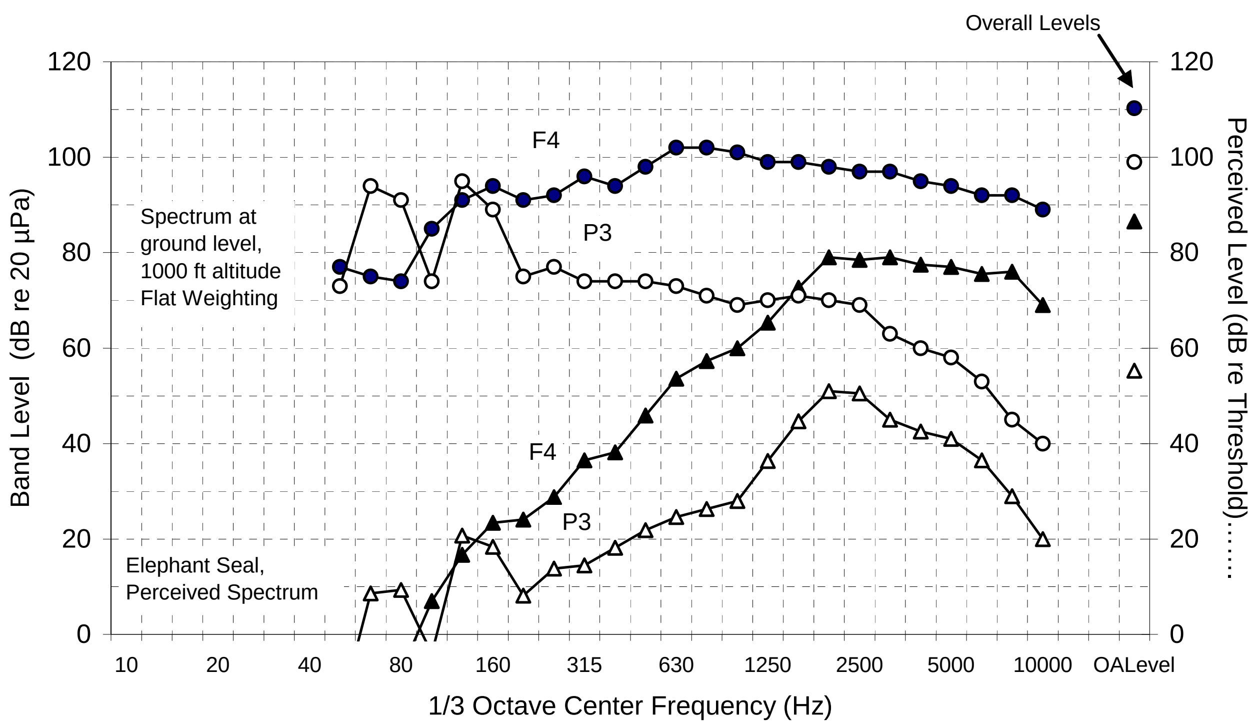


Figure G-3. Aircraft Noise Spectra vs. Hearing Response

While the actual audiogram can be used as a weighting function as demonstrated above, this is not a practical solution in the present application because of the large number of species and sources involved. Moreover, the audiograms of many animal species listening in air are not known. Several species of concern, such as pinnipeds and birds, have reduced sensitivity at low frequencies as compared with at moderate frequencies (the same pattern as in humans). Therefore, the A-weighting response appropriate for humans was examined as a potential basis for estimating the levels perceived by species exposed to a variety of noise sources on the HRC.

For birds, a comparison of real and perceived levels from F-4 and P-3 aircraft was made by using the reported hearing thresholds of selected bird species. The results of the analysis show that the measured difference in overall received noise levels for the two aircraft produced by the A-weighting function is comparable to the estimated differences in perceived levels for birds (Table G-2). The measured difference using unweighted overall sound levels is much smaller and thus would provide a poor estimate of the potential noise impact of these sources on birds. This comparison indicated that A-weighting (which attenuates low frequencies) is effective in simulating the hearing function of birds, since the difference in the A-weighted aircraft spectra is similar to the difference in the perceived levels. A-weighted metrics are therefore considered appropriate for use in determining potential noise impacts on birds.

Table G-2. Analysis of A-Weighted Sound Level vs. Flat Overall Level as a Measure of Loudness for Birds

	Overall Measured Sound Level (1,000 feet altitude, re 20 μPa)		Perceived Sound Level [3] (Received level—hearing threshold)	
Aircraft	**dB (flat) [1]**	**dBA [2]**	**Anseriforms [4]**	**Passeriforms [5]**
F-4 (100%)	110.0	109.0	94.0	87.0
P-3 (100%)	99.0	84.0	65.0	59.0
F-4 - P-3 difference	11.0	25.0	29.0	28.0

Notes:

[1] dB (flat) - overall sound level with no weighting.

[2] dBA - overall A-weighted level.

[3] Perceived Sound Level - overall sound level of the aircraft above the hearing threshold. It is an estimate of the loudness perceived by a given species.

The difference between the unweighted levels of the two aircraft is 11 dB, whereas the A-weighted level difference is 25 dB. The F-4 has a significant amount of sound energy at high frequencies compared with the P-3. If A-weighting (which attenuates low frequencies) is effective in simulating the hearing function of birds, the difference in the A-weighted aircraft spectra should be similar to the difference in perceived levels, as these data indicate.

[4] Anseriforms are waterfowl (e.g., ducks, geese, swans).

[5] Passeriforms are perching birds or passerines (i.e., songbirds).

The hearing response of the elephant seal in its most sensitive range is about 20 dB less sensitive than that of human hearing (see Figure G-1). To compensate for this, an additional 20 dB attenuation was added to the A-weighting response and the resulting characteristic was applied to the F-4 and P-3 spectra. The results are shown in Figure G-4. Here the adjusted A-weighted responses are compared to the estimated perceived responses. The overall adjusted A-weighting responses for the two aircraft can be seen to differ by about 26 dB, compared to the perceived difference of about 30 dB. The overall adjusted A-weighted level exceeds the overall perceived level by about 4 dB for the F-4 and about 9 dB for the P-3. This difference occurs because, at low frequencies, the A-weighting factors are relatively higher than the seal audiogram. This difference is most important for sources with dominant low-frequency components.

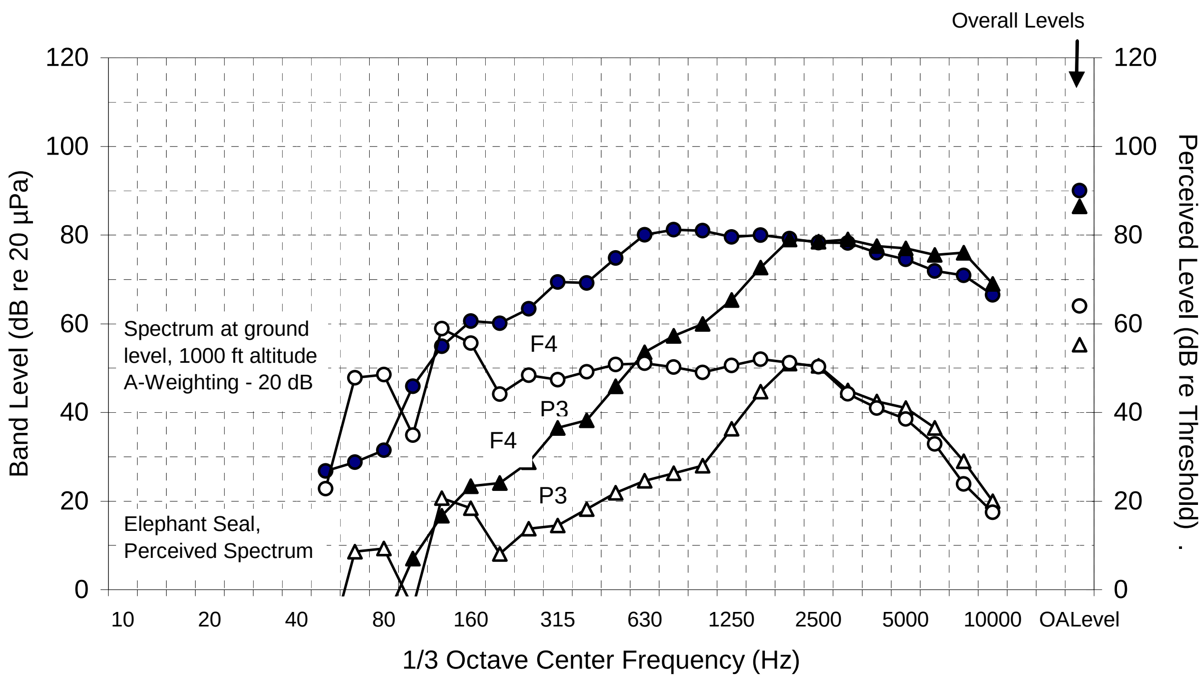


Figure G-4. Adjusted A-Weighting of Aircraft Noise vs. Hearing Response

G.2.4 AMBIENT NOISE

Ambient noise is the background noise at a given location. Airborne ambient noise can vary considerably depending on location and other factors, such as wind speed, temperature stratification, terrain features, vegetation, and the presence of distant natural or man-made noise sources.

In predicting human response to loud airborne noise sources, it is reasonable to assume that ambient background noise would have little or no effect on the calculated noise levels since the ambient levels would add insignificant fractions to calculated values. Therefore, ambient background noise is not considered in the noise calculations.

Ambient noise may have a more significant effect on prediction of marine mammal response to loud airborne noise sources. Marine mammals are exposed to a wide range of ambient sounds ranging from the loud noise of nearby wave impacts on the quiet of remote areas during calm wind conditions. The ambient noise background on beaches is strongly influenced by surf noise. During high surf conditions pinnipeds may not hear an approaching aircraft until it is nearly overhead. The resulting rapid noise level increase may cause a panic response that normally would not occur for calm conditions when the approaching aircraft can be initially heard at longer ranges. Some examples of airborne noise levels in human and marine mammal habitat are given in Table G-3.

It should be noted that the characteristics of subsonic noise, which is measured on an A-weighted scale, and supersonic noise, which is measured on a C-weighted scale, are different. Therefore, each is calculated separately, and it would be incorrect to add the two values together. Nevertheless, both subsonic and supersonic noises occur in the HRC. Together, they form the cumulative acoustic environment in the region. Therefore, each is addressed where applicable in this EIS/OEIS.

Table G-3. Representative Airborne Noise Levels

Source of Noise	dBA re 20 μPa
F/A-18 at 1,000 feet (Cruise Power)	98
Helicopter at 200 feet (UH-1N)	91
Car at 25 feet (60 mph) [1]	70–80
Light Traffic at 100 feet [1]	50–60
Quiet Residential (daytime) [1]	40–50
Quiet Residential (night) [1]	30–40
Wilderness Area [1]	20–30
Offshore (low sea state) [2]	40–50
Surf [2]	60–70

[1] Kinsler et al., 1982.
[2] U.S. Coast Guard, 1960.

G.3 SOUND TRANSMISSION THROUGH THE AIR-WATER INTERFACE

Many of the sound sources considered in this EIS/OEIS are airborne vehicles, but a significant portion of the concern about noise impacts involves marine animals at or below the surface of the water. Thus, transmission of airborne sound into the ocean is a consideration. This subsection describes some basic characteristics of air-to-water transmission of sound for both subsonic and supersonic sources. Sound is transmitted from an airborne source to a receiver underwater by four principal means: (1) a direct path, refracted upon passing through the air-water interface; (2) direct-refracted paths reflected from the bottom in shallow water; (3) lateral (evanescent) transmission through the interface from the airborne sound field directly above; and (4) scattering from interface roughness due to wave motion.

Several papers are available in the literature concerning transmission of sound from air into water. Urick (1972) presents a discussion of the effect and reports data showing the difference in the underwater signature of an aircraft overflight for deep and shallow conditions. He includes analytic solutions for both the direct and lateral transmission paths and presents a comparison of the contributions of these paths for near-surface receivers. Young (1973) presents an analysis which, while directed at deep-water applications, derived an equivalent dipole underwater source for an aircraft overflight that can be used for direct path underwater received level estimates. A detailed description of air-water sound transmission is given in *Marine Mammals and Noise* (Richardson et al., 1995a). The following is a short summary of the principal features.

Figure G-5 shows the general characteristics of sound transmission through the air-water interface. Sound from an elevated source in air is refracted upon transmission into water because of the difference in sound speeds in the two media (a ratio of about 0.23). Because of this difference, the direct sound path is totally reflected for grazing angles less than 77°, i.e., if the sound reaches the surface at an angle more than 13° from vertical. For smaller grazing angles, sound reaches an underwater observation point only by scattering from wave crests on the surface, by non-acoustic (lateral) pressure transmission from the surface, and from bottom reflections in shallow water. As a result, most of the acoustic energy transmitted into the water from a source in air arrives through a cone with a 26° apex angle extending vertically downward from the airborne source. For a moving source, the intersection of this cone with the surface traces a “footprint” directly beneath the path of the source, with the width of the footprint being a function of the altitude of the source. To a first approximation, it is only the sound transmitted within this footprint that can reach an underwater location by a direct-refracted path. Because of the large difference in the acoustic properties of water and air, the pressure field is actually doubled at the surface of the water, resulting in a 6 dB increase in pressure level at the surface. Within the direct-refracted cone, the in-air sound transmission paths are affected both by geometric spreading and by the effects of refraction.

In shallow water within the direct transmission cone, the directly transmitted sound energy is generally greater than the energy contribution from bottom reflected paths. At horizontal distances greater than the water depth, the energy transmitted by reflected paths becomes dominant, especially in shallow water. The ratio of direct to reverberant energy depends on the bottom properties. For hard bottom conditions the reverberant field persists for longer ranges than the direct field. However, with increasing horizontal distance from the airborne source, underwater sound diminishes more rapidly than does the airborne sound.

Near the surface, the laterally transmitted pressure from the airborne sound is transmitted hydrostatically underwater. Beyond the direct transmission cone this component can produce higher levels than the underwater-refracted wave. However, the lateral component is very dependent on frequency and thus on acoustic wavelength. The level received underwater is 20 dB lower than the airborne sound level at a depth equal to 0.4 wavelength.

For this application, it is necessary to have an analytical model to predict the total acoustic exposure level experienced by marine mammals near the surface and at depth near the path of an aircraft overflight. Malme and Smith (1988) described a model to calculate the acoustic energy at an underwater receiver in shallow water, including the acoustic contributions of both the direct sound field (Urick, 1972) and a depth-averaged reverberant sound field (Smith, 1974).

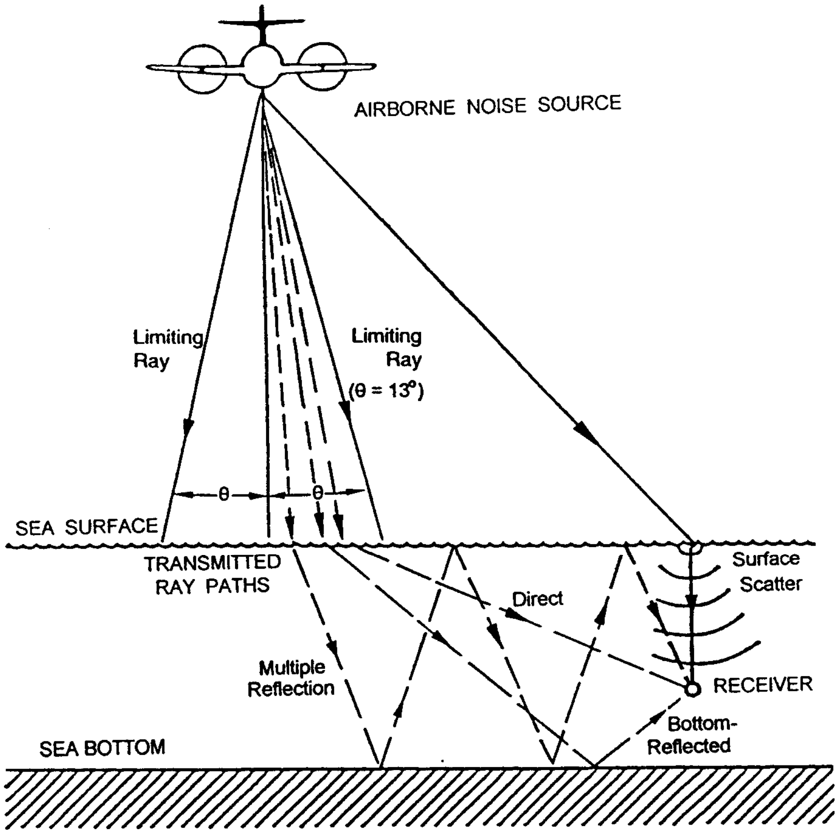


Figure G-5. Characteristics of Sound Transmission through Air-Water Interface

In the present application, the Urick (1972) analysis for the lateral wave field was also included to predict this contribution. The paths of most concern for this application are the direct-refracted path and the lateral path. These paths will likely determine the highest sound level received by mammals located nearly directly below a passing airborne source and mammals located near the surface, but at some distance away from the source track. In shallow areas near shore, bottom-reflected acoustic energy will also contribute to the total noise field, but it is likely that the direct-refracted and lateral paths will make the dominant contributions.[1]

Figure G-6 shows an example of the model prediction for a representative source-receiver geometry. The transmission loss (TL) for the direct-refracted wave, the lateral wave, and their resultant energy-addition total is shown. Directly under the aircraft, the direct-refracted wave is seen to have the lowest TL. For the shallowest receiver at a 3-ft depth, the lateral wave is seen to become dominant at about a horizontal range of 40 ft. Beyond this point the underwater level is controlled by the sound level in the air directly above the receiver and follows the same decay slope with distance. For the deeper receiver at 10 ft, the lateral wave does not become dominant until the horizontal range is about 130 ft. When sound reaches the receiver via the direct-refracted path, it decays at about 12 dB/distance doubled (dd), consistent with a surface dipole source. In

[1]The bottom-reflected reverberant sound field section of this model for offshore applications requires detailed knowledge of bottom slope and bottom composition. In view of the requirements of this application, this level of detail is not appropriate and the reflected path subroutine was not used.

contrast, when the sound reaches the receiver via the lateral path, it decays at about 6 dB/dd, consistent with the airborne monopole source. Underneath the aircraft, the drop in sound level with depth change from 3 to 10 ft is only about 2 dB, but beyond about 200 ft, a 12 dB drop occurs for the same change in depth.

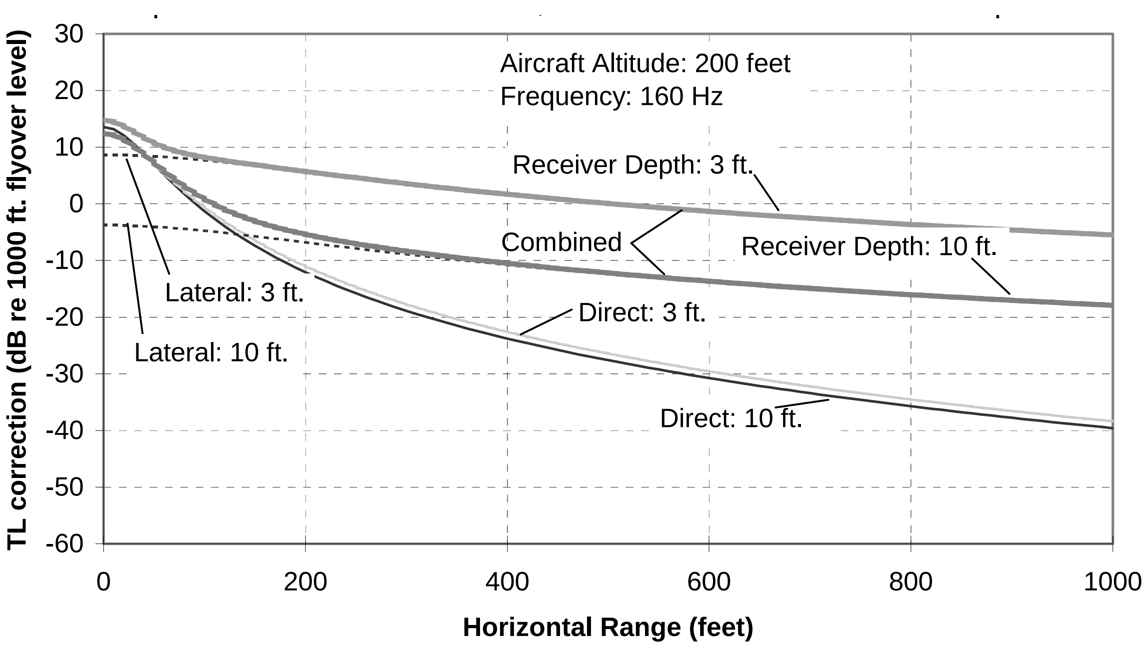


Figure G-6. Transmission Loss of Noise through Air-Water Interface, Comparison of Direct-Refracted, Lateral and Combined TL Components

Figures G-7A-C illustrate the interaction between the various parameters for different sets of variables. For clarity, only the total transmission loss curves are shown in these figures. Figure G-7A shows the influence of frequency (wavelength) change on transmission loss. Here the loss at a depth of 3 ft can be seen to increase significantly with frequency in the region where the lateral wave is dominant. Thus marine mammals near the surface will benefit from high-frequency attenuation when they are not directly below the source track. Figure G-7B shows the change in TL with receiver depth for low-frequency sound. Near the source track, a 6 dB drop in level occurs for a change in depth from 1 to 30 ft, but beyond a horizontal range of 200 ft, there is a 20 to 30 dB drop in level for the same change in receiver depth. Note, however, that for an increase in depth from 30 to 300 ft, the received level increases because of the effective source directionality. Figure G-7C shows the effect of increasing the aircraft altitude. In this case the region near the source track is affected the most with about a 38 dB drop in level for an altitude change of 50 ft to 5,000 ft. At a horizontal range of 200 ft, this drop is about 20 dB, with a decrease to 15 dB at 500 ft.

For a passing airborne source, received level at and below the surface diminishes with increasing source altitude, but the duration of exposure increases. The maximum received levels at and below the surface are inversely proportional to source altitude, but total noise energy exposure is inversely proportional to the product of source altitude and speed because of the link between altitude and duration of exposure.

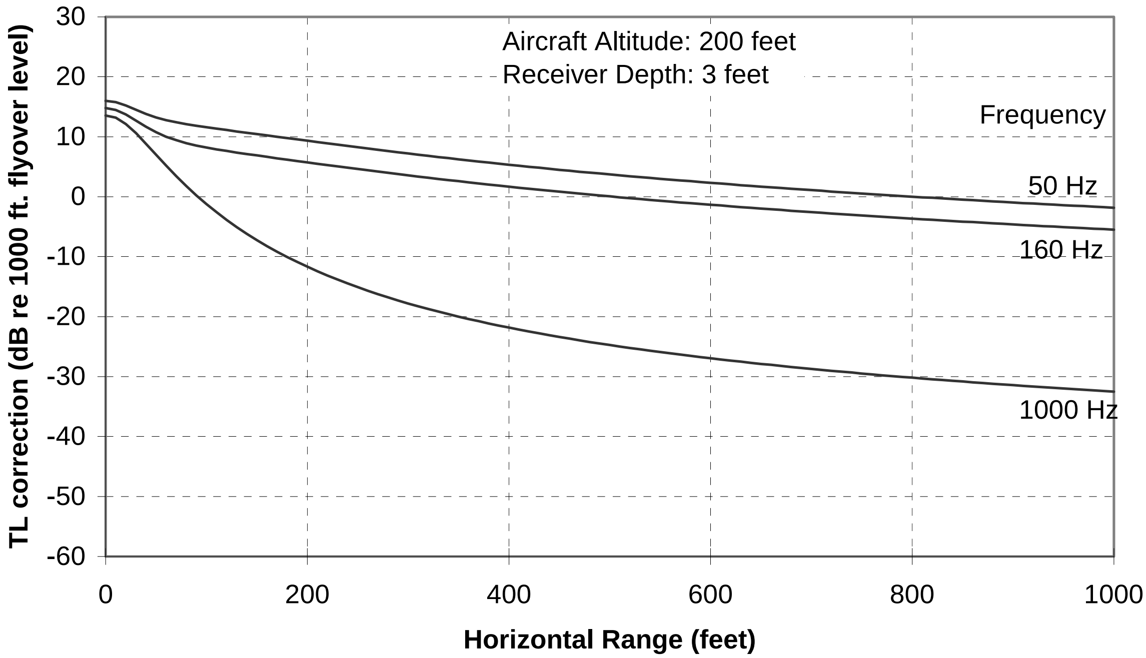


Figure G-7A. Air-Water Transmission Loss vs. Frequency

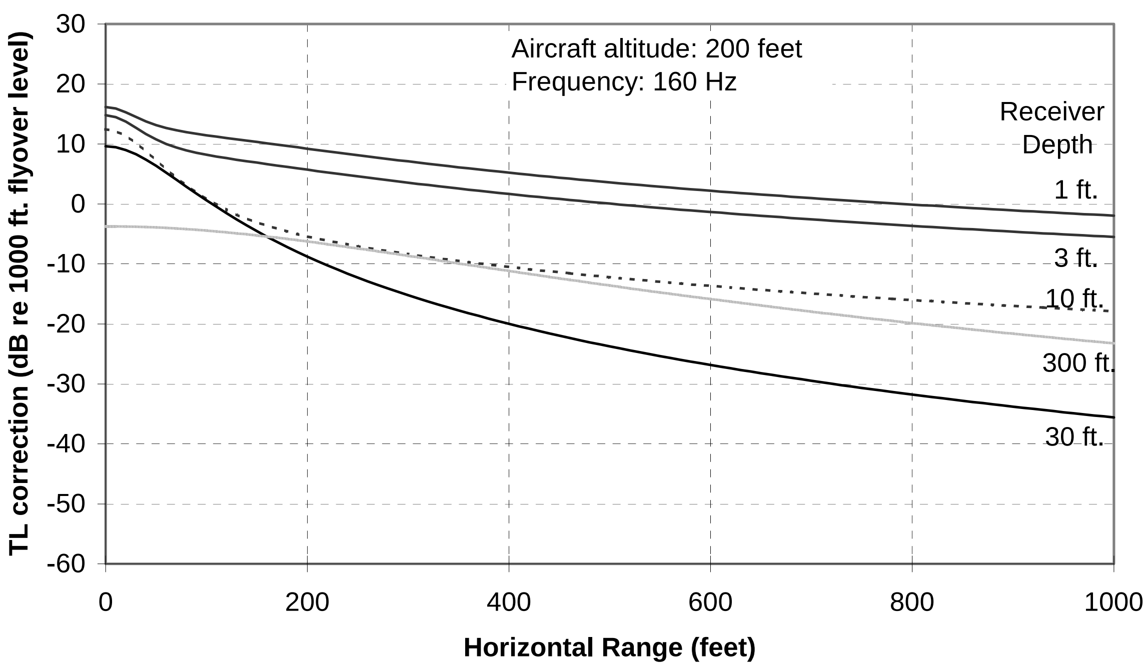


Figure G-7B. Air-Water Transmission Loss vs. Receiver Depth

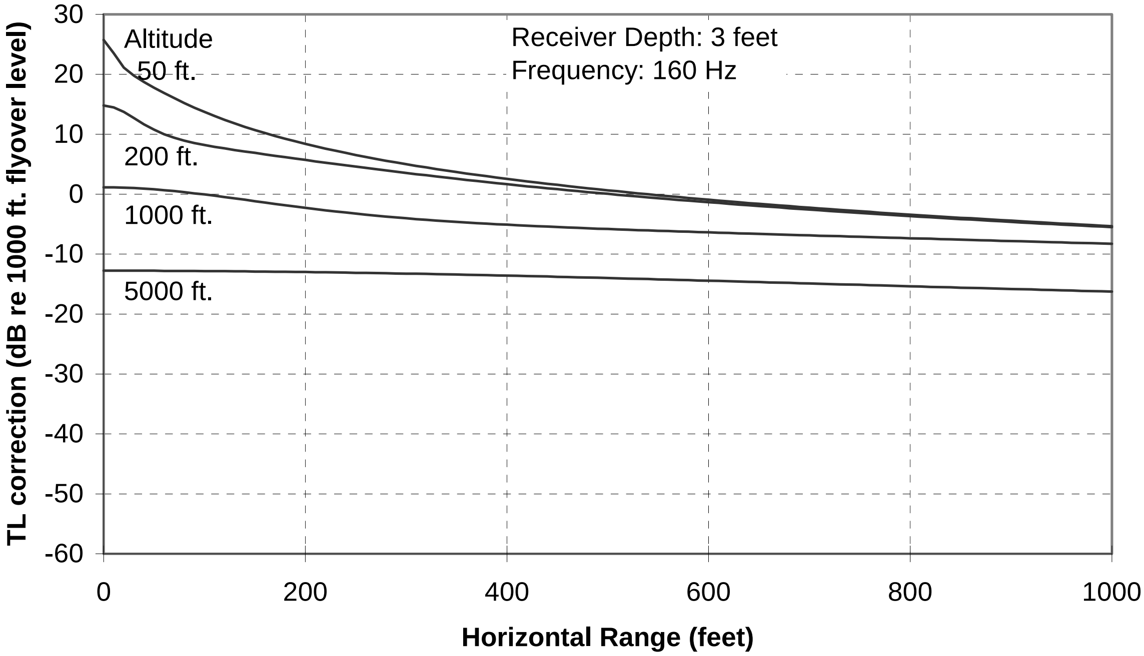


Figure G-7C. Air-Water Transmission Loss vs. Aircraft Altitude

In summary, airborne sound does not, in general, transmit well into the water because of the difference in sound speeds between air and water. If the sound reaches the surface at an angle more than 13° from vertical, the sound is generally reflected rather than transmitted into the water. While scattering from waves also facilitates sound entering the water, in the ocean this is also somewhat offset by bubbles at the surface introduced by breaking waves. A 13° cone from the source's altitude to the ocean's surface traces a "footprint" along the source's flight, but as size of the footprint increases with altitude, the sound level reaching the ocean surface decreases as a result of transmission loss through the air.

G.3.1 SUPERSONIC SOURCES

While sonic booms are not always heard at the surface, if present, a sonic boom footprint produced by a supersonic aircraft in level flight at constant speed traces a hyperbola on the sea surface. The apex of the hyperbola moves at the same speed and direction as the aircraft with the outlying arms of the hyperbola traveling at increasing oblique angles and slower speeds until the boom shock wave dissipates into a sonically propagating pressure wave at large distances from the flight path. The highest boom overpressures at the water surface are produced directly below the aircraft track. In this region the pressure-time pattern is described as an "N-wave" because of its typical shape. Aircraft size, shape, speed, and altitude determine the peak shock pressure and time duration of the N-wave. The incidence angle of the N-wave on the water surface is determined by the aircraft speed (i.e., for Mach 2 the incidence angle is 45). Thus for aircraft in level flight at speeds less than about Mach 4.3, the N-wave is totally reflected from the surface. Dives and other maneuvers at supersonic speeds of less than Mach 4.3 can generate N-waves at incidence angles that are refracted into the water, but the water source regions affected by these transient events are limited. Since the aircraft, missiles, and targets used in range activities generally operate at less than Mach 4.3, sonic boom penetration into the water from these sources occurs primarily by lateral (evanescent) propagation. Analyses by Sawyers (1968) and Cook (1969) have shown that the attenuation rate (penetration) of the boom pressure wave is related to the size, altitude and speed of the source vehicle. The attenuation of the N-wave is not related to the length of the signature in the simple way that the lateral wave penetration from subsonic sources is related to the dominant wavelength of their signature. Specific examples will be given for the supersonic vehicles used in range tests as appropriate in this EIS/OEIS.

G.4 UNDERWATER SOUND CHARACTERISTICS

Many of the general characteristics of sound and its measurement were discussed in the introduction to airborne noise characteristics. This section expands on this introduction to summarize the properties of sound underwater that are relevant to understanding the effects of range activities on the underwater marine environment in the HRC area. Since the effect of underwater sound on human habitat is not an issue (except perhaps for divers), the primary environmental concern that is addressed is the potential impact on marine mammals.

G.4.1 UNITS OF MEASUREMENT

The reference level for airborne sound is 20 μPa, consistent with the minimum level detectable by humans. For underwater sound, a reference level of 1 μPa is used because this provides a more convenient reference and because a reference based on the threshold of human hearing in air is irrelevant. For this reason, as well as the different propagation properties of air and water, it is not meaningful to compare the levels of sound received in air (measured in dB re 20 μPa) and in water (in dB re 1 μPa) without adding the 26 dB correction factor to the airborne sound levels.

G.4.2 SOURCE CHARACTERISTICS

The most significant range-related sources of underwater sound operating on the HRC are the ships used in Anti-Submarine Warfare Exercises. Because of their slow speed compared to most of the airborne sources considered in the last section, they can be considered to be continuous sound sources. The primary underwater transient sound sources are naval gunfire, aircraft delivered bombs and gunfire, missile launches, and water surface impacts from missiles and falling debris. All sources are subsonic or stationary in water. While supersonic underwater shock waves are produced at short ranges by underwater explosions, no sources operate at supersonic speeds in water.

G.4.3 UNDERWATER SOUND TRANSMISSION

Airborne sources transmit most of their acoustic energy to the surface by direct paths which attenuate sound energy by spherical divergence (spreading) and molecular absorption. For sound propagating along oblique paths relative to the ground plane, there may also be attenuation (or amplification) by refraction (bending) from sound speed gradients caused by wind and temperature changes with altitude. There may also be multipath transmission caused by convergence of several refracted and reflected sound rays, but this is generally not important for air-to-ground transmission. However, for underwater sound, refracted and multipath transmission is often more important than direct path transmission, particularly for high-power sound sources capable of transmitting sound energy to large distances.

A surface layer sound channel often enhances sound transmission from a surface ship to a shallow receiver in tropical and mid-latitude deep-water areas. This channel is produced when a mixed isothermal surface layer is developed by wave action. An upward refracting sound gradient, produced by the pressure difference within the layer, traps a significant amount of the sound energy within the layer (Sound travels faster with increasing depth.) This results in cylindrical rather than spherical spreading. This effect is particularly observable at high frequencies where the sound wavelengths are short compared to the layer depth. When the mixed layer is thin or not well defined, the underlying thermocline may extend toward the surface, resulting in downward refraction at all frequencies and a significant increase in transmission loss at shorter ranges where bottom reflected sound energy is normally less than the directly transmitted sound component.

In shallow water areas sound is trapped by reflection between the surface and bottom interfaces. This often results in higher transmission loss than in deep water because of the loss that occurs with each reflection, especially from soft or rough bottom material. However, in areas with a highly reflective bottom, the transmission loss may be less than in deep water areas since cylindrical spreading may occur.

The many interacting variables involved in prediction of underwater transmission loss have led to the development of analytical and computer models. One or more of these models will be used in analyzing the potential impact of the underwater sound sources in the range areas.

G.4.4 UNDERWATER AMBIENT SOUND

For Hawaii, Au et al., (2000) have demonstrated that ambient sound pressure levels during the peak of humpback whale “season” (specifically between mid-February and mid-March) are approximately 120 dB re µ1 Pa with spectral peaks at 315 Hz and 630 Hz. For the ocean in general, above 500 Hz, deep ocean ambient sound is produced primarily by wind and sea state conditions. Below 500 Hz, the ambient sound levels are strongly related to ship traffic, both near and far. In shallow water near continents and islands, surf is also a significant factor. Wenz (1962) and Urick (1983) are among many contributors to the literature on underwater ambient sound. Figure G-8, based on these two sources, was adapted by Malme et al. (1989) to show ambient sound spectra in 1/3-octave bands for a range of sea state and ship traffic conditions.

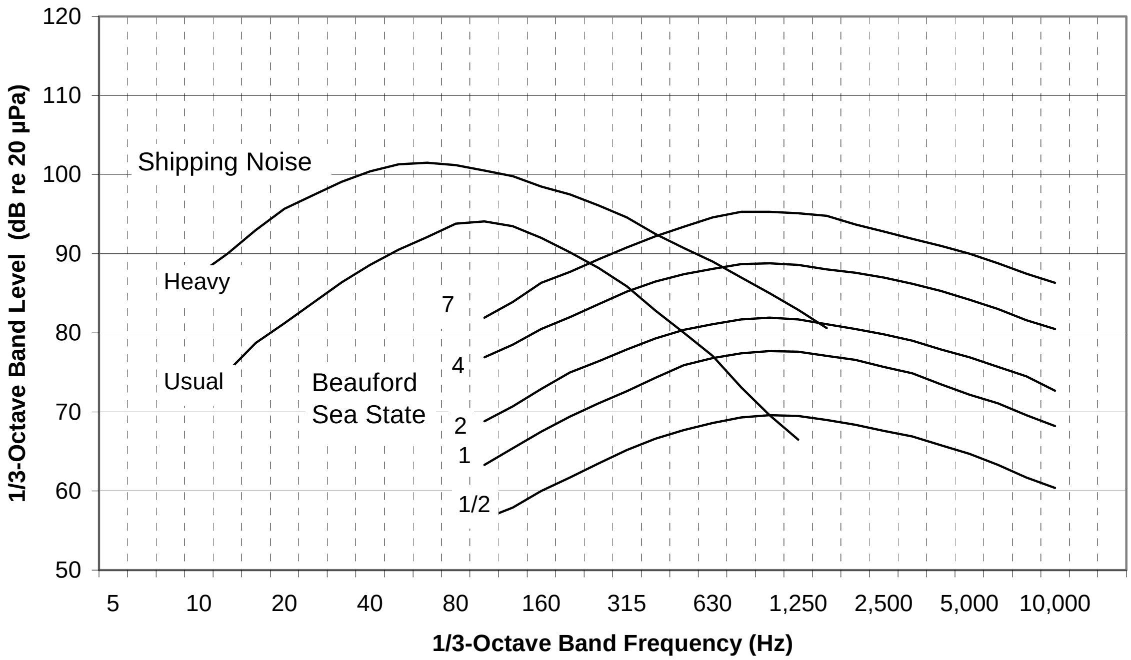


Figure G-8. Underwater Ambient Sound

Wind

On a 1/3-octave basis, wind-related ambient sound in shallow water tends to peak at about 1 kHz (see Figure G-8). Levels in 1/3-octave bands generally decrease at a rate of 3 to 4 dB per octave at progressively higher frequencies and at about 6 dB per octave at progressively lower frequencies. Sound levels increase at a rate of 5 to 6 dB per doubling of wind speed. At a frequency of about 1 kHz, maximum 1/3-octave band levels are frequently observed at 95 dB referenced to 1 μPa for sustained winds of 34 to 40 knots and at about 82 dB for winds in the 7 to 10 knot range. Wave action and spray are the primary causes of wind-related ambient sound; consequently, the wind-related noise component is strongly dependent on wind duration and fetch as well as water depth, bottom topography, and proximity to topographic features such as islands and shore. A sea state scale, which is related to sea surface conditions as a function of wind conditions, is commonly used in categorizing wind-related ambient sound. The curves for wind-related ambient sound shown in Figure G-8 are reasonable averages, although relatively large departures from these curves can be experienced depending on site location and other factors such as bottom topography and proximity to island or land features.

Surf

Very few data have been published relating specifically to local sound levels due to surf in offshore areas along mainland and island coasts. Wilson et al. (1985) present underwater sound levels for wind-driven surf along the exposed Monterey Bay coast, as measured at a variety of distances from the surf zone. Wind conditions varied from 25 to 35 knots. They vary from 110 to 120 dB in the 100 to 1,000 Hz band at a distance of 650 ft from the surf zone, down to levels of 96 to 103 dB in the same band 4.6 nm from the surf zone. Assuming that these levels are also representative near shorelines in the HRC area, surf sound in the 100 to 500 Hz band will be 15 to 30 dB above that due to wind-related noise in the open ocean under similar wind speed conditions.

Distant Shipping

The presence of a relatively constant low-frequency component in ambient sound within the 10 to 200 Hz band has been observed for many years and has been related to distant ship traffic as summarized by Wenz (1962) and Urick (1983). Low-frequency energy radiated primarily by cavitating propellers and by engine excitation of the ship hull is propagated efficiently in the deep ocean to distances of 100 nm or more. Higher frequencies do not propagate well to these distances due to acoustic absorption. Also, high-frequency sounds radiated by relatively nearby vessels will frequently be masked by local wind-related sound. Thus, distant shipping contributes little or no sound at high frequency. Distant ship-generated low-frequency sound incurs more attenuation when it propagates across continental shelf regions and into shallow offshore areas than occurs in the deep ocean.

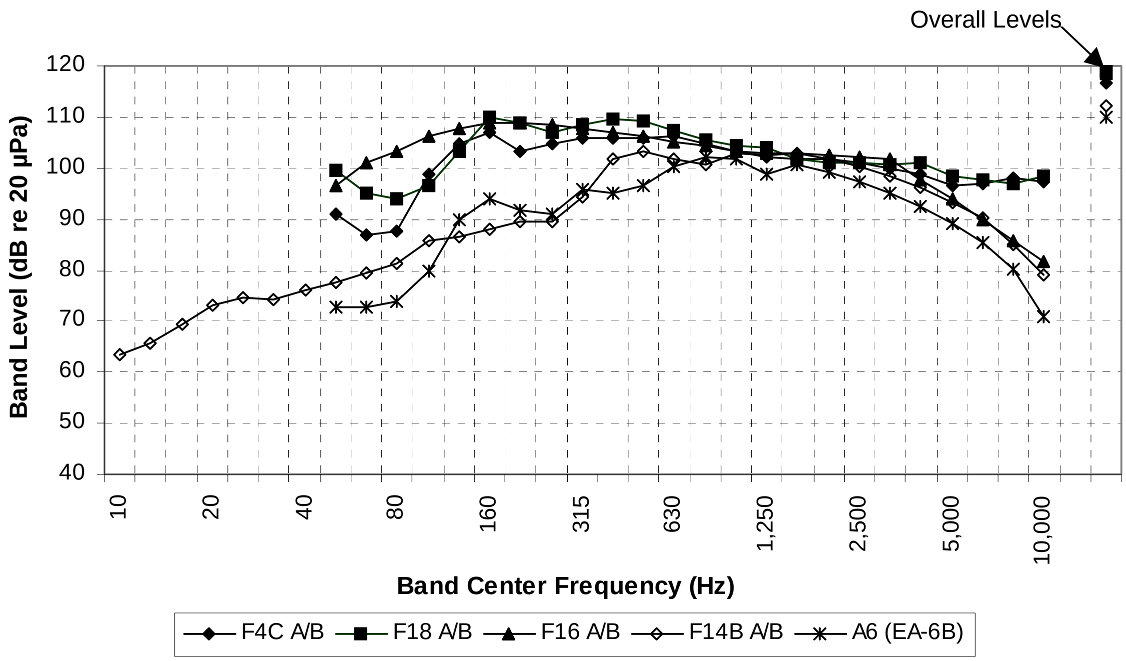
Figure G-8 also provides two curves that approximate the upper bounds of distant ship traffic sound. The upper curve represents the sound level at sites exposed to heavily used shipping lanes. The lower curve represents moderate or distant shipping sound as measured in shallow water. As shown, highest observed ambient sound levels for these two categories are 102 dB and 94 dB, respectively, in the 60 to 100 Hz frequency range. In shallow water the received sound level from distant ship traffic can be as much as 10 dB below the lower curve given in Figure G-8, depending on site location on the continental shelf. In fact, some offshore areas can be effectively shielded from this low-frequency component of shipping sound due to sound propagation loss effects.

Note that the shipping sound level curves shown in Figure G-8 show typical received levels attributable to *distant* shipping. Considerably higher levels can be received when a ship is present within a few miles.

G.4.5 MARINE MAMMAL SOUND METRICS

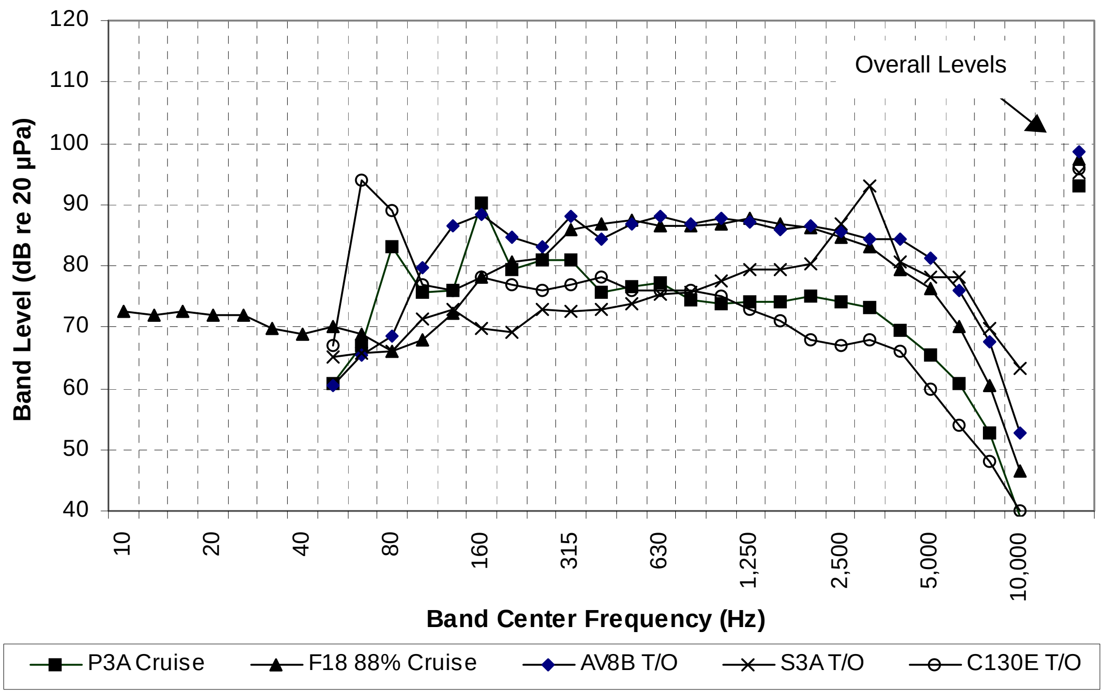
Sound received at and below the sea surface is relevant to marine mammals and some other marine animals at sea. The spectral composition and overall level of each airborne noise source must both be considered in assessing potential impacts on marine mammals present at sea in the HRC. As described earlier, the most significant sources are low-flying aircraft and their related weapons, naval gunfire, targets, missiles, and debris impacts. Brief sound transients or impulses from surface missile launches, low level explosions, and gunfire may also be important during training.

Aircraft spectrum information was obtained from the U.S. Air Force Armstrong Laboratory for various aircraft types (Air Force Aerospace Medical Research Laboratory, 1990). Data for some additional types of aircraft occasionally used on the HRC were also included. The information obtained is summarized in the 1/3-octave band spectra shown in Figure G-9A (for fighter and attack aircraft), Figure G-9B (selected HRC aircraft), and Figure G-9C (helicopters). Most of these spectra represent received levels near the surface during overflights at 1,000 ft above sea level under standard atmospheric conditions (59° F, 70 percent relative humidity). The data shown in this standard format can be adjusted for different aircraft altitudes and other atmospheric attenuation conditions—an important consideration at high frequencies.



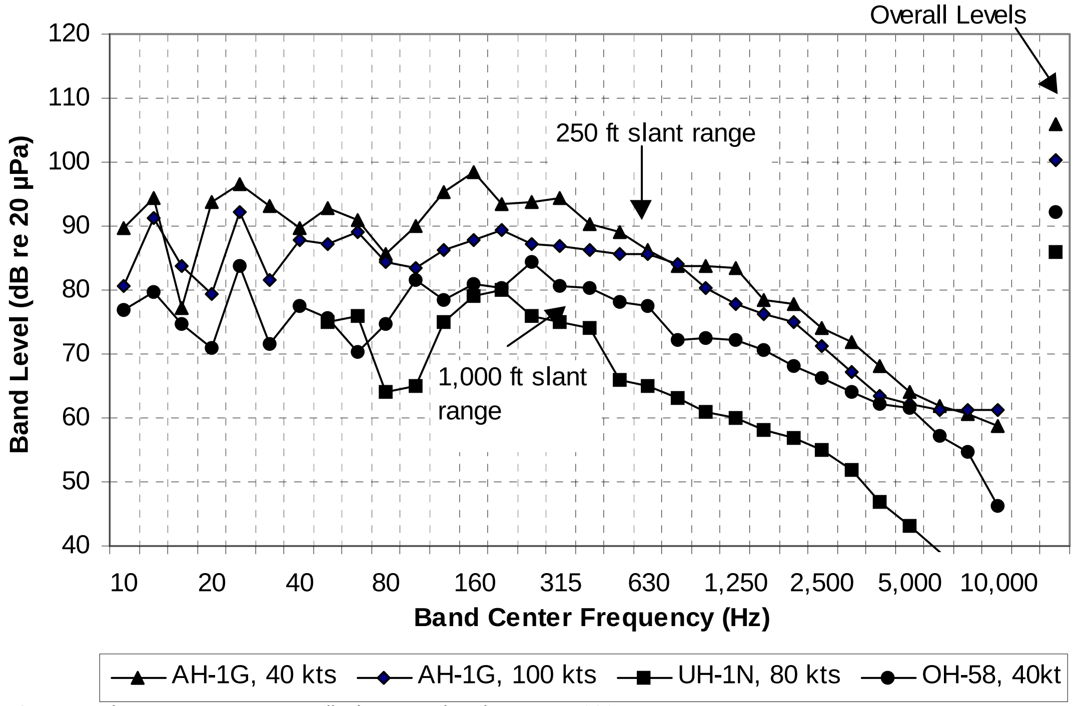
Source: Air Force Aerospace Medical Research Laboratory, 1990.

Figure G-9A. Noise Spectra: Fighter and Attack Aircraft



T/O = takeoff
Source: Air Force Aerospace Medical Research Laboratory, 1990.

Figure G-9B. Noise Spectra: Selected HRC Aircraft



Source: Air Force Aerospace Medical Research Laboratory, 1990.

Figure G-9C. Noise Spectra: Helicopters

The aircraft spectra can be compared to the shapes and quantitative features of marine mammal audiograms, when known, to determine the weighting functions and overall level adjustments needed to estimate the perceived overall levels produced during close encounters. These levels can then be compared to known or assumed impact thresholds to determine whether a detailed analysis is needed. If a detailed analysis is indicated, then contour plots can be calculated to estimate the total number of animals potentially affected by an encounter scenario.

G.4.6 SONIC BOOM PROPAGATION INTO THE WATER

Aircraft Overflights

Supersonic activities in the HRC result in sonic boom penetration of the water in the operating area. Boom signatures were estimated using the Air Force's PCBOOM3 model to determine the potential for sound impacts near or at the surface. The F-4 fighter was used in this analysis since it is representative of aircraft using the range. Table G-4 shows the underwater boom parameters at locations near the water surface together with the estimated attenuation rate of peak pressure with depth using a method developed by Sawyers (1968).

Table G-4. Underwater Sonic Boom Parameters for F-4 Overflight

Sonic Boom Parameters			Depth Peak Pressure Loss (feet)					
Speed	**Alt. (feet)**	**T (msec)**	**Lp (1μPa)**	**CSEL**	**ASEL**	**6 dB**	**10 dB**	**20 dB**
M1.2	10,000	103	168.0	143.9	129.6	11.5	24.6	68.9
M1.2	5,000	88	179.9	148.8	134.3	9.8	21.3	59.7
M1.2	1,000	64	182.9	159.1	145.6	6.9	15.1	42.6
M2.2	1,000	44	186.7	163.1	149.7	9.7	21.0	58.4

Source: Ogden Environmental, 1997.

Missile and Target Overflights

Low-level supersonic target and missile flights also produce significant sounds underwater from sonic booms. Specific data are not available for the Vandal target under normal flight conditions at low altitudes of 100 ft down to 20 ft. The required sonic boom estimates were made using a method developed by Carlson (1978) and adapted for model-based analysis by Lee and Downing (1996). This analysis assumes that the essential boom signature is a simple “N-wave” as is typically measured for supersonic aircraft passing at high altitudes (hundreds of feet). At lower altitude overflights, which are of interest here, the pressure contributions from the shape variations on the aircraft body and wings become observable, and at very low altitudes the signature is no longer a simple N-wave.

The acoustic impact analysis requires estimates of both the peak pressure level produced by a Vandal boom and the total sound energy exposure. The peak pressure level produced at close range (near field) can be influenced by contributions from minor peaks in the waveform. A relevant study by McLean and Shrout (1966) made a comparison of near-field boom waveforms calculated with appropriate near-field theory with waveforms predicted by far-field theory for representative aircraft. The results showed that the peaks predicted by the near-field theory were generally about 10 percent lower than those predicted at the same range by far-field theory. Thus in this application, the use of the Carlson method would be expected to yield conservative results.

The energy density spectrum and total sound energy exposure were estimated using Fourier analysis of the predicted N-wave to obtain the unweighted (flat) energy density spectrum and the F-SEL. This spectrum was then A-weighted to estimate the A-SEL. The A-SEL is about 9 dB below the F-SEL. On the issue of near-field effects, the change in frequency distribution of the pressure signature with distance must be considered. The near-field signature has more of its energy in smaller shock waves associated with the details of the airframe (e.g., fins, fuselage changes in area, etc.). The peaks associated with the far-field N signature have not yet fully developed so more of the acoustic energy appears at higher frequencies. A coalescing process is caused by non-linear propagation of high-pressure sound in the atmosphere (sound travels faster at higher pressures) that occurs with distance as the sound wave propagates outward from the flight path. Initially smooth high-pressure fluctuations compress into shock waves. Thus, because of the increased high-frequency content, the resulting total energy of a near-field signature measured at 20 ft would likely be reduced less by the A-weighting process than would the total energy of an N-wave approximation. However, this difference is not be expected to be more than 2 to 3 dB because of the large shifts in spectrum energy that would be required during propagation.

An analytic model was developed to predict the boom signature produced by Vandal flights that used the Vandal dimensions and assumed a level flight at Mach 2.1 at various altitudes. For an altitude of 20 ft, the predicted overpressure underwater at the surface is 300 pounds per square foot or 203 dB re 1 µPa with a boom duration of 4.8 milliseconds. The peak level is estimated to be 10 dB lower at a depth of 1.5 ft and 20 dB lower at a depth of 5 ft, based on an analysis developed by Sawyers (1968).

Appendix H
Cultural Resources

APPENDIX H
CULTURAL RESOURCES

Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999

MEMORANDUM OF AGREEMENT
AMONG
THE UNITED STATES DEPARTMENT OF THE NAVY,
PACIFIC MISSILE RANGE FACILITY;
THE HAWAII STATE HISTORIC PRESERVATION OFFICER;
AND
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
REGARDING
ACTIVITIES PROPOSED WITHIN
THE PACIFIC MISSILE RANGE FACILITY ENHANCED CAPABILITY
ENVIRONMENTAL IMPACT STATEMENT,
BARKING SANDS, KAUAI, HAWAII

January 1999

WHEREAS, the United States (U.S.) Department of the Navy, under Section 106 of the National Historic Preservation Act, is responsible for taking into account the effects of its undertakings on properties included on, or eligible for listing on, the National Register of Historic Places (National Register), herein after referred to as historic properties, and, prior to approval of an undertaking, to afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the undertaking; and

WHEREAS, the Navy proposes to enhance the capabilities of the Pacific Missile Range Facility (PMRF) to support Navy theater ballistic missile defense (TBMD) and other Department of Defense missile testing and training activities, which enhancements would involve areas on the islands of Kauai and Niihau; and

WHEREAS, the Navy has determined that the enhancements of PMRF's capabilities may have an effect upon historic properties and has consulted with the ACHP and the Hawaii State Historic Preservation Officer (SHPO) pursuant to Section 800.13 of the regulations (36 CFR Part 800) implementing Section 106 of the National Historic Preservation Act (16 USC 470f); and

WHEREAS, interested agencies and members of the public, including the Hawaii SHPO, potentially affected Native Hawaiian organizations, and affected land owners, have been provided the opportunity to comment on the possible effects that this undertaking may have on historic properties at the locations defined in Stipulations I, II, III, and IV and shown on Attachments A through D, through public hearings, consultation meetings, or other means; and

WHEREAS, the Navy conducts on-going activities on Niihau and Kaula Island, with respect to which questions have been raised as to whether they constitute undertakings requiring consultation with the Hawaii SHPO; and

PMRF EIS MOA *1/26/1999*

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

WHEREAS, the areas of potential effect for the Navy's proposed and on-going activities, as noted above, are as follows: on the island of Kauai, as depicted on Attachment B, the PMRF Main Base, the Restrictive Easement area, the area of Makaha Ridge under the jurisdiction of PMRF, the Kokee area under PMRF jurisdiction, and the Kamokola magazine area in the vicinity of the existing storage magazines and the proposed missile storage buildings; the entire island of Kaula; and on the island of Niihau, the areas primarily in the Northern and Southern portions of the island in the vicinity of proposed support sites and on-going ground exercises; and

WHEREAS, portions of the PMRF Restrictive Easement Area (ground hazard area) associated with the undertaking are known to contain historic properties , but that the activities conducted for this undertaking are ongoing and have been previously reviewed by the Hawaii SHPO and determined to have no effect (Attachment E); and

WHEREAS, PMRF and the Niihau Ranch have an established protocol for the use of Niihau Island facilities and helicopter services (Attachment G), which takes into account potential effects on historic properties from Navy activities; and

WHEREAS, the Niihau landowner and residents have an interest in preserving confidentiality concerning the existence and location of archeological resources on Niihau, which interest is similar to that recognized in Section 470hh of the Archeologica Resources Protection Act with respect to such resources on public lands, and the parties recognize that trafficking in, removal, damage to, or defacement of such properties is prohibited and punishable by State and Federal law; and

WHEREAS, the acronyms, abbreviations, and definitions given in Attachment I are applicable throughout this Memorandum of Agreement and its attachments;

NOW THEREFORE, the Navy, the Hawaii SHPO, and the ACHP agree that the proposed undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties. The Navy will ensure that the measures in Stipulations I through V are carried out.

STIPULATIONS

I. Pacific Missile Range Facility, Main Base

Potential effects on historic properties within, or in the vicinity of, PMRF Main Base locations (Attachment C) from facility construction (including ground clearing and subsurface excavation), instrument siting, operational activities (including amphibious, RIMPAC, and National Guard activities), a launch pad mishap, an accidental launch vehicle ground strike, construction or launch vibration, ignition of vegetation from missile exhaust or debris and subsequent fire suppression activities, and/or increased personnel or off-road traffic within, or in the vicinity of, proposed locations, shall be mitigated in the following manner:

Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

A. Avoidance of known historic properties, as practical.
B. When avoidance is not possible, monitoring of all ground disturbing activities within sensitive areas, in a manner consistent with the proposed Draft Archaeological Monitoring Plan provided in Attachment J of this Memorandum of Agreement.
C. Survey by a professional archaeologist, qualified by standards established by the Department of the Interior, National Park Service and described in 36 CFR, Part 61, Appendix A, of potential construction areas and relocation of those areas, as practicable, prior to any construction or exercises to ensure the avoidance of sensitive areas, particularly in the Major's Bay and Nohili Dune and Nohili ditch areas.
D. Spraying of water on vegetation surrounding launch sites prior to launches to prevent ignition.
E. Use of open sprays rather than directed streams of water to suppress unexpected fires and avoid dune erosion or damage to sensitive sites.
F. Survey by a professional archaeologist (as described in Stipulation I.C) subsequent to unexpected fires, launch pad mishaps, or accidental launch vehicle ground strikes; historic buildings and/or structures inspections subsequent to unexpected fires, launch pad mishaps, accidental launch vehicle ground strikes, or excessive construction or launch vibration.
G. In all cases where funerary objects and/or human remains are inadvertently discovered or disturbed, all activity in the immediate area will cease and the following individuals or organizations notified:
    1. PMRF Environmental Engineer or Historic Preservation Point of Contact
    2. U.S. Navy Archaeologist
    3. Hawaii SHPO
    4. Na Ohana Papa O Mana
    5. Hui Malama I Na Kupuna O Hawaii Nei
    6. Office of Hawaiian Affairs.
    7. Kauai/Niihau Islands Burial Council

    Subsequent actions taken will be in accordance with Sections 3(d) and 7 of the Native American Graves Protection and Repatriation Act (NAGPRA), its implementing regulations at 43 CFR Part 10, and 36 CFR, Part 800.11, and will follow the procedures of the Draft Burial Plan provided in Attachment K.
H. Briefings to construction and operational personnel regarding the sensitivity of cultural resources sites and the civil penalties associated with their intentional disturbance by personnel or off-road vehicular traffic.

II. Pacific Missile Range Facility, Makaha Ridge, Kokee, and Kaula Island

The Navy has conducted records searches and field investigations to determine if historic properties are present within the areas of potential effect of the Navy's undertakings at Makaha Ridge, Kokee, and Kaula Island and determined that these areas do not contain historic properties, with the exception of potential cold war properties, at Makaha Ridge and Kokee. (Cultural Resources Management Overview Survey, Pacific Missile Range Facility, Hawaiian Area, Kauai, Hawaii, August 1996; Environmental Impact Assessment

Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

Kaula Island Target Hawaii, U.S. Navy, February 1980). None of the cold war properties should be affected by the Navy activities. If it were later determined that Navy activities would affect any of these properties, data recovery would be conducted to preserve information concerning the properties.

III. Pacific Missile Range Facility, Kamokala Magazines

The Navy has conducted only a reconnaissance level survey of the area proposed for construction of two new missile storage buildings near Kamokala Magazines, and it has not been determined whether there are historic properties within the area of potential effect. Prior to any construction or ground disturbing activities, the Navy shall conduct archaeological surveys of the area of potential effect associated with the proposed missile storage buildings to determine the existence of historic properties. The surveys shall be conducted by a professional archaeologist (as described in Stipulation I.C). If historic properties are found, the potential effects on such properties from facility construction or remediation activities (including ground clearing and subsurface excavation) and operational activities, shall be determined and mitigations established in consultation with the Hawaii SHPO and other signatories to this Memorandum of Agreement, as appropriate. Potential mitigations may include:

A. Those mitigations described in Stipulations I.A, I.B, I.G, and I.H of this Memorandum of Agreement;
B. Inspections of historic structures subsequent to unexpected fires or excessive construction vibration.

IV. Island of Niihau

A. The Navy has conducted archaeological surveys of areas A, B, Q, E, F, G, and J on the Island of Niihau, which are shown on Attachment A of this Memorandum of Agreement; and has determined that they do not contain any prehistoric or historic archeological sites. The Navy has conducted partial archaeological surveys of areas H, I, K, and M on Niihau, as shown on Attachment A, and has determined that the likelihood of historic properties being in these areas is low. The Hawaii SHPO believes that the archaeological report needs revision to acceptably cover Section 106 concerns. Additionally, the Hawaii SHPO believes that the process used by the Navy to identify historic properties on Niihau was not adequate to determine the presence of traditional cultural resources and further believes that an ethnographic survey covering the area of potential effect on Niihau will be necessary to make this determination.

B. Prior to conducting any new activities on the island of Niihau, the Navy shall ensure that an ethnographic survey is conducted, covering specific sites and associated areas potentially affected by proposed activities as well as those ongoing activities described in Attachment H, to more fully determine the existence of traditional cultural properties within these areas. The scope of this survey shall be determined in consultation with the landowner and the Hawaii SHPO and may be limited by constraints imposed by the landowner. Disagreements on the scope of the survey would be the subject of further

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

consultation, which could lead to dispute resolution under Stipulation VI. The Navy, the Hawaii SHPO, and the landowner, shall consult concerning the manner of conducting this survey and the Navy will consider the recommendations and guidance provided by the SHPO. The SHPO may advise the Navy whether it believes the information provided adequately identifies traditional cultural properties, if any, in the project area. Any information provided to the Navy, the SHPO, or any other government agency shall be maintained confidential and no information shall be released without the written consent of the landowner, residents, and informants.

C. The Navy will continue to consult with the Hawaii SHPO to determine which, if any, of the Navy's on-going activities on Niihau, described in Attachment H, have the potential to affect historic properties on the island. The Navy shall provide sufficient documentation for any no historic property or no effect determination. However, pending completion of the ethnographic survey referred to in IV.B., the overview of archaeological settlement patterns referred to in IVE., and other surveys referred to in IV.D., and any subsequent consultation with the Hawaii SHPO or other interested parties, the Navy may continue on-going activities. For activities for which the Navy and SHPO agree there is a potential for effect on historic properties, continuation of these activities will be subject to the completion of an ethnographic survey addressing their potential effects or they would continue for a maximum period of 5 years in the absence of an ethnographic survey and any appropriate mitigation plan. Fieldwork for the survey will be initiated no later than June 30, 2000.

D. Any additional studies required to identify and inventory historic properties on the island of Niihau, either with respect to specific sites H, I, K, and M, or any broader study to establish context, will be conducted in accordance with the National Historic Preservation Act, its implementing regulations, and other appropriate guidance provided by the Secretary of the Interior. Archaeological surveys will be conducted by a professional archaeologist, meeting the requirements described in Stipulation I.C and agreeable to the landowner, and a representative of the Niihau Ranch. All surveys conducted will result in an acceptable report that will be provided to the Navy and the SHPO. The information contained in the survey, and in any reports provided to the Navy and the SHPO, shall be maintained confidential and no information shall be released without the express agreement of the landowner and residents.

E. An acceptable overview report of likely archaeological site (settlement) patterns of the specific sites and associated areas of potential impact for all planned and ongoing projects will be provided by PMRF to SHPO no later than 1 October 1999. This shall be based on existing archaeological and archival documents and probably some brief archaeological fieldwork (transects). This overview provides the context for evaluating potential impacts, for predicting likely site settlement patterns, for interpreting sites that might be found, and for evaluating the significance of those sites. The information contained in the survey, and in any reports provided to the Navy and the SHPO, shall be maintained confidential and no information shall be released without the express agreement of the landowner and residents.

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

F. Any planned and future undertakings will be reviewed and any required studies will be conducted in accordance with the National Historic Preservation Act, its implementing regulations, and other appropriate guidance provided by the Secretary of the Interior. Archaeological surveys will be conducted by a professional archaeologist, meeting the requirements described in Stipulation I.C and agreeable to the landowner, and a representative of the Niihau Ranch. All surveys will result in an acceptable report that will be provided to the Navy and the SHPO. The information contained in the survey, and in any reports provided to the Navy and the SHPO, shall be maintained confidential and no information shall be released without the express agreement of the landowner and residents.

G. If historic properties, including traditional cultural properties, are discovered as a result of either the ethnographic survey described in III.C. or other surveys conducted as described in III.E., the Navy will determine the potential effects on any such historic properties from activities such as facility construction (including ground clearing and subsurface excavation); instrument siting; operational activities (including those described in Attachment H); road or infrastructure improvements; construction of fire breaks or fire suppression activities; the accidental distribution and clean-up of missile launch debris; increased personnel or off-road traffic within, or in the vicinity of, proposed locations, including those on-going activities described in Attachment H.

H. If the Navy determines that its activities on Niihau will result in adverse effects to historic properties, the Navy shall determine appropriate mitigations, in consultation with the landowner, Niihau residents, and the Hawaii SHPO.

I. In all cases where historic properties, including funerary objects and/or human remains, are inadvertently discovered or disturbed, all activity in the immediate area will cease and the following individuals or organizations notified:

The Landowner
Niihau Elders
PMRF Environmental Engineer or Historic Preservation Point of Contact
U.S. Navy Archaeologist
Hawaii SHPO
Appropriate Kauai/Niihau Islands Burial Council Member

Subsequent actions will include securing the area to protect the historic property from further disturbance and appropriate treatment of these properties will be determined through consultation among the individuals and organizations described within this Stipulation.

J. Where the threat of fire exists in an operation, PMRF shall provide adequate fire suppression equipment and shall schedule and provide for a Niihau Ranch fire suppression team to be on standby on Niihau during operations.

Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

K. Briefings shall be given to non-resident personnel regarding the sensitivity of historic properties and the procedures to be followed if discoveries are made.

L. Information beyond the reports referenced above concerning archeological resources on Niihau will only be provided to the State of Hawaii through the same procedures and subject to the same commitment of confidentiality as is required for such resources on public lands, as specified in Section 470hh(b) of the Archeological Resources Protection Act.

V. Continuing Consultation

A. For Stipulations I, II, III, and IV, consultation will continue with Native Hawaiian organizations to include Na Ohana Papa O Mana, Hui Malama I Na Kupuna O Hawaii Nei, the Kauai/Niihau Islands Burial Council, and the Office of Hawaiian Affairs, and emphasis will be placed on continuing consultation with the Office of Hawaiian Affairs during the months of February and March 1999 to accommodate their internal procedures guiding the consultation process, and documents related to this consultation will be maintained in an appendix to this Memorandum of Agreement.

VI. Resolving Objections

A. Should any approving party to this MOA object in writing to the Navy regarding any action carried out or proposed with respect to implementation of this MOA, the Navy shall consult with the objecting party to resolve the objection. If after initiating such consultation the Navy determines that the objection cannot be resolved through consultation, the Navy shall forward all documentation relevant to the objection to the Advisory Council on Historic Preservation, including the Navy's proposed response to the objection. Within 30 days after receipt of all pertinent documentation, the Council shall exercise one of the following options:

1. Advise the Navy that the Council concurs in the Navy's proposed response to the objection, whereupon the Navy will respond to the objection accordingly; or

2. Provide the Navy with recommendations, which the Navy shall take into account in reaching a final decision regarding its response to the objection.

B. Should the Council not exercise one of the above options within 30 days after receipt of all pertinent documentation, the Navy may assume the Council's concurrence in its proposed response to the objection.

C. The Navy shall take into account any Council recommendation or comment provided in accordance with this stipulation with reference to the subject of the objection; the Navy's responsibility to carry out all actions under this MOA that are not the subjects of the objection shall remain unchanged.

VII. Amendments

PMRF EIS MOA *1/26/1999*

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

A. Any approving party to this MOA may propose to the Navy that the MOA be amended, whereupon the Navy shall consult with the other parties to this MOA to consider such an amendment. 36 CFR Section 800.5(e) shall govern the execution of any such amendment.

B. Execution of this Memorandum of Agreement and implementation of its terms evidence that the U.S. Department of Navy has afforded the ACHP an opportunity to comment on the actions proposed within the PMRF Enhanced Capabilities EIS and its potential effects on historic properties and that the U.S. Navy has taken into account the effects of the undertaking on historic properties.

UNITED STATES DEPARTMENT OF THE NAVY, PACIFIC MISSILE RANGE FACILITY

By: J A Bowlin **Date:** 26 Jan 99
J.A. Bowlin, Captain, U.S. Navy,
Commanding Officer, Pacific Missile Range Facility

HAWAII STATE HISTORIC PRESERVATION OFFICER

By: **Date:** 1/27/99
State Historic Preservation Officer

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: John M. Fowler **Date:** 3/18/99
John M. Fowler,
Executive Director

PMRF EIS MOA *1/26/1999*

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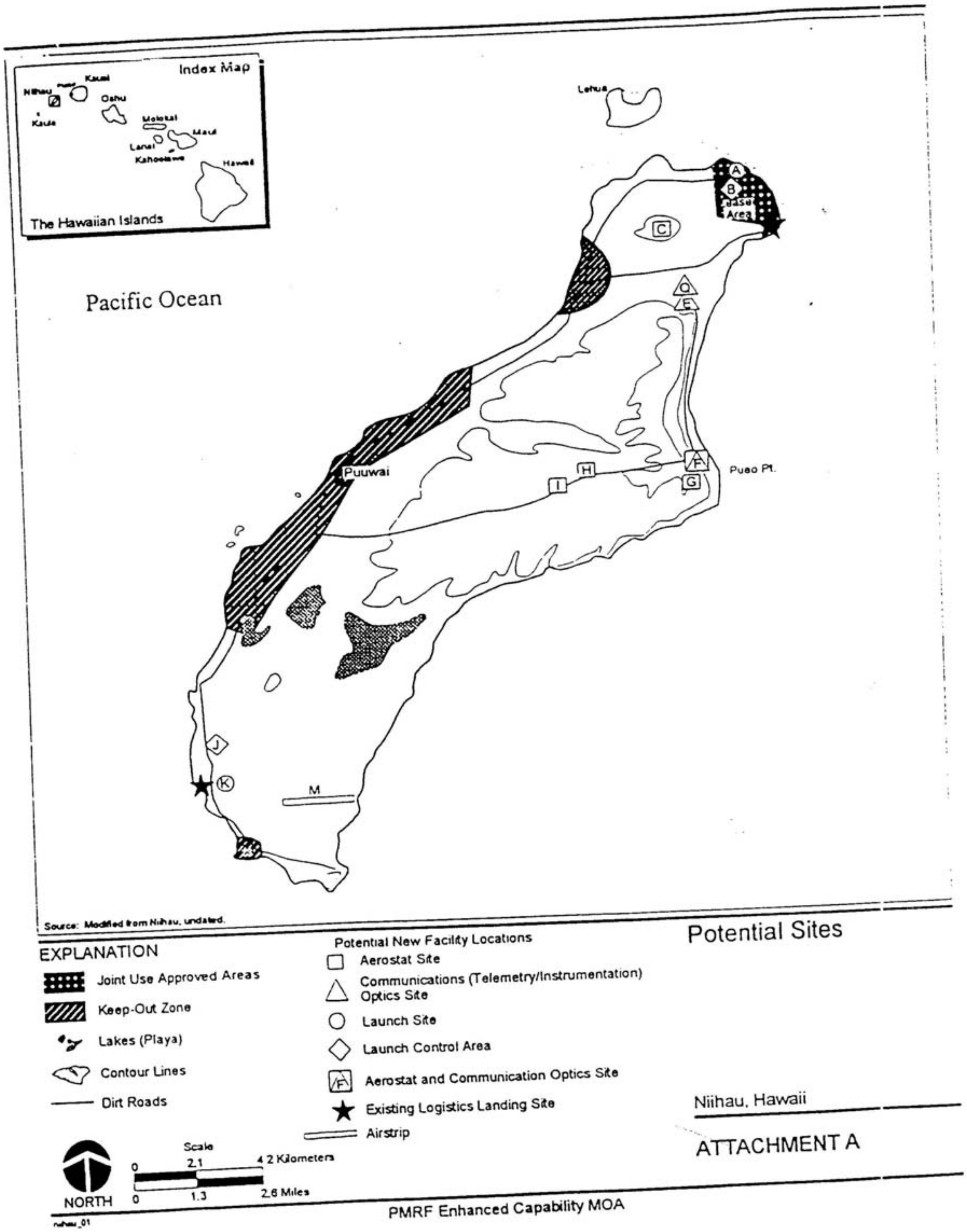
Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

APPENDIX

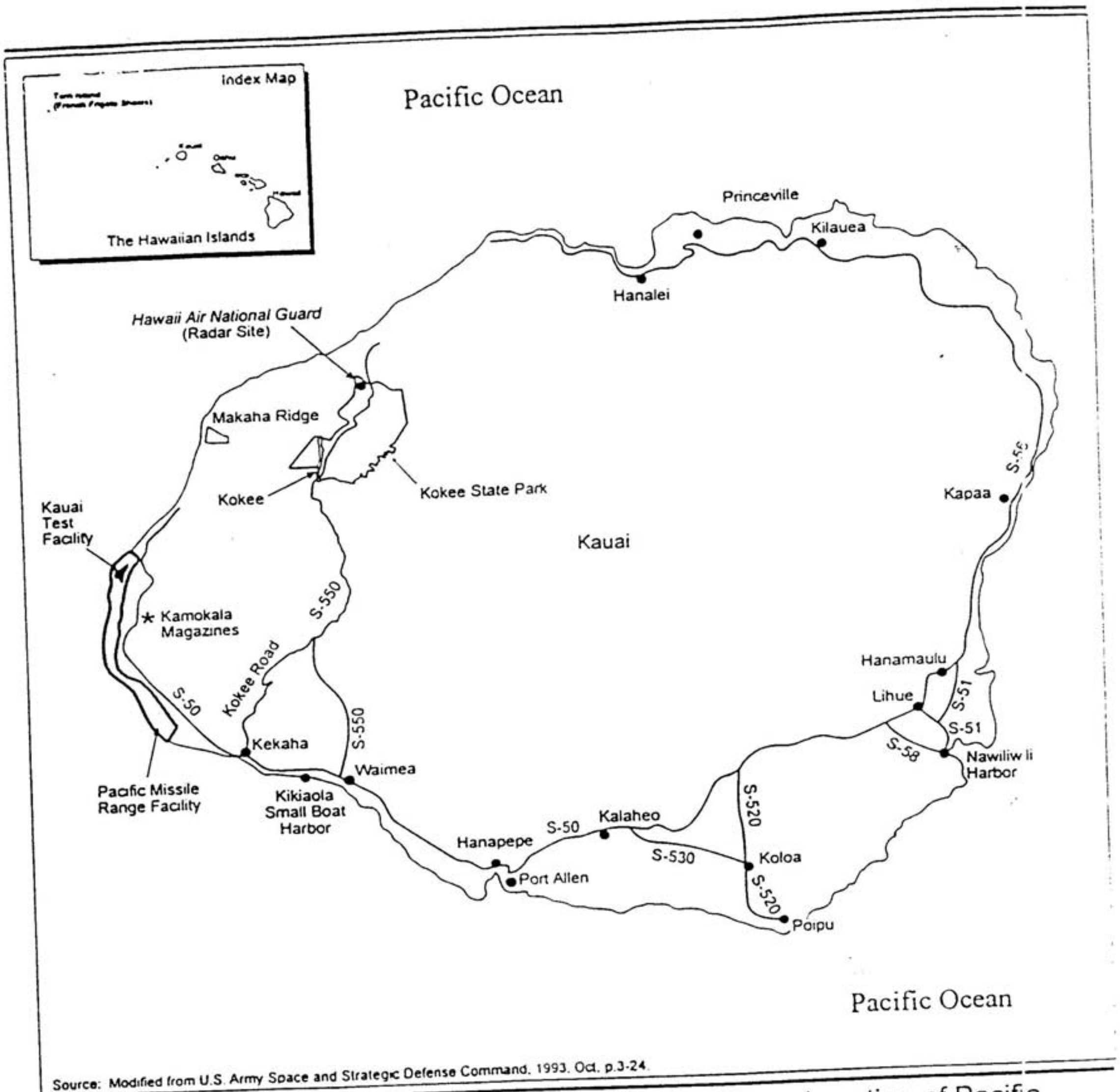
Documents Related to Consultation

Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)



A-1

Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)



EXPLANATION
S-50 = State Highway
—— Kokee State Park Boundary

Location of Pacific Missile Range Facility and Related Sites

Hawaii

ATTACHMENT B

Scale
0 4.1 8.1 Kilometers
0 2.5 5 Miles

NORTH

PMRF Enhanced Capability MOA

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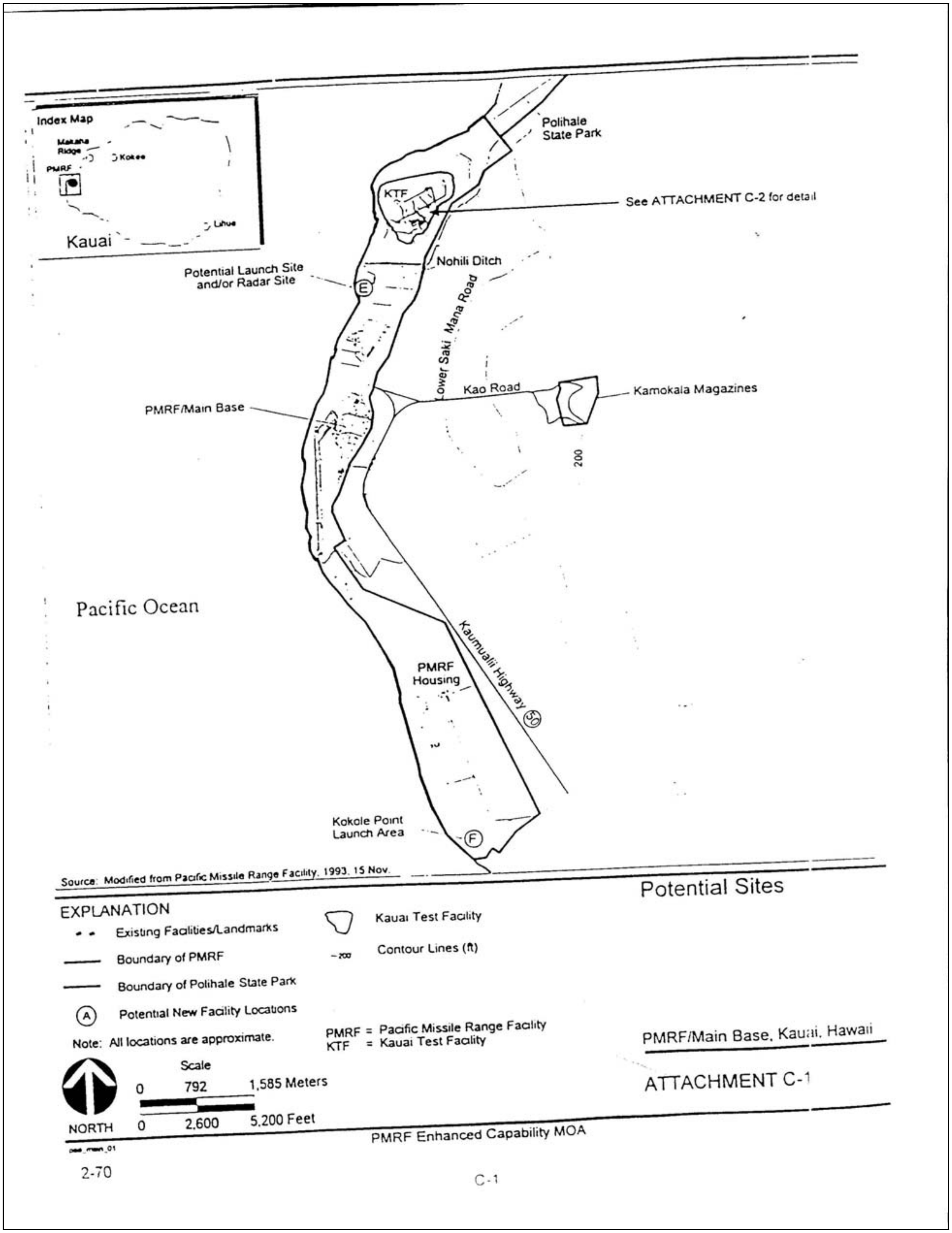
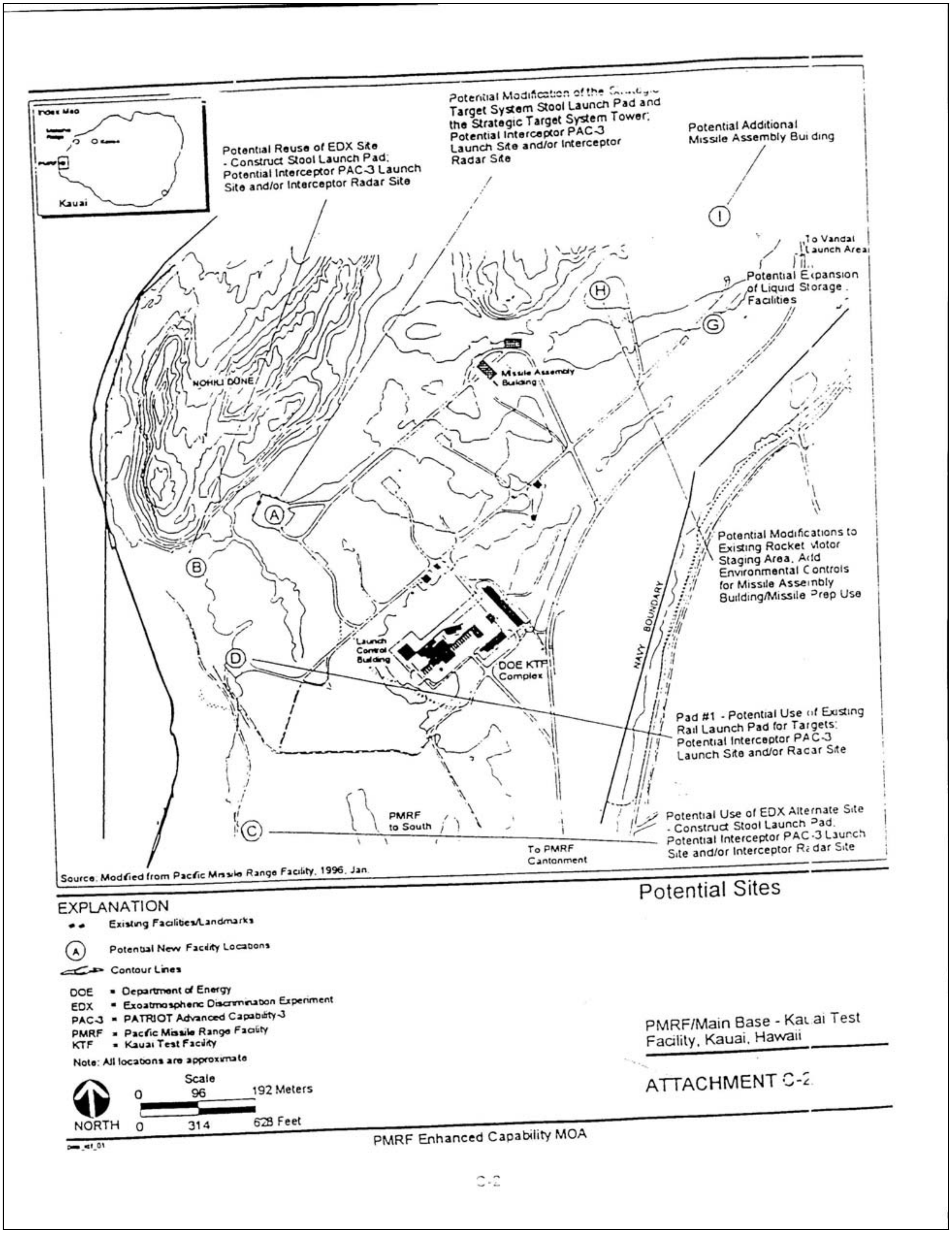
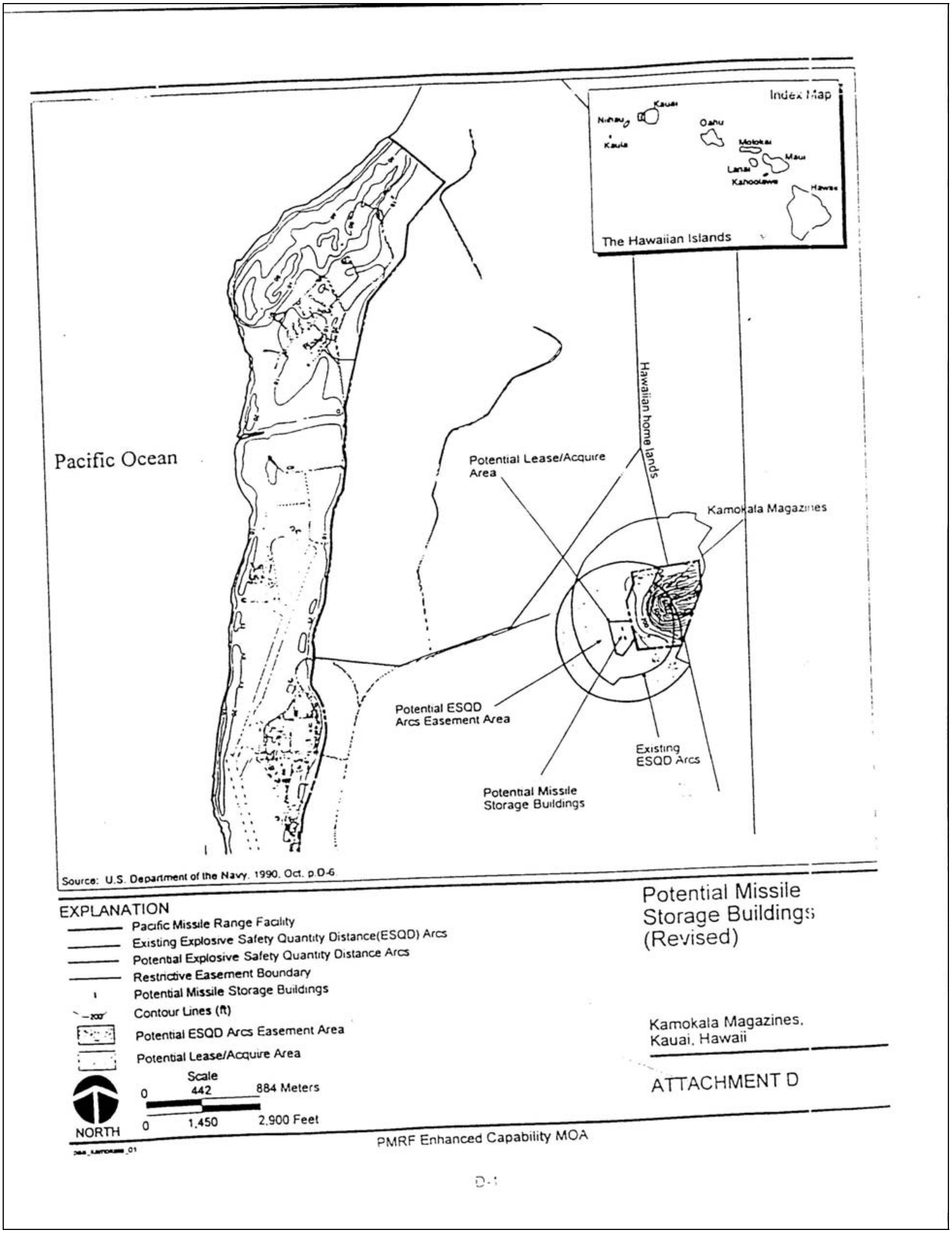
Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)



Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)



Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)



Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

COPY

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU HAWAII 96813

REF:HP-AMK

SEP 10

LOG NO 9118
DOC NO 9305NM69

MEMORANDUM

TO: Brian Choy, Director
Office of Environmental Quality Control

FROM: Keith Ahue, Chairperson and
State Historic Preservation Officer

SUBJECT: Draft EIS for the PMRF Easement over State Land for Safety and Ground Hazard Areas for STARS and Navy Vandal Missile Launches Historic Preservation Review & National Historic Preservation Act Compliance
TMK: 1-2-02: por. 1, 15 and por. 24
Mana, Waimea, Kaua'i

We have reviewed the above document. It should be clearly stated in the document that no 100 % archaeological inventory survey has been conducted in the ROI (2110 acres). Small portions of the area have been recently surveyed by DLNR - State Parks (Carpenter and Yent, pers. com. August 1993). However, it is presumed that no physical action will occur in this area. Therefore, since it is an easement, we concur that the ROI will have " no effect" on significant historic sites.

We do have some minor comments and concerns with this document. We do have concerns with the permanent signs. No map was provided on the location of these signs. Since they will be permanent, we need to know what type of construction will take place, along with information on the design of this signs.

The summary on the archaeological research conducted to date, should be updated and include the following: Cleeland 1974, Bordner 1976, Sinoto 1978, Kikuchi 1970, Kennedy/Jenks 1952, Yent 1982, McMahon 1988a & b, Gonzalez et al 1990, Walker, Kalima & Rosendahl 1990, Welch 1990a & b, U.S. Navy (n.d.), draft Flores and Kaohi 1992 and O'Hare & Rosendahl 1993. Appendix D-1 should be updated to include current State of Hawaii inventory sites numbers: 6017, 6018, 6019, 6020, 6021, 6024 and 724. We are unsure of the correlation of the temporary numbers listed in the table with these numbers.

If you have any questions please call Nancy McMahon at 587-0006.

NM:amk

c: Linda Ninh, U.S. Army Space and SDC

ATTACHMENT E

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

ATTACHMENT F

Reserved

Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

ATTACHMENT G

NIIHAU RANCH
P.O. Box 229
Makaweli, Kauai, HI 96769

PMRF Expanded Capabilities
Support and
Land Use Agreement

Proposed Addendum
to
Terms and Conditions for Use of Niihau Island Facilities and Helicopter Services

PROTECTION OF HISTORICAL/CULTURAL RESOURCES:

1. In planning for PMRF operations support, the proposed Niihau land areas required for support of any particular operation shall be identified by PMRF representatives to the NGPOC, who will forward and discuss the plan with the property owner and Niihau elders. Historically/culturally sensitive areas shall be avoided whenever possible, or measures shall be employed to prevent or minimize damage to those sites. Where threat of fire exists in any operation, PMRF shall schedule and provide for a Niihau Ranch fire suppression team to be on standby on Niihau during operations. PMRF shall provide adequate fire suppression equipment for use by the team.

2. Prior to any activity which will require known disturbance of the ground (i.e., construction) the site shall be surveyed by a professional archaeologist, if not previously surveyed. Prior to start of ground disturbance activity, construction crews shall be briefed on the sensitivity of cultural resources and the procedures to be followed if sensitive items are uncovered during work at the site. During site preparation and construction, the site shall be monitored by a representative of the Niihau Ranch. A qualified archaeologist, agreeable to the landowner, would assist the island elders in monitoring the siting areas during construction and all ground disturbing activities. If sensitive items are uncovered during surveys or construction, as confirmed by the landowner and Niihau elders, with assistance of the qualified archaeologist (including artifacts or human remains), work shall stop, the area protected and followup action initiated. The property owner and elders from the Niihau community will employ action consistent with local custom. Work may recommence upon the advice of the property owner. Survey reports will be reviewed by representatives of the Niihau Ranch. Private or commercial publishing of any information pertaining to Niihau is prohibited without permission of the landowner.

3. Should there be unexpected property damage resulting from any PMRF operations, the property owner and elders from the Niihau community will be consulted on

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

appropriate measures to protect, stabilize, or restore the property. The Navy will pay for cost of stabilization/restoration if desired by the landowner.

4. PMRF shall be responsible for funding and scheduling all required surveys in consultation with the NGPOC who will obtain all required approvals by the property owner.

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

ATTACHMENT H

Niihau Island
Ongoing Activities

Downed Pilot Training:

These exercises are called TRAP (Tactical Recovery of Aircrew Personnel) missions, and provide coordination training for downed crew and recovery force personnel. The mission starts with coordination planning between PMRF program manager and Niihau Ranch Government Point of Contact (NRGPOC), D. Nekomoto). Exercise provides training for downed aircrew in escape and evasion and coordination of recovery helicopter assets. Niihau Ranch personnel are hired to locate downed aircrew, who are trying to remain hidden, and the Niihau Helicopter is contracted to provide exercise support and medevac standby. The standby exercise is scheduled and a briefing session is included, where aircrew and recovery force personnel are briefed on conducting operations on Niihau Island. Included in the pre exercise briefing, typically, is the NRGPOC, Mr. Robinson, the aircrew personnel who will be on the ground, and the recovery force team. Personnel are briefed on general rules, boundaries, hazards, and safety procedures. Personnel are also given tips by Mr. Robinson on evasion and detection avoidance. The exercise starts when the aircrew personnel are inserted at approximately 0730 by Niihau Helicopter, usually at Kaunuopou, then flies to Nanina where it remains on medevac/safety standby until the operation is complete. Aircrew execute escape and evasion plans and coordinate their rescue by helicopter at about 1600. Following the exercise, a debriefing session is held, bringing out strong and weak points of the mission. See figure 1 attached.

Impact assessment: Minimum to no impact. Personnel are taking all measures to prevent discovery, and do not overturn rocks or dig any soil. Helicopter landing areas are designated for their suitability and absence of any cultural resources.

Special Warfare Operations:

These are very similar in nature to the TRAP missions described above, and usually involve Special Warfare reconnaissance forces, whose objective is to come ashore clandestinely, remain undetected (Niihau Ranch personnel are contracted to perform island defender roles), proceed to a pre-designated reconnaissance objective, and from concealment, record activities and features at the objective site. The Niihau Helicopter provides transportation for the PMRF Operations Conductor, Special Warfare Exercise Coordinator, communications crew, and medical emergency corpsman. The medical emergency corpsman sets up a command post on island to monitor the exercise safety/conduct and performs on scene coordinator functions. Prior to the exercise, extensive briefings are conducted with Special Warfare personnel with Mr. Robinson. Following the exercise, a debriefing session is held on the island with Niihau personnel and again at PMRF with special warfare exercise personnel. See figure 1 attached.

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

Impact assessment: Minimum to no impact. Personnel are taking all measures to prevent discovery, and do not overturn rocks or dig any soil. Reconnaissance objectives are ranch buildings, and approaches to these objectives are roads or animal trails. Alternatives to using established animal trails or roads is transit through thorny Kiawe and Lantana plants. Helicopter landing areas are designated for their suitability and absence of any cultural resources. The Command Post is established at a ranch constructed facility at Nanina Beach

Amphibious Landings:

No large scale amphibious exercises are anticipated on Niihau Island. Amphibious operations conducted to date include those which are associated with Special Warfare exercises and Mr. Robinson's own logistics efforts. Landings which are associated with Special Warfare ops are very small scale, usually a single rubber boat and a squad size element of reconnaissance personnel, whose mission is to evade detection. In these exercises, landing on the beach also includes swimming ashore from support boats or submarines offshore. Mr. Robinson's own logistics efforts includes landing with the Ranch's leased LCM-8 landing craft, which includes bringing fuel and supplies to support the ranch and Navy facilities on the island. See large Niihau map.

Impact assessment: Minimum to no impact. Personnel who participate in small scale amphibious landings are taking all measures to prevent discovery, and do not overturn rocks or dig any soil. Landings by the Ranch are conducted at several sites which have been utilized for generations.

Helicopter Terrain Flight (TERF) Operations:

USMC Helicopters use Niihau for TERF training, which is basically low level flight and navigation exercising cockpit coordination, lookout doctrine, and TERF specific pilot techniques and procedures. A route was established in about 1992 with Mr. Robinson, and tested for sound impacts to Puuwai Village (no impact). The Niihau Helicopter transports the PMRF Operations Conductor to Kaeo mountain to observe and communicate with USMC aircraft, as the on scene coordinator. USMC aircraft fly the route, report eleven checkpoints on the route to the operations conductor. The operations conductor visually establishes individual crew performance. A debrief is conducted following the exercise. TERF is occasionally combined with Electronic Warfare (EW) exercises. See figure 2 attached.

Impact assessment: Minimum to no impact. Marine Corps helicopters are involved in overflight activity. Emergency landing requirements are prebriefed and provide suitable landing zones which are routinely used by the Niihau helicopter in ranch and company operations. Operations Conductor observation site at Kaeo is a landing site used by the Niihau Ranch.

Electronic Warfare (EW) Exercises:

Electronic Warfare Exercises are conducted from various positions on Niihau for USMC helicopters as well as for surface combatants on the range. Electronic signals

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

replicating those which may be found in a battle area are emitted from fixed (Perch Site) hardware or from mobile equipment. The Niihau Helicopter transports personnel to the Perch Site for operations which vary from single to multiple day operations. Equipment (Electronic Threat Simulators and Jammers) installed at the Perch Site are used to provide the desired signals. The Perch Site equipment is usually used for sending signals to ships in the range operations area. In the mobile EW operations, used mostly to support USMC helicopter operations, an EW team and electronic equipment are transported to the selected site by the Niihau Helicopter, and the team establishes a temporary EW position with portable Electronic Threat Simulators and Jammers. Signals are sent to helicopters for exercising Threat Warning System operation and interpretation, evasive maneuvering, and countermeasure procedures. See large Niihau map.

Impact assessment: Minimum to no impact. Marine Corps helicopters are involved in offshore flight activity. Emergency landing requirements are prebriefed and provide suitable landing zones which are routinely used by the Niihau helicopter in ranch and company operations. On island operations sites coincides with helicopter landing sites used by the Niihau Ranch. A fire extinguisher is included as part of the standard equipment taken by the EW team.

Unmanned Aerial Vehicle (UAV) Contingency Landing Support:

Several sites on Niihau have been designated for contingency landing by UAV aircraft, in the event an approach to PMRF cannot be executed for any reason such as unforecast winds, mechanical problem, etc. These sites are designated on the accompanying map, and were selected for prevailing wind conditions, and for being relatively flat and open without obstructions. The northern site is Kaunuopou, and the site east of Puuwai is Kamoilii. Both are pasture areas, and well suited for this activity. When UAV operations are in progress, Niihau Ranch is contracted to provide contingency landing support with a standby ground handling support crew. The Niihau Helicopter is contracted to transport a mobile flight control unit and personnel to the selected contingency landing site if a contingency landing is required. Niihau Ranch personnel are trained by the program requiring their support in ground handling and procedures, and supported all three world record flights by Pathfinder and Pathfinder Plus UAVs. See large Niihau map. Kaunuopou is located just north of the Minex Marker.

Impact assessment: Minimum to no impact. Landing sites are to be used in emergency only situation, so occasion for use of the site is already remote. Selected landing sites are located in pasture land, and wide open areas void of cultural resources.

Instrumentation/Test Sites:

To support a variety of programs and projects, requirements for instrumentation sites arise from time to time. Sites are selected based on geometry, and project requirement, and are usually temporary in nature. Equipment proposed for these sites could be small, compact units up to trailered units. All proposed sites are reviewed by Mr. Robinson for approval. A good example of this is the Moving Target Simulator instrumentation requirement. Three sites were selected, and instrumentation placed at those sites, consisting of a small weatherproof box about 2'x2'x1', a solar panel and a towered

Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

antenna. Niihau Ranch was contracted to support these sites with labor and transportation. Temporary fences were built around the sites to protect the instruments from intrusion and destruction by animals. Upon project completion, sites were dismantled and instrumentation removed. Another example is the Inertial Navigation Marker used for Mine Warfare Training. An orange pyramid shaped structure was surveyed and placed at Kaunuopou for use by P-3 aircraft as an inertial navigation checkpoint in executing simulated mining exercises over the range. A similar Initial Point (IP) is established on the Kauai side of the channel, however, in the event drone launch activities from PMRF launch pad conflicts with requirements for conducting Mine exercises, the Niihau IP would be used. The Niihau IP was contracted for use in RIMPAC '94, and was to be removed after the exercise. Mr. Robinson elected to leave the structure in place to allow PMRF the use of it, as it was not bothering anyone by being there. See large Niihau map.

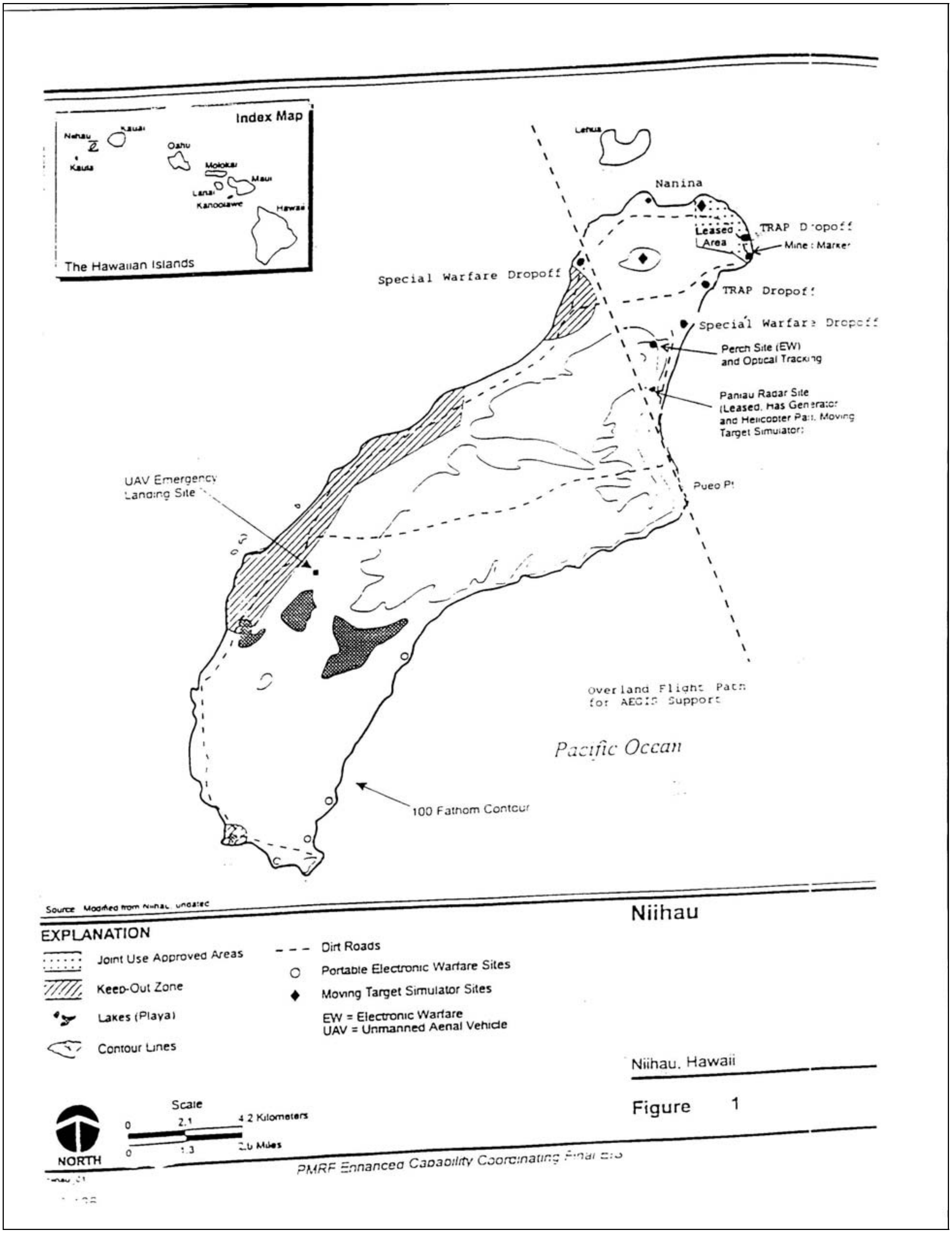
Impact assessment: Minimum to no impact. Sites are selected in consultation with Mr. Robinson and Niihau elders to reduce the possibilities of any cultural impacts. Towered antennas are usually very small (usually less than 10' high, and tower is usually an aluminum or steel pipe. A higher antenna was used, for one project, and was mounted on a trailer. Fences are usually Kiawe wood posts, and animal control wire constructed around the immediate perimeter of the selected site.

Cruise Missile Defense/Near Land Overland AEGIS support:

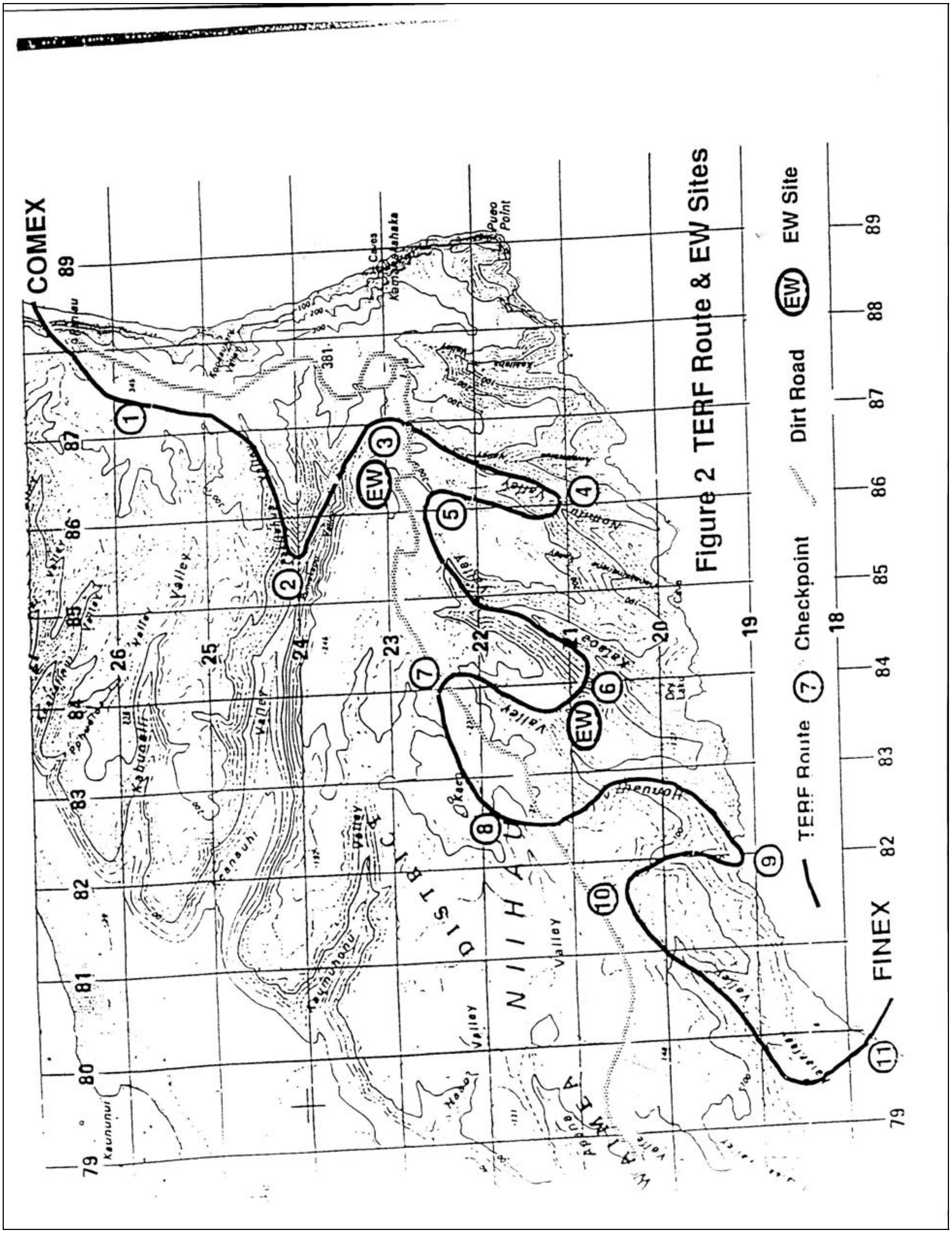
The AEGIS Program, in executing tests in the littoral (nearshore) environment performs tests where BQM-74 drones or manned aircraft conduct overflight of Niihau's northern land area . This is to provide test scenarios replicating hostile missiles fired towards an AEGIS ship from a land mass which features a mountainous backdrop and a land to sea transition. Program personnel indicates that there aren't any other locations adjacent to an instrumented range which provides the desired geography. The program contracts Niihau Ranch personnel to support operations by keeping land area below the intended flight track clear of unauthorized personnel and to perform contingency support (drone recovery or fire suppression) functions should they be required. The Niihau Helicopter is contracted to provide transportation to Niihau for an AEGIS program representative and a PMRF representative to function as on site observers of the overflight operations. See figure 1 attached.

Impact assessment: Minimum or no impact. Drones are remotely piloted and manned aircraft are involved in overflight activity only. The drones fly specific profiles and are monitored visually and by radar . Departure from the established profile or loss of command link will result in the drone entering a recovery mode (proceed to a recovery point and parachute descent into the recovery area.) The actual time the aircraft flies over Niihau is less then one minute per pass. The probability of a catastrophic incident occurring is extremely low since the vehicle is under the control of an experienced pilot and the short amount of time the aircraft is actually over the island.

Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)



Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)



Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

ATTACHMENT I

ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

ACRONYMS AND ABBREVIATIONS

CFR	Code of Federal Regulations
Council	Advisory Council on Historic Preservation
CRMP	Cultural Resources Management Plan
EIS	Environmental Impact Statement
National Register	National Register of Historic Places
OPNAVINST 5090.1B	Environmental and Natural Resources Program Manual
PMRF	Pacific Missile Range Facility
SHPO	State Historic Preservation Officer
U.S.	United States

DEFINITIONS

Grave or Ceremonial Objects. As defined by the Native American Graves Protection and Repatriation Act, these cultural items include:

1. Associated funerary objects, which shall mean objects that, as a part of the death rite or ceremony of a culture, are placed with individual human remains either at the time of death or later.
2. Unassociated funerary objects, which shall mean objects that, as a part of the death rite or ceremony of a culture, are reasonably believed to have been placed with individual human remains either at the time of death or later.
3. Sacred objects, which shall mean specific ceremonial objects that are needed by traditional Native Hawaiian religious leaders for the practice of traditional Native Hawaiian religions by their present day adherent.
4. Items of cultural patrimony, which shall mean an object having ongoing historical, traditional, or cultural importance central to the Native Hawaiian group or culture itself, rather than property owned by an individual Native Hawaiian, and which, therefore, cannot be alienated, appropriated, or conveyed by any individual regardless of whether or not the individual is a member of the Native Hawaiian organization.

Hui Malama I Na Kupuna O Hawaii Nei. As defined in Public Law 101-601 (Native American Graves Protection Repatriation Act), the nonprofit, Native Hawaiian organization incorporated under the laws of the State of Hawaii by that name on April 17, 1989, for the purpose of providing guidance and expertise in decisions dealing with Native Hawaiian cultural issues, particularly burial issues.

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

Native Hawaiian Organization. Any organization which (a) serves and represents the interests of Native Hawaiians, (b) has a primary and stated purpose the provision of services to Native Hawaiians, and (c) has expertise in Native Hawaiian affairs, and shall include the Office of Hawaiian Affairs and the Hui Malama I Na Kupuna O Hawaii Nei.

Office of Hawaiian Affairs. Established by the constitution of the State of Hawaii, the Office of Hawaiian Affairs (OHA) is a state agency, independent from the executive and all other branches of government. OHA is a trust entity for all individuals whose ancestors were natives of the Hawaiian Islands prior to 1778. The agency was established, in 1979, to manage and administer the resources held for the benefit of Hawaiians, and to formulate policy for them; it is governed through a board of trustees.

Professional Archaeologist. An archaeologist qualified by standards established by the Department of the Interior, National Park Service and described in 36 CFR, Part 61, Appendix A.

Restrictive Easement (Ground Hazard Area). The land area within which all debris from a terminated missile launch will fall. At the PMRF, this area encompasses a 3,048-meter (10,000-foot) arc (maximum) radiating out from centerpoint which is the STARS launch pad.

Undertaking. As defined by Section 106 of the National Historic Preservation Act, a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including (a) those carried out by or on behalf of such agency, (b) those carried out with federal financial assistance, (c) those requiring a federal permit, license, or approval, and (d) those subject to state or local regulation administered pursuant to a delegation or approval by a federal agency.

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

ATTACHMENT J

Draft Archaeological Monitoring Plan

Proposed activities associated with the U.S. Navy's Pacific Missile Range Facility (PMRF) Enhanced Capability Environmental Impact Statement (EIS) include ground disturbance from construction, military exercises, and military operations. Inasmuch as several of the locations encompassed by the proposed action and alternatives (including the No Action Alternative) are known to encompass areas with potential archaeological sensitivity, an Archaeological Monitoring Plan has been developed to deal with the possible unexpected discovery of archaeological materials (prehistoric, historic, or traditional) and burials.

1. All monitoring activities will be undertaken by a qualified archaeologist familiar with the range of cultural resources likely to be found within the project area. In the event that monitoring activities are to take place within a known contaminated site, the archaeologist will be OSHA 40-hour trained.

2. Archaeological monitoring will consist of identification, evaluation, collection, recording, analysis, and reporting of archaeological remains during ground disturbing activities. The data retrieved shall be sufficient to characterize the nature of all major deposits and strata, regardless of the cultural content, and discuss their known extent through time and space.

3. A coordination meeting shall take place between the archaeological monitor and the construction team, prior to any ground-disturbing activities taking place. The meeting shall outline the duties and responsibilities of both the archaeologists and the construction team.

4. Arrangements for the services of a physical anthropologist (or other scientists as appropriate) with a background in human osteology will be made prior to any ground disturbing activities. In the event that osteological analysis of skeletal remains is required, this work will conform with the provisions of the Draft Burial Plan, provided as Attachment K to this Memorandum of Agreement.

5. The archaeological monitor will be present while all ground disturbing activities are occurring. The monitor will inspect the backdirt removed from construction areas as well as exposed soil profiles.

6. The archaeological monitor will be authorized to halt ground disturbing operations in order to evaluate, assess, and determine what course of action should be taken for the protection of any identified cultural materials.

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

7. If archaeological materials are encountered, the monitor will record and collect data sufficient to determine the significance of the site. If the site is determined to be not significant, the monitor will perform appropriate procedures, including plotting the location on the project topographic map, taking samples (as appropriate), preparing site maps, and photography. If the site is determined to be significant, the monitor will notify the following individuals in order to formulate the most appropriate mitigation measures:

   - PMRF Environmental Engineer or cultural resources point-of-contact
   - U.S. Navy Archaeologist
   - Hawaii State Historic Preservation Officer

   If the site contains grave or ceremonial objects or human remains, the monitor will secure the site and notify the following individuals. Subsequent actions will follow the guidance provided in the Native American Graves Protection and Repatriation Act (NAGPRA) and the Draft Burial Plan provided as Attachment K to this Memorandum of Agreement.

   - PMRF Environmental Engineer or Cultural Resources Point of Contact
   - U.S. Navy Archaeologist
   - Hawaii State Historic Preservation Officer
   - Hui Malama I Na Kupuna O Hawaii Nei
   - Office of Hawaiian Affairs

8. Stratigraphic profiles of excavated areas containing cultural materials will be made and photographs taken. A sampling of stratigraphic profiles will be drawn of excavated areas, regardless of the presence of cultural materials, in order to provide useful information regarding the lack of cultural materials in a given area.

9. A report addressing any findings or subsequent mitigation resulting from the monitoring will be submitted to the Hawaii State Historic Preservation for review.

10. With the exception of grave or ceremonial objects, or humans remains, any cultural materials discovered during the conduct of this monitoring plan will remain the property of the PMRF and will be curated in accordance with current PMRF policy. Grave or ceremonial objects and/or human remains will be treated in accordance with the Draft Burial Plan, provided as Attachment K to this Memorandum of Agreement.

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

ATTACHMENT K

BURIAL TREATMENT PLAN

This burial treatment plan has been developed by the Commanding Officer, Pacific Missile Range Facility (PACMISRANFAC) in compliance with the Native American Graves Protection and Repatriation Act (NAGPRA) and Section 106 of the National Historic Preservation Act and provides detailed procedures to be followed when Native Hawaiian remains are inadvertently encountered during construction activities, erosion or any other natural or human activity.

The plan reflects understandings between PACMISRANFAC, SHPO, KIBC, Na Ohana Papa O Mana, Hui Malama I Na Kupuna O Hawaii Nei, and OHA regarding the inadvertent discovery, disinterment, reinterment, temporarily curate and preservation of native Hawaiian human remains. It is noted that the general policy of the signatories shall be for burials not to be moved when at all possible.

Each party will observe the following understandings. Each party may terminate this agreement upon notice to the other, and each party will give prompt consideration to any changes proposed by the other.

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

COSTS

1. The U.S. Navy shall pay for all preservation in-place costs, as arranged in individual cases, in compliance with the National Historic Preservation Act.

2. The U.S. Navy shall pay for all archaeological costs (field, laboratory and report) in compliance with the National Historic Preservation Act.

3. PACMISRANFAC shall pay for disinterment and reinterment ceremonies provided for by this agreement. The amount of payment shall be agreed upon from time to time between PACMISRANFAC, OHA and KIBC representatives. Payments in any given Federal Government fiscal year shall not exceed $1,000 without specific approval of the Commanding Officer, PACMISRANFAC.

PREVIOUSLY IDENTIFIED HAWAIIAN BURIALS

1. Whenever a project is proposed within an area which contains previously identified Hawaiian burial sites, including burial sites identified during archaeological survey for projects under Section 106 compliance, the project proposal shall be submitted to the KIBC for its review. Within thirty days of the submittal the SHPO shall determine whether the burial sites within the project area shall be preserved in place or relocated.

2. If the remains are to be preserved in-place, they shall be preserved in-place in accordance with the preservation part of this agreement.

3. If the remains are to be relocated, they shall be disinterred in accordance with the disinterment part of this agreement.

INADVERTENT DISCOVERY OF HUMAN REMAINS

When human remains are inadvertently discovered on base, the following steps shall occur:

1. Work shall stop in the immediate area and the U.S. Navy's archaeologist at PACNAVFACENGCOM, Hui Malama I Na Kupuna O Hawaii Nei, Na Ohana Papa O Mana, OHA and SHPO, shall be notified.

2. The remains shall not be moved until the U.S. Navy's archaeologist has the opportunity to determine whether they are recent remains under the jurisdiction of police authorities or whether they are historic remains, older than 50 years in age. If they are recent remains, the remains are not considered under this agreement.

Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

3. If the remains are historic, the U.S. Navy archaeologist, or a designated professional archaeologist, shall document the context of the remains, burial features, grave goods, and attempt to establish the ethnic identity of the remains with minimal disturbance.

4. If the remains appear likely to be native Hawaiian, the SHPO, KIBC and OHA's Kauai office shall be notified. If the remains appear unlikely to be native Hawaiian, the SHPO shall be notified, and arrangements other than those covered in this agreement shall be followed.

5. If the remains are in no danger and can be preserved in-place, they shall be preserved in-place in accordance with the preservation part of this agreement.

6. If the remains are threatened by construction or erosion and cannot be preserved in-place, they shall be disinterred in accordance with the disinterment part of this agreement.

7. Steps 1-4, above, shall be executed within 5 working days of discovery.

PRESERVATION IN-PLACE

When human remains are discovered and can be preserved in-place, the following steps shall occur:

1. The remains shall be covered up in their original manner as indicated by the archaeological findings (e.g., with sand, with stone platform, etc.).

2. The remains shall be marked on PACMISRANFAC maps to ensure protection in the face of future base planning and activities.

3. The remains shall be protected by appropriate means (e.g., sign, low fence, etc.) as determined appropriate by the KIBC and OHA's Kauai field representative

4. An appropriate ceremony shall occur, as considered necessary by the KIBC and OHA's Kauai field representative.

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

DISINTERMENT & REINTERMENT

When human remains must be disinterred, the following steps shall occur:

1. When remains are established to be native Hawaiian or are considered likely to be native Hawaiian, OHA's Kauai field representative and the KIBC shall determine if a ceremony is needed prior to disinterment. This determination shall be made within 48 hours of notification of these agencies of the decision for disinterment. If a ceremony is desired, a Federal employee acceptable to these agencies shall conduct the ceremony. If an acceptable Federal employee is not available, then a ceremony may be conducted by a nonfederal person designated by OHA's Kauai field representative and the KIBC. This ceremony may include the main elements of: ho'oponopono: mihi - an explanation and apology for the disturbance; hala - a forgiveness for the offending action; and oki - an emotional resolution that the offense of disturbing will not have future harmful consequences. This ceremony is regarded by native Hawaiians as a healing between living individuals and souls associated with burial. The ceremony will ordinarily involve one to four persons and take approximately one hour.

2. The U.S. Navy's archaeologist, in consultation with the SHPO, shall see that the remains are removed by archaeologists employed or engaged by the Federal Government. Minimal osteological analyses shall be performed within 5 days to determine or verify whether the remains are native Hawaiians (when uncertain) and to establish the number of individuals, age and sex. The proper standards of professional conduct, respect, and sensitivity shall be observed during the removal and treatment of the remains, and the integrity of each individual's remains and of any ho'omoe pu (associated grave goods) will be maintained. All osteological analyses shall be done with due recognition of native Hawaiian beliefs and respect for ancestral bones. No analyses shall be conducted which result in a destruction of bone material.

3. During the time prior to reburial, the remains shall stay on the island of Kaua'i and adequate securing for the integrity of disinterred individuals shall be assured. Further, OHA, SHPO, and KIBC shall be notified of the likely duration of time prior to reburial.

4. Human remains and their associated grave goods shall be reinterred in an underground concrete shelter at PACMISRANFAC (Facility No. 443) for permanent interment in individual casings of concrete. The shelter will have a lockable gate as the only entrance to prevent unauthorized access. The Government will maintain records for the location of the remains within the shelter.

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Appendix H.1. Memorandum of Agreement—Activities Proposed Within the Pacific Missile Range Facility Enhanced Capability Environmental Impact Statement, 1999 (Continued)

REPORTS

Archaeological reports, whether for remains preserved in-place of for remains which are disinterred/reinterred, shall be prepared. Copies shall be filed with each signatory.

ACCESS TO PACMISRANFAC

All access by SHPO, KIBC and OHA representatives to PACMISRANFAC under this memorandum shall be subject to reasonable PACMISRANFAC requirements for identification, escort and other administrative and security procedures. Individuals who are not State or Federal employees may be required to sign liability waivers as a condition of entry to PACMISRANFAC.

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Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii

PROGRAMMATIC AGREEMENT
AMONG
THE COMMANDER NAVY REGION HAWAII,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION
AND THE HAWAII STATE HISTORIC PRESERVATION OFFICER
REGARDING
NAVY UNDERTAKINGS IN HAWAII

WHEREAS, the Commander Navy Region (COMNAVREG) Hawaii's area of responsibility (AOR) encompasses the Pearl Harbor Naval Complex, which includes but is not limited to the Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility; outlying Oahu installations; and the Pacific Missile Range Facility at Barking Sands; Kauai; and

WHEREAS for purposes of this Programmatic Agreement (PA), the term AOR shall refer to Navy property within the State of Hawaii; and

WHEREAS, COMNAVREG Hawaii, in order to meet its national defense mission requirements, authorizes, carries out or causes to be carried out a variety of undertakings including, but not limited to, dredging of its harbor; maintenance, rehabilitation, repair, construction and demolition of buildings, structures, and roads; and work regarding grounds and associated landscaping within the State of Hawaii; and

WHEREAS, COMNAVREG Hawaii, formerly known as Commander, U.S. Naval Base, Pearl Harbor, has determined that these undertakings may have an effect upon properties listed or eligible for listing on the National Register of Historic Places (NRHP), including the Pearl Harbor Naval Base National Historic Landmark (NHL) District and four other individual NHLs; and

WHEREAS, the Commander U.S. Naval Base, Pearl Harbor (COMNAVBASE) and the Advisory Council on Historic Preservation (ACHP) entered into a Memorandum of Agreement (MOA) for the assigned missions of the U.S. Naval Base, Pearl Harbor, Hawaii, which MOA

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

was executed by the ACHP on September 4, 1979 with the concurrence of the State Historic Preservation Officer (SHPO); and

WHEREAS, said MOA is superseded by this PA; and

WHEREAS, COMNAVREG Hawaii has consulted with ACHP, and the SHPO, as well as the National Park Service (NPS), the Office of Hawaiian Affairs (OHA), the National Trust for Historic Preservation, Historic Hawaii Foundation (HHF), Oahu Council of Hawaiian Civic Clubs, Outdoor Circle, and MISSOURI Memorial Association Inc; and

WHEREAS, pursuant to Section 800.14(b) of the regulations, 36 CFR Part 800, which implement the National Historic Preservation Act (NHPA), 16 U.S.C. 470f, Section 106 and Section 110(f) of the same act, 16 U.S.C. 470h-2(f), the entities listed above have been invited to sign this PA; and

WHEREAS, COMNAVREG Hawaii has prepared an Integrated Cultural Resources Management Plan (ICRMP) addressing all Navy installations within the Pearl Harbor Naval Complex and all Navy housing on Oahu;

NOW, THEREFORE, COMNAVREG Hawaii, the ACHP, and the SHPO agree that COMNAVREG Hawaii will undertake its national defense mission and related activities within the State of Hawaii in accordance with the following stipulations to satisfy its responsibilities under Section 106 and Section 110(f) of the NHPA.

<u>STIPULATIONS</u>

COMNAVREG Hawaii shall ensure that the following measures are carried out:

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

I. APPLICABILITY

This PA applies to all Navy undertakings initiated within the State of Hawaii, regardless of whether they are initiated and carried out by COMNAVREG Hawaii or by another command or lessee of the Navy. Included, as of the date of this PA, within COMNAVREG Hawaii's geographic AOR in the State of Hawaii are the Pearl Harbor Naval Complex including the Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility, outlying areas on Oahu (Naval Magazine Pearl Harbor; Naval Computer and Telecommunications Area Master Station Eastern Pacific; retained lands from the former Naval Air Station Barbers Point and Fleet and Industrial Supply Center Red Hill), Pacific Missile Range Facility on Kauai and its outlying facilities; and all Navy housing areas in Hawaii. It is intended that more specific PAs or MOAs will be executed for undertakings in Stipulation IX.C.1, including but not limited to the Ford Island Master Development Plan, and construction of any housing on Ford Island.

II. PROFESSIONAL STANDARDS

A. All undertakings, cultural resource management and planning studies and historic property surveys affecting historic buildings and structures will be carried out by, reviewed by or under the oversight or supervision of a person or persons meeting the professional qualifications for Historical Architect under Standard (a) in "The Secretary of the Interior's Historic Preservation Professional Qualification Standards" (Federal Register Vol. 62, No. 119, p. 33719, 1997). Reviews will be documented by the professional making the review. Personnel qualifying under this stipulation should have documented professional experience and expertise applying the Secretary of the Interior's Standards for the Treatment of Historic Properties.

B. All archaeological undertakings pursuant to this PA, as well as surveys and mitigation planning regarding archaeological resources, will be carried out by, reviewed by or under the oversight or supervision of a person or persons meeting

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

the professional qualifications for Archeologist or Cultural Anthropologist, as appropriate, in "The Secretary of the Interior's Historic Preservation Professional Qualification Standards" (Federal Register Vol. 62, No. 119, p. 33712, 33715, 1997). Reviews will be documented by the professional making the review.

C. All reviews, to determine if, under Appendix A, Section I.C, an undertaking requires no further review, will be carried out by persons who either meet the standards set forth above in Stipulation II.A or have been trained by such persons to make the specific determinations and oversee the undertakings listed in Section I.C of Appendix A. The work performed by II.C. personnel pursuant to Appendix A will be supervised by personnel qualified under Stipulation II.A.

D. Where COMNAVREG Hawaii utilizes contracts that involve work governed by this PA on properties listed or eligible for listing on the National Register, COMNAVREG Hawaii will use appropriate contract performance requirements, and/or appropriate source selection criteria which may include minimum qualifications for historic preservation experience and satisfactory prior performance, as appropriate to the nature of the work and the type of procurement, developed with the participation of Navy professionals meeting the standards of Stipulation II.A, for projects involving historic buildings and structures, or II.B, for projects involving archaeological sites or Traditional Cultural Properties (TCPs). Appropriate historic preservation requirements may address: project planning, description or scope; adequate pre-construction survey of historic properties affected; professional qualifications of contractor personnel; refurbishment and reuse of historical materials and fixtures; minimizing demolition of historic fabric; and supervision, oversight, and accountability.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

III. PERSONNEL TRAINING

A. COMNAVREG Hawaii shall provide suitable training in the application of "The Secretary of the Interior's Standards for the Treatment of Historic Properties" NPS, 1997 (Standards) to appropriate Navy personnel who are responsible for making decisions regarding the budgeting, programming, planning, design, contracting, construction (including oversight and quality assurance), alteration, maintenance, repair, equipment installation, preservation, or rehabilitation of historic properties. In addition, personnel qualified under Stipulations II.A and II.B will provide training in implementation of the ICRMP for appropriate treatment, preservation, and protection of cultural resources, including cultural awareness training in the appropriate treatment of Hawaiian cultural resources. Personnel qualified under Stipulations II.A and II.B should also receive continuing professional education or training, through appropriate courses or conference sessions on historic preservation or cultural resource management.

B. COMNAVREG Hawaii shall develop and implement an in-house training program to advise Navy personnel of this PA, Sections 106, 110, and 111 of the NHPA, and procedures, techniques, and related matters regarding the preservation of the historic properties and cultural resources located within the State of Hawaii.

IV. OTHER AGREEMENTS

A. World War II temporary buildings constructed from 1939-1946 are the subject of a Programmatic Memorandum of Agreement among the U.S. Department of Defense, the ACHP, and the National Conference of State Historic Preservation Officers (NCSHPO) executed on 7 July 1986 (WWII Temporary Buildings PMOA). COMNAVREG Hawaii has identified 22 remaining WWII Temporary Structures, which are listed in Appendix B. COMNAVREG Hawaii will notify the parties to this PA of any proposed change in the list of such structures, and of

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

any action, which would be adverse, to be taken with respect to any such structure under the PMOA. While the parties to this PA acknowledge that actions taken with respect to these 22 structures may be governed by the WWII Temporary Buildings PMOA, they agree to engage in future discussions to explore preservation options for any or all of these structures.

B. Historic Family Housing Units are the subject of a Programmatic Agreement among the U.S. Navy, the ACHP, and the NCSHPO executed on 17 November 2000 (Family Housing PA). Ground disturbance in archaeologically sensitive areas in the AOR will be governed by this PA instead of the Family Housing PA. NTHP and HHF will be considered "interested parties" for purposes of the Family Housing PA for any action to be taken in the AOR.

C. The Programmatic Agreement among COMNAVREG Hawaii, the ACHP and the SHPO regarding Navy undertakings in Hawaii, executed on 26 June 2002, has been terminated and is fully superceded by this agreement.

V. DEVELOPMENT AND IMPLEMENTATION OF PEARL HARBOR NAVAL COMPLEX ICRMP

COMNAVREG Hawaii completed an ICRMP in March 2002 to guide its management of historic properties while facilitating the process of designing and constructing new facilities, as required, to support COMNAVREG Hawaii's mission in Hawaii. COMNAVREG Hawaii consulted with the ACHP, the SHPO and other consulting parties in the development of this document.

A. Should COMNAVREG Hawaii choose to reconsider any treatment proposed by the ICRMP, the reconsideration will be conducted in accordance with 36 CFR Part 800.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

B. COMNAVREG Hawaii will develop additional ICRMPs for the outlying areas within the State of Hawaii and will integrate these ICRMPs into facility management systems using methods similar to those used for Pearl Harbor to analyze, evaluate the significance of, and categorize facilities.

VI. AREA OF POTENTIAL EFFECTS

When a proposed undertaking is limited to the maintenance, repair or rehabilitation of a listed, eligible or contributing building's interior, the area of potential effects (APE) is the individual building. For projects involving exterior work not identified in Appendix A; ground disturbing activities not addressed in Stipulation X; and for projects involving new construction or additions; COMNAVREG Hawaii shall consult with the SHPO prior to determining the APE. Demolition and any proposed new construction, either on the same site or elsewhere within the AOR, which is associated with the demolition, shall be reviewed as a single project.

VII. IDENTIFICATION OF HISTORIC PROPERTIES

A. Numerous surveys have been conducted to identify National Register-eligible properties within the COMNAVREG Hawaii AOR. As other ICRMPs are developed, or existing ICRMPs are updated, Navy personnel qualified under Stipulation II.A, for historic buildings and structures, or II.B for archaeological sites or TCPs, will determine if additional properties in the AOR not previously listed or determined to be eligible for listing on the National Register are eligible for the National Register for Section 106 purposes. COMNAVREG Hawaii will make a reasonable and good faith effort to identify any Native Hawaiian organization that might attach religious and cultural significance to historic properties within the AOR and invite them to be consulting parties. If COMNAVREG Hawaii and the SHPO do not agree on a determination of

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

eligibility, or if the ACHP or NPS so request, COMNAVREG Hawaii will obtain a determination of eligibility from the Keeper of the National Register.

B. If a property in the AOR that was not previously listed or determined to be eligible for listing on the National Register is determined to be eligible by Navy personnel qualified under Stipulation II.A for historic buildings and structures or Stipulation II.B for archaeological sites and TCPs, COMNAVREG Hawaii shall treat the property as eligible for Section 106 purposes. Such determination requires no SHPO review. Any such determinations will be included in the reporting requirements described in Stipulation XII.

C. Any consulting party to this PA may bring to the attention of COMNAVREG Hawaii information relating to any property in the AOR believed by the consulting party to be eligible for listing on the National Register, with a request that the eligibility of the property be evaluated. Similarly, any consulting party may request that COMNAVREG Hawaii re-evaluate the eligibility of any property within the AOR previously determined not to be eligible for the National Register, or re-evaluate the historic resource management category assigned to any property. Such requests shall be considered and addressed by Navy personnel qualified under Stipulation II.A for historic buildings and structures, or II.B for archaeological sites or TCPs. The resulting determination will be submitted to the SHPO for review pursuant to 36 C.F.R. § 800.4(c)(2).

VIII. HISTORIC SITES AND INTERPRETIVE ACTIVITIES

In recognition of the historic and cultural significance of the PHNHL to Native Hawaiians and others, the Navy will generally look favorably on affording access for preservation and protection of historic sites to individuals and organizations, including any Native Hawaiian organization that attaches cultural significance to historic properties. Requests for such access need to be submitted in writing and will be considered in light of military operational

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

requirements and anti-terrorist / force-protection security conditions and other pertinent circumstances as determined by COMNAVREG Hawaii at the time. Final approval or disapproval will be provided by the Navy in writing. Upon request the Navy will consider events that celebrate and interpret historic activities tied to the PHNHL.

IX. REVIEW OF PROJECT EFFECTS

A. Projects Requiring No Further Review

1. If Navy personnel, as described in Stipulation II.A for projects involving historic buildings and structures or II.B for projects involving archaeological sites and TCPs, determine that an undertaking does not have the potential to cause effects on listed, contributing or eligible properties, or that such undertaking is listed in Appendix A, no further review under this PA and the NHPA is required. All such undertakings and determinations made will be documented, recorded, and reported in accordance with Stipulation XII. Such documentation will be made available upon request to the parties in accordance with Stipulation XII.

2. If personnel, as described in Stipulation II.C, determine that an undertaking is listed in Appendix A, no further review under this PA and the NHPA is required. All such undertakings and determinations made will be documented and recorded. Such documentation will be made available upon request to the parties in accordance with Stipulation XII.

B. Projects with Potential Effects but No Adverse Effects

1. If personnel, as described in Stipulation II.A, for projects involving historic buildings and structures, or II.B for projects involving archaeological sites and TCPs, determine that an undertaking, except those provided for in Stipulation

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

IX.A, has the potential to cause effects on historic properties but will have no adverse effect, COMNAVREG Hawaii will seek concurrence with the finding concurrently from the SHPO and any Native Hawaiian organization that has made known to COMNAVREG Hawaii that it attaches religious and cultural significance to the specific property subject to the finding. A copy of the finding will concurrently be provided to any consulting party who has filed a request in writing to receive such finding.

2. If the SHPO, OHA or consulting parties, including Native Hawaiian organizations, disagree with the finding, they shall, within 30 calendar days from receipt of the finding, advise COMNAVREG Hawaii of the reasons for disagreement; otherwise, concurrence will be presumed. If any consulting party advises COMNAVREG Hawaii that an additional 15 days are needed for review, COMNAVREG Hawaii will generally give such a request favorable consideration. COMNAVREG Hawaii shall consult with the objecting party to resolve the disagreement, if any, or request the ACHP to review the finding in accordance with in Stipulation XIV, Resolving Objections.

3. If the determination of no adverse effect is conditioned upon the undertaking's consistency with the Secretary of the Interior's Standards, pursuant to 36 C.F.R. §§ 800.5(a)(2)(ii) or 800.5(b), Navy personnel qualified under Stipulation II.A will review (and document their review) the plans, drawings, specifications, and any modifications, for consistency with the Secretary's Standards, and will monitor the progress of the undertaking on site in coordination with the project manager and contract personnel. Where practical, COMNAVREG Hawaii will retain the same project manager throughout the length of the contract to provide continuity in addressing preservation issues.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

4. Navy Personnel qualified under Stipulation II.A will have the responsibility to coordinate with project managers and contracting personnel to ensure fulfillment of Section 106 stipulations or conditions during construction.

C. Projects That May Have Adverse Effects

1. Consultation will be initiated pursuant to 36 CFR 800.1(c) under 36 CFR Section 800.6 for any undertaking which may have an adverse effect on: (a) a contributing property that is within the NHL or the ICRMP historic management zones; (b) a property outside the ICRMP management zones and the NHL which is listed or eligible for listing on the National Register; or (c) an historic property identified to be of religious and cultural significance to Native Hawaiian organizations.

2. Any project, other than demolition, which may have an adverse effect on a property identified in the ICRMP as a Category III historic property, which is outside the NHL and not part of an ICRMP management zone, and is not designated as having other importance, and is documented in accordance with Level III HABS/HAER standards (or lesser standards if agreed to, in writing, by the SHPO), requires notification but no further preservation action. Notification shall be given to the SHPO, and to any consulting party who has filed a request in writing to receive such notifications, when the proposed project will have an adverse effect on the historic property, to afford the SHPO 30 calendar days, prior to execution of the project, to review existing or any new information that may change the property's significance or status. If a party disagrees with the proposed action COMNAVREG Hawaii shall consult with the objecting party to resolve the disagreement, if any, or request the ACHP to review the finding in accordance with in Stipulation XIV, Resolving Objections.

D. Design and Construction Modifications

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

1. If after completion of an undertaking's review pursuant to this PA or during the implementation of any previously reviewed project, COMNAVREG Hawaii finds that it is necessary to modify the project scope, design, materials, or construction documents, personnel as described in Stipulation II.A for projects involving historic buildings and structures, or II.B for projects involving archaeological sites and TCPs, shall review the proposed changes (and document the review) to determine if these modifications may affect an historic property, or change the nature of the adverse effect.
2. If personnel described in Stipulation II.A for projects involving historic buildings and structures, or II.B for projects involving archaeological sites and TCPs, determine that the modification will not result in adverse effects to historic properties, the professional who made the determination will document this finding, in consultation with the SHPO, if appropriate. This documentation will be filed in the project's administrative record and noted in the reporting requirements developed in accordance with Stipulation XII.
3. If COMNAVREG Hawaii personnel, as described in Stipulation II.A for projects involving historic buildings and structures, or II.B for projects involving archaeological sites and TCPs, find that the modification will result in an adverse effect, COMNAVREG Hawaii will determine in consultation with the SHPO whether the adverse effect can be avoided, thereby resolving the matter. If the adverse effect cannot be avoided, COMNAVREG Hawaii will consult with the SHPO, the ACHP, NPS (if within the NHL), and other consulting parties, including any Native Hawaiian organization that has made known to COMNAVREG Hawaii that it attaches religious and cultural significance to the affected historic property, to resolve the adverse effects in accordance with 36 CFR Section 800.6, or Stipulation XI as appropriate.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

X. GROUND DISTURBING ACTIVITIES

A. NHL: COMNAVREG Hawaii has developed maps, in consultation with the SHPO, OHA, Oahu Council of Hawaiian Civic Clubs (OCHCC) and any Native Hawaiian organization that has made known to COMNAVREG Hawaii that they attach religious and cultural significance to historic properties within the NHL. These maps have been incorporated into the ICRMP, and depict those areas where ground-disturbing activities are to be tested or monitored by an archaeologist who meets the qualifications indicated in Stipulation II.B. For Ford Island, these maps identify strafing marks and other historic surface features. All maps will be maintained and updated as appropriate by COMNAVREG Hawaii. No monitoring is required for work outside these areas or in existing concrete utility trenches.

B. Outlying Areas: COMNAVREG Hawaii will develop, in consultation with the SHPO, OHA, OCHCC and any Native Hawaiian organization that has made known to COMNAVREG Hawaii that it attaches religious and cultural significance to historic properties within such installations, maps for the installations beyond the NHL which will identify areas for which ground disturbing activities will require monitoring by an archaeologist who meets the qualifications indicated in Stipulation II.B. No monitoring is required for work outside these areas or in existing concrete utility trenches.

C. Archaeological Work: Any required archaeological testing or monitoring shall be implemented in accordance with an archaeological work plan, which will be prepared in consultation with the SHPO, OHA, OCHCC and any Native Hawaiian organization which has made known to COMNAVREG Hawaii that it attaches religious and cultural significance to any affected historic properties.

D. Submerged Resources: Any undertakings in areas known to have a potential for submerged cultural resources will be planned in consultation with NPS, SHPO

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

and OHA, as appropriate to develop a work plan and monitoring plan that will ensure avoidance of adverse effects to the resource.

E. Contractor Notification: COMNAVREG Hawaii will establish working procedures with Navy contracting commands to ensure that (1) contractors engaged in ground disturbing activities will be required to stop work in the vicinity of any discovered archaeological deposit; and will be required to immediately notify COMNAVREG Hawaii and the contracting officer of the encounter of any such deposit, and (2) construction in the vicinity of the discovery will not be resumed until COMNAVREG Hawaii has completed consultation in accordance with Stipulation XI.

XI. DISCOVERIES AND EMERGENCIES

A. If during the performance of an undertaking, historic properties, including submerged archaeological sites and TCPs, are discovered or unanticipated effects are found, or a previously unidentified property which may be eligible for listing on the National Register is discovered, COMNAVREG Hawaii will take all reasonable measures to avoid or minimize harm to the property until it concludes consultation with the SHPO and any Native Hawaiian organization, including OCHCC, which has made known to COMNAVREG Hawaii that it attaches religious and cultural significance to the historic property.

B. COMNAVREG Hawaii will notify the SHPO and any appropriate Native Hawaiian organization as soon as practical and develop actions that will take the effects of the undertaking into account. COMNAVREG Hawaii will notify these parties of any time constraints. COMNAVREG Hawaii and these parties will seek to mutually agree upon the time frame for this consultation but in no instance will the consultation exceed ten working days. COMNAVREG Hawaii will provide the SHPO and any appropriate Native Hawaiian organization with written

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

recommendations reflecting the consultation. If the parties do not object to COMNAVREG Hawaii's recommendations within the agreed time frame, COMNAVREG Hawaii will modify the scope of work as necessary to implement the recommendations.

C. In the event that natural disasters, fires, sudden disruptions of utilities service, spill events or other emergency events occur, COMNAVREG Hawaii may take actions without consultation to stabilize any involved historic properties and prevent further damage. Where possible, such emergency measures will be undertaken in a manner that does not foreclose future preservation or restoration, with on-site monitoring by personnel, as described in Stipulation II.A for projects involving historic buildings and structures, or II.B for projects involving archaeological sites and TCPs, and advance telephone notification of the SHPO and any appropriate Native Hawaiian organization known to COMNAVREG Hawaii that attaches religious and cultural significance to the historic property involved. Emergency response work will be undertaken in a manner to avoid or minimize effects on historic properties. Should historic properties be discovered during emergency repair or response activity, work in the immediate area of the property will cease if COMNAVREG Hawaii has determined that a work stoppage at the site will not impede emergency response activities. COMNAVREG Hawaii will advise the SHPO and any appropriate Native Hawaiian organization by telephone of the emergency, the steps being taken to address the emergency, the discovered property and its apparent significance, and a description of the emergency work and potential effects on the discovered property. Within 30 calendar days following this notification, COMNAVREG Hawaii will provide the SHPO and any appropriate Native Hawaiian organization a written report documenting the actions taken to minimize effects, the work's present status and the planned treatment of the property. This action will be included in the report developed in accordance with Stipulation XII.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

XII. REPORTING REQUIREMENTS

A. An on-site meeting between COMNAVREG Hawaii, the SHPO, ACHP, NPS and consulting parties will be coordinated on an annual basis for the duration of this PA. Local meetings with SHPO and local consulting parties will occur on a quarterly basis.

B. Topics: At least two weeks prior to these meetings COMNAVREG Hawaii will provide the consulting parties with the following information, subject to the confidentiality requirements of 36 CFR Part 800.11(c), other applicable laws and military operational requirements:

1. Summary of actions taken under Stipulations VII.A, B; and C and IX.A.1, B, C, and D; to contain:

   a. building number/name or archaeological site number , location, tax map key, and historic categorization;

   b. project name and designation with a brief description of proposed action, determination of effect and applicable provision(s) of Appendix A if any;

   c. date of project completion;

   d. summary of any photographs that document the property before and after construction, including photographs documenting conditions justifying changes in the scope of work and other relevant conditions and information;

   e. name of the reviewer with applicable date; and

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

f. list of properties determined in the reporting period by COMNAVREG Hawaii to be eligible for listing on the National Register pursuant to Stipulation VII.A or B;

g. a list of any reports that present the findings of archaeological work;

h. a summary of any training given pursuant to Stipulation III, identification of current COMNAVREG Hawaii points of contact, and notification of key historic preservation personnel changes.

2. A summary of proposed or anticipated future undertakings, with emphasis on projects with adverse effects such as demolition, new construction, and major development plans. This summary may take the form of a briefing during the scheduled meetings.

C. Assessing Overall Effectiveness. In addition to providing an opportunity for the parties to this PA to review the specific information described in paragraph B, the on-site meetings described in this Stipulation will also provide the parties an opportunity to assess the overall effectiveness of the PA in addressing the preservation of historic properties within the AOR, consistent with the operational mission and activities of COMNAVREG Hawaii. Specifically, the meetings will provide the parties an opportunity to discuss the planning, design, review, and implementation of undertakings affecting historic properties within the AOR, and to discuss and evaluate the following issues:

1. Whether consultations, when required by this PA or carried out pursuant to 36 C.F.R. § 800, have been initiated early enough in the planning process to ensure consideration of potential alternatives that avoid, minimize, or mitigate harm to historic properties.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

2. Whether undertakings affecting historic properties within the AOR have adhered to the Secretary of the Interior's Standards for the Treatment of Historic Properties and the Navy's Historic Structures Preservation Manual (MO-913), unless otherwise provided under this PA.
3. How to increase the effectiveness of source selection criteria and/or contract performance requirements in contracts that involve work affecting historic properties to ensure appropriate treatment of such properties.
4. Whether there has been effective coordination between personnel qualified under Stipulation II of this PA and appropriate project managers and assigned contract personnel with responsibilities involving work affecting historic properties.
5. Whether problems or misunderstandings have arisen in the course of consultations and, if so, how those problems could be avoided in the future.

In addition, the meeting will enable the consulting parties to discuss overall stewardship of historic properties by COMNAVREG Hawaii, to include historic preservation achievements for the past year and historic preservation goals for the upcoming year and any recommendations to amend this PA or improve communications among the parties.

XIII. REVIEW

The ACHP and the SHPO may review activities carried out pursuant to this PA and will review such activities, if so requested. COMNAVREG Hawaii will cooperate with the ACHP and the SHPO in carrying out their review responsibilities.

XIV. RESOLVING OBJECTIONS

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

A. Should any signatory to this PA object in writing to COMNAVREG Hawaii regarding any action carried out or proposed with respect to the implementation of this PA, COMNAVREG Hawaii shall consult with the objecting party. If after initiating such consultation COMNAVREG Hawaii determines that the objection cannot be resolved through consultation, it shall forward all documentation relevant to the objection to the ACHP, including COMNAVREG Hawaii's proposed response to the objection. Within 30 calendar days after receipt of all pertinent documentation, the ACHP shall exercise one of the following options:

1. Advise COMNAVREG Hawaii that the ACHP concurs in COMNAVREG Hawaii's proposed response to the objection, whereupon COMNAVREG Hawaii will respond to the objection accordingly;
2. Provide COMNAVREG Hawaii with recommendations, which COMNAVREG Hawaii shall take into account in reaching a final decision regarding its response to the objection; or
3. Notify COMNAVREG Hawaii that the objection will be referred to the Council membership for formal comment and proceed to refer the objection and comment within 45 calendar days. The resulting comment shall be taken into account by the Navy in accordance with Section 110(1) of the NHPA.

B. Should the ACHP not exercise one of the above options within 30 calendar days after receipt of the pertinent documentation, COMNAVREG Hawaii may assume the ACHP's concurrence in its proposed response to the objection.

C. COMNAVREG Hawaii shall take into account any ACHP recommendation or comment provided in accordance with this stipulation with reference only to the subject of the objection; COMNAVREG Hawaii's responsibility to carry out all

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

actions under this PA that are not the subjects of the objection shall remain unchanged.

D. At any time during implementation of any stipulation in this PA, should an objection to any such stipulation or its manner of implementation be raised by a member of the public, COMNAVREG Hawaii shall take the objection into account and consult as needed with the objecting party, the ACHP and the SHPO to resolve the objection.

XV. AMENDMENT

The ACHP, the SHPO or COMNAVREG Hawaii may request that this PA be amended, whereupon they will consult in accordance with 36 CFR Part 800 to consider such amendment. In particular, they will consider the information developed in COMNAVREG Hawaii's reports under Stipulation XII to determine if COMNAVREG Hawaii can effectively or efficiently carry out activities to support its mission through revisions to this PA. No amendment shall take effect until it has been executed by authorized representatives of the ACHP, the SHPO and COMNAVREG Hawaii.

XVI. TERMINATION

The ACHP, the SHPO or COMNAVREG Hawaii may propose to terminate this PA by providing 30 calendar days notice to the other two explaining the reasons for the proposed termination. The ACHP, the SHPO and COMNAVREG Hawaii will consult during this period to seek agreement on amendments or other actions that would avoid termination. In the event of termination, COMNAVREG Hawaii will comply with 36 CFR Sections 800.3 through 800.7 with regard to individual undertakings covered by this PA.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

XVII. FAILURE TO CARRY OUT AGREEMENT

In the event COMNAVREG Hawaii does not carry out the terms of this PA or if the ACHP determines under 36 CFR Section 800.14(b)(2)(v) that the terms of this PA are not being carried out, COMNAVREG Hawaii will comply with 36 CFR Sections 800.3 through 800.7 with regard to individual undertakings covered by this PA.

XVIII. DURATION

This PA shall become effective upon execution by COMNAVREG Hawaii and the ACHP and shall remain in effect until terminated in accordance with Stipulation XVI.

EXECUTION AND IMPLEMENTATION of this Programmatic Agreement evidences that COMNAVREG Hawaii has satisfied its Section 106 and Section 110(f) responsibilities for all undertakings relative to its national defense mission requirements, including, but not limited to, dredging of its harbor; maintenance, rehabilitation, repair, construction and demolition of buildings, structures, roads; and work regarding grounds and associated landscaping within the area of responsibility of COMNAVREG Hawaii, which encompasses the Pearl Harbor Naval Complex including the Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility; outlying Oahu installations; and the Pacific Missile Range Facility, Barking Sands, Kauai.

The Anti-Deficiency Act, 31 USC § 1341, prohibits federal agencies from incurring an obligation of funds in advance of or in excess of available appropriations. Accordingly, the parties agree that any requirement for the obligation of funds arising from the terms of this agreement shall be subject to the availability of appropriated funds for that purpose, and that this

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

agreement shall not be interpreted to require the obligation or expenditure of funds in violation of the Anti-Deficiency Act.

Each of the undersigned certifies that they have full authority to bind the party that they represent for purposes of entering into this agreement.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

COMMANDER, NAVY REGION HAWAII

By: _______________ Date: 7 July 03

BERNARD J. MCCULLOUGH III
Rear Admiral, U.S. Navy

STATE HISTORIC PRESERVATION OFFICER

By: _______________ Date: 07/08/03

Mr. Peter Young
Chairperson and State Historic Preservation Officer

ADVISORY COUNCIL ON HISTORIC PRESERVATION

By: _______________ Date: 8-5-03

John L. Nau III
Chairman

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

COMNAVREG Hawaii PA June 2003

INVITED SIGNATORIES:

NATIONAL PARK SERVICE

By: ______________________ Date: ______________

NATIONAL TRUST FOR HISTORIC PRESERVATION

By: Paul W. Edmondson Date: June 20, 2003

Paul W. Edmondson

Vice President & General Counsel

OFFICE OF HAWAIIAN AFFAIRS

By: ______________________ Date: ______________

HISTORIC HAWAII FOUNDATION

By: David Scott Date: June 25, 2003

David Scott

Executive Director

OAHU COUNCIL OF HAWAIIAN CIVIC CLUBS

By: ______________________ Date: ______________

Shad Kane

Chairman of Committee on the Preservation of Historic Sites and Cultural Properties

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Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

INVITED SIGNATORIES:

NATIONAL PARK SERVICE

By: ______________________ Date: ______________

NATIONAL TRUST FOR HISTORIC PRESERVATION

By: ______________________ Date: ______________
Richard Moe
President

OFFICE OF HAWAIIAN AFFAIRS

By: ______________________ Date: ______________

HISTORIC HAWAII FOUNDATION

By: ______________________ Date: ______________
David Scott
Executive Director

OAHU COUNCIL OF HAWAIIAN CIVIC CLUBS

By: Shad Kane Date: 6/18/03
Shad Kane
Chairman of Committee on the Preservation of Historic Sites and Cultural Properties

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

THE OUTDOOR CIRCLE

By: ______________________________ Date: ___________________________

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

APPENDIX A

UNDERTAKINGS THAT REQUIRE NO FURTHER REVIEW

I. SPECIFIED UNDERTAKINGS

A. Provided that personnel, as described in Stipulation II.A. determine that the proposed work: (1) will be carried out in accordance with "The Secretary of the Interior's Standards for the Treatment of Historic Properties," NPS, 1997 (Standards) and COMNAVREG Hawaii's "Historic Structures Preservation Manual," NAVFAC MO-913 (Sept. 1991); or (2) is excluded by a provision within this appendix, the following undertakings will not, as indicated in Stipulation IX.A.2., undergo further review or consultation.

1. Undertakings other than demolition or ground-disturbing activities on a property identified as a Category III historic property, which is outside the NHL, and is not part of an ICRMP management zone, and is designated as not having other importance by a professional qualified under Stipulation II.A, and is documented in accordance with Level III HABS/HAER standards.

2. Replacement in kind of siding, trim, or hardware.

3. Replacement of glazing with best available match to existing or original material and design, including retention of window lights and muntin bars. Not included is changing the visual appearance of the original glazing by replacing with tinted glass or by adding tinted or reflective film.

4. Replacement in-kind of steel casement windows and their glazing and hardware to match existing or original materials and design.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

5. Replacement of roofs or parts of a roof that are deteriorated, when replacement matches or is compatible with existing or original material and design; maintenance procedures, such as the oiling of cut cedar shingles, that do not alter the integrity of the original material.

6. Replacement of porches and stairs if replacement matches historic or existing character, material, and design.

7. Removal of building additions and mechanical equipment determined by personnel, as described in Stipulation II.A, not to be contributing.

8. Replacement of exterior lighting when in accordance with the Secretary's Standards.

9. Replacement or installation of screens providing the materials and design match the existing screen or match the existing window frame material or match specifications previously approved by SHPO for buildings of similar period and type.

10. Replacement or installation of gutters, down spouts or roofing materials providing the material and design match existing or are compatible with the building's period and of a type approved by personnel, as described in Stipulation II.A.

11. Removal of existing fixtures, accessories, and cabinets determined by personnel, as described in Stipulation II.A, not to be contributing.

12. Installation of interpretive signs or exhibit structures that are not attached to a historic property and that do not visually intrude on a historic property. Such signs or exhibits shall be constructed of materials and painted colors that are compatible with the historic property and its setting.

13. Maintenance or repair of aboveground utilities, such as gas, fuel, electrical and telephone lines, provided that no disturbance occurs outside existing infrastructure.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

14. Replacement of non-original interior light fixtures in historic interiors

B. Provided that personnel described in Stipulation II.B. determine that the proposed work listed below in this Section of the Appendix, the following undertakings will not undergo further review or consultation.

1. Maintenance or repair of underground utilities, such as sewer, water, storm, electrical, gas and fuel lines, provided that no excavation or ground disturbance occurs outside existing trenches.

2. Landscaping, grounds maintenance, ongoing maintenance of existing landscaping, or removal of dead or dying trees that does not result in subsurface disturbance or root grubbing.

3. Ground disturbing activities that occur outside of the archaeologically sensitive areas indicated on maps prepared in accordance with Stipulation X.

4. Ground disturbing activities that occur above depths established during the map development process described in Stipulation X.

C. Provided that personnel, as described in Stipulation II.A, or II.C, when trained by II.A personnel, determine that the proposed work is listed below, the following undertakings will not, as indicated in Stipulation IX.A.2, undergo further review or consultation.

1. Undertakings affecting properties confirmed in writing by the SHPO as not contributing to the NHL, not eligible for the NRHP or determined by the Keeper of the Register as not contributing to the NHL or eligible for the NRHP.

2. Repairs in kind of siding, trim, or hardware that match original or existing material and architectural finish.

3. Repair without replacement of window frames or sashes by patching, splicing,

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

consolidating or otherwise reinforcing existing materials.

4. Maintenance and repair without replacement of windows and doors and their frames, transom windows, sashes, jambs and moldings. Appropriate maintenance actions include surface treatments and preparation to apply finishes, such as cleaning, rust removal, limited paint removal, application of epoxy consolidates and fillers, and reapplication of protective coating systems.

5. Refurbishment and repair of steel casement windows and their original glazing and hardware.

6. Maintenance and repair of roofs or parts of a roof that are deteriorated, when repair materials match existing or original material and design, maintenance procedures, such as the oiling of cut cedar shingles, do not alter the integrity of the original material.

7. Repair of porches and stairs if work matches existing configuration, material, and design.

8. Removal of non-original surface applied elements such as conduit, pipes, wiring, junction boxes and air conditioners.

9. Painting exterior surfaces when the new paint matches the existing or original color. Damaged or deteriorated paint may be removed to the next sound layer, using the most gentle methods possible, such as hand scraping or hand sanding. Abrasive methods, such as sandblasting and water blasting, are not covered in this appendix.

10. Repair and filling of spalling concrete and cracks if patched to hide repairs. Excluded are patches to historic bomb damage, shrapnel, strafing or bullet marks.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

11. Maintenance, repair, or rewiring of exterior lighting when original appearance is retained.

12. Replacement or installation of caulking and weather-stripping around windows, doors, walls, and roofs.

13. Excavations for repair or replacement of building footings or foundation work within two (2) feet of existing footings and foundations, if there are no visual effects to aboveground structures and their finishes.

14. Maintenance, repair or replacement in-kind of screens providing the materials and design match the existing screens, match the existing window frame material or match specifications previously approved by SHPO for buildings of similar period and type.

15. Maintenance, repair or replacement in-kind of gutters, down spouts or roofing materials providing the material and design match existing or are compatible with the building's period and of a type approved by personnel, a described in Stipulation II.A.

16. Replacement or installation of building fixtures, exterior or interior, with a type previously approved or selected by personnel described in Stipulation II.A.

17. Interior surface treatments, repaired or replaced in-kind, including but not limited to floors, walls, ceilings, woodwork, providing the work is restricted to repainting, refinishing, re-papering, or laying carpet, linoleum, or other recognized floor systems.

18. Interior repair, renovation, or alteration of properties identified in the ICRMP as Category III historic properties not within the NHL or ICRMP management zones.

19. Interior rehabilitation of non-eligible buildings within ICRMP management zones.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

20. Maintenance or repair to equipment, plumbing, electrical, ventilation or air conditioning systems, including replacement in concealed areas, provided such work is not visible from the exterior.

21. Replacement, removal or upgrading of electrical wiring if historic architectural finishes, moldings, and millworks are not affected by the electrical work.

22. Replacement of interior light fixtures in non-historic interiors.

23. Installation of energy conservation materials that are not readily visible, such as concealed installation of thermal insulation and vapor barrier, or repair of roof ventilation.

24. Repair, renovation or alteration, not requiring a MILCON appropriation, of properties identified as Category IV (non-historic) or any facilities less than 50 years of age at contract award.

25. Work on properties not within ICRMP management zones and determined not eligible for the NRHP, in accordance with Stipulation VII, except where such work or new construction is directly adjacent to ICRMP management zones, buildings, cultural sites or archaeologically sensitive areas.

26. Re-paving of streets, parking lots, driveways, sidewalks, curbs or gutters or storm drainage structure repairs with matching materials and configuration.

27. Repairs in kind and maintenance of wharves, piers, berths, or dry-docks, dolphins, quays, pilings, bulkheads, decking, cleats, bitts, or bollards, capstans, cranes, trains or support equipment to maintain operational capability.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

28. Maintenance or repair of swimming pools; outdoor playground and athletic equipment; and related items.

II. REVISION OF APPENDIX

This appendix may be revised with the written agreement of the ACHP, the SHPO, and COMNAVREG Hawaii without a revision being made to the underlying PA. Any such revision will be documented in the report described in Stipulation XII.

Appendix H.2. Programmatic Agreement—Navy Undertakings in Hawaii (Continued)

APPENDIX B
WORLD WAR II TEMPORARY STRUCTURES

32	PWC
212	Ford Is
553	FISC
1144	Barber's Point
1149	Barber's Point
1150	Barber's Point
1152	Barber's Point
1153	Barber's Point
1520	Barber's Point
1562	Barber's Point
1570	Barber's Point
17BE	Makalapa
MQ39	LLL Westloch
Q13	Ford Is
Q14	Ford Is
Q345	LLL Westloch
T15	NSY
T15A	NSY
T47	NSY
T48	NSY
X24	PWC
X8	PWC
X9	PWC

Appendix H.3. Significant Archaeological and Historical Resources Identified within the Boundary of the Pacific Missile Range Facility

Site No.*	Description	Inferred Function	Historic Context	Eligibility Evaluation	National Register Criteria
01-0007	"Major ancient burial ground;" habitation sites; within Nohili Dune (Site 01-1860)	Habitation, burials	Traditional Hawaiian	Not relocated; but culturally sensitive	—
01-0008	Elekuna Heiau; inland side of Nohili Dune (Site 01-1860)	Ceremonial	Traditional Hawaiian	Not relocated; but culturally sensitive	—
01-0009	House sites marked by "single rows of stone … or by low walls;" inland side of Nohili Dune (Site 01-1860)	Habitation	Traditional Hawaiian	Not relocated	—
05-0616	Japanese cemetery; 34 headstones, 4 stone piles of broken tomb markers; may extend to Site 05-0825	Burial	Plantation	Culturally sensitive	cultural
05-0721	Kawaiele (cross-listed as a historic structure; see Table ES-2)	Cultural place	Traditional Hawaiian/ plantation	Cultural place; pond/marsh tied to traditions related to mirages, also used as a fishpond; an original iteration of the ditch said to have been constructed by *menehune*; important as key component of 19th century sugar industry	cultural
05-0825	Burials; unmarked coffin cemetery (5 coffins); may be part of Site 05-0616; coffins uncovered during utility trenching	Burial	Plantation	Culturally sensitive	cultural
05-0826	Habitation deposits, burial (disturbed) in dune	Habitation, burial	Traditional Hawaiian	Potential for informing on traditional Hawaiian occupation of Mana Plain; culturally sensitive	d
05-1829	Extensive cultural deposit north of Nohili Ditch; includes human bone; radiocarbon dates; part of Site 05-1830	Habitation	Traditional Hawaiian	Significant, rich, extensive cultural deposit	d
05-1830	Cultural deposit exposed in south face of Nohili Ditch; part of Site 05-1829	Habitation	Traditional Hawaiian	Significant, rich, extensive cultural deposit	d
05-1831	Burial; found eroding out of dune; within Site 05-2035 area	Burial	Traditional Hawaiian	Culturally sensitive	cultural
05-1832	Burial; found during construction of Range Operations Building (Fac. 105, about 450 m inland of coast); possibly Plantation period	Burial	Traditional Hawaiian?/ plantation?	Culturally sensitive	cultural

Appendix H.3. Significant Archaeological and Historical Resources Identified within the Boundary of the Pacific Missile Range Facility (Continued)

Site No.*	Description	Inferred Function	Historic Context	Eligibility Evaluation	National Register Criteria
05-1833	Burial (scattered bone fragments); found eroding out of dune; may be same as Site 1885	Burial	Traditional Hawaiian	Culturally sensitive	cultural
05-1834	Burials; possibly 10 acres but extent of site and burials not professionally verified	Burial	Traditional Hawaiian	Culturally sensitive	cultural
01-1860	Nohili Dune	Cultural place	Traditional Hawaiian	Cultural place; numerous traditions; site of Elekuna Heiau, habitation deposits; culturally sensitive	cultural
05-1861	Kuaki`i (Pohaku)	Cultural place	Traditional Hawaiian	Cultural place; story of stone image related to group of people going from Mana to Niihau	cultural
05-1884	Burial (partially articulated remains of single individual); found in dune	Burial	Traditional Hawaiian	Culturally sensitive	cultural
05-1885	Burial (scattered bone fragments); found eroding from dune; associated with midden scatter; may be same as Site 05-1833	Habitation, burials	Traditional Hawaiian	Culturally sensitive	cultural
05-2003	Trash deposit	Dump	Plantation	Potential for informing on use of beach areas during Plantation period	d
05-2007	Concrete pillbox; similar to Site 05-2048	Defense	WWII	Associated with WWII development; defense against possible attack in early days of war; interpretive potential	a, c
01-2008	Concrete box; related to Site 01-2050	Fuel delivery	WWII	Associated with early WWII development; fuel delivery through underwater pipeline from offshore tanker; example of poor design that was ultimately abandoned; interpretive potential	a, c
01-2013	Concrete piers, metal gun turret	Road barricade	WWII	Associated with WWII development; installation defense; metal gun turret has interpretive potential	a
01-2017	Midden deposit; inland location between North Nohili Road and PMRF boundary	Habitation	Traditional Hawaiian	Potential for informing on traditional Hawaiian occupation of Mana Plain, particularly in wetlands area	d
01-2019	Midden deposit	Habitation	Traditional Hawaiian	Potential for informing on traditional Hawaiian occupation of Mana Plain	d
01-2021	Midden deposit	Habitation	Traditional Hawaiian	Potential for informing on traditional Hawaiian occupation of Mana Plain	d
05-2023	Concrete box, possible pillbox	Defense?	WWII	Associated with early WWII development; defense against possible attack? requires additional research	a, c
05-2027	Midden deposit	Habitation burials	Traditional Hawaiian	Potential for informing on traditional Hawaiian occupation of Mana Plain; culturally sensitive	d
05-2028	Concrete structure (1), wooden structures (2)	Gun emplacement	WWII	Associated with early WWII development; defense against possible attack	a

Appendix H.3. Significant Archaeological and Historical Resources Identified within the Boundary of the Pacific Missile Range Facility (Continued)

Site No.*	Description	Inferred Function	Historic Context	Eligibility Evaluation	National Register Criteria
05-2031	Midden deposit	Habitation	Traditional Hawaiian	Potential for informing on traditional Hawaiian occupation of Mana Plain	d
05-2032	Revetment; remains of Fac. 442; built in 1942; relatively intact	Defense	WWII	Associated with early WWII development of airfield; defense against possible attack	a
05-2033	Revetment; similar to Site 2032	Defense	WWII	Associated with early WWII development of airfield; defense against possible attack	a
05-2034	Revetment; similar to Site 2032	Defense	WWII	Associated with early WWII development of airfield; defense against possible attack	a
05-2035	Midden deposit	Habitation burials	Traditional Hawaiian	Potential for informing on traditional Hawaiian occupation of Mana Plain; culturally sensitive	d
05-2036	Revetment; similar to Site 2032	Defense	WWII	Associated with early WWII development of airfield; defense against possible attack	a
05-2037	Revetment; similar to Site 2032	Defense	WWII	Associated with early WWII development of airfield; defense against possible attack	a
05-2038	Revetment; similar to Site 2032	Defense	WWII	Associated with early WWII development of airfield; defense against possible attack	a
05-2039	Revetment; similar to Site 2032; but most of berm has been removed	Defense	WWII	Associated with WWII development of airfield; defense against possible attack	a
05-2040	Revetment; M-shaped	Defense	WWII	Associated with WWII development of airfield; defense against possible attack	a
05-2047	Concrete structures (2)	Gun emplacement	WWII	Associated with early WWII development of airfield; defense against possible attack	a
05-2048	Concrete pillbox; similar to Site 01-2007 and in better condition	Defense	WWII	Associated with early WWII development of airfield; defense against possible attack; interpretive potential	a, c
01-2050	Concrete tank; related to Site 01-2008	Fuel delivery	WWII	Associated with early WWII development; fuel delivery through underwater pipeline from offshore tanker; example of poor design that was ultimately abandoned; only four other tanks of this design built in Hawaii; only one that was bomb-proofed with 4 ft-4 in thick concrete slab; interpretive potential	a, c
05-4016	Fire pit remnant; RC date	Habitation	Traditional Hawaiian	Potential for informing on traditional Hawaiian occupation of Mana Plain	d
01-6027	Habitation deposit, midden scatter in dune; part of Nohili Dune (Site 01-1860)	Habitation	Traditional Hawaiian	Potential for informing on traditional Hawaiian occupation of Mana Plain	d

Source: International Archaeological Resources Institute, Inc., 2005

* Site Number – Hawai‘i State Inventory Number (SIHP number) preceded by “50-30-”

Appendix H.4. Significant Historic Buildings and Structures within the Boundary of the Pacific Missile Range Facility

Facility Number		Historic Context Period	Original or Historic Function	Integrity	Eligibility Evaluation	National Register Criteria
			MANAGEMENT CATEGORY I +			
300	BS ES-2b	Cold War	Operations and Crash Station	All new interior finishes, but exterior has high level of integrity, despite small additions	Associated with fighter interceptor defensive system, important in Cold War	a
3992	BS ES-2b	WWII	Radio Room	High level—retains integrity of location, design, setting, materials, workmanship, feeling, association	Associated with history of response to Dec. 7, 1941 attack; distinctive underground splinter-proof building	a, c
4003	BS ES-2c	WWII	Command Post	High level—retains integrity of location, design, setting, materials, workmanship, feeling, association	Associated with history of response to Dec. 7, 1941 attack; distinctive underground splinter-proof building	a, c
			MANAGEMENT CATEGORY II +			
1	Kamokala	WWII	Bomb Storage Magazine (80' length)	Relatively high level, despite sprayed concrete on walls and new concrete floors	Associated with WWII base development; unique group of excavated magazines on Kauai	a, c
2	Kamokala	WWII	Small Arms & Pyrotechnics Magazine (55' length)	Same as Facility 1	Same as Facility 1	a, c
3	Kamokala	WWII	Bomb Storage Magazine (80' length)	Same as Facility 1	Same as Facility 1	a, c
4	Kamokala	WWII	Bomb Storage Magazine (80' length)	Same as Facility 1	Same as Facility 1	a, c
5	Kamokala	WWII	Fuse Magazine (20' length)	Same as Facility 1	Same as Facility 1	a, c
6	Kamokala	WWII	Fuse Magazine (20' length)	Same as Facility 1	Same as Facility 1	a, c
7	Kamokala	WWII	Bomb Storage Magazine (80' length)	Same as Facility 1	Same as Facility 1	a, c
8	Kamokala	WWII	Bomb Storage Magazine (80' length)	Same as Facility 1	Same as Facility 1	a, c
9	Kamokala	WWII	Small Arms & Pyrotechnics Magazine (55' length)	Same as Facility 1	Same as Facility 1	a, c

Appendix H.4. Significant Historic Buildings and Structures within the Boundary of the Pacific Missile Range Facility (Continued)

Facility Number		Historic Context Period	Original or Historic Function	Integrity	Eligibility Evaluation	National Register Criteria
10	Kamokala	WWII	Bomb Storage Magazine (80' length)	Same as Facility 1	Same as Facility 1	a, c
284	BS ES-2b	WWII	Telephone Exchange	Medium level—some interior walls and doors removed. It retains integrity of location, setting, (overall) materials, feeling, association	Associated with history of response to Dec. 7, 1941 attack; distinctive underground splinter-proof building	a, c
350	BS ES-2b	WWII	Command Post	Medium level—retains integrity of location, design, setting, materials, workmanship, feeling, association, despite small addition and minor alterations	Associated with history of response to Dec. 7, 1941 attack; distinctive underground splinter-proof building	a, c
387	Port Allen	Plantation Period	Warehouse	Relatively high level—retains integrity of location, design, setting, workmanship, feeling, and association	Associated with history of harbor development and McBryde Sugar Company, and, thus, with the economic history of Kauai.	a
05-0721 (SIHP no.)	BS ES-2c	Plantation Period	Kawaiele Ditch **	Integrity uncertain, due to lack of information, drawings, or photos of original alignment & dimensions	Associated with history of Kekaha Sugar Co. and changes in agricultural uses of land on west Kauai in the 19th and 20th centuries	a
no #	BS ES-2c	Plantation Period	Kinikini Ditch **	Integrity uncertain, due to lack of information, drawings, or photos of original alignment & dimensions	Associated with history of Kekaha Sugar Co. and changes in agricultural uses of land on west Kauai in the 20th century	a
no #	BS ES-2c	Plantation Period	Nohili Ditch **	Integrity uncertain, due to lack of information, drawings, or photos of original alignment & dimensions	Associated with history of Kekaha Sugar Co. and changes in agricultural uses of land on west Kauai in the 20th century	a
			MANAGEMENT CATEGORY III +			
101	BS ES-2b	Cold War	Regulus missile assembly & storage	Minimal level of integrity—retains integrity of location, setting, materials, association, despite numerous additions	Associated with offensive weapon system important in Cold War	a

Appendix H.4. Significant Historic Buildings and Structures within the Boundary of the Pacific Missile Range Facility (Continued)

Facility Number		Historic Context Period	Original or Historic Function	Integrity	Eligibility Evaluation	National Register Criteria
104	—	Cold War	Dehumidified Aircraft Storage Container (Regulus missile storage)	Relatively high level of integrity—not known if openings original; no renovation drawings in Navy files	Associated with offensive weapon system important in Cold War	a
158	BS ES-2b	Cold War	Dehumidified Aircraft Storage Container (Regulus missile storage)	Medium level of integrity—roll-up doors are recent; date of other openings not known; no renovation drawings in Navy files	Associated with offensive weapon system important in Cold War	a
324	BS ES-2b	Cold War	Hawaii Air National Guard Mess Hall	Relatively high level of integrity—retains integrity of location, design, setting, workmanship, feeling, association	Associated with history of HANG Cold War alert interceptor deployments	a
372	—	Cold War	Hawaii Air National Guard (HANG) War Readiness Material Equipment (Vehicles) Storehouse	Relatively high level of integrity—retains integrity of location, design, setting, workmanship, feeling, association	Associated with history of HANG Cold War alert interceptor deployments	a

Source: International Archaeological Resources Institute, Inc., 2005

* Location as shown in the PMRF Integrated Cultural Resources Management Plan (2005)

\+ Management Categories I, II, and III are defined in Section III.5 of the PMRF Integrated Cultural Resources Management Plan (2005)

** More research needed, tentatively categorized as Category II

SIHP Number – Hawai‘i State Inventory Number

Appendix H.5. Traditional Hawaiian Sites Identified within the Boundary of the Pacific Missile Range Facility

Site No. *	Description	Inferred Function	Environ Zone	Recommended National Register Criteria	Level of Study	References
01-0007	"Major ancient burial ground;" habitation sites; located in Nohili Dune (Site 01-1860)	Habitation burials	Dune	—	Survey	Bennett 1931 Soehren 1965-67 Ching 1974 Drolet et al. 1996
01-0008	Elekuna Heiau; inland side of Nohili Dune (Site 01-1860)	Ceremonial	Dune	—	Survey	Thrum 1907 Bennett 1931 Ching 1974
01-0009	House sites marked by "single rows of stone … or by low walls;" inland side of Nohili Dune (Site 01-1860)	Habitation	Dune	—	Survey	Bennett 1931 Ching 1974
01-0652	Mound	Agricultural	Inland edge	ns	Survey shovel test	McGerty/Spear 1997b
01-0653	Mounds (7)	Agricultural	Inland edge	ns	Survey shovel test	McGerty/Spear 1997b
01-0657	Terrace complex	Agricultural	Inland edge	ns	Survey shovel test	McGerty/Spear 1997b
05-0826	Habitation deposits, burial (disturbed) in dune	Habitation burials	Dune	d	Survey	Soehren 1965-67 Drolet et al. 1996
05-1829	Extensive cultural deposit north of Nohili Ditch; includes human bone; radiocarbon dates; part of Site 05-1830	Habitation	Dune	d	Survey shovel test trench test pit	Soehren 1965-67 ASI 1990b Gonzalez 1991b Williams 1996 Drolet et al. 1996 Drolet 1999 PACDIV 2002c
05-1830	Cultural deposit exposed in south face of Nohili Ditch; part of Site 05-1829	Habitation	Dune	d	Survey shovel test test pit	Kikuchi 1979 Drolet et al. 1996 Drolet 1999
05-1831	Burial; found eroding out of dune; falls within Site 05-2035 boundary	Burial	Dune	Cultural	Reported	Inouye n.d. Drolet et al. 1996
05-1832	Burial; found during construction of Facility 105, Range Operations Building (about 450 m inland of coast); possibly plantation origin	Burial	Dune	Cultural	Reported	Inouye n.d. Drolet et al. 1996
05-1833	Burial (scattered bone fragments); found eroding out of dune; may be same as Site 05-1885	Burial	Dune	Cultural	Survey	Inouye n.d. Drolet et al. 1996

Appendix H.5. Traditional Hawaiian Sites Identified within the Boundary of the Pacific Missile Range Facility (Continued)

Site No. *	Description	Inferred Function	Environ Zone	Recommended National Register Criteria	Level of Study	References
05-1834	Burials; possibly 10 acres but nature of burials and size of site never verified	Burial	Dune	Cultural	Reported	Inouye n.d. Drolet et al. 1996
01-1860	Nohili Dune; includes Sites 01-0007 (dune burials and camps between Polihale and Nohili), 01-0008 (Elekuna Heiau), and 01-0009 (house sites on inland side of Nohili Dune).	Habitation ceremonial burial?	Dune	Cultural	Reported survey	Thrum 1907 Bennett 1931 Soehren 1965-67 Ching 1974 Drolet et al. 1996
05-1861	Kuaki'i (pohaku)	Place	Off-shore	Cultural	Reported	Aipoalani 1991 Kilauano 1991
05-1884	Burial (partially articulated remains of single individual); found in dune within Site 05-2035 area	Burial	Dune	Cultural	Survey	Drolet et al. 1996
05-1885	Burial (scattered bone fragments); found eroding from dune; associated with midden scatter; may be same as Site 05-1833	Habitation burials	Dune	Cultural	Survey	Drolet et al. 1996
01-2017	Midden deposit; surface scatter; adze frag in root throw	Habitation	Back beach marsh edge	d	Survey	Wulzen et al. 1997
01-2019	Midden deposit, between Nohili Dune and Nohili Site	Habitation	Dune	d	Survey	Wulzen et al. 1997
01-2021	Midden deposit, between Nohili Dune and Nohili Site	Habitation	Dune	d	Survey	Wulzen et al. 1997
05-2027	Midden deposit	Habitation burials	Dune	d	Survey	Wulzen et al. 1997
05-2031	Midden deposit	Habitation	Dune	d	Survey	Wulzen et al. 1997
05-2035	Midden deposit; 900 m long dune deposit; includes Sites 05-1831, 05-1884	Habitation burials	Dune	d	Survey	Wulzen et al. 1997
05-4016	Fire pit remnant; RC date; layer of origin contains no cultural material	Habitation	Dune	d	Test pit	Sweeney 1994 Drolet et al. 1996
01-6027	Midden deposit; surface scatter in dune	Habitation	Dune	d	Survey	Nagata 1994 Wulzen et al. 1997

Source: International Archaeological Resources Institute, Inc., 2005

* Site Number – Hawaii State Inventory Number (SIHP number) preceded by "50-30-"

ns = not significant

Appendix H.6. Archaeological Sites at Marine Corps Training Area–Bellows from 2005 MCBH Integrated Cultural Resources Management Plan

Table L-1 Archaelogical Sites at Marine Corps Training Area Bellows

Site No.	Type	Age	Human Remains Present	Artifacts Present	C14	NHRP Status	Reference
383	Hill of Haununaniho (a pu`uhonua or place of refuge	Pre-Contact				Eligible	McAllister 1933
3309	Agricultural	?				Eligible	Hurlbett and Haun 1987
3311	Irrigation Channel	?				Eligible	Hurlbett and Haun 1987
3312	Grave Complex	Historic	Yes			Eligible	Farrell and Spear 2002
4850	Subsurface Cultural Deposits	Pre-Contact		buried flake deposit	A.D. 1459-1954	Eligible	Tuggle 1997
4851	Subsurface Cultural Deposits	Pre-Contact/ Historic	Yes	basalt flakes, volcanic glass flakes, metal, glass, adz fragment, adz preforms	A.D. 780 to Modern	Eligible	Tuggle 1997
4852	Subsurface Cultural Deposits (O 18)	Pre-Contact	Yes	Fishhooks, adzes, lithics, coconut shell grater		NHRP Registered	Tuggle 1997
4853	Subsurface Cultural Deposits	Pre-Contact	Yes	fishhook fragments	A.D. 380-660	Eligible	Tuggle 1997

Appendix H.6. Archaeological Sites at Marine Corps Training Area–Bellows from 2005 MCBH Integrated Cultural Resources Management Plan (Continued)

Site No.	Type	Age	Human Remains Present	Artifacts Present	C14	NHRP Status	Reference
				basalt flakes, adz fragments, hammerstones, glass beads	A.D. 1400-1800		
4854	Habitation-burial Complex	Pre-Contact	Yes		A.D. 1292-1455	Eligible	Tuggle 1997
4855	Subsurface Cultural Deposit	Pre-Contact/ Historic		basalt flakes, concrete slabs, military artifacts	A.D. 1281-1644 A.D. 1420-1954	Eligible	Tuggle 1997
4856	Subsurface Cultural Deposit	Pre-Contact/ Historic	Yes	ceramics, glass, *ulu maika,* worked dog tooth, octopus lure, volcanic glass,	A.D.1476-1955 A.D. 1513-1955	Eligible	Tuggle 1997
4857	Subsurface Cultural Deposit		Yes	basalt fragments,		Eligible	Tuggle 1997
4858	Subsurface Cultural Deposit	Pre-Contact		basalt flakes, adze blanks and preforms		Eligible	Tuggle 1997
4859	Concrete Pads, Structures	Historic WWII				Eligible	Hurlbett and Haun 1987
4860	Concrete Bunkers	Historic WWII				Eligible	Cordy and Tuggle 1976
4861	Concrete Foundations/Artifacts	Historic WWII				?	Leidemann and Cleghorn 1983

Appendix H.6. Archaeological Sites at Marine Corps Training Area–Bellows from 2005 MCBH Integrated Cultural Resources Management Plan (Continued)

Site No.	Type	Age	Human Remains Present	Artifacts Present	C14	NHRP Status	Reference
4862	Military Debris	Historic WWII				?	Leidemann and Cleghorn 1983
4863	House(s)	Historic WWII				?	?
5464	Complex	Pre-Contact		lithic debris		?	Tuggle 1997

Source: U.S. Army Corps of Engineers, Honolulu Engineer District, 2005

Appendix H.7. Army Programmatic Agreement—Makua

Content of the Programmatic Agreement between the United States Army, the Hawai`i State Historic Preservation Officer, and the Advisory Council on Historic Preservation for the Protection and Mitigation of Impacts to Cultural Resources at the Mauka Military Reservation

Source: Supplemental Environmental Assessment for Routine Training at Makua Military Reservation and PFC Pilila`au Range Complex Hawai`I, May 2001 (The Onyx Group, 2001)

4.11.2 Cultural Resources Component of the Proposed Action

On September 18, 2000, a Section 106 PA was finalized with the SHPO and the Advisory Council on Historic Preservation (ACHP). This PA was developed in consultation with Native Hawaiian groups and regulatory agencies over a period of two years. It contains specific programs and efforts to protect and mitigate impacts to cultural resources at Makua.

The PA for Section 106 responsibilities required additional surface surveys of all training and training related activity areas and the initiation of a survey for Traditional Cultural Places (TCP) before training in its proposed modified form could begin. The surface survey of the entire action area has been completed and the report is being reviewed by the SHPO. A contract for the TCP survey was awarded in FY 2000 and is ongoing. In addition, the target objectives have been changed and other actions have been implemented to de-conflict training and archaeological sites. There are 17 archaeological sites within the proposed training area that will be additionally protected by the measures outlined below. Twenty-five percent of the lands at Makua have been surveyed for the presence of archaeological sites. Areas outside the south firebreak road (with the exception of the bivouac area) cannot be surveyed because of the presence of unexploded ordnance. The remaining portion of MMR that may contain historic artifacts is unsafe to survey, without extensive UXO detection [usually preceded by a controlled burn, which also threatens endangered species] and demolition by Explosive Ordnance Disposal experts. The proposed maneuver corridor, the small arms target objectives and the mortar/artillery objectives have been surveyed for both surface and subsurface sites. The area of the 1994 CCAAC modifications was cleared of overburden by bulldozers; subsurface deposits, if present, were examined by archaeologists. The completion of these actions mitigates the potential effects of training on cultural sites to no significant impact.

In addition, to the above actions which permit resumption of training with no significant impact, the Army will undertake other longer term conservation measures in accordance with the PA. The PA for Section 106 compliance over the next five years is appropriate for projects where effects are difficult to define in advance, that would take place over a relatively long period of time, or that involve the routine management of federal installations, facilities, or property.

The additional stipulations of the Makua PA for Section 106 responsibilities for routine training are as follows:

- Additional sub-surface surveys will be done within the training area circumscribed by the south firebreak road. These surveys will be done south of the main live-fire maneuver corridors within the CCAAC. The live-fire maneuver corridors have been surveyed in the past and contain no further subsurface features. Surveys outside the proposed training area will be done as needed after further Section 106 consultation. The presence of UXO in these areas makes survey hazardous. Also, according to the PA, detonation of UXO outside the training area or close to existing sites is subject to consultation under the agreement.

- An annual status report would be provided to the SHPO, the ACHP, and consulting native/indigenous Hawaiian organizations to review implementation of the PA and determine whether amendments are needed.

- The Army would identify native/indigenous Hawaiian organizations, groups, families, and individuals that may ascribe traditional religious and cultural importance to historic properties at Makua. The Office of Hawaiian Affairs and Hui Malama I Na Kupuna O Hawaii Nei would be considered interested parties for the purposes of Section 106 consultation and review.

- Expanded education of Army personnel in cultural resource awareness and protection, as well as avoidance of cultural resources during training, will be undertaken. Instruction could include field trips, classroom training, and printed literature. This information is also included in the cultural resources annex of the range standing operating procedure.

- The Army will actively seek to identify and evaluate cultural resources at Makua. The identification plan is based on a five-year schedule, prioritized according to the potential for the presence of cultural resources and frequency of training activities.

- A database will be prepared using existing cultural data and will be revised as new information becomes available.

- Geographical information system (GIS) mapping of resource locations will be prepared and distributed to the Hawaii SHPO and native Hawaiian groups if requested.

- Cultural resources will be monitored to identify effects from training. For the first year a qualified archeologist will do the monitoring whenever a unit departs the training area immediately following the training exercise. Monitoring records will be kept and included in the annual report to the Hawaii SHPO.

- Cultural resources will be protected from damage during training exercises. Protection measures include managing resources in place as exclusion areas without barriers, establishing physical barriers, and data recovery. Routine detonation of UXO within the training area does not require consultation.

- The Cultural Resources Manager will work with the Wildland Fire Manager to develop acceptable fire containment/control strategies to suppress wildfires while at the same time protecting cultural resources. This coordination will occur during site planning preparation and pre-season fire suppression operations.

In 1998, the Army began a program in cooperation with members of the Waianae community to open Ukanipo Heiau to native Hawaiian religious practitioners under the American Indian Religious Freedom Act of 1978. Meetings took place over a period of two and a half years, culminating in a PA signed in October 2000, giving access to Ukanipo Heiau to members of the native Hawaiian community. This access is independent of training activities in the valley. Access to other sites within the valley has been given on a case-by-case basis as is consistent with training and safety concerns. The potential for increased access to other sites within Makua is being examined.

Appendix H.8. Identified Archaeological Sites in the Makua Valley

Site No.+	Site Description	Source	Report Date
178	Kumuakuopio Heiau*	McAllister	1933
179	Fishing Shrine*	McAllister	1933
180	Kaahihi Heiau*	McAllister	1933
181	Heiau Ukanipo	McAllister	1933
182	Swimming Pool*	McAllister	1933
9518	Makua Trail	Rosendahl	1977
9520	Stone Walls and Enclosure	Rosendahl	1977
9521	Terraces	Rosendahl	1977
9522	Terraces and Walls	Rosendahl	1977
9523	Occupation Complex	Rosendahl	1977
9524	Occupation Complex	Rosendahl	1977
9525	Stacked Stone Wall	Rosendahl	1977
9526	Occupation Complex	Rosendahl	1977
9531	Stone Walls and Platforms	Rosendahl	1977
9532	Subsurface Deposit	Rosendahl	1977
9533	Large Platform	Rosendahl	1977
4627	Agricultural Complex	Carlson et. al.	1993
4629	Several Stone Mounds	Carlson et. al.	1993
4628	Stone Mound and Cupboard	Carlson, et.al.	1993
4630	Habitation Site	Carlson, et.al.	1993
4536#	Stone Walls and Well	Eble et. al.	1993
4537#	Complex of 14 Stone Walls	Eble et. al.	1993
4538#	Enclosure and C-shape	Eble et. al.	1993
4539#	Small Retaining Wall	Eble et. al,	1993
4540#	Agricultural/Habitation Site	Eble et. al.	1993
4541#	Kuleana Plots	Eble et. al.	1993
4542#	Agricultural/Habitation Site	Eble et. al. MMR DPW	1993 2000
4543#	Agricultural/Habitation Site	Eble et. al. MMR DPW	1993 2000
4544#	Agricultural/Habitation Site	Eble et. al. MMR DPW	1993 2000
4545#	Agricultural/Habitation Site	Eble et. al.	1993
4546#	Enclosure/Platform/Possible Heiau	Eble et. al.	1993
4547#	Agricultural Complex-Historic	Eble et. al.	1993
5456#	Subsurface Habitation Features	Williams and Patolo	1998
5587#	Agricultural/Habitation Site	Williams and Patolo	1998
5588#	Agricultural/Habitation Site	Williams and Patolo	1998
5589#	Agricultural/Habitation Site	Williams and Patolo	1998

Appendix H.8. Identified Archaeological Sites in the Makua Valley (Continued)

Site No.+	Site Description	Source	Report Date
5590#	Agricultural/Habitation Site	Williams and Patolo	1998
5775	Complex of 72 features in	Cleghorn, et.al.	1999
5776	Complex of 111 features in	Cleghorn, et.al.	1999
5777	Shrine/Upright Stone in vicinity of Ukanipo Heiau	Cleghorn, et.al.	1999
5778	Complex of 10 features in vicinity of Ukanipo Heiau	Cleghorn, et.al.	1999
5920	Mounds, Terraces	MMR DPW	2000
5921	Mound, Alignment, Terrace	MMR DPW	2000
5922	Mound, Modified Outcrop, Alignment	MMR DPW	2000
5923	Platforms, Walls, Terraces, C-shaped Shelter, Mounds	MMR DPW	2000
5924	Alignment	MMR DPW	2000
5925	Predominantly Walls	MMR DPW	2000
5926	Walls, Platform	MMR DPW	2000
5927	Retaining Wall, Walls, Enclosures, Alignment	MMR DPW	2000
5928	Retaining Wall	MMR DPW	2000
5929	Bunker, Gun Emplacement, Platform	MMR DPW	2000
5930	Platform	MMR DPW	2000
5931	Wall	MMR DPW	2000
5932	Path	MMR DPW	2000
5933	Platform	MMR DPW	2000

Source: The Onyx Group 2001

= Located within the Piliaau Range Complex. No sites located within the live-fire maneuver corridor or mortar or artillery target areas

* = Destroyed

+ - All site number are provided by the Hawai‘i State Historic Preservation Officer and carry the prefix 50-80-03 (e.g., 50-80-03-178)

Appendix H.9. Archaeological Sites at Kahuku Training Area (US Department of the Army, 2004)

Table 7-24
Archaeological Sites at KTA

Site Number	Site Type	Site Description
50-80-02-0259	Spring	Waikane Stone
50-80-02-0260	Heiau	Pu'uala Heiau (4,930 terrace facing)
50-80-02-0599	Bunkers	Three bunkers at Punamanō Communication Station
50-80-02-1043	Complex	Kawela agricultural terraces
50-80-02-2357	Wall	Plantation era stone wall remnant
50-80-02-2358	Single feature	House site 13m x 10m
50-80-02-2359	Two adjacent terraces	Terraces 22.5m x 6m
50-80-02-2360	Single feature	Terrace 20m x 10m
50-80-02-2501	Heiau	Hanakaoe platform 4m x 7m
50-80-02-4882	Bunker	Military bunker 8.7m x 4.5m
50-80-02-4883	Historic house site	Plantation era house site
50-80-02-4884	Imu	Imu site 3m
50-80-02-4885	Heiau	Pahipahi'āluaHeiau 17m x 12m
50-80-02-4886	Bunker	Pentagonal military bunker 3.5m x 3m
50-80-02-4887	Terrace complex	Habitation complex with related agricultural features 24m x 14m
50-80-02-4888	Wall/depressions	Agricultural earthen depressions/rock alignment 20m?
50-80-02-4930	Linear mound	Linear rock mound (remnants Site 260?) 7m x 2m
50-80-02-5534	Rock shelter	Temporary shelter 5m x 2.5m
50-80-02-5536	Rock shelter	Temporary shelter? 15m x 3m
50-80-02-5537	Enclosure	Enclosure (pre-Contact) 62m x 40m
50-80-02-5538	Wall	Wall (pre-Contact) 15m x 1m

Appendix H.9. Archaeological Sites at Kahuku Training Area (Continued)

Table 7-24
Archaeological Sites at KTA *(continued)*

Site Number	Site Type	Site Description
50-80-02-5539	Terraces	Retaining wall and stone concentration 40m x 20m
50-80-02-5540	Terraces	Terraces 15m x 15m
50-80-02-5684	Enclosure	Enclosure 50m x 25m
50-80-02-5685	Rock shelter	Temporary shelter 9m x 5m
50-80-02-5686	Ahupua'a boundary	Wall 4m x 1m
50-80-02-5688	Roadway	Historic roadway 30m x 6m
50-80-02-5689	Bunker	Underground bunker 3m x 2m
50-80-02-5690	Enclosure	Bunker 4m x 3m
50-80-02-9506	Historic irrigation	Kea'aulu Ditch (hist. stone faced irr. ditch)
50-80-02-9507	Historic (?) terrace	'O'io Stream terrace (ag. terrace)
50-80-02-9508	Platform	East 'O'io Gulch platform (stepped stone platform)
50-80-02-9509	Complex	'O'io Gulch complex (agricultural terraces)
50-80-02-9517	Terraces	Kāneali'i agricultural terraces (possible remnants)
50-80-02-9745	Landmark	'Opana Mobile Radar Site
SCS Temp# 1	Military	Fox holes
SCS Temp# 2	Military	Fox holes with rock wall
SCS Temp# 3	Military	Leveled area behind outcrop
SCS Temp# 16	Military	Rock terrace
SCS Temp# 19	Military	Concrete structure
SCS Temp# 30	Military	Bunker
SCS Temp# 36	Military	Concrete slab
SCS Temp# 38	Military	Concrete slab
SCS Temp# 39	Military	Concrete blocks
SCS Temp# 40	Military	Concrete slabs
SCS Temp# 41	Military	Concrete slab
SCS Temp# 42	Military training	Fire pit with trash
SCS Temp# 43	Military	Concrete slabs
SCS Temp# 44	Military	Concrete Slab with metal tank
SCS Temp# 45	Military	Concrete slab
SCS Temp# 47	Military	Concrete slabs
SCS Temp# 48	Military	Foundations with bottle glass
SCS Temp# 49	Military	Concrete drainage
SCS Temp# 53	Military training	Collapsed concrete box
SCS Temp# 54	Military training	Intact concrete box
SCS Temp# 56	Military training	Fire pit with metal fragments and other trash
SCS Temp# 60	Military	Two fire pits with trash

Appendix H.9. Archaeological Sites at Kahuku Training Area (Continued)

Table 7-24
Archaeological Sites at KTA *(continued)*

Site Number	Site Type	Site Description
SCS Temp# 4	Plantation/Agriculture possible	Boulder concentration
SCS Temp# 10	Unknown	Rectangular boulder platform
SCS Temp# 11	Unknown/stabilization	Terrace down slope of a level area
SCS Temp# 12	Pre-military	Multiple features, including mounds and fox holes
SCS Temp# 13	Historic	Linear terrace
SCS Temp# 20	Historic	Terrace and a road
SCS Temp# 21	Historic	Rock mound
SCS Temp# 22	Historic	Rock mound
SCS Temp# 24	Historic	Boulder concentration
SCS Temp# 25	Historic	Tow linear boulder concentrations
SCS Temp# 26	Historic	Rock mound
SCS Temp# 32	Historic	Cobble and boulder terrace
SCS Temp# 33	Historic	Rock mound
SCS Temp# 50	Historic	Linear boulder concentration
SCS Temp# 52	Historic	Boulder and cobble piles
SCS Temp# 55	Historic	Linear boulder concentration
SCS Temp# 57	Historic	Boulder mound and terrace
SCS Temp# 61	Historic	Rock mound and depression
SCS Temp# 63	Historic	Rock mound
SCS Temp# 64	Historic	Multiple rock mounds
SCS Temp# 5	Undetermined	Paved terrace and rock mounds
SCS Temp# 6	Undetermined	Terrace
SCS Temp# 7	Prehistoric	Enclosure and mounds
SCS Temp# 8	Undetermined	Mounds with glass bottles
SCS Temp# 9	Undetermined	Enclosure with entryway
SCS Temp# 14	Prehistoric	Rock mound
SCS Temp# 15	Prehistoric/Historic	Rock concentration
SCS Temp# 17	Undetermined	Modified outcrop, rock mounds
SCS Temp# 18	Agriculture/undetermine d	Linear rock mound
SCS Temp# 29	Traditional	Tow fire pits
SCS Temp# 34	Undetermined	Wall with sub-features
SCS Temp# 46	Undetermined	Large retaining terrace
SCS Temp# 51	Undetermined	Terraces and rock mounds
SCS Temp# 58	Prehistoric	Lithic scatter
SCS Temp# 59	Prehistoric	Rock mound, possible trail marker
SCS Temp# 65	Traditional	Fire pit

Source: IARII 2003 ; GANDA 2003c; SCS 2003.

Appendix H.9. Archaeological Sites at Kahuku Training Area (Continued)

Table 7-25
Historic Military Buildings at KTA

Facility No.	Description (original use)	Year Built	Historical Period
0001	Administrative building	1961	Cold War
0003	Flagpole (gone)	1961	Cold War
0004	Pump house (water supply/treatment building)	1961	Cold War
0005	Barracks and mess hall	1961	Cold War
0008	Water storage tank	1961	Cold War
0009	Water supply/treatment building; pump house	1961	Cold War
0013	Control station; air/fallout shelter	1961	Cold War
0014	Control station; air/fallout shelter	1961	Cold War
0018	Control station; air/fallout shelter	1961	Cold War
00020	Sentry box	1961	Cold War
0022	Protective barrier	1961	Cold War
0023	Protective barrier	1961	Cold War
0026	Protective barrier	1961	Cold War
0027	Protective barrier	1961	Cold War
0028	Sentry control station	1961	Cold War
0030	Protective barrier	1961	Cold War
0036	Protective barrier	1961	Cold War
0037	Warhead building	1961	Cold War
0045	Missile assembly and test building	1961	Cold War
0047	Generator building	1961	Cold War
0048	Transformer building	1955	Cold War
0060	Sentry box	1961	Cold War
0061	ACQ tower (gone)		Cold War
0063	Administration building	1961	Cold War
0064	Flagpole	1961	Cold War
0067	Barracks and mess hall	1961	Cold War
0070	Generator building	1961, 1963	Cold War
0071	Transformer pad	1963	Cold War
0075	MTR & TTR pad	1963	Cold War
0078	MTR & TTR pad	1963	Cold War
0079	MTR & TTR pad	1963	Cold War
0080	Interconnecting corridor	1961	Cold War
0081	Pad for control vans	1961	Cold War
0082	Pad for control vans	1961	Cold War
0083	Pad for control vans	1961	Cold War
0087	HIPAR tower (gone)	1961	Cold War
0089	Water tank	1961	Cold War
0090	Bore site mast (gone)	1961	Cold War
T-150	Guard tower	c. 1961	Cold War
T-151	Guard tower	c. 1961	Cold War

Source: IARII 2003

Source: US Department of the Army, 2004

Appendix H.10. Archaeological Sites Recommended as Eligible to the National Register of Historic Places at Pohakuloa Training Area (US Department of the Army, 2004)

Table 8-25
Archaeological Sites Recommended as Eligible to the NRHP at PTA

State Site Number 50-10-31-	Site Type	Site Function
05000	Lava Tube	Shelter
05001	Lava tube	Shelter
05002	Wall	Ranching
05003	Lava tube	Shelter/habitation
05004	Lava tube	Shelter/habitation/religious
05005	Lava tube	Shelter/habitation/religious
05006	Trail	Transportation
05007	Trail	Transportation
05008	Trail	Transportation
05009	Trail	Transportation
07119	Wall	Ranching
10220	Lava tube	Shelter/habitation
10221	Lava tube	Shelter/habitation
10222	Lava tube	Shelter/habitation
10265	Lava tube	Shelter/habitation
10266	Lava tube	Resource procurement
10267	Lava tube	Shelter/habitation
10268	Lava tube	Resource procurement
10269	Lava tube	Shelter/habitation
10270	Lava tube	Water procurement
10271	Lava tube	Resource procurement
10271	Ahu	marker
10272	Overhang shelter	Shelter
10644	Lava tube	Shelter
10645	Lava tube	Shelter
10646	Lava tube	Shelter
10647	Lava tube	Shelter
10648	Lava tube	Shelter
10649	Lava tube	Shelter
10650	Lava tube	Shelter
10651	Lava tube	Shelter
10652	Lava tube	Shelter
10653	Lava tube	Shelter
10654	Lava tube	Shelter

Appendix H.10. Archaeological Sites Recommended as Eligible to the National Register of Historic Places at Pohakuloa Training Area (Continued)

Table 8-25
Archaeological Sites Recommended as Eligible to the NRHP at PTA *(continued)*

State Site Number 50-10-31-	Site Type	Site Function
10655	Lava tube	Shelter
10656	Lava tube	Shelter
10657	Lava tube blister	Shelter
10658	Lava tube	Resource procurement
14638	Site-complex (enclosures, lava tube blisters, wall, C-shape, lithic scatter, overhang shelter	Lithic workshop, resource (lithic) Procurement/shelter/workshop/trail?
17116	Lava tube	Shelter/habitation
17117	Ahu	Marker
17118	Ahu	Marker
17119	Ahu complex	Unknown
17120	Ahu	Marker
17121	Ahu	Marker
17122	Ahu	Marker
17123	Ahu	Marker
17124	Ahu	Marker
17125	Lava tube	Resource procurement
17126	Overhang shelter	Shelter
17127	Overhang shelter	Shelter
17128	Overhang shelter	Shelter
17129	Overhang shelter	Shelter
17130	Ahu	marker
17131	Overhang shelter	Shelter
17132	Overhang shelter	Shelter
17133	Overhang shelter	Shelter
17134	Overhang Shelter	Shelter
17135	Overhang shelter	Shelter
17136	Lava Tube blister	Shelter
17137	Quarry	Resource procurement
17138	Ahu complex	Unknown
17139	Lava tube	Shelter/historic butchering site
17140	Ahu	Marker
17142	Ahu	Marker
17143	Quarry	Resource procurement
17144	Overhang shelters	Shelter
17145	overhang shelter	Shelter

Appendix H.10. Archaeological Sites Recommended as Eligible to the National Register of Historic Places at Pohakuloa Training Area (Continued)

Table 8-25
Archaeological Sites Recommended as Eligible to the NRHP at PTA *(continued)*

State Site Number 50-10-31-	Site Type	Site Function
17147	Ahu	Marker
17148	Overhang shelter	Shelter
17149	Overhang shelter	Shelter
17150	Lava tube	Shelter/habitation
17151	Lava tube	Shelter/habitation
17153	Ahu	Marker
17154	Overhang shelter	Shelter
17155	Lava tube	Shelter (historic)
17156	Lava tube	Resource procurement/religious
17157	Overhang shelter	Shelter
17158	Lava tube	Shelter
17159	Ahu	Marker
17160	Quarry	Resource procurement
17161	Overhang shelter	Shelter
17162	Quarry	Resource procurement
17163	Lava tube	Historic shelter
17164	Quarry	Resource procurement
17165	Quarry	Resource procurement
17166	Quarry	Resource procurement
18671	Lava tube	Shelter/habitation
18672	Lava tube	Shelter/habitation
18673	Lava tube	Shelter/habitation/religious
18674	Shrine	Religious
18675	Quarry	Resource procurement
18676	Shrine	Religious
18677	Site complex	Religious
18678	Platform	Religious
18679	Trail	Transportation
18680	C-shape	Shelter
19490	Lava tube, C-shape, trail	Shelter/habitation/transportation
19491	Lava tube	Sandalwood resource procurement
19492	Lava tube	Shelter/resource procurement
19493	Overhang shelter	Shelter
19494	Overhang shelter	Shelter
19495	Lava tube	Shelter/habitation
19496	Lava tube	Water procurement
19497	Lava tube	Shelter/habitation

Appendix H.10. Archaeological Sites Recommended as Eligible to the National Register of Historic Places at Pohakuloa Training Area (Continued)

Table 8-25
Archaeological Sites Recommended as Eligible to the NRHP at PTA *(continued)*

State Site Number 50-10-31-	Site Type	Site Function
19498	Lava tube blister	Shelter
19499	Lava tube	Shelter/habitation/resource procurement
19500	Lava tube	Shelter
19501	Lava tube	Shelter/habitation/water and resource procurement
19502	Lava tube	Water procurement
19503	Lava tube	Shelter
19504	Lava tube	Water procurement
19505	Lava tube	Shelter/resource procurement
19506	Lava tube	Shelter/water procurement
19507	Overhang shelter	Shelter
19508	Lava tube	Water procurement
19509	Lava tube	Water procurement
19510	Quarry	Resource procurement
19511	Lava tube	Water procurement
19512	Lava tube	Shelter
19513	Lava tube	Shelter/water procurement
19514	Lava tube	Shelter/habitation/resource procurement
19515	Lava tube	Shelter/habitation/resource procurement
19516	Lava tube	Water procurement
19517	Lava tube	Water procurement
19518	Lava tube	Shelter/habitation
19519	Lava tube	Resource procurement
19520	Lava tube	Shelter
19521	Lava tube	Shelter
19522	Lava tube	Shelter
19523	Lava tube	Shelter/habitation/resource procurement
19524	Lava tube	Shelter
19525	Lava tube	Shelter
19526	Lava tube	Shelter
19527	Lava Tube	Resource procurement
19528	Na Ohule Elua Trail	Transportation
19529	Lava tube	Shelter/habitation
21164	Lava tube	Shelter/habitation
21165	Lava tube	Shelter/habitation
21166	Lava tube	Shelter/habitation
21167	Quarry	Resource procurement

Appendix H.10. Archaeological Sites Recommended as Eligible to the National Register of Historic Places at Pohakuloa Training Area (Continued)

Table 8-25
Archaeological Sites Recommended as Eligible to the NRHP at PTA *(continued)*

State Site Number 50-10-31-	Site Type	Site Function
21168	Ahu	Marker
21169	C-shape	Shelter
21170	Ahu	Marker
21171	Trail	Transportation
21172	Trail	Transportation
21281	Lava tube	Shelter/habitation
21282	Lava tube	Shelter/habitation
21283	Site complex, lava tube	Shelter/habitation/resource procurement
21284	Ahu complex	Unknown
21285	Lava tube	Shelter/habitation
21286	Lava tube	Shelter/habitation
21287	Lava tube	Shelter/habitation
21288	Ahu complex	Marker, unknown
21289	Shrine	Religious
21290	Shrine	Religious
21291	Lava tube	Shelter/habitation
21292	Lava tube	Shelter/habitation
21293	C-shape	Shelter
21294	Lava tube	Shelter/habitation
21295	Lava tube	Shelter/habitation
21296	Lava tube	Shelter/habitation
21297	Lava tube	Shelter/habitation
21298	Ahu complex	Marker, unknown
21300	Excavated pit	Unknown
21301	Pavement	Unknown
21302	Ahu, petroglyph	Marker, unknown
21303	Lava tube	Shelter/habitation
21304	Quarry	Resource procurement
21305	Lava tube	Shelter/habitation
21306	C-shape	Shelter
21307	Ahu	Marker
21308	C-shape	Shelter
21309	Lava tube	Shelter/habitation
21310	Ahu	Marker
21311	Ahu, platform	Marker, religious
21312	Lava tube	Shelter/habitation
21313	Pits, area I	Unknown

Appendix H.10. Archaeological Sites Recommended as Eligible to the National Register of Historic Places at Pohakuloa Training Area (Continued)

Table 8-25
Archaeological Sites Recommended as Eligible to the NRHP at PTA *(continued)*

State Site Number 50-10-31-	Site Type	Site Function
21314	Pits, area II	Unknown
21315	Pits, area III	Unknown
21316	Pits, area IV	Unknown
21351	Site complex	Workshop
21483	Lava tube	Shelter/habitation
21484	Lava tube	Shelter/habitation
21485	Lava tube	Shelter/habitation
21486	Lava tube	Shelter/habitation
21487	Lava tube	Shelter/habitation
21488	Lava tube	Shelter/habitation
21489	Lava tube	Shelter/habitation
21490	Lava tube	Shelter/habitation
21491	Lava tube	Shelter/habitation
21492	Lava tube	Shelter/habitation
21493	Quarry, excavated pit	Resource procurement, unknown
21494	Lava tube	Shelter/habitation
21495	Site complex	Unknown
21496	Lava tube	Shelter/habitation
21497	Lava tube	Shelter/habitation
21498	Lava tube	Shelter/habitation
21499	Ahu complex	Unknown
21500	Ahu complex	Unknown
21501	Lava tube	Shelter/habitation
21502	Lava tube	Shelter/habitation
21503	Site complex	Religious
21665	Lava tube	Shelter/habitation
21666	Quarry	Resource procurement
21667	Quarry	Resource procurement
21668	Quarry	Resource procurement
21669	Quarry	Resource procurement
21670	Quarry	Resource procurement
21671	Quarry	Resource procurement
21672	Quarry	Resource procurement
21673	Quarry	Resource procurement
21674	Quarry	Resource procurement
21744	Lithic, pavement	Resource procurement, lithic workshop
21745	Lava tube	Shelter/habitation

Appendix H.10. Archaeological Sites Recommended as Eligible to the National Register of Historic Places at Pohakuloa Training Area (Continued)

Table 8-25
Archaeological Sites Recommended as Eligible to the NRHP at PTA *(continued)*

State Site Number 50-10-31-	Site Type	Site Function
21746	Site complex	Unknown
21747	Lava tube	Shelter/habitation
21748	Excavated pit	Unknown
21749	Lava tube	Shelter/habitation
21750	Shrine	Religious
21807	Lava tube	Shelter/habitation
21809	Lava tube	Shelter/habitation
22941	Lava tube, lithic	Resource procurement
23450	Ahu	Marker
23451	Lava tube	Shelter
23452	Enclosure	Unknown
23453	Enclosure	Unknown
23454	Modified outcrop	Unknown
23455	Excavated pit complex	Resource procurement
23456	Enclosure	unknown
23457	Trail	Transportation
23458	Quarry	Resource procurement
23459	Enclosure	Shelter
23460	Lava tube/modified outcrop	Shelter
23461	Enclosure	Shelter
23462	Ahu	marker
23463	Excavated pit complex	Resource procurement
23464	Site-complex	Shelter/habitation
23465	Lithic scatter	Lithic workshop
23466	Lava tube	Shelter/habitation
23621	Excavated pit complex	unknown
23622	Excavated pit complex	unknown
23625	Lava tube	Shelter/habitation
23626	Lava tube	Shelter/habitation

Source: IARII 2003

Source: US Department of the Army, 2004

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Appendix I
Land Use

APPENDIX I
LAND USE

APPENDIX E
LAND TITLE

The 103rd Congress enacted Public Law 103-150 on November 23, 1993, apologizing to Native Hawaiians for the U.S. role in the 1893 overthrow of the monarchy. The Joint Resolution is not applicable to the disposition of ceded lands at PMRF or support sites. Specifically, the Resolution neither recognizes nor creates rights to any of the ceded lands in Native Hawaiian or any other group defined by race or ancestry, and contains the following express disclaimer: "Nothing in this Joint Resolution is intended to serve as a settlement of any claims against the government." The Resolution provides no direction to any individual Federal agency as to any specific implementing action. There is no instruction with respect to ceded lands. The Resolution can be seen as an appeal to Federal agencies having dealings with the Native Hawaiian community to be alert to the special sensitivities of that community with respect to the ending of the monarchy.

For the EIS process, such sensitivity is already mandated by the statutes and regulations governing the process, particularly those concerning scoping and subsequent public input. It was precisely the public input during scoping that prompted an examination of the ceded lands issue. An assessment of this issue for the EIS would have occurred whether or not the Resolution had been passed.

Many who offered testimony or wrote letters in response to the scoping notice questioned the military's title to PMRF and support sites. They asserted that persons of Hawaiian descent have claims to the land or may be entitled to have some sort of special control over the disposition of these lands. In response to these concerns, a review of the title to these ceded lands was conducted. The possibility that Hawaiians or native Hawaiians (as those terms are used in existing legislation to denote classes defined by race or ancestry) should have special consideration in decisions concerning ceded lands has been carefully evaluated.

The circumstances by which the lands now known as PMRF came into Federal ownership are described at the end of this appendix. This report shows that valid legal title to these lands was vested in the United States either by condemnation, by conveyance, or by set-aside of ceded public lands of the Territory.

The claims advanced during the scoping process focused on ceded lands, i.e., the lands known as Crown or government lands during the period of the monarchy, which were ceded (granted) to the United States when Hawaii was annexed to the United States in 1898. The claims seek "return" of these lands to the "Hawaiian people," to "native Hawaiians" or to "Hawaiians." It is noted that the terms "native Hawaiian" and "Hawaiian" are defined in a number of state and Federal statutes solely in terms of race or ancestry; that is, as referring to persons descended from inhabitants of the Hawaiian Islands just prior to the discovery of the islands by Captain Cook in 1778. There is no accepted definition of "the Hawaiian people" in state or Federal law, but it is assumed for purposes of the discussion below that the term as used during the scoping process referred generally to persons who are either "native Hawaiians" or "Hawaiians" as otherwise defined by law.

The basis for the claims advanced during scoping was not explained in detail, so the status of the Crown and government lands under the monarchy was reviewed to determine whether any basis for such claims might exist.

PMRF Enhanced Capability Final EIS E-1

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a)

Both the Crown and government lands were set apart from the lands under the exclusive control of the king at the time of the Great Mahele. Under the monarchy, the government lands were dedicated to public purposes. The instrument by which Kamehameha III conveyed the lands that would eventually become known as "government lands" stated, with respect to the lands conveyed, that:

> These lands are to be in the perpetual keeping of the Legislative Council (Nobles and Representatives) or in that of the superintendents of said lands, appointed by them from time to time, and shall be regulated, leased, or sold, in accordance with the will of said Nobles and Representatives, for the good of the Hawaiian Government, and to promote the dignity of the Hawaiian Crown.

The Crown lands were intended for the support of the king in what might be called his official capacity. Any doubt on this point was resolved in 1865, when legislation was enacted making the Crown lands inalienable and forbidding leases for more than 30 years. The preamble to this legislation, after noting the history of the Crown Lands, stated:

> *And whereas,* the history of the lands shows that they were vested in the King for the purpose of maintaining the Royal State and Dignity; and it is therefore disadvantageous to the public interest, that the lands should be alienated, or the said Royal Domain diminished. *And whereas, further,* during the two late reigns, the said Royal Domain has been greatly diminished, and is now charged with mortgages to secure considerable sums of money; now therefore,...

This was followed by the text of the law. Leasing was placed under the control of a body known as the Commissioners of Crown Lands. Bonds were authorized for the purpose of retiring mortgages against the property, and the proceeds of the leases, less a portion to be used for discharging the bonds, were made payable to the king. By this statute, the status of the Crown lands as a public resource for the support of the head of the government, rather than the personal property of the King, was confirmed in the law of the kingdom.

Thus, it clearly appears that during the monarchy, both Crown lands and the government lands were essentially dedicated to governmental purposes. At least during the later years of the monarchy, many citizens of the kingdom were not of Hawaiian descent, but the government lands appear to have been administered for the benefit of the citizenry as a whole rather than solely for those of Hawaiian ancestry. There is no indication that during the monarchy any individual (except the king, his wife, and his successors with respect to Crown lands) or any group or category of persons defined by Hawaiian ancestry alone had any claim to the Crown or government lands. Indeed, even the right of the monarch to dispose of the Crown lands at his will was rejected not only by the courts and the legislature, but ultimately by Kamehameha V himself when he signed the 1865 legislation making the Crown lands inalienable.

Beyond the historical documents themselves, a review of respected historical works discloses no support for a position that during the existence of the kingdom, Crown or government lands were somehow intended only for the benefit of persons of Hawaiian ancestry, except perhaps for the monarch's claim to the Crown lands[1]. With respect to the personal rights of the monarch,

[1] Perhaps the single most valuable resource on the subject is R.S. Kuykendall, *The Hawaiian Kingdom* (3 vols., 1938), esp. Vol. I, Chapter XV, "The Land Revolution." Other writers with thoughtful if varying viewpoints include L.H. Fuchs, *Hawaii Pono: A Social History* (1961) pp. 14-17 and Gavan Daws, *Shoal of Time: A History of the Hawaiian Islands* (1974), esp. pp. 124-128. More technical works include L.

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

it should be noted that Queen Liliuokalani's claim that she held an interest in the Crown lands as her individual property, and was entitled to compensation from the United States for its loss, was carefully considered and specifically rejected by the U.S. Claims Court in 1910. In that case, entitled *Liliuokalani v. U.S.,* 45 St. Cl. 418 (1910), the Queen argued that she held a vested equitable life estate in the Crown lands. After discussing the history of the establishment of the Crown lands, their treatment under the kingdom, and the 1865 legislation that made Crown lands inalienable, the court stated:

> The [1848] reservations [of Crown lands] were made to the Crown and not the King as an individual. The Crown lands were the resourceful methods of income to sustain, in part at least, the dignity of the office to which they were inseparably attached. When the office ceased to exist they became as other lands of the Sovereignty and passed to the defendants as part and parcel of the public domain.

During both the Republic and the Territorial periods, ceded lands were treated as public property, and under the Territory they were explicitly dedicated to public purposes. With the possible exception of the Hawaiian Homes Commission Act, the governing statutes neither acknowledged nor created property rights in any of these lands based on Hawaiian ancestry.

At statehood, the special status of these lands as dedicated to governmental purposes was confirmed by section 5(f) of the Admission Act, which limited the uses of ceded lands to the following:

- Support of the public schools and other public education institutions
- Betterment of the conditions of native Hawaiians, as defined in the Hawaiian Homes Commission Act, 1920, as amended
- Development of farm and home ownership on as widespread a basis as possible
- Making public improvements
- Provision of lands for public use

This statute established no requirement that any specific portion of the ceded lands be used for "native Hawaiians," or that any portion of the ceded lands be so used. It is simply included such use among those permitted. No property rights were established in any individual or group simply by virtue of Hawaiian ancestry.

Taken together, the foregoing facts indicate that no individual has a legal claim, based on any right of property, to any federally-retained ceded lands simply by virtue of Hawaiian ancestry. As against any such claim, the government's chain of title, from a purely legal standpoint, is unimpeachable. Even if such a claim might once have existed, it would appear to be barred by the 12-year statute of limitations in the Federal Quiet Title Act.

No other valid basis was offered during the scoping process for the claim that some or all Hawaiians, racially defined, should have special status in determining the disposition of ceded lands, and no such basis has been independently identified. Of course, persons of Hawaiian

Cannelora, *The Origin of Hawaii Land Titles and of the Rights of Native Tenants* (1974); Jon J. Chinen, *Original Land Titles in Hawaii* (1961); Neil M. Levy, *Native Hawaiian Land Rights*, 63 Cal. L. R. 848 (1975).

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

ancestry, like all members of the community who are or may be affected by the decisions concerning PMRF, have a variety of rights under Federal law to participate in the process leading up to those decisions.

For all of these reasons, the only legal and legitimate course for the DOD in making decisions concerning ceded lands is to treat these lands just like any other lands owned in fee simple by the government, and to afford to all persons, including Hawaiians and native Hawaiians, who may wish to be involved in those decisions the full range of rights provided by law, without discrimination.

Resolving claims that the ceded lands were wrongfully taken by the United States, and that they should be returned (or compensation provided) to a class defined by race or ancestry, is beyond the scope of this EIS and the discretion committed to this action to the DOD. In the final analysis, such resolution is a political issue for which such redress as may be due must be provided by Congress within the boundary of constitutional law.

E-4 *PMRF Enhanced Capability Final EIS*

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

DEPARTMENT OF THE NAVY

PACIFIC MISSILE RANGE, BARKING SANDS
(Formerly Known as Mana Airport Military Reservation)

1,925.090	Acres - Fee (Set aside)
201.927	Acres - Lease
1.864	Acres - Easement
2,128.881	Acres - Total

PMRF Enhanced Capability Final EIS E-5

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

Department of the Navy
Pacific Missile Range
Barking Sands

CEDED LANDS—I

1. LOCATION OF PROPERTY: Pacific Missile Range, Kekaha; Waimea District, Kauai, HI

2. DATE CEDED AND HOW: June 29, 1940, Governor's Executive Order Number 887.

3. RESTRICTIONS ON USE OR DISPOSAL:

a. Set aside "for a site for the Mana Airport Military Reservation."

b. Executive Orders Numbers 945 and 887 contain provisions that "the land herein described is set aside upon the understanding that access to the shore for the purpose of fishing will be denied only on the portion used for bombing and that only while same is actually in progress or about to commence."

4. ACREAGE: 548.57 acres (Original)
548.57 acres (Current)

5. CONTROLLING DOD SERVICE COMPONENT: U.S. Navy Pacific Missile Range Facility, Barking Sands.

6. STATUS OF TITLE: U.S.-owned

7. ENCUMBRANCES:

a. Host-Tenant Real Estate Agreement dated October 1, 1992, for a term of five years, with the Department of the Air Force for use of certain buildings, runways, taxiways, aircraft parking space, and associated lands.

8. NARRATIVE: Prior to 1967 was used as an auxiliary landing field for Army and Air Force purposes. The field was transferred to the Navy on February 2, 1968, for use as a missile range. Since transfer, the facility has been used for missile launching as well as the appurtenant housing and administrative buildings and landing strip.

a. PRESENT USE: Missile launching with supporting facilities.

b. PAST USE: Air Field

c. CODE: 1. "Missile Launching Site and Supporting Facilities"

E-6 *PMRF Enhanced Capability Final EIS*

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

Department of the Navy
Pacific Missile Range
Barking Sands

CEDED LANDS - II

1. LOCATION OF PROPERTY: Pacific Missile Range, Kekaha; Waimea District, Kauai, HI

2. DATE CEDED AND HOW: June 10, 1941, Governor's Executive Order Number 945.

3. RESTRICTIONS ON USE OR DISPOSAL:

a. Set aside "for additions to Mana Airport Military Reservation."

b. Executive Orders Numbers 945 and 887 contain provisions that "the land herein described is set upon the understanding that access to the shore for the purpose of fishing will be denied only on the portion used for bombing and that only while same is actually in progress or about to commence."

4. ACREAGE: 1,509.00 acres (Original)
1,376.52 acres (Current)

5. CONTROLLING DOD SERVICE COMPONENT: U.S. Navy Pacific Missile Range Facility, Barking Sands.

PMRF Enhanced Capability Final EIS E-7

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

6. STATUS OF TITLE:

a.	U.S.-owned (Navy)	1,376.52 acres
b.	Conveyed to Hawaii	132.48 acres
	TOTAL	1,509.00 acres

7. ENCUMBRANCES:

a. Subject to three easements for drainage ditches, each 80 feet in width, as shown on a plan attached to, and made a part of, GEO Number 945.

b. Use Agreement dated May 5, 1969 for an unlimited term issued to the Department of Commerce and amended on October 13, 1969, to modify the original use area. The current Use Agreement covers the exclusive use of 31.8 acres and is to be used in connection with the National Bureau of Standards Frequency-time Broadcast Station, WWVH, BARSAN site.

8. NARRATIVE: Governor's Executive Order Number 945 was issued on June 10, 1941 and set aside 1,509 acres for the Mana Airport Military Reservation. 132.48 acres of the set-aside land was conveyed to the State of Hawaii by Quitclaim Deed dated January, 1963.

See discussion of Governor's Executive Order Number 887 for current and past uses and code.

E-8 *PMRF Enhanced Capability Final EIS*

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

Department of the Navy
Pacific Missile Range
Barking Sands

ACQUIRED LANDS

1. LOCATION OF PROPERTY: Pacific Missile Range, Kekaha; Waimea District, Kauai, HI

2. LANDS ACQUIRED UNDER LEASE: 201.927 acres are under lease from the State of Hawaii, dated August 20, 1964, for purposes of road and pipeline rights-of-way.

3. LANDS ACQUIRED BY TRANSFER: An easement for electric line and water pipeline comprising 1.864 acres was transferred from the Department of the Air Force by letter dated August 26, 1964.

PMRF Enhanced Capability Final EIS E-9

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

DEPARTMENT OF THE NAVY

PACIFIC MISSILE RANGE REMOTE RADAR FACILITY

245.321	Acres - Lease
245.321	Acres - Total

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

Department of the Navy
Pacific Missile Range
Remote Radar Facility

ACQUIRED LANDS

1. LOCATION OF PROPERTY: Pacific Missile Range Remote Radar Facility; Makaha Ridge, Kekaha, Kauai, HI

2. LANDS UNDER LEASE: 245.321 acres are used under General Lease Number S-3952, dated December 17, 1965, from the State of Hawaii.

PMRF Enhanced Capability Final EIS E-11

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

DEPARTMENT OF THE NAVY

KAULA ROCK BOMBING TARGET

108	Acres - Fee (Set aside)
108	Acres - Total

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

Department of the Navy
Kaula Rock Bombing Target

CEDED LANDS

1. LOCATION OF PROPERTY: Kaula Rock Bombing Target, Kaula Island; approximately 20 miles SW of the Island of Niihau in the Hawaiian Islands.

2. DATE CEDED AND HOW: December 13, 1924, Governor's Executive Order Number 173.

3. RESTRICTIONS ON USE OR DISPOSAL: United States Lighthouse Reservation for Lighthouse Station to be under the management and control of the Department of Commerce.

4. ACREAGE: 108 acres (Original)
108 acres (Current)

5. CONTROLLING DOD SERVICE COMPONENT: Naval Air Station Barbers Point.

6. STATUS OF TITLE: U.S.-owned

7. ENCUMBRANCES: None

8. NARRATIVE: Kaula Island was originally set-aside for use by the Lighthouse Service as a lighthouse station on December 13, 1924. The United States Coast Guard, successor to the Lighthouse Service, granted a revocable permit to the Department of the Navy on September 9, 1952, to use Kaula Rock as an aerial bombing target involving the use of live ammunition. The Department of the Navy reported to the Bureau of the Budget, in their Hawaii Property Review Report dated June 28, 1961, that Kaula Rock was being utilized as a bombing target and it was expected to continue being used as such until after August 21, 1964. The United States Coast Guard transferred Kaula Island to the Department of the Navy by letter dated June 11, 1965, under the terms and conditions of 10 U.S.C. 2571, as amended, and under authorization of the Director of the Budget.

In 1978, the State of Hawaii contemplated the inclusion of Kaula Island into a State Seabird Sanctuary and in a memorandum dated May 30, 1978, to the Chairman, Board of Land and Natural Resources, the Deputy Attorney General for the State took the position that the Island belonged to the State. Also, that since the property was no longer being used for lighthouse purposes by the United States the set aside in Governor's Executive Order Number 173 should be canceled by appropriate documentation.

The Legal Counsel for the Pacific Division Naval Facilities Engineering Command in written "Opinion on Title to the Island of Kaula" dated July 27, 1978, took the position that the Island is owned by the United States and that transfer of jurisdiction, control, accountability and custody of Kaula Island to the Department of Navy from the United States Coast Guard was proper and in conformance with United States law.

a. PRESENT USE: It was reported that approximately 9.5 acres or 8.8% of the Island is being used as an aerial bombing impact area and the remainder as a bird sanctuary. The use of the impact area is under the control of the Commander Third Fleet.

PMRF Enhanced Capability Final EIS E-13

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

b. PAST USE: From 1924 to 1952, used as a lighthouse station by the Lighthouse Service and its successor the United States Coast Guard. 1952 to 1965 it was used jointly by the United States Coast Guard and the Department of the Navy as a lighthouse station and an aerial bombing target. From 1965 to the present time, the Island has continued to be used as an aerial bombing target.

c. CODE: 1. (Aerial Bombing Target)

E-14 PMRF Enhanced Capability Final EIS

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

DEPARTMENT OF THE AIR FORCE

KOKEE AIR FORCE STATION

9.61	Acres - Lease
0.48	Acres - Lease (Non-exclusive)
10.09	Acres - Total

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

Department of the Air Force
Kokee Air Force Station
(Transferred to NASA)

ACQUIRED LANDS

1. LOCATION OF PROPERTY: Kokee Air Force Station; 22 miles NW of Lihue, Island of Kauai, HI

2. LANDS USED UNDER LEASE: 9.61 acres are used under no-cost leases from the State of Hawaii for purposes of an Aircraft Control and Warning System. In addition, there are non-exclusive lease interests from the State of Hawaii covering 0.48 acres for water and power lines.

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

DEPARTMENT OF THE AIR FORCE

KAENA POINT SATELLITE TRACKING STATION

0.01	Acres - Easement
1.91	Acres - License
20.00	Acres - Lease
131.01	Acres - Lease (Non-exclusive)
152.93	Acres - Total

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

Department of the Air Force
Kaena Point Satellite Tracking Station

ACQUIRED LANDS

1. LOCATION OF PROPERTY: Kaena Point Satellite Tracking Station; Waialua and Waianae Districts, Oahu, HI

2. LANDS USED UNDER LICENSE: 1.91 acres are used under no-cost license for water line right-of-way.

3. LANDS USED UNDER LEASE: 20 acres are leased from the State of Hawaii at no cost. In addition, there are non-exclusive use rights from the State of Hawaii, covering 130.01 acres for road, water line and power line rights-of-way.

4. LANDS ACQUIRED BY RESERVATION: Easement interest in 0.01 acre was reserved by the United States in a Quitclaim Deed dated December 28, 1966.

E-18 PMRF Enhanced Capability Final EIS

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

DEPARTMENT OF THE AIR FORCE

MAUI DEEP SPACE SURVEILLANCE SITE
(formerly ARPA Midcourse Optical Station)

3.58	Acres - Lease
0.19	Acres - License
3.77	Acres - Total

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

Department of the Air Force
Maui Deep Space Surveillance Site

ACQUIRED LANDS

1. LOCATION OF PROPERTY: 21 miles SE of Wailuka, County of Maui, Island of Maui, HI

2. LANDS USED UNDER LEASE: 3.58 acres are leased from the University of Hawaii as a site for a research observatory.

3. LANDS USED UNDER LICENSE: 0.19 acres of right-of-way for an access road is used under license from the State of Hawaii.

E-20 *PMRF Enhanced Capability Final EIS*

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

OTHER LOCATIONS PROPERTY LAND TITLE

User/Location	Instrument	Property Owner
PMRF/Kokee, Kauai	Lease through NASA	State of Hawaii
DOE/Mount Kahili Repeater Station, Kauai	Lease	County of Kauai
DOE/Mauna Kapu Communication Site, Oahu	Memorandum of Agreement	Federal Aviation Administration
DOE/Makua Radio/Repeater/Cable Head, Oahu	Memorandum of Agreement	U.S. Air Force
PMRF/Mauna Kapu Electronic Warfare Site, Oahu	Lease	Campbell Estate
DOE/Mount Haleakala, Maui	Memorandum of Agreement	Federal Aviation Administration
Maui High Performance Computing Center, Maui	Lease	Private Landholders
Wheeler Army Airfield, Oahu	N/A	U.S. Army
Mt Kaala Air Force Station, Oahu	N/A	U.S. Air Force
Tern Island	N/A	U.S. Department of Interior
Johnston Atoll	N/A	U.S. Air Force

PMRF Enhanced Capability Final EIS E-21

Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

PMRF MISCELLANEOUS IN-GRANTS (Page 1 of 2)

PROJECT CONTRACT	DNLR NUMBER	INSTRUMENT	PARTY	ACTIVITY	AREA/LOCATION	TERM START	TERM END
63323 NOy(R)		IN-LEASE	STATE C&C HONO	PMRF HAWAREA	SOUTH POINT, HI/CABLES & LINE OF SIGHT		65 YRS
54650 NOy(R)		IN-LEASE	HUTCHINSON SUGAR CO	PMRF HAWAREA	KAMAOA, HAWAII		
54649 NOy(R)		IN-LEASE	HUTCHINSON SUGAR CO.	PMRF HAWAREA	PAKINI IKI, HAWAII		
3217 NF(R)		IN-REVOC PERMIT	STATE DOT	PMRF HAWAREA	PORT ALLEN KAUAI 4,970SF WAREHOUSE SPACE	11/1/69	INDEF
3202 NF(R)		IN-PERMIT	COUNTY OF KAUAI	PMRF HAWAREA	KEKAHA DUMPING GROUNDS KOKOLE PT, KAUAI	5/1/69	INDEF
28896 NF(R)		IN-AGRMT	STATE DLNR	PMRF HAWAREA	BRIDGE WIDENING/ROAD 6000 SF	1/28/77	1/27/27
80RP00037		IN-ESMT GRNT/SURR	STATE	PMRF HAWAREA	ELEC/WATER ESMT ALONG KAUMUALII HWY, KAUAI	5/20/80	INDEF
80RP00007		IN-LEASE	STATE	PMRF HAWAREA	MANA, WAIMEA(KONA) ROAD ESMT B5 & B6	10/29/79	INDEF
79RP00066	9-2-103E	IN-ESMT CORRECTON	CAMBELL ESTATE	PMRF HAWAREA	MAUNA KAPU/UNDGND DUCT LINE ESMT 110 COOR NOY(R)6802		
79RP00030	10-5-132	IN-LEASE	STATE DLNR	PMRF HAWAREA	MANA, WAIMEA, KAUAI DRAINAGE ESMTS	9/8/78	8/19/29
79RP00019	10-5-127	IN-LEASE	STATE	PMRF HAWAREA	WIDEN BRIDGE NO. 96, MANA, WAIMEA, KAUAI	1/28/77	1/27/27
68046 NOy(R)	10-4-001	IN-LEASE	STATE	PMRF HAWAREA	BONHAM AFB, TRACTS 1-4 AMEND 5/31/73	4/26/65	
68020 NOy(R)	9-2-103E	IN-ESMT	CAMPBELL ESTATE	PMRF HAWAREA	MAUHA KAPU ROADWAY	11/5/64	

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Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

PMRF MISCELLANEOUS IN-GRANTS (Page 2 of 2)

PROJECT CONTRACT	DNLR NUMBER	INSTRUMENT	PARTY	ACTIVITY	AREA/LOCATION	TERM START	TERM END
86RP016P COAST GUARD		IN-PERMIT	COAST GUARD	PMRF HAWAREA	ACCESS & UTIL TO NAVY KOKOLE PT FAC ON KAUAI	5/20/86	4/30/96
84RP00040	10-5-136	IN-LEASE	ALEXANDER & BALDWIN	PMRF HAWAREA	PORT ALLEN WAREHOUSE/OPEN STORAGE	7/16/91	7/15/93
84RP00036	NOT DLR	IN-LEASE	STATE HARBOR DIV	PMRF HAWAREA	PORT ALLEN PIER SHED 12,079 SF/TORPEDO SHOP	7/1/85	6/30/04
84RP00035	NOT DLR	IN-LEASE	STATE HARBOR DIV	PMRF HAWAREA	PORT ALLEN, OFFICE/WAREHOUSE SPACE/4,108 SF	7/1/91	6/30/93
80RP00063	9-2-115	IN-PERMIT	ARMY	PMRF HAWAREA	UNDERGROUND ELEC SYS MAUNA KAPU COMM STA	8/1/80	7/31/95
78RP00040	9-2-104	IN-LEASE	CAMPBELL ESTATE	PMRF HAWAREA	LOT 340, 0.426 AC. SUPPORT MAUNA KAPU COM	7/1/63	6/30/18
65222 NOy(R)		IN-PERMIT	COAST GUARD	PMRF HAWAREA	MAKAHUENA PT, KAUAI MOBILE RADAR SITE	5/1/57	INDEF
		IN-PERMIT	COAST GUARD	PMRF HAWAREA	KILAUEA PT. LIGHT STA KAUAI/MOBIL RADAR SITE	5/1/57	INDEF
83RP00007		IN-LEASE	ROBINSON HELEN M. (NIIHAU)	PMRF HAWAREA	PAHIAU RIDGE, NIIHAU 2.93 AC/RADAR SITE	6/4/84	6/7/99
KA DACA84-5-68-38 S-3746-7-101		IN-LEASE TO ARMY	STATE DLNR	PACMISRANFAC HAWAREA	INSTALL NAVY MICROWAVE ON MT KAALA/5,333 SF LAND	5/14/68	9/9/99
EC 90RP00011		IN-PERMIT	STATE	PACMISRANFAC	PIER SHED SPACE, PORT ALLEN/2,325 SF	10/1/89	9/9/99
N6274289RP00003		IN-LEASE	ROBINSON HEIEN M. (NIIHAU)	PACMISRANFAC	LANDING AND RECOVERY SITE, NIIHAU, 1,167 ACRES	11/1/88	10/31/99

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Exhibit I-1. Land Title from the 1998 PMRF Enhanced Capability Final EIS (U.S. Department of the Navy, 1998a) (Continued)

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Appendix J
Acoustic Impact Modeling

APPENDIX J
ACOUSTIC IMPACT MODELING

J.1 SOUND PRESSURE LEVEL, ENERGY FLUX DENSITY, AND UNDERWATER EXPLOSIVES MODELING

J.1.1 BACKGROUND AND OVERVIEW

All marine mammals are protected under the Marine Mammal Protection Act (MMPA). The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the United States.

The Endangered Species Act of 1973 (ESA) provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of their ecosystems. A “species” is considered endangered if it is in danger of extinction throughout all or a significant portion of its range. A species is considered threatened if it is likely to become an endangered species within the foreseeable future. There are marine mammals, already protected under MMPA, listed as either endangered or threatened under ESA, and afforded special protections. Actions involving sound in the water include the potential to harass marine animals in the surrounding waters. Demonstration of compliance with MMPA and the ESA, using best available science, has been assessed using criteria and thresholds accepted or negotiated, and described here.

Sections of the MMPA (16 United States Code [U.S.C.] 1361 et seq.) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity, other than commercial fishing, within a specified geographical region. Through a specific process, if certain findings are made and regulations are issued, or if the taking is limited to harassment, notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings may be granted if National Marine Fisheries Service (NMFS) finds that the taking will have no more than a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses, and that the permissible methods of taking, and requirements pertaining to the mitigation, monitoring, and reporting of such taking are set forth.

NMFS has defined negligible impact in 50 Code of Federal Regulations (CFR) 216.103 as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

Subsection 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for an authorization to incidentally take small numbers of marine mammals by harassment. The National Defense Authorization Act of 2004 (NDAA) (Public Law 108-136) removed the small numbers limitation and amended the definition of “harassment” as it applies to a military readiness activity to read as follows:

> (i) *any act that injures or has the significant potential to injure a marine mammal or marine mammal stock in the wild [Level A Harassment]; or*
> (ii) *any act that disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of natural behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding, or sheltering, to a point where such behavioral patterns are abandoned or significantly altered [Level B Harassment].*

The primary potential impact on marine mammals from underwater acoustics is Level B harassment from noise. For explosions, in the absence of any mitigation or monitoring measures, there is a very small chance that a marine mammal could be injured or killed when exposed to the energy generated from an explosive force on the sea floor. Analysis of noise impacts on cetaceans is based on criteria and thresholds initially presented in Navy Environmental Impact Statements for ship shock trials of the Seawolf submarine and the Winston Churchill (DDG 81; U.S. Department of the Navy, 2001) and the Incidental Harassment Authorization (National Marine Fisheries Service, 2005) and the Letter of Authorization (National Marine Fisheries Service, 2006) for Eglin Air Force Base.

Non-lethal injurious impacts (Level A Harassment) are defined in those documents as tympanic membrane (TM) rupture and the onset of slight lung injury. The threshold for Level A Harassment corresponds to a 50% rate of TM rupture, which can be stated in terms of an energy flux density (EFD) value of 205 decibels (dB) re 1 micropascal squared–second (μPa^2-s). TM rupture is well-correlated with permanent hearing impairment. Ketten (1998) indicates a 30% incidence of permanent threshold shift (PTS) at the same threshold.

The criteria for onset of slight lung injury were established using partial impulse because the impulse of an underwater blast wave was the parameter that governed damage during a study using mammals, not peak pressure or energy (Yelverton, 1981). Goertner (1982) determined a way to calculate impulse values for injury at greater depths, known as the Goertner “modified” positive impulse. Those values are valid only near the surface because as hydrostatic pressure increases with depth, organs like the lung, filled with air, compress. Therefore the “modified” positive impulse thresholds vary from the shallow depth starting point as a function of depth.

The shallow depth starting points for calculation of the “modified” positive impulses are mass-dependent values derived from empirical data for underwater blast injury (Yelverton, 1981). During the calculations, the lowest impulse and body mass for which slight, and then extensive, lung injury found during a previous study (Yelverton et al., 1973) were used to determine the positive impulse that may cause lung injury. The Goertner model is sensitive to mammal weight; such that smaller masses have lower thresholds for positive impulse so injury and harassment will be predicted at greater distances from the source for them. Impulse thresholds of 13.0 and 31.0 pounds per square inch-millisecond (psi-ms), found to cause slight and extensive injury in a dolphin calf, were used as thresholds in the analysis contained in this document.

Metrics for Physiological Effect Thresholds

Effect thresholds used for acoustic impact modeling in this document are expressed in terms of Energy Flux Density (EFD) / Sound Exposure Level (SEL), which is total energy received over time in an area, or in terms of Sound Pressure Level (SPL), which is the level (root mean square) without reference to any time component for the exposure at that level. Marine and terrestrial mammal data show that, for continuous-type sounds of interest, Temporary Threshold Shift (TTS) and Permanent Threshold Shift (PTS) are more closely related to the energy in the sound exposure than to the exposure SPL.

The Energy Level (EL) for each individual ping is calculated from the following equation:

$$EL = SPL + 10\log10(\text{duration})$$

The EL includes both the ping SPL and duration. Longer-duration pings and/or higher-SPL pings will have a higher EL.

If an animal is exposed to multiple pings, the energy flux density in each individual ping is summed to calculate the total EL. Since mammalian TS data show less effect from intermittent exposures compared to continuous exposures with the same energy (Ward, 1997), basing the effect thresholds on the total received EL is a conservative approach for treating multiple pings; in reality, some recovery will occur between pings and lessen the effect of a particular exposure. Therefore, estimates are conservative because recovery is not taken into account (given that generally applicable recovery times have not been experimentally established) and as a result, intermittent exposures from sonar are modeled as if they were continuous exposures.

The total EL depends on the SPL, duration, and number of pings received. The TTS and PTS thresholds do not imply any specific SPL, duration, or number of pings. The SPL and duration of each received ping are used to calculate the total EL and determine whether the received EL meets or exceeds the effect thresholds. For example, the TTS threshold would be reached through any of the following exposures:

- A single ping with SPL = 195 dB re 1 μPa and duration = 1 second.
- A single ping with SPL = 192 dB re 1 μPa and duration = 2 seconds.
- Two pings with SPL = 192 dB re 1 μPa and duration = 1 second.
- Two pings with SPL = 189 dB re 1 μPa and duration = 2 seconds.

Derivation of an Effects Threshold for Marine Mammals based on Energy Flux Density

As described in detail in Section 4.1.2, SEL (EFD level) exposure threshold established for onset-TTS is 195 dB re 1 μPa^2-s. This result is corroborated by the short-duration tone data of Finneran et al. (2000, 2003) and the long-duration sound data from Nachtigall et al. (2003a, b). Together, these data demonstrate that TTS in small odontocetes is correlated with the received EL and that onset-TTS exposures are fit well by an equal-energy line passing through 195 dB re 1 μPa^2-s. Absent any additional data for other species and being that it is likely that small odontocetes are more sensitive to the mid-frequency active/high-frequency active (MFA/HFA) frequency levels of concern, this threshold is used for analysis for all cetacea.

A similar process has been used to establish a TTS threshold for the Hawaiian monk seal based on research by Kastak et al. (1999; 2005). Of the three pinniped groups studied by Kastak et al., elephant seals are the most closely related to the Hawaiian monk seal (the family *Monachinae*). The onset-TTS number, provided by Kastak et al. for elephant seals and used to analyze TTS impacts on monk seals in this document, is 204 dB re 1μPa^2-s.

The PTS thresholds established for use in this analysis are based on a 20 dB increase in exposure EL over that required for onset-TTS. The 20 dB value is based on estimates from terrestrial mammal data of PTS occurring at 40 dB or more of TS, and on TS growth occurring at a rate of 1.6 dB/dB increase in exposure EL. This is conservative because: (1) 40 dB of TS is actually an upper limit for TTS used to approximate onset-PTS, and (2) the 1.6 dB/dB growth rate is the highest observed in the data from Ward et al. (1958, 1959). Using this estimation method (20 dB up from onset-TTS) for the Hawaii Range Complex (HRC) analysis, the PTS threshold for cetacea is 215 dB re 1μPa^2-s and for monk seals it is 224 dB re 1μPa^2-s.

Level B (non-injurious) Harassment also includes a TTS threshold consisting of 182 dB re 1 μPa^2-s maximum EFD level in any 1/3-octave band above 100 hertz (Hz) for toothed whales (e.g., dolphins). A second criterion, 23 psi, has recently been established by NMFS to provide a more conservative range for TTS when the explosive or animal approaches the sea surface, in which case explosive energy is reduced, but the peak pressure is 1 μPa^2-s is not (Table J-1). NMFS applies the more conservative of these two.

For Multiple Successive Explosions (MSEs), the acoustic criterion for sub-TTS behavioral disturbance is used to account for behavioral effects significant enough to be judged as harassment, but occurring at lower sound energy levels than those that may cause TTS. The sub-TTS threshold is derived following the approach of the Churchill Final Environmental Impact Statement (FEIS) for the energy-based TTS threshold. The research on pure-tone exposures reported in Schlundt et al. (2000) and Finneran and Schlundt (2004) provided a threshold of 192 dB re 1 μPa^2-s as the lowest TTS value. This value for pure-tone exposures is modified for explosives by (a) interpreting it as an energy metric, (b) reducing it by 10 dB to account for the time constant of the mammal ear, and (c) measuring the energy in 1/3 octave bands, the natural filter band of the ear. The resulting TTS threshold for explosives is 182 dB re 1 μPa^2-s in any 1/3 octave band. As reported by Schlundt et al. (2000) and Finneran and Schlundt (2004), instances of altered behavior in the pure-tone research generally began five dB lower than those causing TTS. The sub-TTS threshold is therefore derived by subtracting 5 dB from the 182 dB re 1 μPa^2-s in any 1/3 octave band threshold, resulting in a 177 dB re 1 μPa^2-s (EL) sub-TTS behavioral disturbance threshold for MSE.

Table J-1. Level A and B Harassment Threshold–Explosives

Threshold Type (Explosives)	Threshold Level
Level A – 50% Eardrum rupture (full spectrum energy)	205 dB
Temporary Threshold Shift (TTS) (peak one-third octave energy)	182 dB
Sub-TTS Threshold for Multiple Successive Explosions (peak one-third octave energy)	177 dB
Temporary Threshold Shift (TTS) (peak pressure)	23 psi
Level A – Slight lung injury (positive impulse)	13 psi-ms
Mortality – 1% Mortal lung injury (positive impulse)	31 psi-ms

Derivation of a Behavioral Effect Threshold for Marine Mammals Based on Sound Pressure Level (SPL)

Over the past several years, the Navy and NMFS have worked on developing alternative criteria to replace and/or to supplement the acoustic thresholds used in the past to estimate the probability of marine mammals being behaviorally harassed by received levels of MFA and HFA sonar. Following publication of the Draft EIS/OEIS the Navy continued working with the NMFS to refine a mathematically representative curve for assessment of behavioral effects modeling associated with the use of MFA/HFA sonar. As detailed in Section 4.1.2, the NMFS Office of Protected Resources made the decision to use a risk function and applicable input parameters to estimate the probability of behavioral responses that NMFS would classify as harassment for the purposes of the MMPA given exposure to specific received levels of MFA/HFA sonar. This decision was based on the recommendation of the two NMFS scientists, consideration of the independent reviews from six scientists, and NMFS MMPA regulations affecting the Navy's use of Surveillance Towed Array Sensor System Low-Frequency Active (SURTASS LFA) sonar (U.S. Department of the Navy, 2002; National Oceanic and Atmospheric Administration, 2007).

The particular acoustic risk function developed by the Navy and NMFS is derived from a solution in Feller (1968) with input parameters modified by NMFS for MFA/HFA sonar for mysticetes, odontocetes, and pinnipeds. In order to represent a probability of risk in developing this function, the function would have a value near zero at very low exposures, and a value near one for very high exposures. One class of functions that satisfies this criterion is cumulative probability distributions, a type of cumulative distribution function. In selecting a particular functional expression for risk, several criteria were identified:

- The function must use parameters to focus discussion on areas of uncertainty;
- The function should contain a limited number of parameters;
- The function should be capable of accurately fitting experimental data; and
- The function should be reasonably convenient for algebraic manipulations.

As described in U.S. Department of the Navy (2001), the mathematical function below is adapted from a solution in Feller (1968).

$$R = \frac{1-\left(\frac{L-B}{K}\right)^{-A}}{1-\left(\frac{L-B}{K}\right)^{-2A}}$$

Where: R = risk (0 – 1.0);

L = Received Level (RL) in dB

B = basement RL in dB; (120 dB)

K = the RL increment above basement in dB at which there is 50 percent risk

A = risk transition sharpness parameter (10)

It is important to note that the probabilities associated with acoustic modeling do not represent an individual's probability of responding; they identify the proportion of an exposed population (as represented by an evenly distributed density of marine mammals per unit area) that is likely to respond to an exposure. In addition, modeling does not take into account reductions from any of the Navy's standard protective mitigation measures which should significantly reduce or eliminate actual exposures that may have otherwise occurred during training.

J.1.2 ACOUSTIC SOURCES

The HRC acoustic sources are categorized as either broadband (producing sound over a wide frequency band) or narrowband (producing sound over a frequency band that that is small in comparison to the center frequency). In general, the narrowband sources within the HRC are anti-submarine warfare (ASW) sonars, and the broadband sources are explosives. This delineation of source types has a couple of implications. First, the transmission loss used to determine the impact ranges of narrowband ASW sonars can each be adequately characterized by model estimates at a single frequency. Broadband explosives, on the other hand, produce significant acoustic energy across several frequency decades of bandwidth. Propagation loss is sufficiently sensitive to frequency as to require model estimates at several frequencies.

Second, energy metrics are defined for both types. However, explosives are impulsive sources that produce a shock wave that dictates additional pressure-related metrics (peak pressure and positive impulse). Detailed descriptions of both types of sources are provided in the following subsections.

J.1.2.1 Sonars

The majority of training and research, development, testing, and evaluation activities in the HRC involve five types of narrowband sonars. Exposure estimates are calculated for each sonar according to the manner in which it operates. For example, the AN/SQS 53 and AN/SQS 56 are hull-mounted, mid-frequency active (MFA) surface ship sonars that operate for many hours at a time (although sound is output—the "active" portion—only a small fraction of that time), so it is most useful to calculate and report surface ship sonar exposures per hour of operation. The BQQ-10 submarine sonar is also reported per hour of operation. However, the submarine sonar is modeled as pinging only twice per hour. The AN/AQS-22 is a helicopter-deployed sonar, which is lowered into the water, pings several times, and then moves to a new location; this sonar is used for localization and tracking a suspected contact as opposed to searching for contacts. For the AN/AQS-22, it is most helpful to calculate and report exposures per dip. The AN/SSQ-62 is a sonobuoy that is dropped into the water from an aircraft or helicopter and pings about 10 to 30 times in an hour. For the AN/SSQ-62, it is most helpful to calculate and report exposures per sonobuoy. For the MK-48 torpedo the sonar is modeled for a typical training event and the MK-48 reporting metric is the number of torpedo runs. Table J-2 presents the deployment platform, frequency class, the metric for reporting exposures, and the units for each sonar.

Table J-2. Active Sonars Modeled in the Hawaii Range Complex

Sonar	Description	Frequency Class	Exposures Reported	Units per hour
MK-48	Torpedo sonar	High-frequency	Per torpedo	One torpedo run
AN/SQS-53	Surface ship sonar	Mid-frequency	Per hour	120 sonar pings
AN/SQS-56	Surface ship sonar	Mid-frequency	Per hour	120 sonar pings
AN/SSQ-62	Sonobuoy sonar	Mid-frequency	Per sonobuoy	8 sonobuoys
AN/AQS-22	Helicopter-dipping sonar	Mid-frequency	Per dip	2 dips
BQQ-10[1]	Submarine sonar	Mid-frequency	Per hour	2 sonar pings

[1] BQQ-10 is modeled as representative of all MFA submarine sonar (BQQ-10, BQQ-5, and BSY-1)

Note that MK-48 source described here is the high-frequency active (HFA) sonar on the torpedo; the explosive source of the detonating torpedo is described in the next subsection.

The acoustic modeling that is necessary to support the exposure estimates for each of these sonars relies on a generalized description of the manner of the sonar's operating modes. This description includes the following:

- "Effective" energy source level—The total energy across the band of the source, scaled by the pulse length ($10 \log_{10}$ [pulse length]), and corrected for source beam width so that it reflects the energy in the direction of the main lobe. The beam pattern correction consists of two terms:
  - Horizontal directivity correction: $10 \log_{10} (360 / \text{horizontal beam width})$
  - Vertical directivity correction: $10 \log_{10} (2 / [\sin(\theta_1) - \sin(\theta_2)])$, where θ_1 and θ_2 are the 3-dB down points on the main lobe.
- Source depth—Depth of the source in meters.
- Nominal frequency—Typically the center band of the source emission. These are frequencies that have been reported in open literature and are used to avoid classification issues. Differences between these nominal values and actual source frequencies are small enough to be of little consequence to the output impact volumes.
- Source directivity—The source beam is modeled as the product of a horizontal beam pattern and a vertical beam pattern. Two parameters define the horizontal beam pattern:
  - Horizontal beam width—Width of the source beam (degrees) in the horizontal plane (assumed constant for all horizontal steer directions).
  - Horizontal steer direction—Direction in the horizontal in which the beam is steered relative to the direction in which the platform is heading

  The horizontal beam is rectangular with constant response across the width of the beam and with flat, 20-dB down sidelobes. (Note that steer directions ϕ, $-\phi$, $180^o - \phi$, and $180^o + \phi$ all produce equal impact volumes.)

Similarly, two parameters define the vertical beam pattern:

- Vertical beam width—Width of the source beam (degrees) in the vertical plane measured at the 3-dB down point. (The width is that of the beam steered towards broadside and not the width of the beam at the specified vertical steer direction.)

- Vertical steer direction—Direction in the vertical plane that the beam is steered relative to the horizontal (upward looking angles are positive).

To avoid sharp transitions that a rectangular beam might introduce, the power response at vertical angle θ is

$$\max \{ \sin^2 [n(\theta_s - \theta)] / [n \sin (\theta_s - \theta)]^2,\ 0.01 \}$$

where $n = 180^o / \theta_w$ is the number of half-wavelength-spaced elements in a line array that produces a main lobe with a beam width of θ_w. θ_s is the vertical beam steer direction.

- Ping spacing—Distance between pings. For most sources this is generally just the product of the speed of advance of the platform and the repetition rate of the sonar. Animal motion is generally of no consequence as long as the source motion is greater than the speed of the animal (nominally, three knots). For stationary (or nearly stationary) sources, the "average" speed of the animal is used in place of the platform speed. The attendant assumption is that the animals are all moving in the same constant direction.

Many of the actual parameters and capabilities of these sonars are classified. Parameters used for modeling were derived to be as representative as possible taking into account the manner with which the sonar would be used in various training scenarios. However, when there was a wide range of potential modeling input values, the default was to model using a nominal parameter likely to result in the most impact, so that the model would err towards the maximum potential exposures. For instance, a submarine's use of MFA sonar (because they do not want to be detected) is generally rare, very brief, using minimal power, and may be narrowly focused. Modeling for the BQQ 10 use, however, errs on the side of maximum potential exposures by assuming sonar use twice an hour, for one second, at 235 dB, and using an omnidirectional transmission.

For the sources that are essentially stationary (AN/SSQ-62 and AN/AQS-22), emission spacing is the product of the ping cycle time and the average animal speed.

J.1.2.2 Explosives

Explosives detonated underwater introduce loud, impulsive, broadband sounds into the marine environment. The acoustic energy of an explosive is, generally, much greater than that of a sonar, so careful treatment of them is important, since they have the potential to injure. Three source parameters influence the effect of an explosive: the weight of the explosive warhead, the type of explosive material, and the detonation depth. The net explosive weight (or NEW) accounts for the first two parameters. The NEW of an explosive is the weight of only the explosive material in a given round, referenced to the explosive power of TNT (trinitrotoluene).

The detonation depth of an explosive is particularly important due to a propagation effect known as surface-image interference. For sources located near the sea surface, a distinct interference pattern arises from the coherent sum of the two paths that differ only by a single reflection from the pressure-release surface. As the source depth and/or the source frequency decreases, these two paths increasingly, destructively interfere with each other, reaching total cancellation at the surface (barring surface-reflection scattering loss). Since most HRC explosive sources are munitions that detonate essentially upon impact, the effective source depths are quite shallow, and therefore the surface-image interference effect can be pronounced. In order to limit the cancellation effect (and thereby provide exposure estimates that tend toward the worst case), relatively deep detonation depths are used. Consistent with earlier VAST/IMPASS modeling, a source depth of 1 foot is used for gunnery rounds. For the missile and bombs, a source depth of 2 meters (m) is used. For Extended Echo Ranging/Improved Extended Echo Ranging (EER/IEER) a nominal depth of 20 m is used to ensure that the source is located within any significant surface duct, resulting in maximum potential exposures. Table J-3 gives the ordnances of interest in the HRC, their NEWs, and their expected detonation depths.

Table J-3. Explosive Sources Modeled in Hawaii Range Complex

Ordnance	Net Explosive Weight for Modeling	Detonation Depth for Modeling
5" Naval gunfire	9.54 lbs	1 ft
76 mm Rounds	1.6 lbs	1 ft
Maverick	78.5 lbs	2 m
Harpoon	448 lbs	2 m
MK-82	238 lbs	2 m
MK-83	574 lbs	2 m
MK-84	945 lbs	2 m
MK-48	851 lbs	50 ft
Demolition Charges	20 lbs	Bottom
EER/IEER	5 lbs	20m

The exposures expected to result from these ordnances are generally computed on a per in-water explosive basis. The cumulative effect of a series of explosives can often be derived by simple addition if the detonations are spaced widely in time or space, allowing for sufficient animal movement as to ensure that a different population of animals is harassed by each ordnance detonation. There may be rare occasions when MSEs are part of a static location event such as during Mine Exercise (MINEX), Missile Exercise (MISSILEX), Bombing Exercise (BOMBEX), Sinking Exercise (SINKEX), Gunnery Exercise (GUNEX), and Naval Surface Fire Support (NSFS). For these events, the Churchill FEIS approach was extended to cover MSE events occurring at the same location. For MSE exposures, accumulated energy over the entire training time is the natural extension for energy thresholds since energy accumulates with each subsequent shot; this is consistent with the treatment of multiple arrivals in Churchill. For positive impulse, it is consistent with Churchill FEIS to use the maximum value over all impulses received.

For MSEs, the acoustic criterion for sub-TTS behavioral disturbance is used to account for behavioral effects significant enough to be judged as harassment, but occurring at lower sound energy levels than those that may cause TTS. Preliminary modeling undertaken for other Navy compliance documents using the sub-TTS threshold of 177 dB EL has demonstrated that for events involving MSEs using small (NEW) explosives (MINEX, GUNEX, and NSFS), the footprint of the threshold for explosives onset TTS criteria based on the 23 psi pressure component dominates and supersedes any exposures at a received level involving the 177 dB EL threshold. Restated in another manner, modeling for the sub-TTS threshold should not result in any estimated impacts that are not already quantified under the larger footprint of the 23 psi criteria for small MSE. Given that modeling for sub-TTS should not, therefore, result in any additional harassment takes for MINEX, GUNEX, and NSFS, analysis of potential for behavioral disturbance using the sub-TTS criteria was not undertaken for these events (MINEX, GUNEX, and NSFS).

For the remainder of the MSE events (BOMBEX, SINKEX, and MISSILEX) where the sub-TTS exposures may need to be considered, these potential behavioral disturbances were estimated by extrapolation from the acoustic modeling results for the explosives TTS threshold (182 dB re 1 mPa^2-s in any 1/3 octave band). To account for the 5 dB lower sub-TTS threshold, a factor of 3.17 was applied to the TTS modeled numbers in order to extrapolate the number of sub-TTS exposures estimated for MSE events. This multiplication factor is used calculate the increased area represented by the difference between the 177 dB sub-TTS threshold and the modeled 182 dB threshold. The factor is based on the increased range 5 dB would propagate (assuming spherical spreading), where the range increases by approximately 1.78 times, resulting in a circular area increase of approximately 3.17 times that of the modeled results at 182 dB.

A special case in which simple addition of the exposure estimates may not be appropriate is addressed by the modeling of a “representative” Sink Exercise (SINKEX). In a SINKEX, a decommissioned surface ship is towed to a specified deep-water location and there used as a target for a variety of weapons. Although no two SINKEXs are ever the same, a representative case derived from past exercises is described in the *Programmatic SINKEX Overseas Environmental Assessment* (March 2006) for the Western North Atlantic.

In a SINKEX, weapons are typically fired in order of decreasing range from the source with weapons fired until the target is sunk. A torpedo may be used after all munitions have been expended if the target is still afloat. Since the target may sink at any time during the exercise, the actual number of weapons used can vary widely. In the representative case, however, all of the ordnances are assumed expended; this represents the worst case of maximum exposure.

The sequence of weapons firing for the representative SINKEX is described in Table J-4. Guided weapons are nearly 100% accurate and are modeled as hitting the target (that is, no underwater acoustic effect) in all but two cases: (1) the Maverick is modeled as a miss to represent the occasional miss, and (2) the MK-48 torpedo intentionally detonates in the water column immediately below the hull of the target. Unguided weapons are more frequently off-target and are modeled according to the statistical hit/miss ratios. Naval gunfire from 5-inch and 76-mm weapons onboard surface ships is also very accurate and may include a both live and inert rounds. Note that these hit/miss ratios are artificially low in order to demonstrate a worst-case scenario; they should not be taken as indicative of weapon or platform reliability.

The MK 48 torpedo is modeled as detonating immediately below the target's hull. A nominal depth of 50 feet is used as its source depth in this analysis. Modeling, however, for impacts from the MK 48 is conservative and errs on side of maximum potential exposures because in a SINKEX this torpedo would be the last piece of ordnance fired (given it will sink the target). Range clearance procedures at the start of the event and previous ordnance hitting the target hull should have resulted in any marine species previously in the vicinity would have left the area before the MK 48 was ever fired. Note that MK-48 source described here is the explosive source of the detonating torpedo; the active pinger on the torpedo is described in the previous subsection. Again, however, a torpedo homing in on a target hull that has been subjected to naval gunfire and bombardment is unlikely to encounter marine animals in the vicinity of that target.

Table J-4. Representative SINKEX Weapons Firing Sequence

Time (Local)	Event Description
0900	Range Control Officer receives reports that the exercise area is clear of non-participant ship traffic, marine mammals, and sea turtles.
0909	Hellfire missile fired, hits target.
0915	2 HARM missiles fired, both hit target (5 minutes apart).
0930	1 Penguin missile fired, hits target.
0940	3 Maverick missiles fired, 2 hit target, 1 misses (5 minutes apart).
1145	1 SM-1 fired, hits target.
1147	1 SM-2 fired, hits target.
1205	5 Harpoon missiles fired, all hit target (1 minute apart).
1300-1335	7 live and 3 inert MK 82 bombs dropped – 7 hit target, 2 live and 1 inert miss target (4 minutes apart).
1355-1410	4 MK-83 bombs dropped – 3 hit target, 1 misses target (5 minutes apart).
1500	Surface gunfire commences – 400 5-inch rounds fired (one every 6 seconds), 380 hit target, 20 miss target.
1700	MK-48 torpedo fired, hits, and sinks target.

J.1.3 ENVIRONMENTAL PROVINCES

Propagation loss ultimately determines the extent of the Zone of Influence (ZOI) for a particular source activity. In turn, propagation loss as a function of range responds to a number of environmental parameters:

- Water depth,
- Sound speed variability throughout the water column,

- Bottom geo-acoustic properties, and
- Wind speed.

Due to the importance that propagation loss plays in ASW, the Navy has over the last four to five decades invested heavily in measuring and modeling these environmental parameters. The result of this effort is the following collection of global databases of these environmental parameters that are accepted as standards for all Navy modeling efforts:

- Water depth—Digital Bathymetry Data Base Variable Resolution (DBDBV),
- Sound speed—Generalized Dynamic Environmental Model (GDEM),
- Bottom loss—Low-Frequency Bottom Loss (LFBL), Sediment Thickness Database, and High-Frequency Bottom Loss (HFBL), and
- Wind speed—U.S. Navy Marine Climatic Atlas of the World.

This section provides some quantitative examples of the relative impact of these various environmental parameters. These examples then are used as guidance for determining environmental provinces (that is, regions in which the environmental parameters are relatively homogenous and can be represented by a single set of environmental parameters) within the HRC Operating Area (OPAREA).

J.1.3.1 Impact of Environmental Parameters

Within a typical operating area, the environmental parameter that tends to vary the most is bathymetry. It is not unusual for water depths to vary by an order of magnitude or more with the resulting impact on ZOI calculations being significant. Bottom loss can also vary considerably over typical operating areas but its impact upon ZOI calculations tends to be limited to waters on the continental shelf and the upper portion of the slope. Generally, the primary propagation paths in deep water from the source to most of the ZOI volume do not involve any interaction with the bottom. In shallow water, particularly if the sound velocity profile directs all propagation paths to interact with the bottom, bottom loss variability can play a large role.

The spatial variability of the sound speed field is generally small over operating areas of typical size. The presence of a strong oceanographic front is a noteworthy exception to this rule. To a lesser extent variability in the depth and strength of a surface duct can be of some importance. In the mid latitudes, seasonal variation often provides the most significant variation in the sound speed field. For this reason, both summer and winter profiles are modeled for each selected environment.

J.1.3.2 Environmental Provincing Methodology

The underwater acoustic environment can be quite variable over ranges in excess of 10 kilometers (km). For ASW applications, ranges of interest are often sufficiently large as to warrant the modeling of the spatial variability of the environment (e.g., in HRC the nominal range considered for an AN/SQS 53 sonar is approximately 65 nautical miles). In the propagation loss calculations, each of the environmental parameters is allowed to vary (either continuously or discretely) along the path from acoustic source to receiver. In such applications, each propagation loss calculation is conditioned upon the particular locations of the source and receiver. On the other hand, the range of interest for marine animal harassment for some criteria (TTS and PTS criteria) is more limited. This reduces the importance of the exact location of source and marine animal and makes the modeling required more manageable in scope.

In lieu of trying to model every environmental profile that can be encountered in an operating area, this effort utilizes a limited set of representative environments. Each environment is characterized by a fixed water depth, sound velocity profile, and bottom loss type. The operating area is then partitioned into homogeneous regions (or provinces), and the most appropriately representative environment is assigned to each. This process is aided by some initial provincing of the individual environmental parameters. The Navy-standard high-frequency bottom loss database in its native form is globally partitioned into nine classes. (Low-frequency bottom loss is likewise provinced in its native form although it is not considered in this selection of environmental provinces. The sources for which low-frequency bottom loss would be of interest have limited impact ranges thus rendering bottom loss of little consequence in this analysis.) The Navy-standard sound velocity profiles database is also available as a provinced subset. Only the Navy-standard bathymetry database varies continuously over the World's oceans. However, even this environmental parameter is easily provinced by selecting a finite set of water depth intervals. "Octave-spaced" intervals (10, 20, 50, 100, 200, 500, 1,000, 2,000, and 5,000 m) provide an adequate sampling of water depth dependence.

ZOI volumes are then computed using propagation loss estimates derived for the representative environments. Finally, a weighted average of the ZOI volumes is taken over all representative environments; the weighting factor is proportional to the geographic area spanned by the environmental province.

The selection of representative environments is subjective. However, the uncertainty introduced by this subjectivity can be mitigated by selecting more environments and by selecting the environments that occur most frequently over the operating area of interest.

As discussed in the previous subsection, ZOI estimates are most sensitive to water depth. Unless otherwise warranted, at least one representative environment is selected in each bathymetry province. Within a bathymetry province, additional representative environments are selected as needed to meet the following requirements.

- In water less than 1,000 m, bottom interactions occur at shorter ranges and more frequently; thus, significant variations in bottom loss need to be represented.
- Surface ducts provide an efficient propagation channel that can greatly influence ZOI estimates. Variations in the mixed layer depth need to be accounted for if the water is deep enough to support the full extent of the surface duct.

Depending on the size and complexity of the operating area, the number of environmental provinces tends to range from 5 to 20.

J.1.3.3 Description of Environmental Provinces Used in Acoustic Modeling

The HRC OPAREA consists of a number of warning areas, specialized ranges, and long-used training locations in and around the Hawaiian Islands. The HRC OPAREA is approximately bounded north and south by latitudes 25° N and 17° N and east and west by meridians 162° W and 154° W. Within these overall boundaries, a series of representative areas (Sonar Modeling Areas [SMAs]) have been defined for modeling purposes. The boundaries for these areas were drawn based on their encompassing the majority of the environmental variability in the OPAREA and having been the locations for the majority of previous Major Exercise training events, other training events, and research, development, test, and evaluation (RDT&E) events.

The various Navy units involved in Major Exercise training events, other training events, or RDT&E operate without consideration for their location within these SMAs or the boundaries as defined in this EIS/OEIS; the SMAs were only created for analytical purposes to support modeling. Stated in another manner, the boundaries created for analysis in this EIS/OEIS are artificial constructs that have no bearing on the conduct of activities being analyzed, do not restrict the movement of individual units, and are not boundaries to the conduct of training events or RDT&E within the HRC OPAREA. Details regarding the SMAs as representative environmental provinces for the HRC OPAREA are presented in the following paragraphs of this section.

For all of these provinces, the average wind speed (winter and summer) is 13 knots. The subsequent subsections describe the representative environmental provinces for the individual SMAs and specialized ranges.

The HRC OPAREA contains a total of 32 distinct environmental provinces. These represent the various combinations of nine bathymetry provinces, three Sound Velocity Profile (SVP) provinces, and six HFBL classes. However, as discussed in the following paragraphs, 12 of the provinces are similar enough to be considered the same, or occur so infrequently, that differentiating them is inconsequential, and, therefore, the modeling is based on 20 environmental provinces.

The bathymetry provinces represent depths ranging from shallowest of waters (10 m) to typical deep-water depths (slightly more than 5,000 m). However, the various ranges are concentrated in the deepest bathymetry province with nearly 90% of the entire range complex represented by environmental provinces with depths in the 5,000-m province. The distribution of the bathymetry provinces over the entire HRC OPAREA is provided in Table J-5.

Table J-5. Distribution of Bathymetry Provinces in the HRC OPAREA

Province Depth (m)	Frequency of Occurrence
10	Lima Landing & Puuloa only
20	0.01%
50	0.02%
100	0.05%
200	0.22%
500	0.75%
1,000	2.15%
2,000	7.87%
5,000	88.93%

The distribution of the three sound speed provinces is presented in Table J-6.

Table J-6. Distribution of Sound Speed Provinces in the HRC OPAREA

SVP Province	Frequency of Occurrence
81	66.07%
88	33.41%
98	0.52%

The variation in sound speed profiles among the three provinces is quite minimal; indeed due to the tropical location, even the seasonal variability is quite small. This is illustrated in Figure J-1 that displays the upper 1,000 m of the winter and summer profiles.

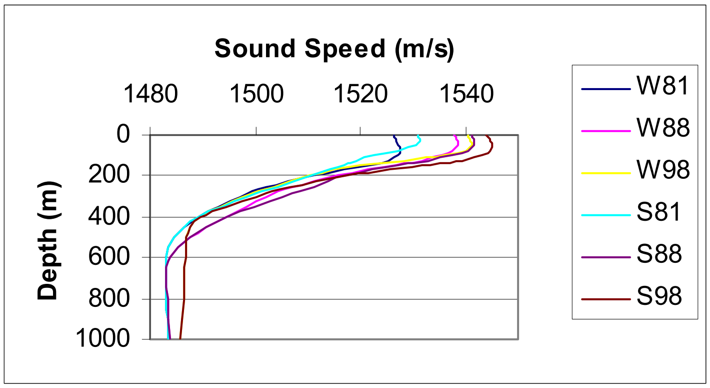


Figure J-1. Summer and Winter SVPs in the HRC OPAREA

The feature of the sound speed field that typically provides the most significant impact upon the size of the ZOI is the mixed layer or surface duct. Propagation loss from a source in a surface duct to points within the surface duct can be as much as 10 dB less than loss to points below the duct. The portion of the water column that enjoys this preferential propagation path (and hence longer impact ranges) is determined by the mixed layer depth. Among these profiles, the mixed layer depth (see Table J-7) is typically 50 m in both seasons.

Table J-7. Mixed Layer Depths in the HRC OPAREA

SVP Province	Summer Mixed Layer Depth (m)	Winter Mixed Layer Depth (m)
81	75	30
88	50	30
98	50	50

The HFBL classes represented in the HRC OPAREA vary from low-loss bottoms (class 2, typically in shallow water) to high-loss bottoms (class 8). Unlike the other two types of environmental parameters, the distribution of the five HFBL classes is provided in Table J-8.

Table J-8. Distribution of High-Frequency Bottom Loss Classes in the HRC OPAREA

HFBL Class	Frequency of Occurrence
2	0.57%
3	22.68%
4	23.22%
5	14.53%
7	11.47%
8	27.53%

Given the limited variability in the sound speed field, the logic for consolidating the environmental provinces focuses upon water depth and the HFBL class. The first consideration was to ensure that all nine bathymetry provinces are represented. The four shallowest bathymetry provinces do not occur frequently in the HRC OPAREA but, nonetheless, need to be represented by at least one environmental province. Within each of these depth regimes, the predominant environmental province is selected as the representative.

Nearly 90% of the HRC OPAREA is in the deepest bathymetry province; such a large area warrants the greatest partitioning. Among the 10 potential 5,000-m environmental provinces, the six most prevalent provinces are selected as representative. These span all five HFBL classes that occur at this water depth and two of the three SVP provinces (missing only SVP province 98 which is virtually indistinguishable from SVP province 88). The remaining bathymetry provinces (200, 500, 1,000, and 2,000 m) are then assigned to two or three of the most prevalent environmental provinces, ensuring that no environmental province that occurs in at least 10% of bathymetry regime is omitted. The resulting 20 environmental provinces used in the HRC OPAREA acoustic modeling are described in Table J-9.

J.1.3.3.1 Environmental Provinces in Sonar Modeling Area 1 (SMA 1)

SMA 1 is a range located north and west of Kauai and encompasses the Pacific Missile Range Facility (PMRF) Barking Sands Underwater Range Expansion (BSURE), the Barking Sands Tactical Underwater Range (BARSTUR), and most of the PMRF Shallow Water Training Range (SWTR) as shown on Figure J-2.

Although SMA 1 is primarily in deep water, it does include areas that are shallower than 200 m. The distribution of bathymetry provinces in SMA 1 is described in Table J-10.

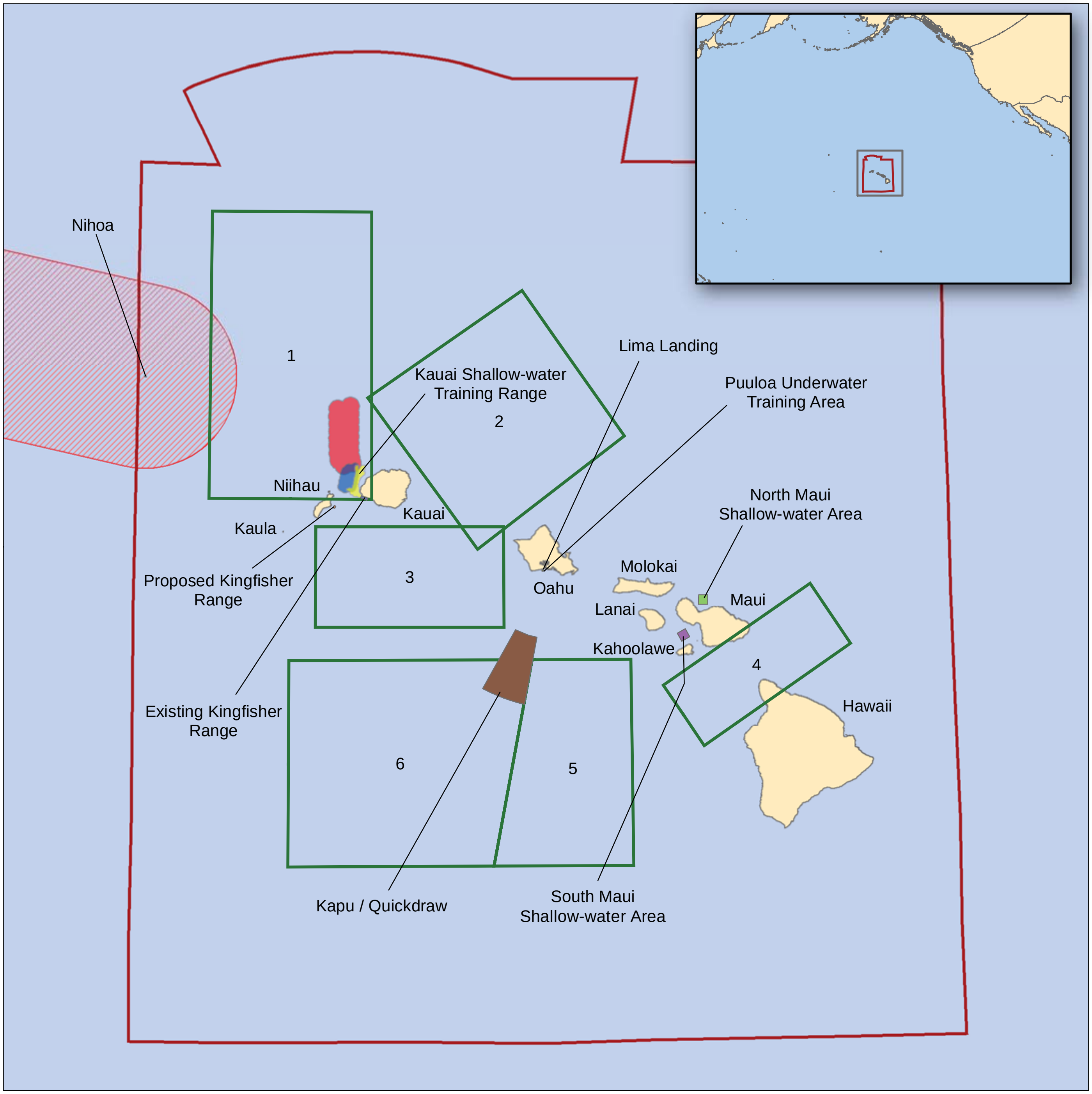
Table J-9. Distribution of Environmental Provinces in the HRC OPAREA

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
1	20 m	81	8	– 98*	0.2 sec	0.01%
2	50 m	81	8	– 98*	0.2 sec	0.02%
3	100 m	81	8	– 98*	0.2 sec	0.42%
4	200 m	81	2	52	0.2 sec	0.08%
5	200 m	81	8	– 98*	0.23 sec	0.14%
6	500 m	88	8	0	0.11 sec	0.11%
7	500 m	81	8	– 98*	0.23 sec	0.56%
8	1,000 m	81	8	52	0.22 sec	1.52%
9	1,000 m	88	8	52	0.11 sec	0.62%
10	2,000 m	81	8	52	0.18 sec	6.45%
11	2,000 m	88	8	52	0.08 sec	1.43%
12	5,000 m	81	5	13	0.22 sec	10.01%
13	5,000 m	81	7	13	0.09 sec	10.34%
14	5,000 m	81	4	13	0.17 sec	24.20%
15	5,000 m	88	3	13	0.23 sec	26.21%
16	5,000 m	81	8	13	0.13 sec	12.65%
17	5,000 m	88	8	13	0.09 sec	5.47%
18	500 m	88	2	– 98*	0.2 sec	0.08%
19	100 m	81	2	52	0.2 sec	0.01%
20	10 m	81	2	52	0.2 sec	Lima Landing / Puuloa only

* Negative province numbers indicate shallow water provinces

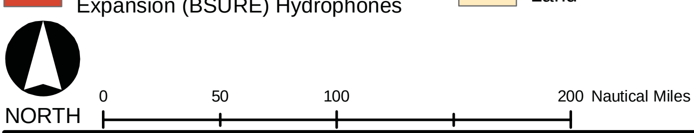
Table J-10. Distribution of Bathymetry Provinces in SMA 1

Bathymetry	Frequency of Occurrence
200	0.05%
500	0.75%
1,000	2.39%
2,000	5.10%
5,000	91.71%



EXPLANATION

- Sonar Modeling Area
- Hawaii Range Complex
- Northwestern Hawaiian Islands Marine National Monument
- Barking Sands Tactical Underwater Range (BARSTUR) Hydrophones
- Barking Sands Underwater Range Expansion (BSURE) Hydrophones
- North Maui Shallow-water Area
- South Maui Shallow-water Area
- Kapu / Quickdraw Area
- Kauai Shallow-water Training Range
- Land



Hawaii Range Complex Modeling Areas

Hawaiian Islands

Figure J- 2

SMA 1 is almost exclusively in SVP province 88 as indicated in the distribution given in Table J-11.

Table J-11. Distribution of Sound Speed Provinces in SMA 1

Sound Speed Province	Frequency of Occurrence
81	0.17%
88	99.83%

Almost all of the HFBL classes present in the HRC OPAREA are represented in SMA 1; however, more than half of SMA 1 is a class 3 (low-loss) bottom as indicated in Table J-12.

Table J-12. Distribution of High-Frequency Bottom Loss Classes in SMA 1

High-Frequency Bottom Loss Class	Frequency of Occurrence
2	0.37%
3	54.28%
4	5.92%
5	13.32%
8	26.10%

For acoustic modeling purposes, the environmental variability of SMA 1 is captured by the 10 provinces listed in Table J-13. Note that the vast majority of SMA 1 is represented by two 5,000-m provinces—one with a low-loss bottom (15) and the other by with a high-loss bottom (17).

Table J-13. Distribution of Environmental Provinces in SMA 1

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
4	200 m	81	2	52	0.2 sec	0.01%
5	200 m	81	8	– 98*	0.23 sec	0.04%
6	500 m	88	8	0	0.11 sec	0.37%
7	500 m	81	8	– 98*	0.23 sec	0.06%
8	1,000 m	81	8	52	0.22 sec	0.07%
9	1,000 m	88	8	52	0.11 sec	2.32%
11	2,000 m	88	8	52	0.08 sec	5.10%
15	5,000 m	88	3	13	0.23 sec	73.53%
17	5,000 m	88	8	13	0.09 sec	18.19%
18	500 m	88	2	– 98*	0.2 sec	0.31%

* Negative province numbers indicate shallow water provinces

J.1.3.3.2 Sonar Modeling Area 2 (SMA 2)

SMA 2 is located between and north of Kauai and Oahu and includes none of the smaller, specialized ranges. Although roughly equivalent in size to SMA 1, SMA 2 does not include coastal waters and thus has less environmental diversity. The bathymetry distribution is limited to depths of a kilometer or more as described in Table J-14.

Table J-14. Distribution of Bathymetry Provinces in SMA 2

Bathymetry	Frequency of Occurrence
1,000	1.84%
2,000	13.47%
5,000	84.68%

As with SMA 1, there are two SVP provinces covering SMA 2. As indicated in Table J-15, SMA 2 is nearly evenly divided between these two SVP provinces.

Table J-15. Distribution of Sound Speed Provinces in SMA 2

Sound Speed Province	Frequency of Occurrence
81	53.06%
88	46.94%

The limited environmental diversity is further demonstrated by the distribution of HFBL classes described in Table J-16.

Table J-16. Distribution of High-Frequency Bottom Loss Classes in SMA 2

High-Frequency Bottom Loss Class	Frequency of Occurrence
3	60.10 %
5	6.52 %
8	33.38 %

The environmental variability SMA 2 is reflected in the seven provinces listed in Table J-17.

Table J-17. Distribution of Environmental Provinces in SMA 2

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
8	1,000 m	81	8	52	0.22 sec	1.84%
10	2,000 m	81	8	52	0.18 sec	13.20%
11	2,000 m	88	8	52	0.08 sec	0.28%
14	5,000 m	81	4	13	0.17 sec	20.04%
15	5,000 m	88	3	13	0.23 sec	46.57%
16	5,000 m	81	8	13	0.13 sec	17.97%
17	5,000 m	88	8	13	0.09 sec	0.31%

J.1.3.3.3 Sonar Modeling Area 3 (SMA 3)

SMA 3 is located south of Kauai and west of Oahu. It includes none of the smaller, specialized ranges. The bathymetry distribution is limited to depths of a kilometer or more as described in Table J-18.

Table J-18. Distribution of Bathymetry Provinces in SMA 3

Bathymetry	Frequency of Occurrence
1,000	0.95%
2,000	11.95%
5,000	87.10%

SMA 3 is described in its entirety by the sound speed province 81. The bottom loss classes in SMA 3 are limited to a medium-loss class (4) and a high-loss class (8) with distributions indicated in Table J-19.

Table J-19. Distribution of High-Frequency Bottom Loss Classes in SMA 3

High-Frequency Bottom Loss Class	Frequency of Occurrence
4	28.17%
8	71.83%

Table J-20 describes the four environmental provinces selected for SMA 3. The distribution of these provinces reflects the deep-water nature of this operating area.

Table J-20. Distribution of Environmental Provinces in SMA 3

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
8	1,000 m	81	8	52	0.22 sec	0.95%
10	2,000 m	81	8	52	0.18 sec	11.95%
14	5,000 m	81	4	13	0.17 sec	28.17%
16	5,000 m	81	8	13	0.13 sec	58.93%

J.1.3.3.4 Sonar Modeling Area 4 (SMA 4)

SMA 4 is situated between Oahu and the island of Hawaii. It includes none of the smaller, specialized ranges but does include some shallow-water regions. The bathymetry distribution includes all eight bathymetry provinces but emphasizes deep-water with nearly 90% of the operating area in water depths of a kilometer or more as indicated in Table J-21.

Table J-21. Distribution of Bathymetry Provinces in SMA 4

Bathymetry	Frequency of Occurrence
20	0.12%
50	0.25%
100	0.62%
200	2.23%
500	7.64%
1,000	16.84%
2,000	40.13%
5,000	32.17%

SMA 4 is described in its entirety by the sound speed province 81. Bottom loss is likewise limited in variability with over 90% of the operating area characterized by a high-loss bottom (see Table J-22).

Table J-22. Distribution of High-Frequency Bottom Loss Classes in SMA 4

High-Frequency Bottom Loss Class	Frequency of Occurrence
2	6.59%
5	1.00%
7	0.01%
8	92.41%

SMA 4 is partitioned into the 12 environmental provinces listed in Table J-23. The distribution of environmental provinces is dominated by provinces with high-loss bottoms in the 1,000-m, 2,000-m and 5,000-m water depth regimes.

Table J-23. Distribution of Environmental Provinces in SMA 4

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
1	20 m	81	8	– 98*	0.2 sec	0.13%
2	50 m	81	8	– 98*	0.2 sec	0.25%
3	100 m	81	8	– 98*	0.2 sec	0.49%
4	200 m	81	2	52	0.2 sec	0.99%
5	200 m	81	8	– 98*	0.23 sec	1.24%
7	500 m	81	8	– 98*	0.23 sec	7.64%
8	1,000 m	81	8	52	0.22 sec	16.84%
10	2,000 m	81	8	52	0.18 sec	40.13%
12	5,000 m	81	5	13	0.22 sec	1.00%
13	5,000 m	81	7	13	0.09 sec	0.01%
16	5,000 m	81	8	13	0.13 sec	31.17%
19	100 m	81	2	52	0.2 sec	0.13%

J.1.3.3.5 Sonar Modeling Area 5 (SMA 5)

Located south of Oahu and west of the island of Hawaii, SMA 5 is predominantly a deep-water region. This operating area includes none of the smaller, specialized ranges. The bathymetry distribution provided in Table J-24 includes only two bathymetry provinces, with more than 95% of the area in the 5,000-m bathymetry province.

Table J-24. Distribution of Bathymetry Provinces in SMA 5

Bathymetry	Frequency of Occurrence
2,000	3.35%
5,000	96.65%

The distribution of sound speed provinces is similarly concentrated in a single province, 81, as presented in Table J-25.

Table J-25. Distribution of Sound Speed Provinces in SMA 5

Sound Speed Province	Frequency of Occurrence
81	96.33%
98	3.67%

The distribution of bottom-loss classes is a little less concentrated as indicated in Table J-26.

Table J-26. Distribution of High-Frequency Bottom Loss Classes in SMA 5

High-Frequency Bottom Loss Class	Frequency of Occurrence
4	29.15%
7	61.94%
8	8.91%

The resulting five provinces that describe SMA 5 are presented in Table J-27 and reflect a distribution whose environmental variability is driven mainly by bottom loss.

Table J-27. Distribution of Environmental Provinces in SMA 5

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
10	2,000 m	81	8	52	0.18 sec	3.35%
13	5,000 m	81	7	13	0.09 sec	55.39%
14	5,000 m	81	4	13	0.17 sec	29.15%
16	5,000 m	81	8	13	0.13 sec	8.44%
17	5,000 m	88	8	13	0.09 sec	3.67%

J.1.3.3.6 Sonar Modeling Area 6 (SMA 6)

SMA 6 is a large deep-water region located south of Kauai and Oahu, and adjacent to SMA 5 on the east. Like SMA 5, this operating area is exclusively deep-water as demonstrated in Table J-28.

Table J-28. Distribution of Bathymetry Provinces in SMA 6

Bathymetry	Frequency of Occurrence
2,000	0.56%
5,000	99.44%

SMA 6 is described in its entirety by the sound speed province 81. The ocean bottom in this region is primarily medium loss, distributed as shown in Table J-29.

Table J-29. Distribution of High-Frequency Bottom Loss Classes in SMA 6

High-Frequency Bottom Loss Class	Frequency of Occurrence
4	53.25%
5	37.04%
7	9.71%

A total of four environmental provinces are used to characterize this operating area according to the distribution given in Table J-30.

Table J-30. Distribution of Environmental Provinces in SMA 6

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
10	2,000 m	81	8	52	0.18 sec	0.56%
12	5,000 m	81	5	13	0.22 sec	37.04%
13	5,000 m	81	7	13	0.09 sec	9.15%
14	5,000 m	81	4	13	0.17 sec	53.25%

J.1.3.3.7 Underwater Ranges at PMRF

Instrumented underwater ranges called BARSTUR, BSURE, and the SWTR are located between and north of Niihau and Kauai. They are contained entirely within the southeast corner of SMA 1 with a bathymetry distribution as described in Table J-31.

Table J-31. Distribution of Bathymetry Provinces in PMRF Ranges

Bathymetry	Frequency of Occurrence
500	3.5 %
1,000	11.53 %
2,000	12.38 %
5,000	72.58 %

These underwater ranges at PMRF are described in their entirety by the sound speed province 88. The ranges are fairly evenly divided between low-loss bottoms and high-loss bottoms according to the distribution described in Table J-32.

Table J-32. Distribution of High-Frequency Bottom Loss Classes in PMRF Ranges

High-Frequency Bottom Loss Class	Frequency of Occurrence
2	2.72 %
3	38.03 %
8	59.25 %

The various combinations of environmental properties results in the six provinces defined in Table J-33.

Table J-33. Distribution of Environmental Provinces in PMRF Ranges

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
6	500 m	88	8	0	0.11 sec	1.34%
9	1,000 m	88	8	52	0.11 sec	11.53%
11	2,000 m	88	8	52	0.08 sec	12.38%
15	5,000 m	88	3	13	0.23 sec	38.03%
17	5,000 m	88	8	13	0.09 sec	34.56%
18	500 m	88	2	– 98*	0.2 sec	2.16%

J.1.3.3.8 South Maui Shallow-water Area and Potential MK 48 Area (SMA 7 & 8)

The South Maui Shallow-water Area is located between Kahoolawe, Lanai, and Maui. In addition to the PMRF ranges, it is one of two other areas that are typically used by submarines for training with MK 48 torpedoes. The other area is also in “shallow water” and is situated just north of Kahalui, Maui. These areas are referred to as “shallow” (being less than 600 ft deep) by training event planners and participants given safety requirements for vertical separation between participants to preclude the possibility of collisions. Both areas are also small in comparison to the SMAs, and hence the environmental variability is less pronounced. The distribution of water depths is limited to two bathymetry provinces as shown in Table J-34.

Table J-34. Distribution of Bathymetry Provinces in South Maui Shallow-water Area and Potential MK-48 Ranges

Bathymetry	Frequency of Occurrence
100	24.44%
200	75.56%

The South Maui Shallow-water Area and the potential MK 48 area are described in its entirety by the sound speed province 81. Two bottom loss classes, distributed as indicated in Table J-35, are present in these areas.

Table J-35. Distribution of High-Frequency Bottom Loss Classes in South Maui Shallow-water Area and Potential MK-48 Ranges

High-Frequency Bottom Loss Class	Frequency of Occurrence
2	9.55%
8	90.45%

This environmental variability is represented by the four environmental provinces described in Table J-36.

Table J-36. Distribution of Environmental Provinces in South Maui Shallow-water Area and Potential MK-48 Ranges

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
3	100 m	81	8	– 98*	0.2 sec	18.19%
4	200 m	81	2	52	0.2 sec	3.30%
5	200 m	81	8	– 98*	0.23 sec	72.76%
19	100 m	81	2	52	0.2 sec	6.25%

J.1.3.3.9 Kapu/Quickdraw

Kapu/Quickdraw is a gunnery range located south of Oahu. This range partially overlaps SMA 6 and thus shares some of the same environmental characteristics. The range is strictly deep-water (5,000-m bathymetry province) and described in its entirety by the sound speed province 81. The only material environmental variability is in bottom loss class, as demonstrated in Table J-37.

Table J-37. Distribution of High-Frequency Bottom Loss Classes in Kapu/ Quickdraw Range

High-Frequency Bottom Loss Class	Frequency of Occurrence
4	78.72%
8	21.28%

The bottom-loss distribution, in turn, directly dictates the distribution of environmental provinces as listed in Table J-38.

Table J-38. Distribution of Environmental Provinces in Kapu/Quickdraw Range

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
14	5,000	81	4	13	0.17 sec	78.72%
16	5,000	81	8	52	0.13 sec	21.28%

J.1.3.3.10 Lima Landing

Lima Landing is a limited area well inside the mouth of Pearl Harbor and it serves as the location for an Explosive Ordnance Demolition (EOD) Range. The limited extent of this range permits the entire range to be characterized by the single environmental province listed in Table J-39.

Table J-39. Distribution of Environmental Provinces in Lima Landing

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
20	10 m	81	2	52	0.2 sec	100%

J.1.3.3.11 Kingfisher (Old and Proposed)

Two areas in the HRC OPAREA are designated for Kingfisher mine avoidance training. The "old" range is located just south of Kauai, adjoining the Shallow Water Training Range to the west. The "proposed" area is nearby, just east of Niihau. Both areas are very small size scale in comparison to the resolution of the Navy-standard databases. As such, the only environmental parameter that is apt to vary significantly is water depth. Water depths in the old range are known to vary between 150 to 350 feet (46 to 107 m). Given that the dominant bottom loss class is 2, the best fit for the Kingfisher ranges is provided by environmental province 19, as described in Table J-40.

Table J-40. Distribution of Environmental Provinces in the Kingfisher Ranges

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
19	100 m	81	2	52	0.2 sec	100%

J.1.3.3.12 Puuloa

Puuloa Underwater Training Area is a small area just south of Pearl Harbor. The limited extent of this range permits the entire range to be characterized by the single environmental province listed in Table J-41.

Table J-41. Distribution of Environmental Provinces in Puuloa Range

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
20	10 m	81	2	52	0.2 sec	100 %

J.1.3.3.13 Shallow Water Training Range

The SWTR is located just to the west of Kauai, overlapping a portion of the PMRF Ranges and part of SMA 1. The bathymetry distribution emphasizes shallow water as indicated in Table J-42.

Table J-42. Distribution of Bathymetry Provinces in SWTR

Bathymetry	Frequency of Occurrence
50	9.85%
100	9.85%
200	1.79%
500	47.70%
1,000	30.81%

The distribution of sound speed provinces is provided in Table J-43.

Table J-43. Distribution of Sound Speed Provinces in SWTR

Sound Speed Province	Frequency of Occurrence
81	72.46%
88	27.54%

The distribution of bottom loss classes presented in Table J-44 indicates relatively equal portions of low-loss and high-loss bottoms in SWTR.

Table J-44. Distribution of High-Frequency Bottom Loss Classes in SWTR

High-Frequency Bottom Loss Class	Frequency of Occurrence
2	2.72%
3	38.03%
8	59.25%

Without the influence of large, deep-water provinces, the SWTR is more uniformly distributed over the 10 environmental provinces it contains as indicated in Table J-45.

Table J-45. Distribution of Environmental Provinces in SWTR

Environmental Province	Water Depth	SVP Province	HFBL Class	LFBL Province	Sediment Thickness	Frequency of Occurrence
2	50 m	81	8	– 98*	0.2 sec	9.85%
3	100 m	81	8	– 98*	0.2 sec	4.92%
4	200 m	81	2	52	0.2 sec	0.71%
5	200 m	81	8	– 98*	0.23 sec	1.08%
6	500 m	88	8	0	0.11 sec	14.60%
7	500 m	81	8	– 98*	0.23 sec	3.00%
8	1,000 m	81	8	52	0.22 sec	1.79%
9	1,000 m	88	8	52	0.11 sec	29.02%
18	500 m	88	2	– 98*	0.2 sec	30.10%
19	100 m	81	2	52	0.2 sec	4.92%

J.1.4 IMPACT VOLUMES AND IMPACT RANGES

Without range clearance procedures and standard protective measures serving as mitigation, many training activities would have the potential to injure or harass marine animals. For potential impacts from acoustic exposures, the number of animals exposed to potential harm in any such action is dictated by the number of marine mammals present per unit area, the propagation field, and the characteristics of the noise source.

The impact volume associated with a particular activity is defined as the volume of water in which some acoustic metric exceeds a specified threshold. The product of this impact volume with a volumetric animal density yields the expected value of the number of animals exposed to (or taken according to) that acoustic metric at a level that exceeds the threshold. The acoustic metric can either be an energy term (energy flux density, either in a limited frequency band or across the full band) or a pressure term (such as peak pressure or positive impulse). The thresholds associated with each of these metrics set levels at which a percentage of the animals exposed will experience harassment.

Regardless of the type of source, estimating the number of animals that may be exposed to an acoustic or pressure wave in a particular environment entails the following steps:

- Each source emission is modeled according to the particular operating mode of the sonar. The “effective” energy source level is computed by integrating over the bandwidth of the source, scaling by the pulse length, and adjusting for gains due to source directivity. The location of the source at the time of each emission must also be specified.
- For the relevant environmental acoustic parameters, transmission loss (TL) estimates are computed, sampling the water column over the appropriate depth and range intervals. TL data are sampled at the typical depth(s) of the source and at the nominal center frequency of the source. If the source is relatively broadband, an average over several frequency samples is required.

- The accumulated energy within the waters that the source is "operating" is sampled over a volumetric grid. At each grid point, the received energy from each source emission is modeled as the effective energy source level reduced by the appropriate propagation loss from the location of the source at the time of the emission to that grid point and summed. For the peak pressure or positive impulse, the appropriate metric is similarly modeled for each emission. The maximum value of that metric (over all emissions) is stored at each grid point.
- The impact volume for a given threshold is estimated by summing the incremental volumes represented by each grid point for which the appropriate metric exceeds that threshold.
- Finally, the number of exposures is estimated as the "product" (scalar or vector, depending upon whether an animal density depth profile is available) of the impact volume and the animal densities.

This section describes in detail the process of computing impact volumes (that is, the first four steps described above). This discussion is presented in two parts: active sonars and explosive sources. The relevant assumptions associated with this approach and the limitations that are implied are also presented. The final step, computing the number of exposures, is discussed in Section J.1.5.

J.1.4.1 Computing Impact Volumes for Active Sonars

This section provides a detailed description of the approach taken to compute impact volumes for active sonars. Included in this discussion are:

- Identification of the underwater propagation model used to compute transmission loss data, a listing of the source-related inputs to that model, and a description of the output parameters that are passed to the energy accumulation algorithm.
- Definitions of the parameters describing each sonar type.
- Description of the algorithms and sampling rates associated with the energy accumulation algorithm.

J.1.4.1.1 Transmission Loss Calculations

TL data are pre-computed for each of two seasons in the five environmental provinces described in the previous subsection using the GRAB propagation loss model (Keenan, 2000). The TL output consists of a parametric description of each significant eigenray (or propagation path) from source to animal. The description of each eigenray includes the departure angle from the source (used to model the source vertical directivity later in this process), the propagation time from the source to the animal (used to make corrections to absorption loss for minor differences in frequency and to incorporate a surface-image interference correction at low frequencies), and the transmission loss suffered along the eigenray path.

The eigenray data for a single GRAB model run are sampled at uniform increments in range out to a maximum range for a specific “animal” (or “target” in GRAB terminology) depth. Multiple GRAB runs are made to sample the animal depth dependence. The depth and range sampling parameters are summarized in Table J-46. Note that some of the low-power sources do not require TL data to large maximum ranges.

Table J-46. TL Depth and Range Sampling Parameters by Sonar Type

Sonar	Range Step	Maximum Range	Animal Depth
MK 48	10 meter (m)	10 kilometer (km)	0 – 1 km in 5-m steps 1 km – Bottom in 10-m steps
AN/SQS 53	10 m	200 km	0 – 1 km in 5-m steps 1 km – Bottom in 10-m steps
AN/SQS 56	10m	40 km	0 – 1 km in 5-m steps 1 km – Bottom in 10-m steps
BQQ 10	10m	150 km	0 – 1 km in 5-m steps 1 km – Bottom in 10-m steps
AN/AQS 22	10 m	10 km	0 – 1 km in 5-m steps 1 km – Bottom in 10-m steps
AN/ASQ 62	5 m	5 km	0 – 1 km in 5-m steps 1 km – Bottom in 10-m steps

In a few cases, most notably the AN/SQS 53 for thresholds below approximately 180 dB, TL data may be required by the energy summation algorithm at ranges greater than covered by the pre-computed GRAB data. In these cases, TL is extrapolated to the required range using a simple cylindrical spreading loss law in addition to the appropriate absorption loss. This extrapolation leads to a conservative (or under) estimate of transmission loss at the greater ranges.

Although GRAB provides the option of including the effect of source directivity in its eigenray output, this capability is not exercised. By preserving data at the eigenray level, this allows source directivity to be applied later in the process and results in fewer TL calculations.

The other important feature that storing eigenray data supports is the ability to model the effects of surface-image interference that persist over range. However, this is primarily important at frequencies lower than those associated with the sonars considered in this subsection. A detailed description of the modeling of surface-image interference is presented in the subsection on explosive sources.

J.1.4.1.2 Energy Summation

The summation of energy flux density over multiple pings in a range-independent environment is a trivial exercise for the most part. A volumetric grid that covers the waters in and around the area of sonar operation is initialized. The source then begins its set of pings. For the first ping, the TL from the source to each grid point is determined (summing the appropriate eigenrays after they have been modified by the vertical beam pattern), the “effective” energy source level is reduced by that TL, and the result is added to the accumulated energy flux density at that grid point. After each grid point has been updated, the accumulated energy at grid points in each depth layer are compared to the specified threshold. If the accumulated energy exceeds that threshold, then the incremental volume represented by that grid point is added to the impact volume for that depth layer.

The source is then moved along one of the axes in the horizontal plane by the specified ping separation distance, and the second ping is processed in a similar fashion. This procedure continues until the maximum number of pings specified has been reached.

Defining the volumetric grid over which energy is accumulated is the trickiest aspect of this procedure. The volume must be large enough to contain all volumetric cells for which the accumulated energy is likely to exceed the threshold but not so large as to make the energy accumulation computationally unmanageable.

Determining the size of the volumetric grid begins with an iterative process to determine the lateral extent to be considered. Unless otherwise noted, throughout this process the source is treated as omni-directional and the only animal depth that is considered is the TL target depth that is closest to the source depth (placing source and receiver at the same depth is generally an optimal TL geometry).

The first step is to determine the impact range (R_{MAX}) for a single ping. The impact range in this case is the maximum range at which the effective energy source level reduced by the transmission loss is less than the threshold. Next the source is moved along a straight-line track and energy flux density is accumulated at a point that has a CPA range of R_{MAX} at the mid-point of the source track. That total energy flux density is then compared to the prescribed threshold. If it is greater than the threshold (which, for the first R_{MAX}, it must be) then R_{MAX} is increased by 10%, the accumulation process is repeated, and the total energy is again compared to the threshold. This continues until R_{MAX} grows large enough to ensure that the accumulated energy flux density at that lateral range is less than the threshold. The lateral range dimension of the volumetric grid is then set at twice R_{MAX}, with the grid centered along the source track. In the direction of advance for the source, the volumetric grid extends of the interval from [–R_{MAX}, 3 R_{MAX}] with the first source position located at zero in this dimension. Note that the source motion in this direction is limited to the interval [0, 2 R_{MAX}]. Once the source reaches 2 R_{MAX} in this direction, the incremental volume contributions have approximately reached their asymptotic limit and further pings add the same essentially the same amount. This geometry is demonstrated in Figure J-3.

If the source is directive in the horizontal plane, then the lateral dimension of the grid may be reduced and the position of the source track adjusted accordingly. For example, if the main lobe of the horizontal source beam is limited to the starboard side of the source platform, then the port side of the track is reduced substantially as demonstrated in Figure J-4.

Once the extent of the grid is established, the grid sampling can be defined. In both dimensions of the horizontal plane the sampling rate is approximately R_{MAX}/100. The round-off error associated with this sampling rate is roughly equivalent to the error in a numerical integration to determine the area of a circle with a radius of R_{MAX} with a partitioning rate of R_{MAX}/100 (approximately 1%). The depth-sampling rate of the grid is comparable to the sampling rates in the horizontal plane but discretized to match an actual TL sampling depth. The depth-sampling rate is also limited to no more that 40 m in order to ensure that significant TL variability over depth is captured.

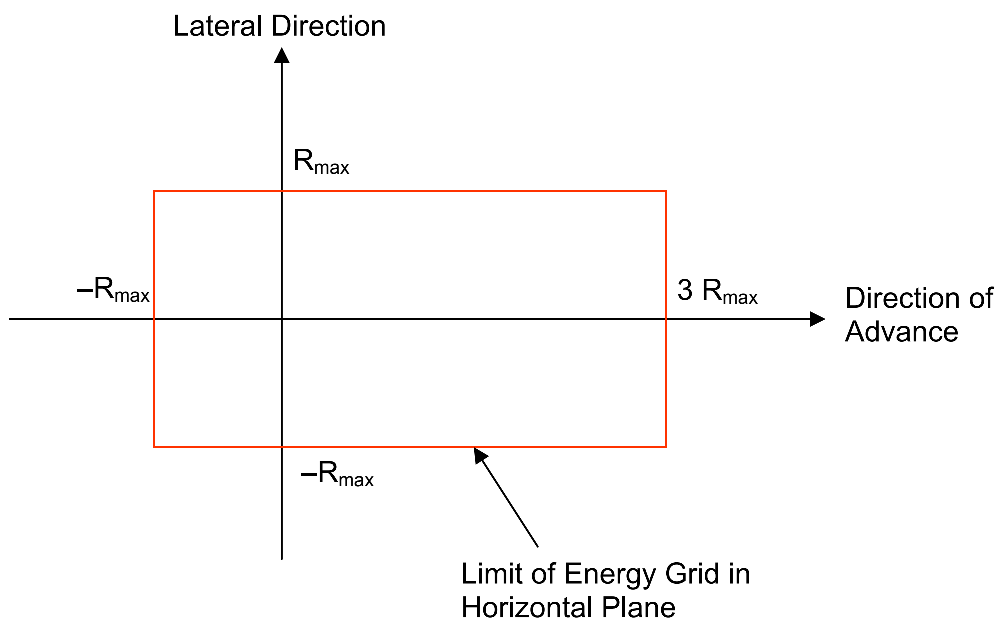


Figure J-3. Horizontal Plane of Volumetric Grid for Omni-Directional Source

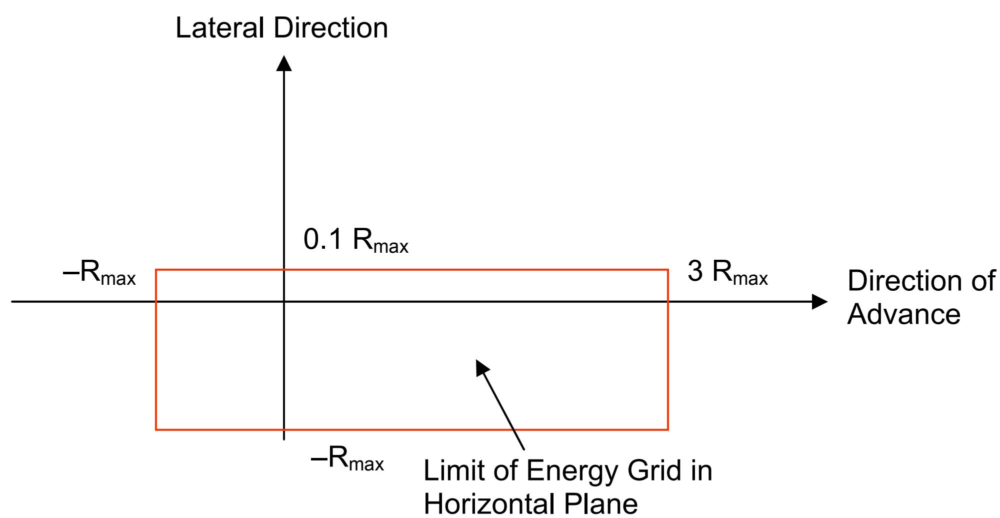


Figure J-4. Horizontal Plane of Volumetric Grid for Starboard Beam Source.

J.1.4.1.3 Impact Volume per Hour of Sonar Operation

The impact volume for a sonar moving relative to the animal population (density) increases with each additional ping at the start. The rate at which the impact volume increases varies with a number of parameters but eventually approaches some asymptotic limit. Beyond that point the increase in impact volume becomes essentially linear as depicted in Figure J-5.

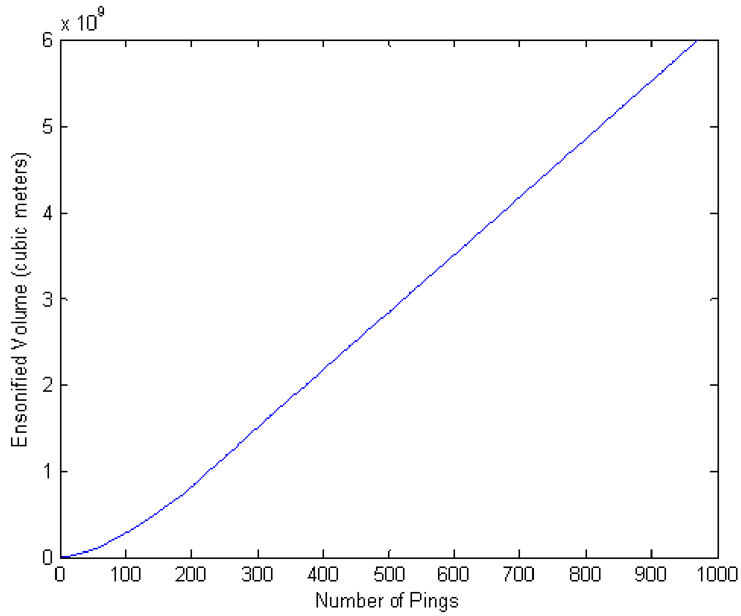


Figure J-5. AN/SQS 53 Impact Volume by Ping

The slope of the impact volume versus number of pings at a given depth is the impact volume added per ping. This number multiplied by the number of pings in an hour gives the hourly impact volume for the given depth increment. Completing this calculation for all depths in a province, for a given source, gives the hourly impact volume vector, v_n, which contains the hourly impact volumes by depth for province n. Figure J-6 provides an example of an hourly impact volume vector for a particular environment.

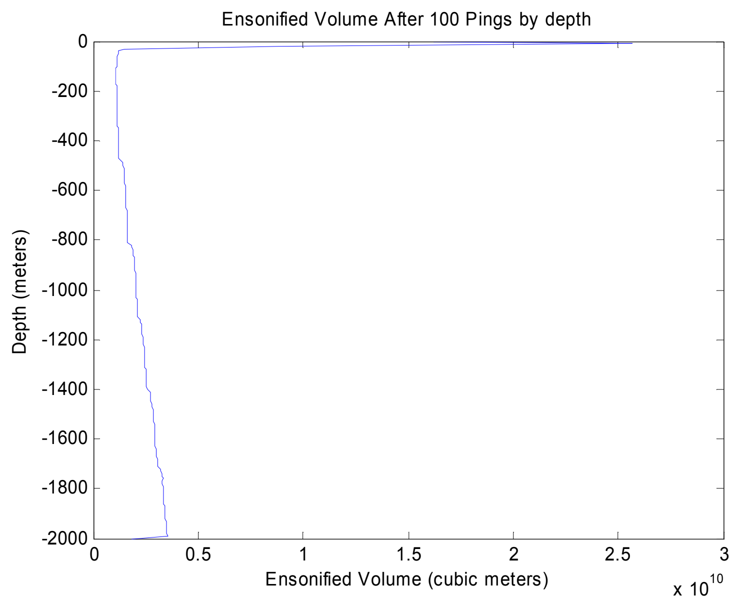


Figure J-6. Example of an Impact Volume Vector

J.1.4.2 Computing Impact Volumes for Explosive Sources

This section provides the details of the modeling of the explosive sources. This energy summation algorithm is similar to that used for sonars, only differing in details such as the sampling rates and source parameters. These differences are summarized in the following subsections. A more significant difference is that the explosive sources require the modeling of additional pressure metrics: (1) peak pressure, and (2) "modified" positive impulse. The modeling of each of these metrics is described in detail in the subsections of J.1.4.2.3.

J.1.4.2.1 Transmission Loss Calculations

Modeling impact volumes for explosive sources span requires the type of same TL data as needed for active sonars. However, unlike active sonars, explosive ordnances are very broadband, contributing significant energy from tens of hertz to tens of kilohertz. To accommodate the broadband nature of these sources, TL data are sampled at seven frequencies from 10 Hz to 40 kHz, spaced every two octaves.

An important propagation consideration at low frequencies is the effect of surface-image interference. As either source or target approach the surface, pairs of paths that differ in history by a single surface reflection set up an interference pattern that ultimately causes the two paths to perfectly cancel each other when the source or target is at the surface. A fully coherent summation of the eigenrays produces such a result but also introduces extreme fluctuations at all depths that would have to be highly sampled range and depth, and then smoothed to give meaningful results. An alternative approach is to implement what is sometimes called a semi-coherent summation. A semi-coherent sum attempts to capture significant effects of surface-image interference (namely the reduction of the field as the source or target approach the surface) without having to deal with the more rapid fluctuations associated with a fully coherent sum. The semi-coherent sum is formed by a random phase addition of paths that have already been multiplied by the expression:

$$\sin^2 [\, 4\pi \, f \, z_s \, z_a \, / \, (c^2 \, t) \,]$$

where f is the frequency, z_s is the source depth, z_a is the animal depth, c is the sound speed and t is the travel time from source to animal along the propagation path. For small arguments of the sine function this expression varies directly as the frequency and the two depths. It is this relationship that causes the propagation field to go to zero as the depths approach the surface or the frequency approaches zero.

A final important consideration is the broadband nature of explosive sources. This is handled by sampling the TL field at a limited number of frequencies. But the image-interference correction given above varies substantially over that frequency spacing. To avoid possible under sampling, the correction is averaged over each frequency interval.

J.1.4.2.2 Source Parameters

Unlike the active sonars, the explosive sources are defined by only two parameters: (1) net explosive weight, and (2) source detonation depth. Values for these source parameters are defined in Section J.1.2.2.

The effective energy source level, which is treated as a de facto input for the other sonars, is instead modeled directly for EER and explosives. For both the energy source level is comparable to the model used for other explosives (Arons [1954], Weston [1960], McGrath [1971], Urick [1983], Christian and Gaspin [1974]). The energy source level over a one-third octave band with a center frequency of f for a source with a net explosive weight of w pounds is

$$10 \log_{10} (0.26 \, f) + 10 \log_{10} (\, 2 \, p_{max}^2 \, / \, [1/\theta^2 + 4 \, \pi \, f^2] \,) + 197 \;\; \text{dB}$$

where the peak pressure for the shock wave at 1 m is defined as

$$p_{max} = 21600 \, (w^{1/3} \, / \, 3.28 \,)^{1.13} \;\; \text{psi} \qquad \text{(A-1)}$$

and the time constant is defined as:

$$\theta = [(0.058) \, (w^{1/3}) \, (3.28 \, / \, w^{1/3})^{\,0.22} \,] \, / \, 1{,}000 \;\; \text{msec} \qquad \text{(A-2)}$$

J.1.4.2.3 Impact Volumes for Various Metrics

The impact of explosive sources on marine species is measured by four different metrics, each with its own threshold(s). The energy metric, peak one-third octave, is treated in similar fashion as the energy metric used for the active sonars, including the summation of energy if there are multiple source emissions. The other two, peak pressure and positive impulse, are not accumulated but rather the maximum levels are stored.

Peak One-Third Octave Energy Metric

The computation of impact volumes for the energy metric follows closely the approach taken to model the energy metric for the active sonars. The only significant difference is that energy flux density is sampled at several frequencies in one-third-octave bands and only the peak one-third-octave level is accumulated.

Peak Pressure Metric

The peak pressure metric is a simple, straightforward calculation. At each range/animal depth combination, transmission ratio modified by the source level in a one-octave band and beam pattern is averaged across frequency on an eigenray-by-eigenray basis. This averaged transmission ratio (normalized by the broadband source level) is then compared across all eigenrays with the maximum designated as the peak arrival. Peak pressure at that range/animal depth combination is then simply the product of:

- The square root of the averaged transmission ratio of the peak arrival,
- The peak pressure at a range of 1 m (given by equation A-1), and
- The similitude correction (given by $r^{-0.13}$, where r is the slant range along the eigenray estimated as tc with t the travel time along the dominant eigenray and c the nominal speed of sound.

If the peak pressure for a given grid point is greater than the specified threshold, then the incremental volume for the grid point is added to the impact volume for that depth layer.

"Modified" Positive Impulse Metric

The modeling of positive impulse follows the work of Goertner (Goertner, 1982). The Goertner model defines a "partial" impulse as

$$\int_0^{T_{min}} p(t)\,dt$$

where p(t) is the pressure wave from the explosive as a function of time t, defined so that p(t) = 0 for t < 0. This pressure wave is modeled as

$$p(t) = p_{max}\, e^{-t/\theta}$$

where p_{max} is the peak pressure at 1 m (see equation A-1), and θ is the time constant defined as

$$\theta = 0.058\, w^{1/3}\, (r/w^{1/3})^{0.22} \text{ seconds}$$

with w the net explosive weight (pounds), and r the slant range between source and animal.

The upper limit of the "partial" impulse integral is

$$T_{min} = \min \{T_{cut}, T_{osc}\}$$

where T_{cut} is the time to cutoff and T_{osc} is a function of the animal lung oscillation period. When the upper limit is T_{cut}, the integral is the definition of positive impulse. When the upper limit is defined by T_{osc}, the integral is smaller than the positive impulse and thus is just a “partial” impulse. Switching the integral limit from T_{cut} to T_{osc} accounts for the diminished impact of the positive impulse upon the animals lungs that compress with increasing depth and leads to what is sometimes call a “modified” positive impulse metric.

The time to cutoff is modeled as the difference in travel time between the direct path and the surface-reflected path in an isospeed environment. At a range of r, the time to cutoff for a source depth z_s and an animal depth z_a is

$$T_{cut} = 1/c \{ [r^2 + (z_a + z_s)^2]^{1/2} - [r^2 + (z_a - z_s)^2]^{1/2} \}$$

where c is the speed of sound.

The animal lung oscillation period is a function of animal mass M and depth z_a and is modeled as

$$T_{osc} = 1.17\, M^{1/3} (1 + z_a/33)^{-5/6}$$

where M is the animal mass (in kg) and z_a is the animal depth (in feet).

The modified positive impulse threshold is unique among the various injury and harassment metrics in that it is a function of depth and the animal weight. So instead of the user specifying the threshold, it is computed as $K (M/42)^{1/3} (1 + z_a / 33)^{1/2}$. The coefficient K depends upon the level of exposure. For the onset of slight lung injury, K is 19.7; for the onset of extensive lung hemorrhaging (1% mortality), K is 47.

Although the thresholds are a function of depth and animal weight, sometimes they are summarized as their value at the sea surface for a typical calf dolphin (with an average mass of 12.2 kg). For the onset of slight lung injury, the threshold at the surface is approximately 13 psi-msec; for the onset of extensive lung hemorrhaging (1% mortality), the threshold at the surface is approximately 31 psi-ms.

As with peak pressure, the “modified” positive impulse at each grid point is compared to the derived threshold. If the impulse is greater than that threshold, then the incremental volume for the grid point is added to the impact volume for that depth layer.

J.1.4.2.4 Impact Volume per Explosive Detonation

The detonations of explosive sources are generally widely spaced in time and/or space. This implies that the impact volume for multiple firings can easily be derived by scaling the impact volume for a single detonation. Thus the typical impact volume vector for an explosive source is presented on a per detonation basis.

The one exception to this rule is SINKEX. Impact volume vectors for the representative SINKEX are provided on a per-event basis (that is, representing the cumulative impact of all weapons fired during the event).

J.1.4.3 Impact Volume by Operating Area

The HRC OPAREA is comprised of 20 environmental provinces. The hourly impact volume vector for training events involving any particular source is a linear combination of the 20 volume impact vectors, $\{v_1, v_2, ..., v_{20}\}$, with the weighting determined by the distribution of those 20 environmental provinces within the source's operation area. Unique hourly impact volume vectors for winter and summer are calculated for each type of source and each metric/threshold combination.

J.1.5 EXPOSURES

This section defines the animal densities and their depth distributions for the HRC. This is followed by a series of tables providing exposure estimates per unit of operation for each source type (active sonars and explosives) and for a SINKEX.

J.1.5.1 Animal densities

Densities are usually reported by marine biologists as animals per square kilometer, which is an area metric. This gives an estimate of the number of animals below the surface in a certain area, but does not provide any information about their distribution in depth. The impact volume vector (see Subsection J.1.4.1.3) specifies the volume of water ensonified above the specified threshold in each depth interval. A corresponding animal density for each of those depth intervals is required to compute the expected value of the number of exposures. The two-dimensional area densities do not contain this information, so three-dimensional densities must be constructed by using animal depth distributions to extrapolate the density at each depth. The required depth distributions are presented in next subsection.

Barlow presents density results based on an in-depth analysis of line-transect data collected during vessel surveys conducted within the U.S. Exclusive Economic Zone (EEZ) near the Hawaiian Island Archipelago from August-November 2002 (Barlow, 2006). Results from these surveys were initially published in a NMFS Administrative Report (Barlow, 2003), which is cited for density/abundance values in the RIMPAC report (Gilcrest et al., 2006). However, the Barlow (2006) paper (Barlow, 2006) is a peer-reviewed journal article and represents the "best available information" for this region. The study area and densities provided in Barlow (2006) also overlap entirely with older aerial survey data presented by Mobley (Mobley, et al., 2000); therefore, the "Inshore" densities included in the RIMPAC document are also not necessary nor is their use advised.

Barlow (Barlow, 2006; Table 4) provided abundance for two stratum, the Main Island stratum which covered from the main islands to approximately 75 nautical miles (nm) (140 km) offshore, and the Outer EEZ (OEEZ) stratum which covered the rest of the EEZ (200 nm, 370 km) around the entire Hawaiian island chain (including all 1,500 miles of the chain to the Northwest Hawaiian Islands ending at Kure Atoll). Density and CV were pooled for combined strata only.

Based on the abundance numbers per stratum in Barlow (Barlow, 2006), it would be tempting to apply the pooled densities to only the OEEZ stratum (for those species with 100% occurrence) or divide based on percentage abundance in each strata (e.g., bottlenose dolphins had 14% abundance in Main Island and 86% abundance in OEEZ). However, this is likely not a good idea. Other researchers (Baird et al., 2006; Baird et al., 2005a,b; Baird, 2005) have carried out long-term studies near the Main Hawaiian Islands, and have observed many species, not seen by Barlow (Barlow, 2006) in the Main Island stratum, within 75 nm of the main islands. While these other studies do not provide densities, they do indicate that other species occur close to the islands. Therefore, it is most appropriate to apply densities to the overall area (both strata) exactly as provided in Barlow (Barlow, 2006). The only exceptions to this would be Fraser's dolphin, Longman's beaked whale and Bryde's whale; these three species were seen by Barlow (Barlow, 2006) only in the OEEZ stratum and have not been sighted within 75 nm of the main islands by other researchers either. The densities calculated for these three species by Barlow (Barlow, 2006) can be applied to the OEEZ stratum only (greater than 75 nm from the Main Hawaiian Islands; see Figure 1 in Barlow [Barlow, 2006]).

Barlow (2006) reports on densities for the summer/fall time period. Most of the species for which densities were calculated are resident to the archipelago (i.e., not migratory). Therefore, the densities are applicable year-round. Marine mammals that were not seen by Barlow (2006) occur too rarely to be of concern (right, blue, fin, sei, minke), with two notable exceptions. Humpback whales are seasonal migrants, occurring in the Hawaiian Islands generally from December through April (and therefore were not present during the summer 2002 surveys). The most recent NMFS Alaska Stock Assessment Report (Angliss and Outlaw, 2005) provides an abundance estimate of 4005 for wintering humpback whales in Hawaii, but no density. Mobley et al. (2001) conducted aerial surveys from 1993-2000 over shallow near-shore waters as well as deep pelagic regions (survey lines extended approximately 25 nm offshore). Densities were corrected for availability bias, and the corrected density estimate for 2000 was 0.2186 (CV=0.153), with an abundance of 4,491. This number applies only to winter/spring months and only to areas within 25 nm (46 km) of the Main Hawaiian Islands.

Hawaiian monk seals, an endangered species, are resident throughout the Hawaiian Islands. They are more numerous in the Northwestern Hawaiian Islands where most pupping and foraging occurs (Johanos and Baker, 2005). The most recent population estimate is 1,252 (Carretta et al., 2006), which is applicable to the entire archipelago. However, approximately 77 monk seals are present in and around the Main Hawaiian Islands and spend approximately one-third of the time onshore (hauled-out) according to the Monk Seal Recovery Plan (National Marine Fisheries Service, 2007).

The SMA areas are divided into the percentage of area within 25 nm of Land and beyond 25 nm of Land, based on the offshore surveys by Mobley (Mobley, et al, 2000) and the preliminary analysis by Barlow (Barlow, 2003). Those divisions are not applicable for the densities used here, with the exception of humpback whales.

Each SMA should be assessed in the following manner:

1. Humpback whales—occurrence is limited to offshore areas within 25 nm of land as the only areas to which density/abundance is applied.

2. Monk seals—occurrence is limited to offshore areas only. As noted, monk seals spend approximately one-third of the time hauled-out on shore, and so the potential time for impact on monk seals is reduced by 33%. Monk seals forage in waters generally less than 100 m and occasionally dive to over 500 m (National Marine Fisheries Service 2007). The areas between the shore and 500 m depth, where monk seals are assumed to be concentrated, will be applied for modeling impacts on monk seals.

3. Fraser's dolphin, Bryde's whale, Longman's beaked whale—occurrence appears to be in offshore areas only. Therefore, the percentage of each SMAs that are beyond 75 nm of the Main Hawaiian Islands (see Figure 1 in Barlow [Barlow, 2006]) are the only areas to which density/abundance should be applied.

4. All marine mammal species not specifically noted in #1 and 2 above—occurrence is throughout the Hawaiian Islands including Leeward Islands. Therefore, the percentage of SMAs from 200 nm (370 km) of land (likely 100% for each SMA) are the areas to which density/abundance should be applied.

The animal area densities for the HRC are given in Table J-47.

Table J-47. Hawaiian Islands Animal Densities

Species Name	Scientific Name	Abundance	Area for population (km^2)*	Density ($\#/km^2$)	CV	Area	Season	Reference
Bryde's whale	*B. edeni*	469	N/A	0.0002	0.45	75-200 nm offshore	Year-round	Barlow 2006
Humpback whale	*Megaptera novaeangliae*	4,491	N/A	0.2186	0.15	0-25 nm offshore	Dec-Mar	Mobley et al. 2001
Sperm whale	*Physeter catodon*	6,919	N/A	0.0028	0.81	0-200 nm offshore	Year-round	Barlow 2006
Dwarf sperm whale	*Kogia sima*	17,519	N/A	0.0071	0.74	0-200 nm offshore	Year-round	Barlow 2006
Pygmy sperm whale	*Kogia breviceps*	7,138	N/A	0.0029	1.12	0-200 nm offshore	Year-round	Barlow 2006
Cuvier's beaked whale	*Ziphius cavirostris*	15,242	N/A	0.0062	1.43	0-200 nm offshore	Year-round	Barlow 2006
Longman's beaked whale	*Indopacetus pacificus*	1,007	N/A	0.0004	1.26	75-200 nm offshore	Year-round	Barlow 2006
Blainville's beaked whale	*Mesoplodon densirostris*	2,872	N/A	0.0012	1.25	0-200 nm offshore	Year-round	Barlow 2006
Unidentified beaked whale	*Family Ziphiidae*	371	N/A	0.0002	1.17	0-200 nm offshore	Year-round	Barlow 2006
Bottlenose dolphin	*Tursiops truncatus*	3,215	N/A	0.0013	0.59	0-200 nm offshore	Year-round	Barlow 2006
False killer whale	*Pseudorca crassidens*	236	N/A	0.0001	1.13	0-200 nm offshore	Year-round	Barlow 2006
Killer whale	*Orcinus orca*	349	N/A	0.0001	0.98	0-200 nm offshore	Year-round	Barlow 2006
Pygmy killer whale	*Feresa attenuata*	956	N/A	0.0004	0.83	0-200 nm offshore	Year-round	Barlow 2006
Short-finned pilot whale	*Globicephala macrorhychus*	8,870	N/A	0.0036	0.38	0-200 nm offshore	Year-round	Barlow 2006
Risso's dolphin	*Grampus griseus*	2,372	N/A	0.0010	0.65	0-200 nm offshore	Year-round	Barlow 2006
Melon-headed whale	*Peponocephala electra*	2,950	N/A	0.0012	1.17	0-200 nm offshore	Year-round	Barlow 2006
Rough-toothed dolphin	*Steno bredanensis*	8,709	N/A	0.0036	0.45	0-200 nm offshore	Year-round	Barlow 2006
Fraser's dolphin	*Lagenodelphis hosei*	10,226	N/A	0.0042	1.16	75-200 nm offshore	Year-round	Barlow 2006
Offshore pantropical spotted dolphin	*Stenella attenuata*	8,978	N/A	0.0037	0.48	0-200 nm offshore	Year-round	Barlow 2006
Spinner dolphin	*Stenella longirostris*	3,351	N/A	0.0014	0.74	0-200 nm offshore	Year-round	Barlow 2006
Striped dolphin	*Stenella coeruleoalba*	13,143	N/A	0.0054	0.46	0-200 nm offshore	Year-round	Barlow 2006
Hawaiian monk seal	*Monachus schauinslandi*	1,252	360,000	0.0035	N/A	Offshore Hawaiian Island Archipelago	Year-round	Caretta et al. 2006

* Area was derived via ArcMap (obtaining individual areas for all Main Hawaiian Islands then subtracting those from the overall area of the Hawaiian Island archipelago).

Density for monk seals derived via dividing the abundance from Caretta et al (2006) with the area obtained via ArcMap.

N/A = Not Available

J.1.5.2 Hawaii Range Complex Marine Mammal Depth Distribution Summary

There is very limited depth distribution data for most marine mammals. This is especially true for cetaceans, as they must be tagged at-sea and using a tag that either must be implanted in the skin/blubber in some manner or that adheres to the skin. There is slightly more data for some pinnipeds, as they can be tagged while on shore during breeding or molting seasons and the tags can be glued to the pelage rather than implanted. There are a few different methodologies/techniques that can be used to determine depth distribution percentages, but by far the most widely used technique at this time is the time-depth recorder. These instruments are designed to be attached to the animal for a fairly short period of time (several hours to a few days) via a suction cup, and are retrieved immediately after detachment. Depth information can also be collected via satellite tags, sonic tags, digital tags, and, for sperm whales, via acoustic tracking of sounds produced by the animal itself.

Barlow (Barlow, 2006) provides density values for 20 species (Table 4). There were several species/species groups seen during the 2002 survey for which no abundance/density was calculated; these species are not included in the depth distribution analysis. Monk seals are present year-round and humpbacks are seasonally present in shallow waters of the Hawaiian Islands, bringing the total number of species requiring depth distribution data to 22. Of these 22, there are somewhat suitable depth distribution data for 10. Sample sizes are extremely small for these 10 species, usually fewer than 10 animals total and often only one or two animals. Depth distribution information often must be interpreted from other dive and or preferred prey characteristics, so confidence in any of these depth distributions is not high. However, these depth distribution data represent the “best available” at this time. Depth distributions for the remaining 12 cetaceans in the Hawaiian Islands area have been extrapolated from similar species to provide the “best available” depth distribution information.

Monk seals forage most frequently in less than 100-m depth but have been recorded foraging to 500-m depth.

J.1.5.2.1 Depth Distributions for Mysticetes

Bryde’s whale (*B. edeni*)——There are no depth distribution data for this species. They feed on small schooling fish and krill. They are quite a bit smaller than fin whales (13 feet versus 21 feet) but still closer in size to fins than to blue whales. Therefore, in light of the total lack of data for this species, fin whale (*Balaenoptera physalus*) depth distribution data will be extrapolated to Bryde’s whales. Fin whale data from Ligurian Sea are the most complete (Panigada et al., 2003), and showed differences between day and night diving; daytime dives were shallower (within 100 m) and night dives were deeper (>400 m), likely taking advantage of nocturnal prey migrations into shallower depths; this data may be atypical of fin whales elsewhere in areas where they do not feed on vertically-migrating prey. Goldbogen (Goldbogen, et al. 2006) studied fins in southern CA and found that 60% of total time was spent diving, with the other 40% near surface (<50 m); dives were to >225 m and were characterized by rapid gliding ascent, foraging lunges near the bottom of dive, and rapid ascent with flukes. Dives are somewhat V-shaped, although the bottom of the V is wide. Therefore, percent of time at depth levels for fin whales could be estimated as 40% at <50 m, 20% at 50 to 225 m (covering the ascent and descent times) and 40% at >225 m.

Humpback whales (*Megaptera novaeangliae*)—In a feeding area (Greenland), 37% of time was spent at <4 m, 25% of time 4-20 m, 7% of time 20-35 m, 4% of time 35-50 m, 6% of time 50-100 m, 7% of time 100-150 m, 8% of time 150-200 m, 6% of time 200-300 m, <1% at >300 m (Dietz et al., 2002). In a non-feeding area (HI), humpbacks spent 40% of time in 0-10 m, 27% in 11-20 m, 12% in 21-30 m, 4% in 31-40 m, 3% in 41-50 m, 2% in 51-60 m, 2% in 61-70 m, 2% in 71-80 m, 2% in 81-90 m, 2% in 91-100 m, 1% in 101-110 m, 1% in 111-120 m, 1% in 121-130 m, 1% in 131-140 m, and <1% in <140 m depth (Baird et al., 2000, Table 3).

J.1.5.2.2 Depth Distributions for Odontocetes

Sperm whale (*Physeter catodon,* aka *Physeter macrocephalus*)—Unlike other cetaceans, there is a preponderance of dive information for this species, most likely because it is the deepest diver of all species and so generates a lot of interest (and funding). Sperm whales feed on large and medium-sized squid, octopus, rays and sharks, on or near the ocean floor. Some evidence suggests that they do not always dive to the bottom of the sea floor (likely if food is elsewhere in the water column), but that they do generally feed at the bottom of the dive. The most consistent dive type recorded is U-shaped, whereby the whale makes a rapid descent to the bottom of the dive, forages at various velocities while at depth (likely while chasing prey) and then ascends rapidly to the surface. Perhaps the best source for depth distribution data comes from Amano and Yoshioka (2003), who attached a tag to a female sperm whale near Japan in an area where water depth was 1,000-1,500 m. Based on values in Table 1 for dives with active bottom periods, the total dive sequence was 45.9 min (mean surface time plus dive duration). Mean surface time divided by total time (8.5/45.9) yields a percent of time at the surface (0-2 m) of 19%. Mean bottom time divided by total time (17.5/45.9) yields a percent of time at the bottom of the dive (in this case >800 m as the mean maximum depth was 840 m) of 38%. Total time in the water column descending or ascending equals duration of dive minus bottom time (37.4-17.5) or ~20 minutes. Assuming a fairly equal descent and ascent rate (as shown in the table) and a fairly consistent descent/ascent rate over depth, we assume 10 minutes each for descent and ascent and equal amounts of time in each depth gradient in either direction. Therefore, 0-200 m = 2.5 minutes one direction (which correlates well with the descent/ascent rates provided) and therefore 5 minutes for both directions. Same for 201-400 m, 401-600 m and 601-800 m. Therefore, the depth distribution for sperm whales based on information in the Amano paper is: 19% in 0-2 m, 10% in 2-200 m, 11% in 201-400 m, 11% in 401-600 m, 11% in 601-800 m and 38% in >800 m. The percentages derived above from data in Amano and Yoshioka (2003) are in fairly close agreement with those derived from Table 1 in Watwood et al. (2006) for sperm whales in the Ligurian Sea, Atlantic Ocean, and Gulf of Mexico.

Dwarf sperm whale (*Kogia sima)*—There are no depth distribution data for this species. Prey preference appears to be cephalopods, crustaceans and fish, and there is some evidence that they feed at the bottom. In lieu of any other information, Blainville's beaked whale depth distribution data will be extrapolated to dwarf sperm whales as the two species appear to have similar prey preferences and Kogia sp. are closer in size to Blainville's than to sperm or Cuvier's beaked whales.

Pygmy sperm whale (*Kogia breviceps*)—There are no depth distribution data for this species. An attempt to record dive information on a rehabilitated pygmy sperm whale failed when the TDR package was never recovered (Scott et al., 2001). Prey preference appears to be cephalopods, crustaceans and fish, and there is some evidence that they feed at the bottom. In lieu of any other information, Blainville's beaked whale depth distribution data will be extrapolated to pygmy sperm whales as the two species appear to have similar prey preferences and Kogia sp. are closer in size to Blainville's than to sperm or Cuvier's beaked whales.

Cuvier's beaked whale (*Ziphius cavirostris*)—Studies in Hawaii (Baird et al., 2005a; Baird et al., 2006) found that this species undertook three or four different types of dives, including intermediate (to depths of 292-568 m), deep (>1,000 m) and short-interventilation (within 2-3 m of surface). Studies in the Canary Islands indicated that Cuvier's beaked whales dived to >1,000 m and usually started "clicking" (actively searching for prey) around 475 m (Johnson et al., 2004; Soto et al, 2006). Clicking continued at depths and ceased once ascent to the surface began, indicating active foraging at depth. In both locations, Cuvier's spent more time in deeper water than did Blainville's, although maximum dive depths were similar. There was no significant difference between day and night diving indicating that preferred prey likely do not undergo vertical migrations. To determine depth distribution data for this species, the graph representing daytime dives in Figure 5 in Baird et al. (2005a) was used. It would appear that ~15% of total time is spent in 0-100 m depth, ~13% from 101-200 m depth, ~22% from 201-300 m depth, ~13% from 301-600 m depth, ~6% from 601-800 m depth, ~11% from 801-1,000 m depth, and 20% at >1000 m. These data are representative of only one animal so, like all the other depth distribution data, are very limited in scope.

Longman's beaked whale (aka Tropical bottlenose whale) (*Indopacetus pacificus*)—There are no depth distribution data for this species, and preferred prey species are also unknown. There has been one study on northern bottlenose whales, *Hyperoodon ampullatus*, which provides some guidance as to depth distribution (Hooker and Baird, 1999). Most (62-70%, average = 66%) of the time was spent diving (>40 m), and most dives were somewhat V-shaped. Both shallow dives (<400 m) and deep dives (>800 m) were recorded, and whales spent 24-30% (therefore, average of 27%) of dives at 85% maximum depth indicating they feed near the bottom. Using these data points, we estimate 34% of time at 0-40 m, 39% at 41-800 m, 27% at >800 m for *H. ampullatus* and extrapolate this to *I. pacificus*.

Blainville's beaked whale (*Mesoplodon densirostris)*—Studies in Hawaii (Baird et al., 2004; 2005a; 2006) found that this species undertook several different types of dives, including shallow (0-50 m with most time at 0-20 m), deep (mean maximum of 890 and 1,408 m) and short-interventilation (within 2-4 m of surface). Studies in the Canary Islands indicated that Blainville's beaked whales dived to >655 m and usually started "clicking" (actively searching for prey) around 200-570 m (Johnson et al., 2004). Clicking continued at depths and ceased once ascent to the surface began, indicating active foraging at depth. To determine depth distribution data for this species, the top two left-side graphs in Figure 6 in Baird et al. (2005a) were used. It would appear that ~48% of total time is spent in 0-50 m depth, ~11% from 51-100 m depth, ~11% from 101-200 m depth, ~9% from 201-500 m depth, ~5% from 501-800 m depth, ~5% from 801-1,000 m depth, and 11% at >1,000 m. This data is representative of only two animals, so like all the other depth distribution data is very limited in scope.

Unidentified beaked whale (Family Ziphiidae)—This encompasses all beaked whales and several genera that might be found offshore Hawaii. Based on the total lack of additional information about what this species may have been, suggest using the limited dive information available for Cuvier's beaked whale.

Bottlenose dolphin (*Tursiops truncatus)*—There have been a few studies on bottlenose dolphin depth distributions. Corkeron and Martin (2004) reported that two dolphins spent 66% of time in top 5 m of water surface; maximum dive depth was greater than 150 m, and there was no apparent diurnal pattern. Based on this study plus information from Hastie et al. (2006), the following depth distribution has been estimated for bottlenose dolphins: 66% of time at 0-10 m, 12% at 11-20 m, 12% at 21-30 m, 5% at 31-40 m, 4% at 41-50 m, and 1% at >50 m.

False killer whale (*Pseudorca crassidens*)—The only study conducted on false killer whales diving in Hawaii has not been published in any detail (Ligon and Baird, 2001), but an abstract provides limited information. False killer whales did not dive deep and instead recorded maximum dives of 22, 52, and 53 m in near-shore Hawaii waters. Based on the nearly total lack of data for this species, suggest using the limited dive information available for killer whales.

Killer whale (*Orcinus orca*)—Diving studies on killer whales have been undertaken mainly on “resident” (fish-eating) killer whales in the Puget Sound and are likely not applicable across all populations of killer whales. Diving is usually related to foraging, and mammal-eating killer whales may display different dive patterns. Killer whales in one study (Baird et al., 2005b) dove as deep as 264 m, and males dove more frequently and more often to depths >100 m than females, with fewer deep dives at night. Using best available data from Baird et al. (2003a), it would appear that killer whales spend ~4% of time at depths >30 m and 96% of time at depths <30 m. Dives to deeper depths were often characterized by velocity bursts which may be associated with foraging or social activities.

Pygmy killer whale (*Feresa attenuata*)—There are no depth distribution data for this species, and there is little information on prey preference. In lieu of any other information, killer whale depth distribution data will be extrapolated to pygmy killer whales.

Short-finned pilot whale (*Globicephala macrorhychus*)—The only study conducted on short-finned pilot whales in Hawaii has not been published in any detail (Baird et al., 2003b), but an abstract did indicate that there are significant differences between day and night diving; dives of >100m were far more frequent at night, likely to take advantage of vertically-migrating prey; night dives regularly went to 300-500 m. Deepest dives were during the day, however, perhaps because prey was deeper. A closely-related species, the long-finned pilot whale, also shows marked differences in daytime and nighttime diving in studies in the Ligurian Sea (Baird et al., 2002), but there is no information on percent of time at various depth categories. A study following two rehabilitated and released long-finned pilot whales provides a breakdown of percent of time at depth distribution for two whales (Nawojchik et al., 2003). Averaging the values for the two whales results in the following depth distribution breakdown: 64% at <15 m, 19% at 16-50 m, 7% at 51-100m, 4% at 101-150 m, 5% at 151-200 m, 1% at 201-250 m and <1% at >250 m. As the same type of detailed dive depth distribution is not available for SF pilot whales, these numbers will have to suffice.

Risso’s dolphin (*Grampus griseus*)—There are no depth distribution data for this species. They are primarily squid eaters and feeding is presumed to take place at night. In lieu of any other information, short-finned pilot whale depth distribution data will be extrapolated to Risso’s dolphins.

Melon-headed whale (*Peponocephala electra*)—There are no depth distribution data for this species. They are primarily squid and pelagic fish eaters and at least some feeding is presumed to take place at fairly deep depth. In lieu of any other information, short-finned pilot whale depth distribution data will be extrapolated to melon-headed whales.

Rough-toothed dolphin (*Steno bredanensis*)—There are no depth distribution data for this species. They are believed to be deep divers and feeders. In lieu of any other information, spinner dolphin depth distribution data will be extrapolated for rough-toothed dolphins.

Fraser's dolphin (*Lagenodelphis hosei*—Studies on diving by this species have not been undertaken, but studies of stomach contents in the eastern tropical Pacific and Sulu Sea indicate that they eat myctophid fish as well as cephalopods and crustaceans (Dolar et al., 2003). Based on prey species, this species apparently regularly feeds in deeper waters than spinner dolphins as several of its major prey items are regularly found between 600 and 1,000 m. It is believed that Fraser's dolphins also feed mainly at night. Based on this very limited information, the following are very rough order estimates of time at depth: daytime: 100% at 0-50 m; nighttime: 100% at 0-700 m.

Offshore pantropical spotted dolphin (*Stenella attenuata)*—One study on this species in Hawaii contains dive information (Baird et al., 2001). The biggest differences recorded were in the increase in dive activity at night. During the day, 89% of time was spent within 0-10 m, most of the rest of the time was 10-50 m, and the deepest dive was to 122 m. At night, only 59% of time was spent from 0-10 m and the deepest dive was to 213 m; dives were especially pronounced at dusk. For activities conducted during daytime-only, the depth distribution would be 89% at 0-10 m and 11% at 11-50 m, with <1% at 51-122 m. For activities conducted over a 24-hour period, the depth distribution needs to be modified to reflect less time at surface and deeper depth dives; 80% at 0-10 m, 8% at 11-20 m, 2% at 21-30 m, 2% at 31-40 m, 2% at 41-50 m, and 6% at 51-213 m.

Spinner dolphin (*Stenella longirostris*)—Studies on spinner dolphins in Hawaii have been carried out using active acoustics (fish-finders) (Benoit-Bird and Au, 2003). These studies show an extremely close association between spinner dolphins and their prey (small, mesopelagic fishes). Mean depth of spinner dolphins was always within 10 m of the depth of the highest prey density. These studies have been carried out exclusively at night, as stomach content analysis indicates that spinners feed almost exclusively at night when the deep scattering layer moves toward the surface bringing potential prey into relatively shallower (0-400 m) waters. Prey distribution during the day is estimated at 400-700 m. Based on these data, the following are very rough order estimates of time at depth: daytime: 100% at 0-50 m; nighttime: 100% at 0-400 m.

Striped dolphin (*Stenella coeruleoalba*)—Studies are rare on this species. In lieu of any other information, pantropical spotted dolphin depth distribution data will be extrapolated to striped dolphins.

J.1.5.2.3 Depth Distributions of Pinnipeds

Hawaiian monk seal (*Monachus schauinslandi*)—There have been several recent studies on foraging patterns by monk seals near rookeries in the Northwestern Hawaiian Islands. Dive depths appear to differ slightly between rookeries as well as between age and sex classes. At Pearl and Hermes Reef, most dives were from 8-40 m with a second much smaller node at 100-120 m (Stewart, 2004). At Kure Atoll, most dives were shallower than 40 m, with males tending to dive deeper than females (Stewart and Yochem, 2004a). At Laysan Island, a similar dive pattern was recorded with most dives shallower than 40 m, but at that location females tended to dive deeper than males (250-350 m) (Stewart and Yochem, 2004b). Parrish et al (2002) noted a tendency towards night diving at French Frigate Shoals, with dives to ~80-90 m. The recent monk seal recovery plan update summarizing this data indicates that monk seals generally forage at depths less than 100 m but occasionally dive to over 500 m (National Marine Fisheries Service 2007). Based on these data, the following are rough order estimates of time at depth: 90% at 0-40 m; 9% at 40-120 m; 1% at >120 m.

J.1.5.3 Exposure Estimates

The following sperm whale example demonstrates the methodology used to create a three-dimensional density by merging the area densities with the depth distributions. The sperm whale surface density is 0.0028 whales per square kilometer. From the depth distribution report, "depth distribution for sperm whales based on information in the Amano paper is: 19% in 0-2 m, 10% in 2-200 m, 11% in 201-400 m, 11% in 401-600 m, 11% in 601-800 m and 38% in >800 m." So the sperm whale density at 0 to 2 m is (0.0028*0.19/0.002 =) 0.266 per cubic km, at 2-200 m is (0.0028*0.10/0.198 =) 0.001414 per cubic km, and so forth.

In general, the impact volume vector samples depth in finer detail than given by the depth distribution data. When this is the case, the densities are apportioned uniformly over the appropriate intervals. For example, suppose the impact volume vector provides volumes for the intervals 0 to 2 m, 2 to 10 m, and 10 to 50 m. Then for the depth-distributed densities discussed in the preceding paragraph:

- 0.266 whales per cubic km is used for 0 to 2 m,
- 0.001414 whales per cubic km is used for the 2 to 10 m, and
- 0.001414 whales per square km is used for the 10 to 50 m.

Once depth-varying, three-dimensional densities are specified for each species type, with the same depth intervals and the ensonified volume vector, the density calculations are finished. The expected number of ensonified animals within each depth interval is the ensonified volume at that interval multiplied by the volume density at that interval, and this can be obtained as the dot product of the ensonified volume and animal density vectors.

Since the ensonified volume vector is the ensonified volume per unit operation (i.e., per hour, per sonobuoy, etc), the final exposure count for each animal is the unit operation exposure count multiplied by the number of units (hours, sonobuoys, etc). The tables below are organized by alternative and threshold level; each table represents the total yearly exposures modeled at different threshold levels for each alternative. For sonar sources, exposures are reported at the appropriate risk function level, TTS, and PTS.

The number of total exposures at different threshold levels for each alternative are presented in Section 4.1.2 in Volume 2 of the HRC EIS/OEIS.

J.1.6 REFERENCES FOR J.1

Acevedo-Gutierrez, A., D.A. Croll, and B.R. Tershy, 2002. High feeding costs limit dive time in the largest whales. Journal of Experimental Biology 205: 1747-1753.

Amano, M. and M. Yoshioka, 2003. Sperm whale diving behavior monitored using a suction-cup-attached TDR tag. *Marine Ecology Progress Series* 258: 291-295.

Angliss, R.P. and R.B. Outlaw, 2005. Alaska Marine Mammal Stock Assessments, 2005. NOAA Technical Memorandum NMFS-AFSC-161. 250 pp.

Arons, A.B., 1954. "Underwater Explosion Shock Wave Parameters at Large Distances from the Charge," J. Acoust. Soc. Am. 26, 343.

Baird, R.W., A.D. Ligon, and S.K. Hooker, 2000. Sub-surface and night-time behavior of humpback whales off Maui, Hawaii: a Preliminary Report. Report under contract #40ABNC050729 from the Hawaiian Islands Humpback Whale National Marine Sanctuary, Kihei, HI to the Hawaii Wildlife Fund, Paia, HI.

Baird, R.W., D.J. McSweeney, A.D. Ligon, and D.L. Webster, 2004. Tagging Feasibility and Diving of Cuvier's Beaked Whales (*Ziphius cavirostris*) and Blainville's Beaked Whales (*Mesoplodon densirostris*) in Hawai'i. Report prepared under Order No. AB133F-03-SE-0986.

Baird, R.W., 2005. "Sightings of dwarf *(Kogia sima*) and pygmy (*K. breviceps*) sperm whales from the Main Hawaiian Islands," *Pacific Science. 59:461-466*.

Baird, R.W., D.L. Webster, D.J. McSweeney, A.D. Ligon, and G.S. Schorr, 2005a. Diving Behavior and Ecology of Cuvier's (*Ziphius cavirostris*) and Blainville's Beaked Whales (*Mesoplodon densirostris*) in Hawai`i. Report prepared by Cascadia Research Collective for the Southwest Fisheries Science Center.

Baird, R.W., D.L. Webster, D.J. McSweeney, A.D. Ligon, G.S. Schorr, and J. Barlow, 2006. Diving behaviour of Cuvier's (*Ziphius cavirostris*) and Blainville's (*Mesoplodon densirostris*) beaked whales in Hawai'i. Canadian Journal of Zoology 84: 1120-1128.

Baird, R.W., M.B. Hanson, and L.M. Dill, 2005b. Factors influencing the diving behaviour of fish-eating killer whale: Sex differences and diel and interannual variation in diving rates. *Canadian Journal of Zoology* 83(2):257-267.

Baird, R.W., M.B. Hanson, E.E. Ashe, M.R. Heithaus, and G.J. Marshall, 2003a. Studies of foraging in "southern resident" killer whales during July 2002: dive depths, bursts in speed, and the use of a "crittercam" system for examining sub-surface behavior. Report prepared under Order number AB133F-02-SE-1744 for the NMFS-NMML.

Baird, R.W., D.J. McSweeney, M.R. Heithaus, and G.J. Marshall, 2003b. Short-finned pilot whale diving behavior: deep feeders and day-time socialites. Abstract submitted to the 15th Biennial Conference on the Biology of Marine Mammals, Greensboro, NC, December 2003.

Baird, R.W., J.F. Borsani, M.B. Hanson, and P.L. Tyack, 2002. Diving and night-time behavior of long-finned pilot whales in the Ligurian Sea. *Marine Ecology Progress Series* 237: 301-305.

Baird, R.W., A.D. Ligon, S.K. Hooker, and A.M. Gorgone, 2001. Subsurface and nighttime behavior of pantropical spotted dolphins in Hawai`i. *Canadian Journal of Zoology* 79: 988-996.

Baker, J.D., and T.C. Johanos, 2004. "Abundance of the Hawaiian monk seal in the main Hawaiian Islands," *Biological Conservation, 116:103-110*.

Barlow, J., 2003. "Cetacean abundance in Hawaiian waters during summer/fall of 2002," *Southwest Fisheries Science Center Administrative Report LJ-03-13*, La Jolla, California: National Marine Fisheries Service.

Barlow, J., 2006. "Cetacean abundance in Hawaiian waters estimated from a summer/fall survey of 2002," *Marine Mammal Science. 22:446-464*.

Bartberger, C.L., 1965. "Lecture Notes on Underwater Acoustics," NADC Report NADC=WR-6509, Naval Air Development Center Technical Report, Johnsville, PA, 17 May (AD 468 869) (UNCLASSIFIED).

Benoit-Bird, K.J. and W.W.L. Au, 2003. Prey dynamics affect foraging by a pelagic predator (*Stenella longirostris*) over a range of spatial and temporal scales. *Behavioral Ecology and Sociobiology* 53: 364-373.

Benoit-Bird, K.J., W.W.L. Au, R.E. Brainard, and M.O. Lammers, 2001. Diel horizontal migration of the Hawaiian mesopelagic boundary community observed acoustically. *Marine Ecology Progress Series* 217: 1-14.

Carretta, J.V., K.A. Forney, M.M. Muto, J. Barlow, J. Baker, B. Hanson, and M.S. Lowry. 2006. U.S. Pacific Marine Mammal Stock Assessments: 2005. U.S. Department of Commerce, NOAA-TM-NMFS-SWFSC–388.

Christian, E.A. and J.B. Gaspin, 1974. Swimmer Safe Standoffs from Underwater Explosions," NSAP Project PHP-11-73, Naval Ordnance Laboratory, Report NOLX-89, 1 July (UNCLASSIFIED).

Corkeron, P.J., and A.R. Martin, 2004. Ranging and diving behaviour of two 'offshore' bottlenose dolphins, Tursiops sp., off eastern Australia. *Journal of the Marine Biological Association of the United Kingdom* 84:465-468.

Croll, D.A., A. Acevedo-Gutierrez, B.R. Tershy, and J. Urban-Ramirez, 2001. The diving behavior of blue and fin whales: is dive duration shorter than expected based on oxygen stores? *Comparative Biochemistry and Physiology a-Molecular and Integrative Physiology* 129:797-809.

Croll D.A., C.W. Clark, J. Calambokidis, W.T. Ellison, and B.R. Tershy, 2001. Effect of anthropogenic low-frequency noise on the foraging ecology of *Balaenoptera* whales. *Animal Conservation* 4:13-27.

Department of the Navy, 1998. “Final Environmental Impact Statement, Shock Testing the SEAWOLF Submarine,” U.S. Department of the Navy, Southern Division, Naval Facilities Engineering Command, North Charleston, SC, 637 p.

Department of the Navy, 2001. “Final Environmental Impact Statement, Shock Trial of the WINSTON S. CHURCHILL (DDG 81),” U.S. Department of the Navy, NAVSEA, 597 p.

Dietz, R., J. Teilmann, M.P. Heide Jorgensen, and M.K. Jensen, 2002. Satellite tracking of humpback whales in West Greenland. National Environmental Research Institute, Ministry of the Environment, Denmark. NERI Technical Report 411.

Dolar, M.L.L., W.A. Walker, G.L. Kooyman, and W.F. Perrin, 2003. Comparative feeding ecology of spinner dolphins (*Stenella longirostris*) and Fraser's dolphins (*Lagenodelphis hosei*) in the Sulu Sea. *Marine Mammal Science* 19(1): 1-19.

Feller, W., 1968. *An Introduction to Probability Theory and Its Application, Vol. 1, 3rd ed.* New York: Wiley.

Finneran, J.J., C.E. Schlundt, D.A. Carder, J.A. Clark, J.A. Young, J.B. Gaspin, and S.H. Ridgway, 2000. “Auditory and behavioral responses of bottlenose dolphins (*Tursiops truncatus*) and a beluga whale (*Delphinapterus leucas*) to impulsive sounds resembling distant signatures of underwater explosions,” *Journal of the Acoustical Society of America,* 108:417-431.

Finneran, J.J., D.A. Carder, and S.H. Ridgway, 2003. “Temporary threshold shift measurements in bottlenose dolphins *Tursiops truncatus*, belugas *Delphinapterus leucas*, and California sea lions *Zalophus californianus*, Environmental Consequences of Underwater Sound (ECOUS) Symposium, San Antonio, TX, 12-16 May 2003.

Finneran, J.J., and C.E. Schlundt, 2004. “Effects of intense pure tones on the behavior of trained odontocetes,” Space and Naval Warfare Systems Center, San Diego, Technical Report 1913, EDO Dynamic Systems, February.

Gilcrest, Cembrola, and Deavenport, 2006. Marine Mammal Acoustic Effect Modeling Using Revised Threshold of 173 dB Energy Level Conducted for RIMPAC 06

Goertner, J.F., 1982. “Prediction of Underwater Explosion Save Ranges for Sea Mammals,” Naval Surface Warfare Center (NSWC) Report NSCW TR 82-188, NSWC, Dahlgren, VA (UNCLASSIFIED).

Goldbogen, J.A., J. Calambokidis, R.E. Shadwick, E.M. Oleson, M.A. McDonald, and J.A. Hildebrand, 2006. Kinematics of foraging dives and lunge-feeding in fin whales. *Journal of Experimental Biology* 209(7):1231-1244.

Hastie, G.D., B. Wilson, and P.M. Thompson, 2006. Diving deep in a foraging hotspot: acoustic insights into bottlenose dolphin dive depths and feeding behaviour*.* *Marine Biology* 148: 1181-1188.

Hooker, S.K. and R.W. Baird, 1999. Deep-diving behaviour of the northern bottlenose whale, *Hyperoodon ampullatus* (Cetacean: Ziphiidae). *Proceedings of the Royal Society, London B* 266: 671-676.

Johanos, T.C., and J.D. Baker (eds.). 2002. The Hawaiian monk seal in the Northwestern Hawaiian Islands, 2002. U.S. Dep. Commer., NOAA Tech. Memo. NOAA-TM-NMFS PIFSC-5, 154 p.)

Johanos, T.C. and J.D. Baker, Eds., 2005. The Hawaiian Monk Seal in the Northwestern Hawaiian Islands, 2002. NOAA Technical Memorandum NMFS-PIFSC-5.

Johnson, M., P.T. Madsen, W.M.X. Zimmer, N. Aguilar de Soto, and P.L. Tyack, 2004. Beaked whales echolocate on prey. *Proceedings of the Royal Society, London B* (Suppl.) 271: S383-S386.

Kastak, D., B.L. Southall, R.J. Schusterman, and C.J. Reichmuth, 1999a. "Temporary threshold shift in pinnipeds induced by octave-band noise in water," In: Abstract, *Journal of the Acoustical Society of America,* 106, No 4, Pt. 2:2251 (4aUW6).

Kastak D., B.L. Southall, R.J. Schusterman, and C.R. Kastak. 2005. "Underwater temporary threshold shift in pinnipeds: Effects of noise level and duration," *Journal of the Acoustical Society of America*, 118:3154–3163.

Keenan, R.E., et al., 2000. "Software Design Description for the Comprehensive Acoustic System Simulation (CASS Version 3.0) with the Gaussian Ray Bundle Model (GRAB Version 2.0)", NUWC-NPT Technical Document 11,231, Naval Undersea Warfare Center Division, Newport, RI, 1 June (UNCLASSIFIED).

Ketten, D., 1998. "Marine Mammal Hearing and Acoustic Trauma: Basic Mechanisms, Marine Adaptations, and Beaked Whale Anomalies," La Spezia, Italy.

Lagerquist, B.A., K.M. Stafford, and B.R. Mate, 2000. Dive characteristics of satellite-monitored blue whales (*Balaenoptera musculus*) off the central California coast. *Marine Mammal Science* 16(2): 375-391.

Ligon, A.D. and R.W. Baird, 2001. Diving behavior of false killer whales off Maui and Lana`i, Hawaii. Abstract presented at 14th Biennial Conference on the Biology of Marine Mammals, Vancouver, Canada, December, 2001.

McGrath, J.R., 1971. "Scaling Laws for Underwater Exploding Wires," J. Acoust. Soc. Am. 50.

Miller, P.J.O., M.P. Johnson, P.L. Tyack, and E.A. Terray, 2004. Swimming gaits, passive drag and buoyancy of diving sperm whales (*Physeter macrocephalus*). *Journal of Experimental Biology* 207: 1953-1967.

Mobley, J.R., S.S. Spitz, K.A. Forney, R. Grotefendt, and P.H. Forestell, 2000. "Distribution and abundance of odontocete species in Hawaiian waters: Preliminary results of 1993-98 aerial surveys," *Southwest Fisheries Science Center Administrative Report LJ-00-14C*, La Jolla, California: National Marine Fisheries Service.

Mobley, J.R., S.S. Spitz, and R. Grotefendt, 2001. *Abundance of humpback whales in Hawaiian waters: Results of 1993-2000 aerial surveys,* Report prepared for the Hawaii Department of Land and Natural Resources and the Hawaiian Islands Humpback Whale National Marine Sanctuary, NOAA, U.S. Department of Commerce.

Nachtigall, P.E., J.L. Pawloski, and W.W.L. Au, 2003a. "Temporary threshold shift and recovery following noise exposure in the Atlantic bottlenosed dolphin (*Tursiops truncates*)," *Journal of the Acoustical Society of America,* 113:3425-3429.

Nachtigall, P.E., J.L. Pawloski, and W.W.L. Au, 2003b, "Temporary threshold shift after noise exposure in bottlenose dolphin (Tursiops truncates)." Marine Mammal Science (in review).

National Marine Fisheries Service, 2005. Incidental Harassment Authorization for Conducting the Precision Strike Weapon (PSW) Testing and Training by Eglin Air Force Base. Federal Register 70, No. 160, 48675-48691.

National Marine Fisheries Service, 2006. Final Rule: for Conducting the Precision Strike Weapon (PSW) Testing and Training by Eglin Air Force Base. Federal Register 71, No. 226, 67810-67823.

National Marine Fisheries Service, 2007. "Recovery Plan for the Hawaiian Monk Seal (*Monachus schauinslandi*) Revision," National Marine Fisheries Service, Silver Spring, MD., 165 pp. [Online]. Available: http://www.nmfs.noaa.gov/pr/pdfs/recovery/hawaiianmonkseal.pdf.

National Oceanic and Atmospheric Administration, 2007. "Taking and Importing Marine Mammals Incidental to the U.S. Navy Operations of Surveillance Towed Array Sensor System Low Frequency Active Sonar." Federal Register, Vol 72, No 161, pages 46845-46893. 21 August.

Nawojchik, R., D.J. St. Aubin, and A. Johnson, 2003. Movements and dive behavior of two stranded, rehabilitated long-finned pilot whales (*Globicephala melas*) in the Northwest Atlantic. *Marine Mammal Science* 19(1): 232-239.

Panigada, S., G. Pesante, M. Zanardelli, and S. Oehen, 2003. Day and night-time behaviour of fin whales in the western Ligurian Sea. Proceedings of the Conference Oceans 2003, September 22-26, 2003, San Diego, CA. Pp. 466-471.

Panigada, S., M. Zanardelli, S. Canese, and M. Jahoda, 1999. How deep can baleen whales dive? *Marine Ecology Progress Series* 187: 309-311.

Papastavrou V., S.C. Smith, H. Whitehead, 1989. Diving behavior of the sperm whale, *Physeter macrocephalus*, off the Galapagos Islands [Ecuador]. *Canadian Journal of Zoology* 67:839-846.

Parrish, F.A., K. Abernathy, G.J. Marshall, and B.M. Buhleier, 2002. "Hawaiian monk seals (*Monachus schauinslandi*) foraging in deep-water coral beds," *Marine Mammal Science 18:244-258*.

Schlundt, C.E., J.J. Finneran, D.A. Carder, and S.H. Ridgway, 2000. "Temporary shift in masked hearing thresholds of bottlenose dolphins, *Tursiops truncatus*, and white whales, *Delphinapterous leucas*, after exposure to intense tones," *Journal of the Acoustical Society of America,* 107:3496-3508.

Scott M.D., A.A. Hohn, A.J. Westgate, J.R. Nicolas, B.R. Whitaker, and W.B. Campbell, 2001. A note on the release and tracking of a rehabilitated pygmy sperm whale (*Kogia breviceps*). *Journal of Cetacean Research and Management* 3:87-94.

Soto, N.A., M. Johnson, P.T. Madsen, P.L. Tyack, A. Bocconcelli, and J.F. Borsani, 2006. Does intense ship noise disrupt foraging in deep-diving Cuvier's beaked whales (*Ziphius cavirostris*)? *Marine Mammal Science* 22(3): 690-699.

Stewart, B.S., 2004. Foraging ecology of Hawaiian monk seals (*Monachus schauinslandi*) at Pearl and Hermes Reef, Northwestern Hawaiian Islands: 1997-1998. Pacific Islands Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Pacific Islands Fish. Sci. Cent. Admin. Rep. H-04-03C, 57 p.

Stewart, B.S. and P.K. Yochem, 2004a. Use of marine habitats by Hawaiian monk seals (*Monachus schauinslandi*) from Kure Atoll: Satellite-linked monitoring in 2001-2002. Pacific Islands Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Pacific Islands Fish. Sci. Cent. Admin. Rep. H-04-01C, 109 p.

Stewart, B.S. and P.K. Yochem, 2004b. Use of marine habitats by Hawaiian monk seals (*Monachus schauinslandi*) from Laysan Island: Satellite-linked monitoring in 2001-2002. Pacific Islands Fish. Sci. Cent., Natl. Mar. Fish. Serv., NOAA, Honolulu, HI 96822-2396. Pacific Islands Fish. Sci. Cent. Admin. Rep. H-04-02C, 127 p.

U.S. Department of the Navy, 2001. *Environmental Impact Statement for the Shock Trial of the WINSTON S. CHURCHILL, (DDG-81)*, Department of the Navy.

U.S. Department of the Navy, 2002. "Record of Decision for Surveillance Towed Array Sensor System Low Frequency Active (SURTASS LFA) Sonar." Federal Register, Vol 67, No. 141, pages 48145-48154. 23 July.

Urick, R.J., 1983. *Principles of Underwater Sound for Engineers*, McGraw-Hill, NY (first edition: 1967, second edition: 1975) (UNCLASSIFIED).

Wahlberg, M., 2002. The acoustic behaviour of diving sperm whales observed with a hydrophone array. *Journal of Experimental Marine Biology & Ecology* 281:53-62.

Ward, W.D., 1997. "Effects of high-intensity sound," In: *Encyclopedia of Acoustics*, ed. M.J. Crocker, 1497-1507. New York: Wiley.

Ward, W.D., A. Glorig, and D.L. Sklar, 1958. "Dependence of temporary threshold shift at 4 kc on intensity and time." *Journal of the Acoustical Society of America,* 30:944–954.

Ward, W.D., A. Glorig, and D.L. Sklar, 1959. "Temporary threshold shift from octave-band noise: Applications to damage-risk criteria," *Journal of the Acoustical Society of America,* 31: 522–528.

Watkins, W.A., M.A. Daher, K.M. Fristrup, T.J. Howald, and G. Notarbartolo di Sciara, 1993. Sperm whales tagged with transponders and tracked underwater by sonar. *Marine Mammal Science* 9: 55-67.

Watwood, S.L., P.J.O. Miller, M. Johnson, P.T. Madsen, and P.L. Tyack, 2006. Deep-diving foraging behaviour of sperm whales (*Physeter macrocephalus*). *Journal of Ecology* 75: 814-825.

Weston, D.E., 1960. "Underwater Explosions as Acoustic Sources," Proc. Phys. Soc. 76, 233 (UNCLASSIFIED).

Whitehead, H., S. Brennan, and D. Grover, 1992. Distribution and behaviour of male sperm whales on the Scotian Shelf, Canada. *Canadian Journal of Zoology* 70: 912-918.

Yelverton, J.T., 1981, "Underwater Explosion Damage Risk Criteria for Fish, Birds, and Mammals," Manuscript, presented at 102nd Meeting of the Acoustical Society of America, Miami Beach, FL, December, 1982, 32p.

Yelverton, J.T., D.R. Richmond, E.R. Fletcher, and R.K. Jones, 1973. Safe distances from underwater explosions for mammals and birds. A final report prepared by the Lovelace Foundation for Medical Education and Research, Albuquerque, NM for the Defense Nuclear Agency, Washington, D.C. 67 pp.

Zimmer, W.M.X., M.P. Johnson, A. D'Amico, P.L. Tyack, 2003. Combining data from a multisensor tag and passive sonar to determine the diving behavior of a sperm whale (*Physeter macrocephalus*). *IEEE Journal of Oceanic Engineering* 28:13-28.

J.2 RISK FUNCTION MODELING

J.2.1 RISK FUNCTION: THEORETICAL AND PRACTICAL IMPLEMENTATION

This section discusses the recent addition of a risk function "threshold" to acoustic effects analysis procedure. This approach includes two parts, a new metric, and a function to map exposure level under the new metric to probability of harassment. What these two parts mean, how they affect exposure calculations, and how they are implemented are the objects of discussion.

J.2.1.1 Thresholds and Metrics

The term "thresholds" is broadly used to refer to both thresholds and metrics. The difference, and the distinct roles of each in effects analyses, will be the foundation for understanding the risk function approach, putting it in perspective, and showing that, conceptually, it is similar to past approaches.

Sound is a pressure wave, so at a certain point in space, sound is simply rapidly changing pressure. Pressure at a point is a function of time. Define p(t) as pressure (in micropascals) at a given point at time t (in seconds); this function is called a “time series.” Figure J-7 gives the time series of the first “hallelujah” in Handel's Hallelujah Chorus.

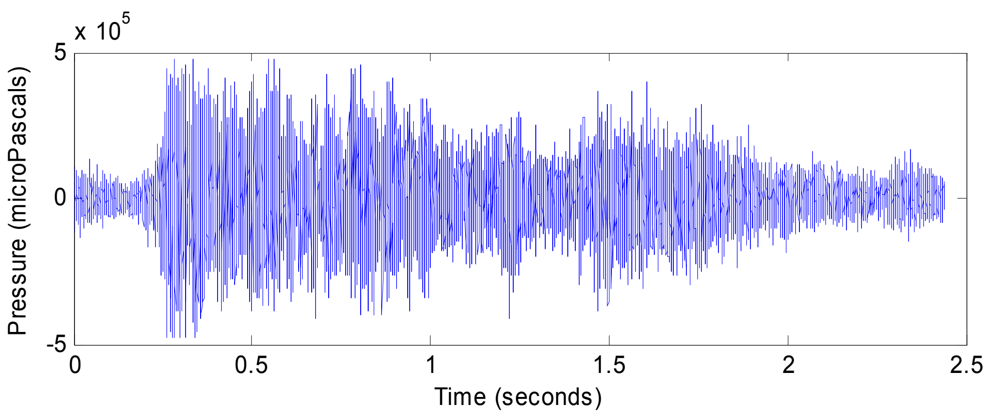


Figure J-7. Time Series

The time-series of a source can be different at different places. Therefore, sound, or pressure, is not only a function of time, but also of location. Let the function p(t), then be expanded to p(t;x,y,z) and denote the time series at point (x,y,z) in space. Thus, the series in Figure J-7 p(t) is for a given point (x,y,z). At a different point in space, it would be different.

Assume that the location of the source is (0,0,0) and this series is recorded at (0,10,-4). The time series above would be p(t;0,10,-4) for 0<t<2.5.

As in Figure J-7, pressure can be positive or negative, but usually the function is squared so it is always positive; this makes integration meaningful. Figure J-8 is $p^2(t;0,10,-4)$.

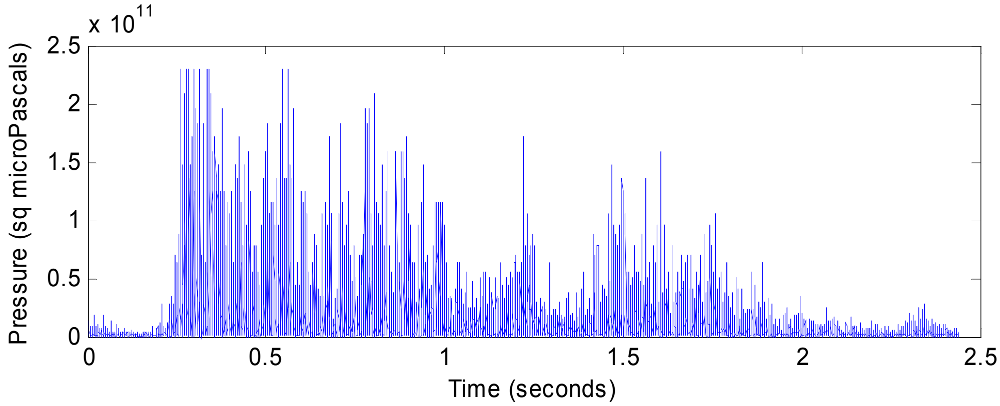


Figure J-8. Time Series Squared

The metric chosen to evaluate the sound field at the end of this first "hallelujah" determines how the time series is summarized from thousands of points, as in Figure J-7, to a single value for each point (x,y,z) in the space. The metric essentially "boils down" the four dimensional p(t,x,y,z) into a three dimensional function m(x,y,z) by dealing with time. There is more than one way to summarize the time component, so there is more than one metric.

Max SPL

One way to summarize $p^2(t; x, y, z)$ to one number over the 2.5 seconds is to only report the maximum value of the function over time or,

$$SPL_{\max} = \max\{p^2(t, x, y, z)\} \text{ for } 0<t<2.5$$

The $SPL_{\max}$ for this snippet of the Hallelujah Chorus is $2.3 \times 10^{11}\, \mu Pa^2$ and occurs at 0.2825 seconds, as shown in Figure J-9.

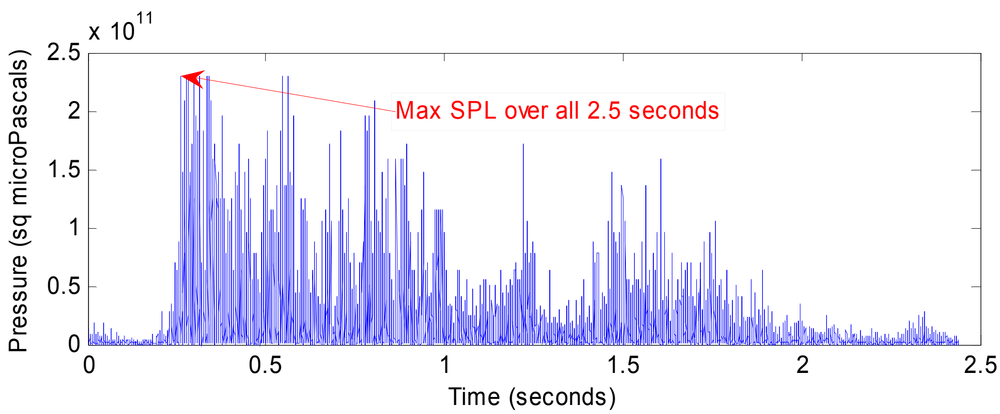


Figure J-9. Max SPL of Time Series Squared

Integration

$SPL_{\max}$ is not necessarily influenced by the duration of the sound (2.5 seconds in this case). Integrating the function over time does take this duration into account. A simple integration of $p^2(t;x,y,z)$ over t is common and usually called "energy."

$Energy = \int_0^T p^2(t,x,y,z)dt$ where T is the maximum time of interest, in this case 2.5

The energy for this snippet of the Hallelujah Chorus is $1.24 \times 10^{11}\ \mu Pa \cdot s$.

Energy is sometimes called "equal energy" because if p(t) is a constant function and the duration is doubled, the effect is the same as doubling the signal amplitude (y value). Thus, the duration and the signal have an "equal" influence on the energy metric.

Mathematically,

$$\int_0^{2T} p(t)^2\,dt = 2\int_0^T p(t)^2\,dt = \int_0^T 2\,p(t)^2\,dt$$

or a doubling in duration equals a doubling in energy equals a doubling in signal.

Sometimes, the integration metrics are referred to as having a "3 dB exchange rate" because if the duration is doubled, this integral increases by a factor of two, or 10log10(2)=3.01 dB. Thus, equal energy has "a 3 dB exchange rate."

After p(t) is determined (i.e., when the stimulus is over), propagation models can be used to determine p(t;x,y,z) for every point in the vicinity and for a given metric. Define

$m_a(x,y,z,T) =$ value of metric "a" at point (x,y,z) after time T

So,

$$m_{energy}(x,y,z;T) = \int_0^T p(t)^2\,dt$$

$$m_{\max SPL}(x,y,z;T) = \max(p(t))\ over\ [0,T]$$

Since modeling is concerned with the effects of an entire event, T is usually implicitly defined: a number that captures the duration of the event. This means that $m_a(x,y,z)$ is assumed to be measured over the duration of the received signal.

Three Dimensions vs Two Dimensions

To further reduce the calculation burden, it is possible to reduce the domain of $m_a(x,y,z)$ to two dimensions by defining $m_a(x,y) = \max\{m_a(x,y,z)\}$ over all z.
This reduction is not used for this analysis, which is exclusively three-dimensional.

Threshold

For a given metric, a threshold is a function that gives the probability of exposure at every value of m_a. This threshold function will be defined as

$$D(m_a(x,y,z)) = \Pr(effect\ at\ m_a(x,y,z))$$

The domain of D is the range of $m_a(x,y,z)$, and its range is the number of thresholds.

An example of threshold functions is the Heavyside (or unit step) function, currently used to determine permanent and temporary threshold shift (PTS and TTS) in cetaceans. For PTS, the metric is $m_{energy}(x,y,z)$, defined above, and the threshold function is a Heavyside function with a discontinuity at 215 dB, shown in Figure J-10.

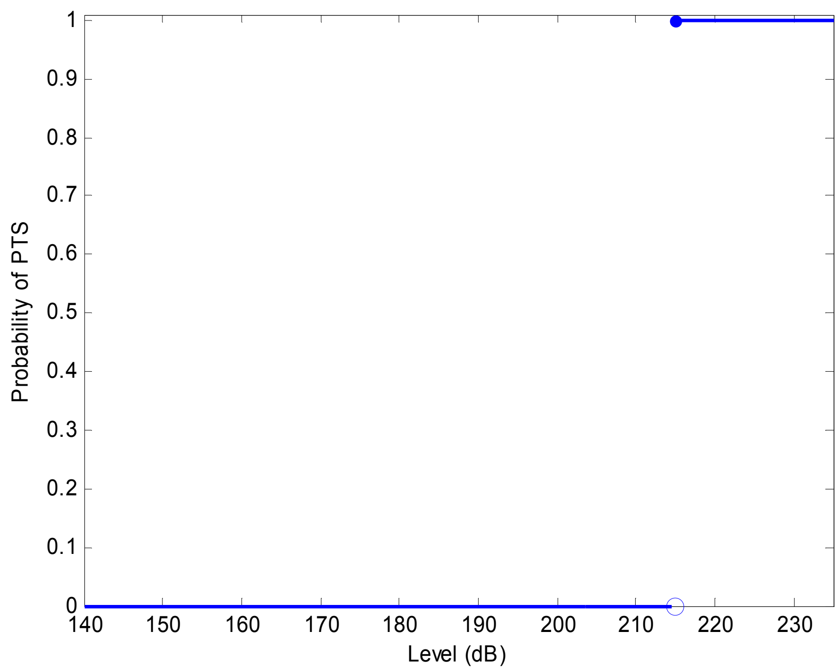


Figure J-10. PTS Heavyside Threshold Function

Mathematically, this D is defined as:

$$D(m_{energy}) = \begin{cases} 0 \ \ for\ m_{energy} < 215 \\ 1 \ \ for\ m_{energy} \geq 215 \end{cases}$$

Any function can be used for D, as long as its range is in [0,1]. The risk function as described in U.S. Department of the Navy (2001), uses the mathematical function below as adapted from a solution in Feller (1968).

$$R = \frac{1-\left(\frac{L-B}{K}\right)^{-A}}{1-\left(\frac{L-B}{K}\right)^{-2A}}$$

Where: R = risk (0 – 1.0);

L = Received Level (RL) in dB;

B = basement RL in dB; (120 dB);

K = the RL increment above basement in dB at which there is 50 percent risk;

A = risk transition sharpness parameter (10) (explained in 3.1.5.3).

Multiple Metrics and Thresholds

It is possible to have more than one metric, and more than one threshold in a given metric. For example, in this document, humpback whales have two metrics (energy and max SPL), and three thresholds (two for energy, one for max SPL). The energy thresholds are heavyside functions, as described above, with discontinuities at 215 and 195 for PTS and TTS respectively.

J.2.1.2 Calculation of Expected Exposures

Determining the number of expected exposures for disturbance is the object of this analysis.

Expected exposures in volume V= $\int_V \rho(V)D(m_a(V))dV$

For this analysis, $m_a = m_{\max SPL}$, so

$$\int_V \rho(V)D(m_a(V)dV = \int_{-\infty}^{\infty}\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} \rho(x,y,z)D(m_{\max SPL}(x,y,z))dxdydz$$

In this analysis, the densities are constant over the x/y plane, and the z dimension is always negative, so this reduces to

$$\int_{-\infty}^{0} \rho(z)\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} D(m_{\max SPL}(x,y,z))dxdydz$$

Numeric Implementation

Numeric integration of $\int_{-\infty}^{\infty} \rho(z)\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} D(m_{\max SPL}(x,y,z))dxdydz$ can be involved because, although the bounds are infinite, D is non-negative out to 120 dB, which, depending on the environmental specifics, can drive propagation loss calculations and their numerical integration out to more approximately 120 km (65 nautical miles) from an AN/SQS 53 sonar having a source level of 235 dB.

The first step in the solution is to separate out the x/y-plane portion of the integral:

Define f(z)= $\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} D(m_{\max SPL}(x,y,z))dxdy$.

Calculation of this integral is the most involved and time consuming part of the calculation. Once it is complete,

$$\int_{-\infty}^{0}\rho(z)\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} D(m_{\max SPL}(x,y,z))dxdydz = \int_{-\infty}^{0}\rho(z)f(z)dz\,,$$

which, when numerically integrated, is a simple dot product of two vectors.

Thus, the calculation of f(z) requires the majority of the computation resources for the numerical integration. The rest of this section presents a brief outline of the steps to calculate f(z) and preserve the results efficiently.

The concept of numerical integration is, instead of integrating over continuous functions, to sample the functions at small intervals and sum the samples to approximate the integral. The smaller the size of the intervals, the closer the approximation, but the longer the calculation, so a balance between accuracy and time is determined in the decision of step size. For this analysis, z is sampled in 5-m steps to 1,000 m in depth and 10-m steps to 2,000 m, which is the limit of animal depth in this analysis. The step size for x is 5 m, and y is sampled with an interval that increases as the distance from the source increases. Mathematically,

$$z \in Z = \{0,5,...1000,1010,...,2000\}$$
$$x \in X = \{0,\pm5,...,\pm5k\}$$
$$y \in Y = \{0,\pm5(1.005)^0,5\pm(1.005)^1,\pm5(1.005)^2,...,5(1.005)^j\}$$

for integers k,j, which depend on the propagation distance for the source. For this analysis, k=20,000 and j=600.

With these steps, $f(z_0)=\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} D(m_{\max SPL}(x,y,z_0))dxdy$ is approximated as

$$\sum_{i\in Y}\sum_{j\in X} D(m_{\max SPL}(x,y,z_0))\left[\left(x_{j+\frac{j}{|j|}}-x_j\right)\left(y_{i+\frac{i}{|i|}}-y_i\right)\right]$$

where X,Y are defined as above.

This calculation must be repeated for each $z_0 \in Z$, to build the discrete function f(z).

With the calculation of f(z) complete, the integral of its product with $\rho(z)$ must be calculated to complete evaluation of

$$\int_{-\infty}^{\infty}\rho(z)\int_{-\infty}^{\infty}\int_{-\infty}^{\infty} D(m_{\max SPL}(x,y,z))dxdydz = \int_{-\infty}^{0}\rho(z)f(z)dz$$

Since f(z) is discrete, and $\rho(z)$ can be readily made discrete,

$\int_{-\infty}^{0} \rho(z) f(z) dz$ is approximated numerically as $\sum_{z \in Z} \rho(z) f(z)$, a dot product.

Preserving Calculations for Future Use
Calculating f(z) is the most time-consuming part of the numerical integration, but the most time-consuming portion of the entire process is calculating $m_{\max SPL}(x, y, z)$ over the area range required for the minimum basement value (120 dB). The calculations usually require propagation estimates out to over 100 km, and those estimates, with the beam pattern, are used to construct a sound field that extends 200 km x 200 km—40,000 sq km, with a calculation at the steps for every value of X and Y, defined above. This is repeated for each depth, to a maximum of 2,000 m.

Saving the entire $m_{\max SPL}(x, y, z)$ for each z is unrealistic, requiring great amounts of time and disk space. Instead, the different levels in the range of $m_{\max SPL}(x, y, z)$ are sorted into 0.5 dB wide bins; the volume of water at each bin level is taken from $m_{\max SPL}(x, y, z)$, and associated with its bin. Saving this, just the amount of water ensonified at each level, at 0.5 dB resolution, preserves the ensonification information without using the space and time required to save $m_{\max SPL}(x, y, z)$ itself. Practically, this is a histogram of occurrence of level at each depth, with 0.5 dB bins. Mathematically, this is simply defining the discrete function V(L,z), where L=.5a for every $a \in R_1$. These functions, or histograms, are saved for future work. The information lost by saving only the histograms is *where* in space the different levels occur, although *how often* they occur is saved. But the thresholds (risk function curves) are purely a function of level, not location, so this information is sufficient to calculate f(z).

Applying the risk function to the histograms is a dot product:

$$\sum_{L \in R_1} D(L) V(L, z_0) \approx \int_{-\infty}^{\infty} \rho(z) \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} D(m_{\max SPL}(x, y, z)) dx dy dz$$

So, once the histograms are saved, neither $m_{\max SPL}(x, y, z)$ nor f(z) must be recalculated to generate $\int_{-\infty}^{\infty} \rho(z) \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} D(m_{\max SPL}(x, y, z)) dx dy dz$ for a new threshold function.

For the interested reader, the following section includes an in-depth discussion of the method, software, and other details of the f(z) calculation.

J.2.1.3 Software Detail

The risk function metric uses the cumulative normal probability distribution to determine the probability that an animal is affected by a given sound pressure level. The probability distribution is defined by the risk function presented above. The acoustic quantity of interest is the maximum sound pressure level experienced over multiple pings in a range-independent environment. The procedure for calculating the impact volume at a given depth is relatively simple.

In brief, given the sound pressure level of the source and the transmission loss (TL) curve, the sound pressure level is calculated on a volumetric grid. For a given depth, volume associated with a sound pressure level interval is calculated. Then, this volume is multiplied by the probability that an animal will be affected by that sound pressure level. This gives the impact volume for that depth, that can be multiplied by the animal densities at that depth, to obtain the number of animals affected at that depth. The process repeats for each depth to construct the impact volume as a function of depth.

The case of a single emission of sonar energy, one ping, illustrates the computational process in more detail. First, the sound pressure levels are segregated into a sequence of bins that cover the range encountered in the area. The sound pressure levels are used to define a volumetric grid of the local sound field. The impact volume for each depth is calculated as follows: for each depth in the volumetric grid, the sound pressure level at each x/y plane grid point is calculated using the sound pressure level of the source, the TL curve, the horizontal beam pattern of the source, and the vertical beam patterns of the source. The sound pressure levels in this grid become the bins in the volume histogram. Figure J-11 shows a volume histogram for a low power sonar. Level bins are 0.5 dB in width and the depth is 50 m in an environment with water depth of 100 m. The oscillatory structure at very low levels is due the flattening of the TL curve at long distances from the source, which magnifies the fluctuations of the TL as a function of range. The "expected" impact volume for a given level at a given depth is calculated by multiplying the volume in each level bin by the risk function probability function at that level. Total expected impact volume for a given depth is the sum of these "expected" volumes. Figure J-12 is an example of the impact volume as a function of depth at a water depth of 100 m.

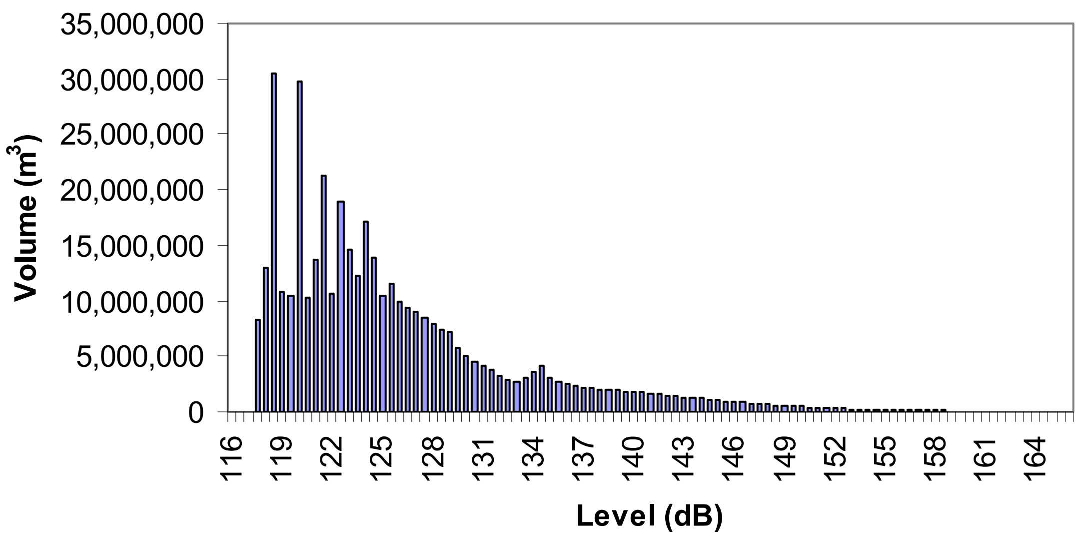


Figure J-11. Example of a Volume Histogram

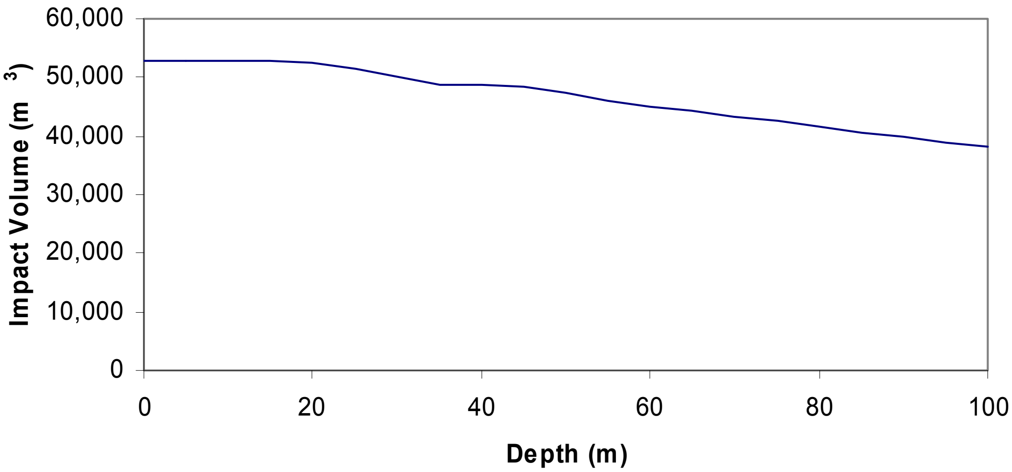


Figure J-12. Example of the Dependence of Impact Volume on Depth

The volumetric grid covers the waters in and around the area of sonar operation. The grid for this analysis has a uniform spacing of 5 m in the x-coordinate and a slowly expanding spacing in the y-coordinate that starts with 5 m spacing at the origin. The growth of the grid size along the y-axis is a geometric series. Each successive grid size is obtained from the previous by multiplying it by 1+Ry, where Ry is the y-axis growth factor. This forms a geometric series. The n^{th} grid size is related to the first grid size by multiplying by $(1+Ry)^{(n-1)}$. For an initial grid size of 5 m and a growth factor of 0.005, the 100^{th} grid increment is 8.19 m. The constant spacing in the x-coordinate allows greater accuracy as the source moves along the x-axis. The slowly increasing spacing in y reduces computation time, while maintaining accuracy, by taking advantage of the fact that TL changes more slowly at longer distances from the source. The x- and y-coordinates extend from –Rmax to +Rmax, where Rmax is the maximum range used in the TL calculations. The z direction uses a uniform spacing of 5 m down to 1,000 m and 10 m from 1,000 to 2,000 m. This is the same depth mesh used for the effective energy metric as described above. The depth mesh does not extend below 2,000 m, on the assumption that animals of interest are not found below this depth.

The next three figures indicate how the accuracy of the calculation of impact volume depends on the parameters used to generate the mesh in the horizontal plane. Figure J-13 shows the relative change of impact volume for one ping as a function of the grid size used for the x-axis. The y-axis grid size is fixed at 5 m and the y-axis growth factor is 0, i.e., uniform spacing. The impact volume for a 5 m grid size is the reference. For grid sizes between 2.5 and 7.5 m, the change is less than 0.1%. A grid size of 5 m for the x-axis is used in the calculations. Figure J-14 shows the relative change of impact volume for one ping as a function of the grid size used for the y-axis. The x-axis grid size is fixed at 5 m and the y-axis growth factor is 0. The impact volume for a 5 m grid size is the reference. This figure is very similar to that for the x-axis grid size. For grid sizes between 2.5 and 7.5 m, the change is less than 0.1%. A grid size of 5 m is used for the y-axis in our calculations. Figure J-15 shows the relative change of impact volume for one ping as a function of the y-axis growth factor. The x-axis grid size is fixed at 5 m and the initial y-axis grid size is 5 m. The impact volume for a growth factor of 0 is the reference. For growth factors from 0 to 0.01, the change is less than 0.1%. A growth factor of 0.005 is used in the calculations.

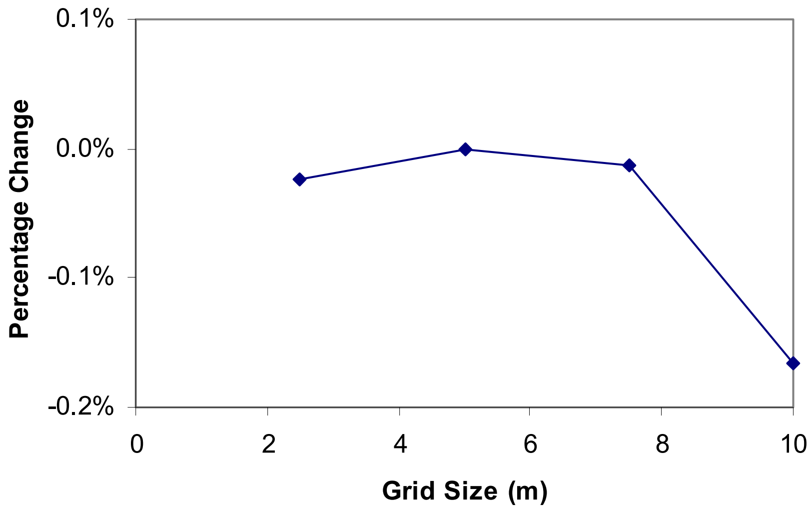


Figure J-13. Change of Impact Volume as a Function of X-axis Grid Size

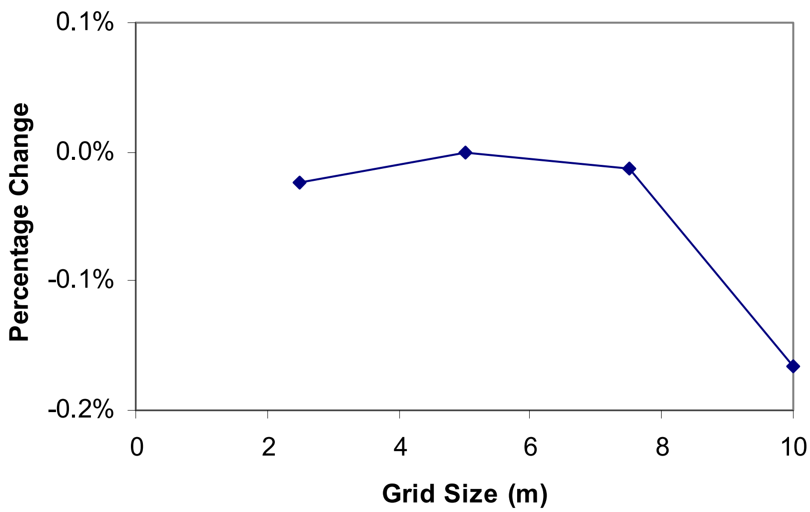


Figure J-14. Change of Impact Volume as a Function of Y-axis Grid Size

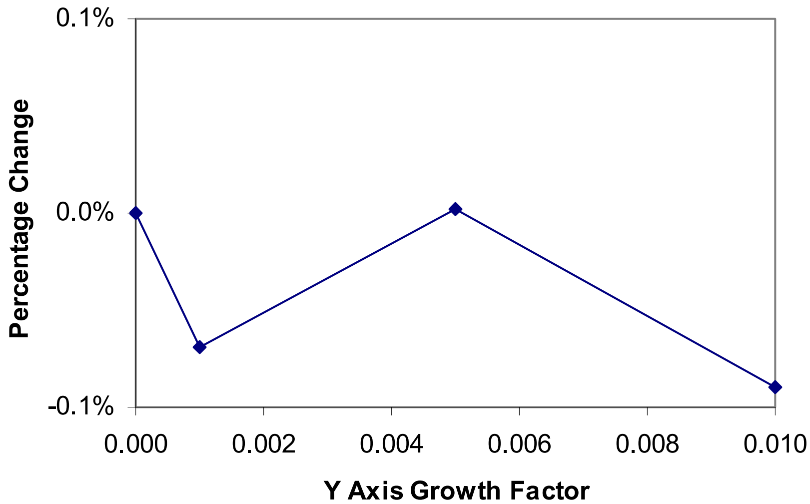


Figure J-15. Change of Impact Volume as a Function of Y-axis Growth Factor

Another factor influencing the accuracy of the calculation of impact volumes is the size of the bins used for sound pressure level. The sound pressure level bins extend from 100 dB (far lower than required) up to 300 dB (much higher than that expected for any sonar system). Figure J-16 shows the relative change of impact volume for one ping as a function of the bin width. The x-axis grid size is fixed at 5 m the initial y-axis grid size is 5 m, and the y-axis growth factor is 0.005. The impact volume for a bin size of 0.5 dB is the reference. For bin widths from 0.25 dB to 1.00 dB, the change is about 0.1%. A bin width of 0.5 is used in our calculations.

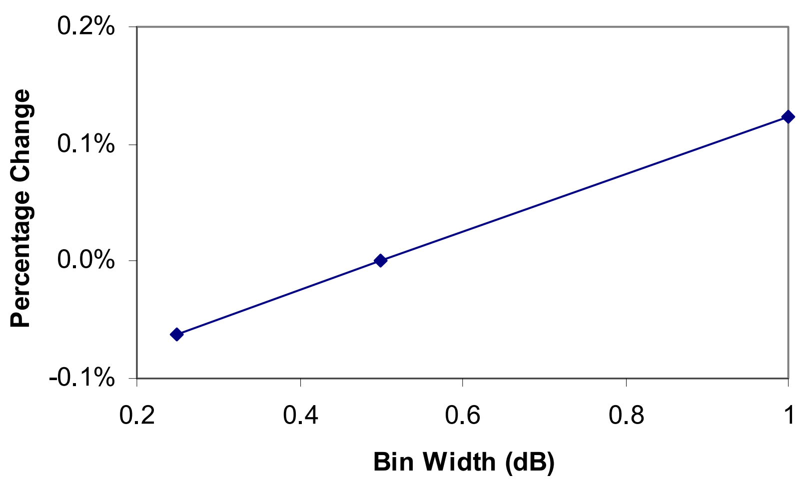


Figure J-16. Change of Impact Volume as a Function of Bin Width

Two other issues for discussion are the maximum range (Rmax) and the spacing in range and depth used for calculating TL. The TL generated for the energy accumulation metric is used for risk function analysis. The same sampling in range and depth is adequate for this metric because it requires a less demanding computation (i.e., maximum value instead of accumulated energy). Using the same value of Rmax needs some discussion since it is not clear that the same value can be used for both metrics. Rmax was set so that the TL at Rmax is more than needed to reach the energy accumulation threshold of 173 dB for 1000 pings. Since energy is accumulated, the same TL can be used for one ping with the source level increased by 30 dB (10 $\log_{10}$(1000)). Reducing the source level by 53 dB, to get back to its original value, permits the handling of a sound pressure level threshold down to 120 dB, established by National Marine Fisheries Service as the minimum required. Hence, the TL calculated to support energy accumulation for 1,000 pings will also support calculation of impact volumes for the risk function metric.

The process of obtaining the maximum sound pressure level at each grid point in the volumetric grid is straightforward. The active sonar starts at the origin and moves at constant speed along the positive x-axis emitting a burst of energy, a ping, at regularly spaced intervals. For each ping, the distance and horizontal angle connecting the sonar to each grid point is computed. Calculating the TL from the source to a grid point has several steps. The TL is made up of the sum of many eigenrays connecting the source to the grid point. The beam pattern of the source is applied to the eigenrays based on the angle at which they leave the source. After summing the vertically beamformed eigenrays on the range mesh used for the TL calculation, the vertically beamformed TL for the distance from the sonar to the grid point is derived by interpolation. Next, the horizontal beam pattern of the source is applied using the horizontal angle connecting the sonar to the grid point. To avoid problems in extrapolating TL, only use grid points with distances less than R_{max} are used. To obtain the sound pressure level at a grid point, the sound pressure level of the source is reduced by that TL. For the first ping, the volumetric grid is populated by the calculated sound pressure level at each grid point. For the second ping and subsequent pings, the source location increments along the x-axis by the spacing between pings and the sound pressure level for each grid point is again calculated for the new source location. Since the risk function metric uses the maximum of the sound pressure levels at each grid point, the newly calculated sound pressure level at each grid point is compared to the sound pressure level stored in the grid. If the new level is larger than the stored level, the value at that grid point is replaced by the new sound pressure level.

For each bin, a volume is determined by summing the ensonified volumes with a maximum SPL in the bin's interval. This forms the volume histogram shown in J-11. Multiplying by the risk function probability function for the level at the center of a bin gives the impact volume for that bin. The result can be seen in Figure J-12, which is an example of the impact volume as a function of depth.

The impact volume for a sonar moving relative to the animal population increases with each additional ping. The rate at which the impact volume increases for the risk function metric is essentially linear with the number of pings. Figure J-17 shows the dependence of impact volume on the number of pings. The function is linear; the slope of the line at a given depth is the impact volume added per ping. This number multiplied by the number of pings in an hour gives the hourly impact volume for the given depth increment. Completing this calculation for all depths in a province, for a given source, gives the hourly impact volume vector which contains the hourly impact volumes by depth for a province. Figure J-18 provides an example of an hourly impact volume vector for a particular environment. Given the speed of the sonar, the hourly impact volume vector could be displayed as the impact volume vector per kilometer of track.

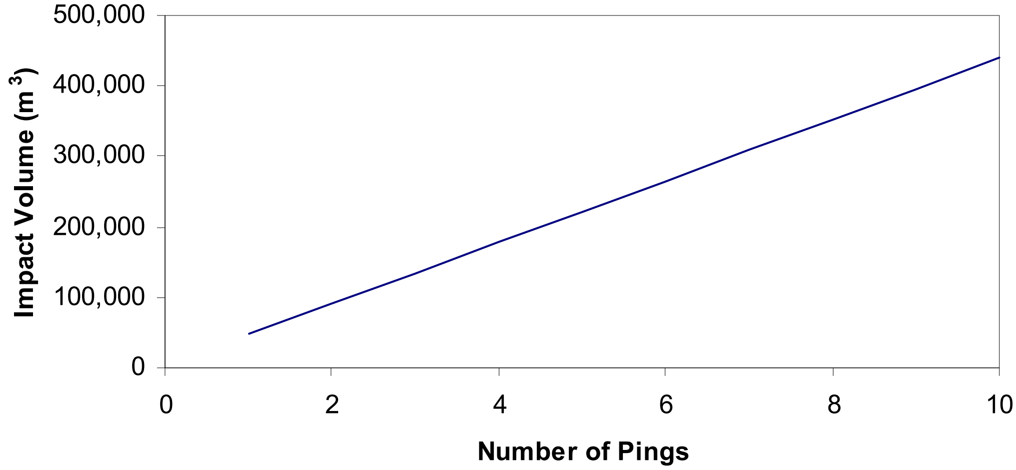


Figure J-17. Dependence of Impact Volume on the Number of Pings

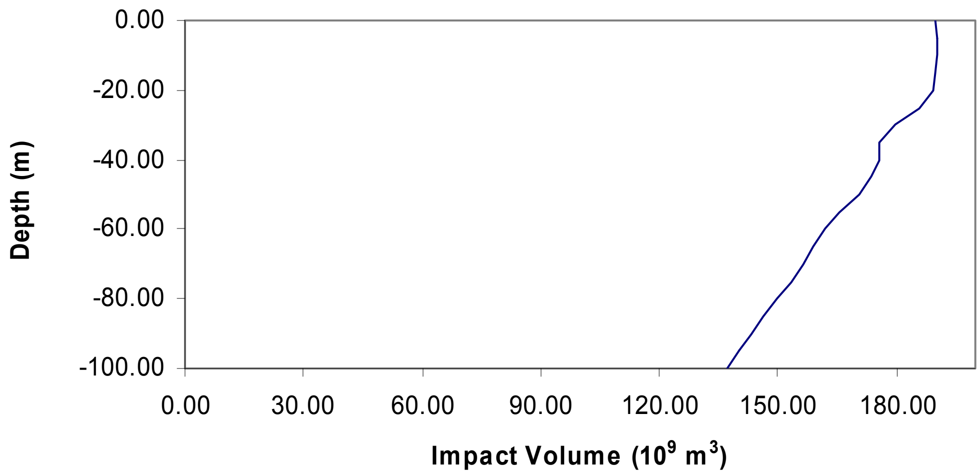


Figure J-18. Example of an Hourly Impact Volume Vector

J.3 DEFINITIONS AND METRICS FOR SOUND AND PROBABILITY/STATISTICS

J.3.1 SOME FUNDAMENTAL DEFINITIONS OF ACOUSTICS

Static Pressure (Acoustics)

At a point in a fluid (gas or liquid), the *static pressure* is the pressure that would exist if there were no sound waves present (paraphrase from Beranek, 1986).

Because *pressure* is a force applied to a unit area, it does not necessarily generate energy. Pressure is a scalar quantity—there is no direction associated with pressure (although a pressure wave may have a direction of propagation). *Pressure* has units of force/area. The SI derived unit of pressure is the pascal (Pa) defined as one N/m^2. Alternative units are many (lbs/ft^2, bars, inches of mercury, etc); some are listed at the end of this section.

Acoustic Pressure

Without limiting the discussion to small amplitude or linear waves, define *acoustic pressure* as the residual pressure over the "average" static pressure caused by a disturbance. As such, the "average" *acoustic pressure* is zero. Here the "average" is usually taken over time (after Beranek, 1986).

Mean-Square Pressure is usually defined as the **short-term** time average of the squared pressure:

$$\frac{1}{T}\int_{\tau}^{\tau+T} p^2(t)dt ,$$

where p is pressure and T is on the order of several periods of the lowest frequency component of the time series starting at time τ. T can be greater, but should be specified as part of the metric.

RMS Pressure is the square root of the mean-square pressure.

Impedance

In general *impedance* measures the ratio of force amplitude to velocity amplitude. For acoustic plane waves, the ratio is ρc, where ρ is the fluid density and c the sound speed.

Equivalent Plane Wave Intensity

As noted by Bartberger (1965) and others, it is general practice to measure (and model) pressure (p) or rms pressure (p_{rms}), and then infer an intensity from the formula for plane waves in the direction of propagation:

$$\text{Intensity} = (p_{rms})^2/\rho c.$$

Such an inferred intensity should properly be labeled as the *equivalent plane-wave intensity in* the *propagation direction*.

Energy Flux Density (EFD)

EFD is the time integral of instantaneous intensity. For plane waves,

$$EFD = \frac{1}{\rho c}\int_0^T p^2(t)dt,$$

where ρc is the impedance. Units are J/m^2.

J.3.2 DEFINITIONS RELATED TO SOUND SOURCES, SIGNALS, AND EFFECTS

Source Intensity

Define *source intensity*, I(θ,ϕ), as the intensity of the projected signal referred to a point at unit distance from the source in the direction (θ,ϕ). (θ,ϕ) is usually unstated; in that case, it is assumed that propagation is in the direction of the axis of the main lobe of the projector's beam pattern.

Source Power

For an omni-directional source, the power radiated by the projector at range r is $I_r(4\pi r^2)$ where I_r is the radiated intensity at range r (in the far field). If intensity has SI units of W/m^2, then the power has units of W. The result can be extrapolated to a unit reference distance if either I_1 is known or $I_r=I_1/r^2$. Then the *source power* at unit distance is $4\pi I_1$, where I_1 is the intensity (any direction) at unit distance in units of power/area.

Pure Tone Signal or Wave (Also, Continuous Wave, CW, Monochromatic Wave, Unmodulated Signal)

Each term means a single-frequency wave or signal. The actual bandwidth of the signal will depend on context, but could be interpreted as “single-frequency as far as can be determined.”

Narrowband Signal

Narrowband is a non-precise term. It is used to indicate that the signal can be treated as a single-frequency carrier signal, which is made to vary (is modulated) by a second signal whose bandwidth is smaller than the carrier frequency. In dealing with sonars, a bandwidth less than about 30% of center frequency is often spoken of as narrowband.

Hearing Threshold

“The *threshold of hearing* is defined as the sound pressure at which one, listening with both ears in a free field to a signal of waning level, can still just hear the sound, or if the signal is being increased from a level below the threshold, can just sense it.” (Magrab, p.29, 1975)

"A threshold of audibility for a specified signal is the minimum effective sound pressure of that signal that is capable of evoking an auditory sensation (in the absence of noise) in a specified fraction of trials." (Beranek, p. 394, 1986)

Temporary (Hearing) Threshold Shift (TTS)

"The diminution, following exposure to noise, of the ability to detect weak auditory signals is termed *temporary threshold shift* (TTS), if the decrease in sensitivity eventually disappears…" (Magrab, p.35, 1975)

Permanent (Hearing) Threshold Shift (PTS)

"The diminution, following exposure to noise, of the ability to detect weak auditory signals is termed temporary threshold shift (TTS), if the decrease in sensitivity eventually disappears, and noise-induced permanent threshold shift (NIPTS) if it does not." (Magrab, p.35, 1975)

J.3.3 DECIBELS AND SOUND LEVELS

Decibel (dB)—Because practical applications of acoustic power and energy involve wide dynamic ranges (e.g., from 1 to 1,000,000,000,000), it is common practice to use the logarithm of such quantities. For a given quantity Q, define the decibel as:

$$10 \log (Q/Q_0) \text{ dB re } Q_0$$

where Q_0 is a reference quantity and log is the base-10 logarithm.

The word "level" usually indicates decibel quantity (e.g., *sound pressure level* or *spectrum level*). Some specific examples for this document follow.

Sound Pressure Level

For pressure p, the *sound pressure level* (SPL) is defined as follows:

$$SPL = 10 \log (p^2/p_0{}^2) \text{ dB re } 1\ p_0{}^2,$$

where p_0 is the reference pressure (usually 1 μPa for underwater acoustics and 20 μPa for in-air acoustics). The convention is to state the reference as p_0 (with the square implicit).

For a pressure of 100 μPa, the SPL would be

$$10 \log [(100\ \mu Pa)^2/ (1\ \mu Pa)^2] \text{ dB re } 1\ \mu Pa$$

$$= 40 \text{ dB re } 1\ \mu Pa$$

This is about the lowest level that a dolphin can hear in water.

Source Level

Refer to source intensity above. Define *source level* as $SL(\theta,\phi) = 10 \log[I(\theta,\phi)/I_0]$, where I_o is the reference intensity (usually that of a plane wave of rms pressure 1 μPa). The reference pressure and reference distance must be specified. When SL does not depend on direction, then the source is said to be *omni-directional;* otherwise it is *directive.*

Intensity Level

It is nearly universal practice to use SPL in place of intensity level. This makes sense as long as impedance is constant. In that case, intensity is proportional to short-term-average, squared pressure, with proportionality constant equal to the reciprocal of the impedance.

When the impedance differs significantly in space or time (as in noise propagation from air into water), the intensity level must specify the medium change and/or the changes in impedance.

Energy (Flux Density) Level (EFDL) Referred to Pressure^2 Time

Note that the abbreviation "EFDL" is not in general usage, but is used here for convenience.

Just as the usual reference for intensity level is pressure (and not intensity itself), the reference often (but not always) used for EFDL is *pressure^2 time*. This makes sense when the impedance is constant. Some examples of conversions follow:

Suppose the integral of the plane-wave pressure-squared time is 1 $\mu Pa^2 s$. Since impedance for water is 1.5 10^{12} μPa(s/m), the EFD is then

$$(1\ \mu Pa^2 s)/(1.5\ 10^{12}\ \mu Pa(s/m)) = 6.66\ 10^{-13}\ \mu Pa\text{-}m = 6.66\ 10^{-19}\ J/m^2$$

Thus an EFDL of 0 dB (re 1 $\mu Pa^2 s$) corresponds to an EFD of 6.66 10^{-19} J/m^2 (in water).

It follows that thresholds of interest for impacts on marine life have values in water as follows:

$$190\ dB\ (re\ 1\ \mu Pa^2 s) = 10^{19} \times 6.66\ 10^{-19}\ J/m^2 = 6.7\ J/m^2$$

$$200\ dB\ (re\ 1\ \mu Pa^2 s) = 66.7\ J/m^2$$

$$215\ dB\ (re\ 1\ \mu Pa^2 s) = 2106.1\ J/m^2$$

Given that 1 J = 1 Ws, notice that these energies are small. Applied to an area the size of a person, 215 dB would yield about 2000 J, or about 2 kWs or about 0.0006 kW-hr.

J.3.4 SOME CONSTANTS AND CONVERSION FORMULAS

Length
1 nm = 1.85325 km
1 m = 3.2808 ft

Speed
1 knot = 0.514791 m/s = 1.85325 km/hr
1 mph= 0.447 m/s= 1.6093 km/hr
1 m/s = 1.94254 knots

Pressure
1 Pa = 1 N/m^2 = 1 J/m^3 = 1 kg/m s^2
1 Pa = 10^6 μ Pa = 10 dyn/cm^2 = 10 μbar
1 μPa = 10^{-5} dyn/cm^2 = 1.4504·10^{-10} psi
1 atm = 1.014 bar = 14.7097 psi
1 kPa = 1000 Pa = 10^9 μPa = 0.145 psi = 20.88 psf

Power
1 W = 1 J/s = 1 Nm/s = 1 kg m^2/s^2
1 W = 10^7 erg/s

Energy (Work)
1 J = 1 N m = 1 kg m^2/s^2
1 J= 10^7 g cm^2/s^2 = 1 W s
1 erg = 1 g cm^2/s^2 = 10^{-7} J
1 kW hr = (3.6) 10^6 J

Acoustic Intensity
1 W/m^2= 1 Pa (m/s) = 10^6 μPa (m/s)
1 W/m^2= 1 J/(s m^2) = 1 N/m s
1 psi in/s = 175 W/m^2 = 1.75 10^8 μPa (m/s)
1 lb/ft s = 14.596 J/m^{2}s = 14.596 W/m^2
1 W/m^2 = 10^7 erg/m^{2}s = 10^3 erg/cm^{2}s

Acoustic Energy Flux Density
1 J/m^2 = 1 N/m = 1 Pa m = 10^6 μPa m = 1 W s/m^2
1 J/m^2 = 5.7 10^{-3} psi in = 6.8 10^{-2} psf ft
1 J/cm^2 = 10^4 J/m^2 = 10^7 erg/cm^2
1 psi in = 175 J/m^2 = 1.75 10^8 μPa m

J.3.5 ADDITIONAL DEFINITIONS FOR METRICS USED IN AIR

Weighted Sound Levels

For sound pressure measurements in air related to hearing, it is common practice to weight the spectrum to reduce the influence of the high and low frequencies so that the response is similar that of the human ear to noise. *A-weighting* is the most common filter, with the weight resembling the ear's responses. Other popular weightings are B and C. The table below gives a sampling of the filter values for selected frequencies.

Frequency (Hz)	A-Weighting (dB)	B-Weighting (dB)	C-Weighting (dB)
10	-70	-38	-14
20	-50	-24	-6
40	-35	-14	-2
80	-23	-7	-1
160	-13	-3	0
320	-7	-1	0
640	-2	0	0
2,000	+1	0	0
5,000	+1	-1	-1
10,000	-3	-4	-4
12,000	-4	-6	-6
20,000	-9	-11	-11

Decibel levels based on these weighted are usually labeled: dBA or dB(A) for A weighting, etc.

Sound Exposure Level (SEL)

For a time-varying sound pressure p(t), *sound exposure level* is computed as

$$\mathrm{SEL} = 10 \log \left[\frac{1}{t_0} \int_0^T p^2(t)\,dt \Big/ p_0^2 \right],$$

where t_0 is 1 second, T is the total duration of the signal (in the same units as those of t_0, namely seconds) and p_0 is the reference pressure (usually 20 μPa).

SEL is thus a function of p(t), T, and the reference pressure. When the impedance of the medium of interest is approximately constant, then SEL can be viewed as the total energy level for the time interval from 0 to T. It has explicit reference units of p_0 for pressure with implicit units of seconds for time.

SEL is almost never used in underwater sound, primarily because it does not account for changes in impedance (as, for example, in sound propagation through sediments). Instead, energy flux density level is the standard.

When p(t) is A-weighted, then the measure is called the *A-weighted SEL* or *ASEL*. Likewise for other weightings.

Equivalent Sound Level (L_{eq})

The *equivalent sound level (L_{eq})* is defined as the A-weighted sound pressure level (SPL) averaged over a specified time period T. It is useful for noise that fluctuates in level with time. L_{eq} is also sometimes called the *average sound level (L_{AT}),* so that $L_{eq} = L_{AT}$ (see, e.g., Crocker, 1997).

If $p_A(t)$ is the instantaneous A-weighted sound pressure and p_{ref} the reference pressure (usually 20 μPa), then

$$L_{eq} = 10 \log \left\{ \left(\frac{1}{T} \int_0^T {p_A}^2(t)\,dt \right) \Big/ p_{ref}^2 \right\}.$$

It is thus equivalent to an average A-weighted intensity or power level.

Note that since the averaging time can be specified to be anything from seconds to hours, L_{eq} has become popular as a measure of environmental noise. For community noise, T may be assigned a value as high as 24 hours or more.

L_{dn} (or DNL)

Following Magrab (1975), L_{dn} was introduced by USEPA in 1974 to provide a single-number measure of community noise exposure over a specified period. It was designed to improve L_{eq} by adding a correction of 10 dB for nighttime levels to account for increased annoyance to the population.

L_{dn} is calculated as the level resulting from a weighted averaging of intensities:

$$10^{L_{dn}/10} = (0.625)10^{L_d/10} + (0.375)10^{(L_n+10)/10}$$

It is thus a long-term-average, weighted function of SPL.

J.3.6 DEFINITIONS FOR PROBABILITY AND STATISTICS (FROM VARIOUS PUBLIC INTERNET SOURCES)

Random Variables

The outcome of an experiment need not be a number, for example, the outcome when a coin is tossed can be “heads” or “tails.” However, we often want to represent outcomes as numbers. A random variable is a function that associates a unique numerical value with every outcome of an experiment. The value of the random variable will vary from trial to trial as the experiment is repeated.

A random variable has either an associated probability distribution (discrete random variable) or probability density function (continuous random variable).

Examples:

1. A coin is tossed 10 times. The random variable X is the number of tails that are noted. X can only take the values 0, 1, ..., 10, so X is a discrete random variable.

2. A light bulb is burned until it burns out. The random variable Y is its lifetime in hours. Y can take any positive real value, so Y is a continuous random variable.

Expected Value (Mean Value)

The expected value (or population mean) of a random variable indicates its average or central value. It is a useful summary value (a number) of the variable’s distribution.

Stating the expected value gives a general impression of the behaviour of some random variable without giving full details of its probability distribution (if it is discrete) or its probability density function (if it is continuous).

Two random variables with the same expected value can have very different distributions. There are other useful descriptive measures which affect the shape of the distribution, for example variance.

The expected value of a random variable X is symbolized by E(X) or μ.

If X is a discrete random variable with possible values x1, x2, x3, ..., xn, and p(xi) denotes P(X = xi), then the expected value of X is defined by:

sum of xi.p(xi)

where the elements are summed over all values of the random variable X.

If X is a continuous random variable with probability density function f(x), then the expected value of X is defined by:

integral of xf(x)dx

Example:

Discrete case: When a die is thrown, each of the possible faces 1, 2, 3, 4, 5, 6 (the xi's) has a probability of 1/6 (the p(xi)'s) of showing. The expected value of the face showing is therefore:

μ = E(X) = (1 x 1/6) + (2 x 1/6) + (3 x 1/6) + (4 x 1/6) + (5 x 1/6) + (6 x 1/6) = 3.5

Notice that, in this case, E(X) is 3.5, which is not a possible value of X.

Variance (Square of the Standard Deviation)

The (population) variance of a random variable is a non-negative number which gives an idea of how widely spread the values of the random variable are likely to be; the larger the variance, the more scattered the observations on average.

Stating the variance gives an impression of how closely concentrated round the expected value the distribution is; it is a measure of the 'spread' of a distribution about its average value.

Variance is symbolized by V(X) or Var(X) or sigma^2

The variance of the random variable X is defined to be:

V(X)=E(X^2)-E(X)^2

where E(X) is the expected value of the random variable X.

Notes

1. the larger the variance, the further that individual values of the random variable (observations) tend to be from the mean, on average;

2. the smaller the variance, the closer that individual values of the random variable (observations) tend to be to the mean, on average;

3. taking the square root of the variance gives the standard deviation, i.e.:

sqrt(V(X))=sigma

4. the variance and standard deviation of a random variable are always non-negative.

Probability Distribution

The probability distribution of a discrete random variable is a list of probabilities associated with each of its possible values. It is also sometimes called the probability function or the probability mass function.

More formally, the probability distribution of a discrete random variable X is a function which gives the probability p(xi) that the random variable equals xi, for each value xi:

p(xi) = P(X=xi)

It satisfies the following conditions:

1. 0 <= p(xi) <= 1

2. sum of all p(xi) is 1

Cumulative Distribution Function

All random variables (discrete and continuous) have a cumulative distribution function. It is a function giving the probability that the random variable X is less than or equal to x, for every value x.

Formally, the cumulative distribution function F(x) is defined to be:

F(x) = P(X<=x)

for

-infinity < x < infinity

For a discrete random variable, the cumulative distribution function is found by summing up the probabilities as in the example below.

For a continuous random variable, the cumulative distribution function is the integral of its probability density function.

Probability Density Function

The probability density function of a continuous random variable is a function which can be integrated to obtain the probability that the random variable takes a value in a given interval.

More formally, the probability density function, f(x), of a continuous random variable X is the derivative of the cumulative distribution function F(x):

f(x) = d/dx F(x)

Since F(x) = P(X<=x) it follows that:

integral of f(x)dx = F(b)-F(a) = P(a<X<b)

If f(x) is a probability density function then it must obey two conditions:

1. that the total probability for all possible values of the continuous random variable X is 1:

    integral of f(x)dx = 1

2. that the probability density function can never be negative: f(x) > 0 for all x.

Normal (Gaussian) Density Function

The normal distribution (the "bell-shaped curve" which is symmetrical about the mean) is a theoretical function commonly used in inferential statistics as an approximation to sampling distributions (see also Elementary Concepts). In general, the normal distribution provides a good model for a random variable, when:

1. There is a strong tendency for the variable to take a central value;
2. Positive and negative deviations from this central value are equally likely;
3. The frequency of deviations falls off rapidly as the deviations become larger.

As an underlying mechanism that produces the normal distribution, one may think of an infinite number of independent random (binomial) events that bring about the values of a particular variable. For example, there are probably a nearly infinite number of factors that determine a person's height (thousands of genes, nutrition, diseases, etc.). Thus, height can be expected to be normally distributed in the population.

J.3.7 REFERENCES FOR J.3

ANSI, 1976. American National Standards Institute, Inc., “American National Standard Acoustical Terminology,” New York.

ANSI S12.12-1992, 1992. “Engineering Method for the Determination of Sound Power Levels of Noise Sources Using Intensity.”

Bartberger, C.L., 1965. “Lecture Notes on Underwater Acoustics,” NADC Report NADC-WR-6509, Naval Air Development Center, Johnsville, PA, 17 May 1965 (AD 468 869).

Beranek, L.L., 1986. Acoustics, American Institute of Physics, Inc., New York.

Beranek, L.L., 1949. Acoustic Measurements, John Wiley and Sons, New York.

Crocker, M.J., 1997. Editor, Encyclopedia of Acoustics, John Wiley & Sons, Inc., New York.

Crocker, M.J. and F. Jacobsen, 1997. “Sound Intensity,” in Crocker (1997).

Fahy, F.J., 1995. Sound Intensity. E&FN Spon, London.

Magrab, E.B., 1975. Environmental Noise Control, John Wiley and Sons, New York.

MHDPM, 1978. McGraw-Hill Dictionary of Physics and Mathematics, D.N. Lapedes (Editor in Chief), McGraw-Hill Book Company, New York.

Pierce, A.D., 1989. Acoustics, An Introduction to Its Physical Principles and Applications, Acoust. Soc. Am., Woodbury, NY.

Ross, D., 1987. Mechanics of Underwater Noise, Peninsula Publishing, Los Altos, CA.

Swets, J.A., 1964. Signal Detection and Recognition by Human Observers, Contemporary Readings, John Wiley and Sons, New York.

Urick, R.J., 1975; 1983. Principles of Underwater Sound, McGraw-Hill, New York.

Yost, W.A. and M.D. Killion, 1997. “Hearing Thresholds,” in Crocker, 1997.

J.3.8 ADDITIONAL REFERENCES GROUPED FOR SELECTED TOPICS

Compliance Documents

NPAL FEIS, 2001. Office of Naval Research, “Final Environmental Impact Statement for the North Pacific Acoustic Laboratory,” Volumes I and II, January 2001.

NPAL LOA, 2002. National Oceanic and Atmospheric Administration/National Marine Fisheries Service, Office of Protected Resources, “Notice of Issuance of a Letter of Authorization, Taking of Marine Mammals Incidental to Operation of a Low Frequency Sound Source by the North Pacific Acoustic Laboratory,” Federal Register, January 22, 2002, (Vol 67, Number 14, Notices, Page 2857-2858).

NPAL ROD, 2002. Department of the Navy, "Record of Decision for the Final Environmental Impact Statement for North Pacific Acoustic Laboratory Project," Federal Register, February 11, 2002, (Vol 67, Number 28, Notices, Page 6237-6239).

Office of Naval Research, 1999. LWAD 99-3 OEA "Overseas Environmental Assessment (OEA) for the Littoral Warfare Advanced Development (LWAD) 99-3 Sea Test," ONR Code 32, 22 July.

Office of Naval Research, 1999. LWAD 99-2 OEA "Overseas Environmental Assessment (OEA) for the Littoral Warfare Advanced Development (LWAD) 99-2 Sea Test," ONR Code 32, 15 April.

SURTASS-LFA

Definitions and Metrics

ANSI, 1976. American National Standards Institute, Inc., "American National Standard Acoustical Terminology," New York.

ANSI S12.12-1992, 1992. "Engineering Method for the Determination of Sound Power Levels of Noise Sources Using Intensity"

Bartberger, C.L., 1965. "Lecture Notes on Underwater Acoustics," NADC Report NADC-WR-6509, Naval Air Development Center, Johnsville, PA, 17 May 1965 (AD 468 869).

Beranek, L.L., 1986. Acoustics, American Institute of Physics, Inc., New York.

Beranek, L.L., 1949. Acoustic Measurements, John Wiley and Sons, New York

Crocker, M.J., 1997. Editor, Encyclopedia of Acoustics, John Wiley & Sons, Inc., New York

Crocker, M.J. and F. Jacobsen, 1997. "Sound Intensity," in Crocker (1997).

Fahy, F.J., 1995. Sound Intensity. E&FN Spon, London.

Green, D.M. and J.A. Swets, 1974. Signal Detection Theory and Psychophysics, Robert E. Krieger Publishing, Huntington.

Kinsler, L.E. and A.R. Frey, 1962. Fundamentals of Acoustics, John Wiley and Sons, New York.

Magrab, E.B., 1975. Environmental Noise Control, John Wiley and Sons, New York.

MHDPM, 1978. McGraw-Hill Dictionary of Physics and Mathematics, D.N. Lapedes (Editor in Chief), McGraw-Hill Book Company, New York.

Pierce, A.D., 1989. Acoustics, An Introduction to Its Physical Principles and Applications, Acoust. Soc. Am., Woodbury, NY.

Ross, D., 1987. Mechanics of Underwater Noise, Peninsula Publishing, Los Altos, CA.

Swets, J.A., 1964. Signal Detection and Recognition by Human Observers, Contemporary Readings, John Wiley and Sons, New York

Urick, R.J., 1975; 1983. Principles of Underwater Sound, McGraw-Hill, New York.

Yost, W.A. and M.D. Killion, 1997. "Hearing Thresholds," in Crocker (1997).

TTS and Related Measurements

Carder, D.A., J.J. Finneran, S.H. Ridgway, and C.E. Schlundt, 1999. Masked temporary threshold shift for impulsive sounds in dolphins and white whales. J. Acoust. Soc. Am. 106(4, Pt. 2):2252.

Carder, D.A., T.L. Kamolnick, C.E. Schlundt, W.R. Elsberry, R.R. Smith, and S.H. Ridgway, 1998. Temporary threshold shift in underwater hearing of dolphins. p. In: Proceedings of the Biological Sonar Conference, Carvoeiro, Portugal (cited in Verboom, 2000)

Finneran, J.J., D.A. Carder, and S.H. Ridgway, 2001. "Temporary threshold shift (TTS) in bottlenose dolphins (*Tursiops truncatus*) exposed to tonal signals," J. Acoust. Soc. Am. 110(5),2749(A), 142nd Meeting of the Acoustical Society of America, Fort Lauderdale, FL, December 2001.

Finneran, J.J. and C.E. Schlundt, 2003. "Effects of intense pure tones on the behavior of trained odontocetes," SPAWAR Systems Center, San Diego, CA 92152, September.

Finneran, J.J., D.A. Carder, and S.H. Ridgway, 2003. "Temporary threshold shift (TTS) measurements in bottlenose dolphins (*Tursiops truncatus*), belugas (*Delphinapterus leucas*), and California sea lions (*Zalophus californianus*)," Environmental Consequences of Underwater Sound (ECOUS) Symposium, San Antonio, TX, May 12–16, 2003.

Kastak, D., and R.J. Schusterman, 1996. Temporary threshold shift in a harbor seal (*Phoca vitulina*). J. Acoust. Soc. Am. 100(3):1905-1908.

Kastak, D., and R.J. Schusterman, 1998. Low-frequency amphibious hearing in pinnipeds: methods, measurements, noise, and ecology. J. Acoust. Soc. Am. 103(4):2216-2228.

Kastak, D., and R.J. Schusterman, 1999. In-air and underwater hearing sensitivity of a northern elephant seal (*Mirounga angustirostris*). Can. J. Zool. 77(11):1751-1758.

Kastak, D., B.L. Southall, R.J. Schusterman, and C.J. Reichmuth, 1999a. Temporary threshold shift in pinnipeds induced by octave-band noise in water. J. Acoust. Soc. Am. 106(4, Pt. 2):2251.

Kastak, D., R.J. Schusterman, B.L. Southall, and C.J. Reichmuth, 1999b. Underwater temporary threshold shift induced by octave-band noise in three species of pinniped. J. Acoust. Soc. Am. 106(2):1142-1148.

Nachtigall, P.E., Pawloski, J.L., and Au, W.W.L., 2003. "Temporary threshold shift and recovery following noise exposure in the Atlantic bottlenosed dolphin (*Tursiops truncatus*)," J. Acoust. Soc.Am. 113, 3425–3429.

Ridgway, S.H., D.A. Carder, R.R. Smith, T. Kamolnick, C.E. Schlundt, and W.R. Elsberry, 1997. Behavioral Responses and Temporary Shift in Masked Hearing Threshold of Bottlenose Dolphins, *Tursiops truncatus*, to 1-second Tones of 141 to 201 dB re 1 μPa. Technical Report 1751, Revision 1, Naval Command, Control and Ocean Surveillance Center (NCCOSC), RDT&E DIV D3503, 49620 Beluga Road, San Diego, CA 92152, September.

Ridgway, S.H., D.A. Carder, R.R. Smith, T. Kamolnick, C.E. Schlundt, and W.R. Elseberry, 1997. Behavioral responses and temporary shift in masked hearing threshold of bottlenose dolphins, *Tursiops truncatus*, to 1-second tones of 141 to 201 dB re 1 µPa. Tech. Rep. 1751. Tech. Rep. to NRaD, RDT&E Div., Naval Command, Control & Ocean Surveillance Center, San Diego, CA. 27 p.

Schlundt, C.E., J.J. Finneran, D.A. Carder, and S.H. Ridgway, 2000. "Temporary shift in masked hearing thresholds (MTTS) of bottlenose dolphins, *Tursiops truncatus*, and white whales, *Delphinapterus leucas*, after exposure to intense tones," J. Acoust. Soc. Am. 107(6), 3496–3508.

SSC, 2004. See Finneran, J.J., and C.E. Schlundt, 2004. "Effects of intense pure tones on the behavior of trained odontocetes." TR 1913, SPAWAR Systems Center (SSC) San Diego, San Diego, CA. [see body of SSC research as reported in papers by Ridgway et al., Schlundt et al., Carder et al., and Finneran et al. sampled within this reference list.]

Noise in Air

Kryter, K.D., 1970. The Effects of Noise on Man, Academic Press, New York.

Newman, J.S. and K.R. Neattie, 1985. "Aviation Noise Effects," Report Number FAA-EE-85-2, U.S. Department of Transportation, Federal Aviation Administration, Office of Environment and Energy, Washington, D.C., March 1985.

NIOSH, 1998. DHHS (NIOSH) Publ. 98-126. NIOSH, Cincinnati, OH. "Criteria for a recommended standard: occupational noise exposure, revised criteria 1998."

OSHA, 1996. Occupational noise exposure in OSHA safety and health standards 29 CFR 1910.95 Fed Regist 61. 9227, 7 March 1996.

"Summary Papers on Human and Animal Hearing Effects in Air," 1991. Special section in J. Acoust. Soc. Am. 90, 124-227 (1991).

J.4 POST ACOUSTIC MODELING ANALYSIS

The acoustic modeling results include additional analysis to account for land mass, multiple ships, and number of animals that could be exposed. Specifically, post modeling analysis is designed to consider:

- Acoustic footprints for sonar sources must account for land masses.
- Acoustic footprints for sonar sources should not be added independently, which would result in overlap with other sonar systems used during the same active sonar activity. As a consequence, the area of the total acoustic footprint would be larger than the actual acoustic footprint when multiple ships are operating together.
- Acoustic modeling should account for the maximum number of individuals of a species that could potentially be exposed to sonar within the course of 1 day or a discreet continuous sonar event if less than 24 hours.

When modeling the effect of sound projectors in the water, the ideal task presents modelers with complete *a priori* knowledge of the location of the source(s) and transmission patterns during the times of interest. In these cases, calculation inputs include the details of ship path, proximity of shoreline, high-resolution density estimates, and other details of the scenario. However, in the HRC, there are sound-producing events for which the source locations, number of projectors, and transmission patterns are unknown, but still require analysis to predict effects. For these cases, a more general modeling approach is required: “We will be operating somewhere in this large area for X hours. What are the potential effects on average?”

Modeling these general scenarios requires a statistical approach to incorporate the scenario nuances into harassment calculations. For example, one may ask: “If an animal receives 130 decibel (dB) sound pressure level (SPL) when the ship passes at closest point of approach (CPA) on Tuesday morning, how do we know it doesn't receive a higher level on Tuesday evening?” This question cannot be answered without knowing the path of the ship (and several other facts). Because the path of the ship is unknown, the number of an individual’s re-exposures cannot be calculated directly. But it can, on average, be accounted for by making appropriate assumptions.

Table J-48 lists unknowns created by uncertainty about the specifics of a future proposed action, the portion of the calculation to which they are relevant, and the assumption that allows the effect to be computed without the detailed information.

Table J-48. Unknowns and Assumptions

Unknowns	Relevance	Assumption
Path of ship (esp. with respect to animals)	Ambiguity of multiple exposures, Local population: upper bound of harassments	Most conservative case: ships are everywhere within SOA
Ship(s) locations	Ambiguity of multiple exposures, land shadow	Equal distribution of action in each modeling area
Direction of sonar transmission	Land shadow	Equal probability of pointing any direction
Number of ships	Effect of multiple ships	Average number of ships per training event
Distance between ships	Effect of multiple ships	Average distance between ships

The following sections discuss three topics that require action details, and describes how the modeling calculations used the general knowledge and assumptions to overcome the future-action uncertainty considering re-exposure of animals, land shadow, and the effect of multiple-ship training events.

Multiple Exposures in General Modeling Scenario

Consider the following hypothetical scenario. A box shaped area is designated on the surface of a well-studied ocean environment with well-known sound propagation characteristics. A sonar-equipped ship and 44,000 whales are inserted into that box and a curtain is drawn. What will happen? This is the general scenario. The details of what will happen behind the curtain are unknown, but the existing knowledge, and general assumptions, can allow for a general calculation of average effects.

For the first period of time, the ship is traveling in a straight line and pinging at a given rate. In this time, it is known how many animals, on average, receive their max SPLs from each ping. As long as the ship travels in a straight line, this calculation is valid. However, after an undetermined amount of time, the ship will change course to a new and unknown heading.

If the ship changes direction 180 degrees and travels back through the same swath of ocean, all the animals the ship passes at closest point of approach (CPA) before the next course change have already been exposed to what will be their maximum SPL, so the population is not “fresh.” If the direction does not change, only new animals will receive what will be their maximum SPL from that ship (though most have received sound from it), so the population is completely “fresh.” Most ship headings lead to a population of a mixed “freshness,” varying by course direction. Since the route and position of the ship over time are unknown, the freshness of the population at CPA with the ship is unknown. This ambiguity continues through the remainder of the training event.

What is known? The source and, in general, the animals remain in the Sonar Operating Area (SOA). Thus, if the farthest range to a possible effect from the ship is X kilometers (km), no animals farther than X km outside of the SOA can be harassed. The intersection of this area with a given animal's habitat multiplied by the density of that animal in its habitat represents the maximum number of animals that can be harassed by activity in that SOA, which shall be defined as “the local population.” Two details: first, this maximum should be adjusted down if a risk function is being used, because not 100 percent of animals within X km of the SOA border will be harassed. Second, it should be adjusted up to account for animal motion in and out of the area.

The ambiguity of population freshness throughout the training event means that multiple exposures cannot be calculated for any individual animal. It must be dealt with generally at the local population level.

Solution to the Ambiguity of Multiple Exposures in the General Modeling Scenario

At any given time, each member of the population has received a maximum SPL (possibly zero) that indicates the probability of harassment during the training event. This probability indicates the contribution of that individual to the expected value of the number of harassments. For example, if an animal receives a level that indicates 50 percent probability of harassment, it contributes 0.5 to the sum of the expected number of harassments. If it is passed later with a higher level that indicates a 70 percent chance of harassment, its contribution increases to 0.7. If two animals receive a level that indicates 50 percent probability of harassment, they together contribute 1 to the sum of the expected number of harassments. That is, we statistically expect exactly one of them to be harassed. Let the expected value of harassments at a given time be defined as “the harassed population” and the difference between the local population (as defined above) and the harassed population be defined as “the unharassed population.” As the training event progresses, the harassed population will never decrease and the unharassed population will never increase.

The unharassed population represents the number of animals statistically “available” for harassment. Since we do not know where the ship is, or where these animals are, we assume an average (uniform) distribution of the unharassed population over the area of interest. The densities of unharassed animals are lower than the total population density because some animals in the local population are in the harassed population.

Density relates linearly to expected harassments. If action A, in an area with a density of 2 animals per square kilometer (km^2) produces 100 expected harassments, then action A in an area with 1 animal per km^2 would produce 50 expected harassments. The modeling produces the number of expected harassments per ping starting with 100 percent of the population unharassed. The next ping will produce slightly fewer harassments because the pool of unharassed animals is slightly less.

For example, consider the case where 1 animal is harassed per ping when the local population is 100, 100 percent of which are initially unharassed. After the first ping, 99 animals are unharassed, so the number of animals harassed during the second ping are

$$10\left(\frac{99}{100}\right) = 1(.99) = 0.99 \text{ animals}$$

and so on for the subsequent pings.

Mathematics

A closed form function for this process can be derived as follows.

Define $P_n =$ unharassed population after ping n

Define $H =$ number of animals harassed in a ping with 100 percent unharassed population

$$P_0 = \text{local population}$$
$$P_1 = P_0 - H$$
$$P_2 = P_1 - H\left(\frac{P_1}{P_0}\right)$$
...
$$P_n = P_{n-1} - H\left(\frac{P_{n-1}}{P_0}\right)$$

Therefore,

$$P_n = P_{n-1}\left(1-\left(\frac{H}{P_0}\right)\right) = P_{n-2}\left(1-\left(\frac{H}{P_0}\right)\right)^2 = \ldots = P_0\left(1-\left(\frac{H}{P_0}\right)\right)^n$$

Thus, the total number of harassments depends on the per-ping harassment rate in an unharassed population, the local population size, and the length of time the sonar operates

Local Population: Upper Bound on Harassments

As discussed above, Navy planners have confined period of sonar use to modeling areas. The size of the harassed population of animals for an action depends on animal re-exposure, so uncertainty about the precise ship path creates variability in the “harassable” population. Confinement of sonar use to a SOA allows modelers to compute an upper bound, or worst case, for the number of harassments with respect to location uncertainty. This is done by assuming that there is a sonar transmitting from each point in the confined area throughout the action length.

NMFS has defined a 24-hour “refresh rate” to account for the maximum number of individuals of a species that could potentially be exposed to sonar within the course of 1 day. The Navy has determined that, in a 24-hour period, all sonar training events in the HRC transmit for a subset of that time, as Table J-49 shows:

Table J-49. Duration of Sonar Use During 24-hour Period

Action	Duration of Sonar Use in 24-hour Period
Other HRC ASW Training	13.5 hours
USWEX	16 hours
RIMPAC	12 hours
Multiple Strike Group	12 hours

Creating the most conservative ship position by assuming that a sonar transmits from each point in the SOA simultaneously can produce an upper bound on harassments for a single ping, but animal motion over the period in the Table J-49 can bring animals into range that otherwise would be out of the harassable population.

Animal Motion Expansion

Though animals often change course to swim in different directions, straight-line animal motion would bring more animals into the harassment area than a “random walk” motion model. Since precise and accurate animal motion models exist more as speculation than documented fact and because the modeling requires an undisputable upper bound, calculation of the upper bound for HRC modeling areas uses a straight-line animal motion assumption. This is a conservative assumption. The consideration of animal motion is to identify the area to be modeled and is not a part of the actual exposure model.

For a circular area, the straight-line motion with initial random direction assumption produces an identical result to the initial fixed direction. Since the HRC SOAs are non-circular polygons, choosing the initial fixed direction as perpendicular to the longest diagonal produces greater results than the initial random direction. Thus, the product of the longest diagonal and the distance the animals move in the period of interest gives the maximum potential expansion in HRC modeling areas due to animal motion. The HRC expansions use this for the animal-motion expansion.

Figure J-19 is an example that illustrates the maximum potential expansion, which occurs during the second arrow.

Risk Function Expansion

The expanded area contains the number of animals that will enter the SOA over the period of interest. However, an upper bound on harassments must also include animals outside the area that would be affected by a ship transmitting from the area’s edge. A gross overestimation could simply include all area with levels greater than the risk function cutoff. In the case of HRC, this would include all area within approximately 120 km from the edge of the adjusted box. This basic method would give a crude and inaccurately high upper bound, since only a fraction of the population is affected in much of that area. A more refined upper bound on harassments can be found by maintaining the assumption that a sonar is transmitting from each point in the adjusted box and calculating the expected ensonified area.

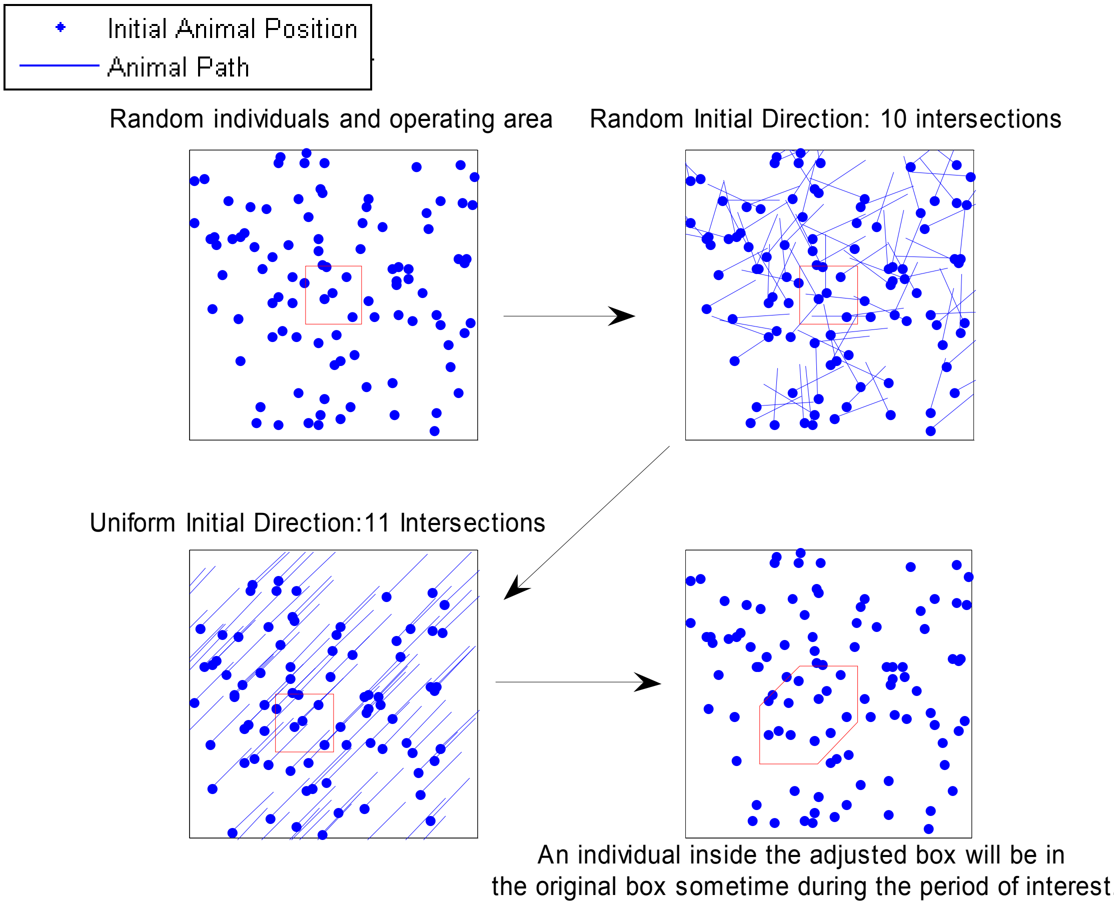


Figure J-19. Process of Determining Maximum Potential Individuals Present in Area at Any Time

The expected lateral range from the edge of a polygon to the cutoff range can be expressed as,

$$\int_{0}^{L^{-1}(120dB)} D(L(r))dr \, ,$$

where D is the risk function with domain in level and range in probability, L is the SPL function with domain in range and range in level, and r is the range from the SOA.

At the corners of the polygon, additional area can be expressed as

$$\frac{[\pi - \theta] \int_{0}^{L^{-1}(120dB)} D(L(r))rdr}{2\pi}$$

with D, L, and r as above, and θ the inner angle of the polygon corner, in radians.

For the risk function and transmission loss of HRC, this method adds an area equivalent to expanding the boundaries of the adjusted box by 4 km. The resulting shape, the adjusted box with a boundary expansion of 4 km, does not possess special meaning for the problem. But the number of individuals contained by that shape, as demonstrated above, is the maximum potential number of harassments that would occur if sonars transmitted continuously from each point in the SOA over the training event length, an upper bound on harassments for that training event.

The plots in Figure J-20 illustrate the growth of area for the sample case above. The shapes of the boxes are unimportant. The area after the final expansion, though, gives an upper bound on the "harassable," or unharassed population.

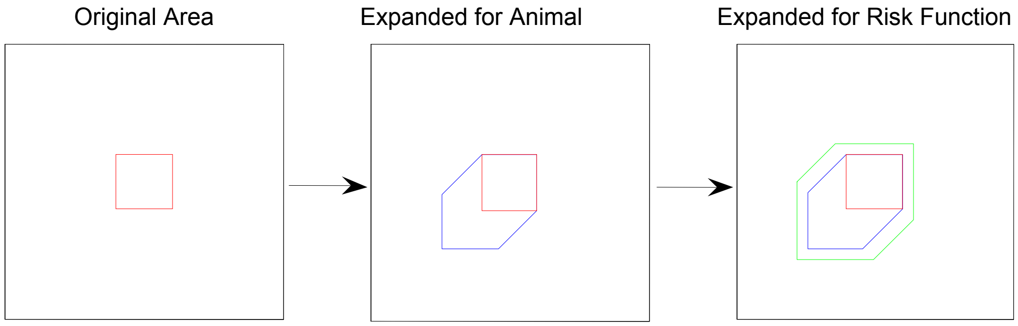


Figure J-20. Process of Expanding Area to Create Upper Bound of Harassments

Example Case

Consider a sample case from the HRC: the rate of exposure for bottlenose dolphins in SOA 2 during the summer, in a Multiple Strike Group Exercise with three active AN/SQS-53 sonars is 0.0234 harassments per ping. The Multiple Strike Group Exercise will transmit sonar pings for 12 hours in a 24-hour period, as given in the action table (Table J-49), with 120 pings per hour, a total of 12*120=1440 pings in a 24-hour period.

SOA 3 has an area of approximately 19,467 km^2 and a diagonal of 217 km. Adjusting this with straight-line (upper bound) animal motion of 5.5 km per hour for 12 hours, animal motion adds 217*5.5*12= 14,322 km^2 to the area. Using risk function to calculate the expected range outside the SOA adds another 1,040 km, bringing the total affected area to 34,458 km^2.

According to Barlow 2006, bottlenose dolphins have a density of 0.0013 animals per km^2 in the Hawaii area, so the upper bound number of bottlenose dolphins that can be affected by sonar activity in SOA 3 in a 12-hour period is 34,458 *0.0013 = 45 dolphins.

In the first ping, 0.0234 bottlenose dolphins will be harassed. With the second ping,

$0.0234\left(\frac{45-0.0234}{45}\right)=0.02338$ bottlenose dolphins will be harassed. Using the formula derived above, after 12 hours of continuous operation, the remaining unharassed population is

$$P_{1440}=P_0\left(1-\left(\frac{h}{P_0}\right)\right)^{1440}=45\left(1-\left(\frac{0.0234}{45}\right)\right)^{1440}\approx 21$$

So the harassed population will be 24 animals.

Contrast this with linear accumulation of harassments without consideration of the local population and the dilution of the unharassed population:

Harassments = 0.234*1440= 34

Figure J-21 illustrates the difference between the two approaches.

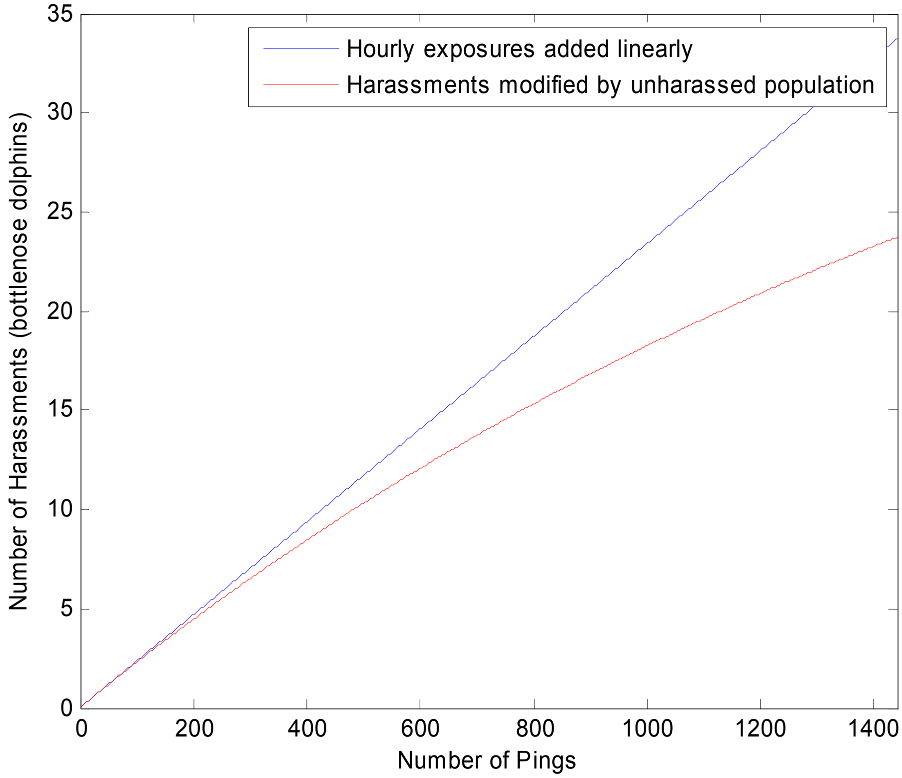


Figure J-21. Comparison of Harassments from Unlimited and Limited Populations

Land Shadow

The risk function considers harassment possible if an animal receives 120 dB sound pressure level, or above. In the HRC, this occurs about 120 km away from an AN/SQS-53-transmitting ship so over a large “effect" area, sonar sound could, but does not necessarily, harass an animal. The harassment calculations for a general modeling case must assume that this effect area covers only water fully populated with animals, but in some portions of the HRC SOAs, land partially encroaches on the area, obstructing sound propagation.

As discussed in the introduction of "Additional Modeling Considerations..." Navy planners do not know the exact location and transmission direction of the sonars at any time. These factors however, completely determine the interference of the land with the sound, or "land shadow," so a general modeling approach does not have enough information to compute the land shadow effects directly. However, modelers can predict the reduction in harassments at any point due to land shadow for different pointing directions and use expected probability distribution of activity to calculate the average land shadow for training events in each SOA.

For HRC, the land shadow is computed over a dense grid in each SOA An example of the grid, for SOA 4, is shown in Figure J-22:

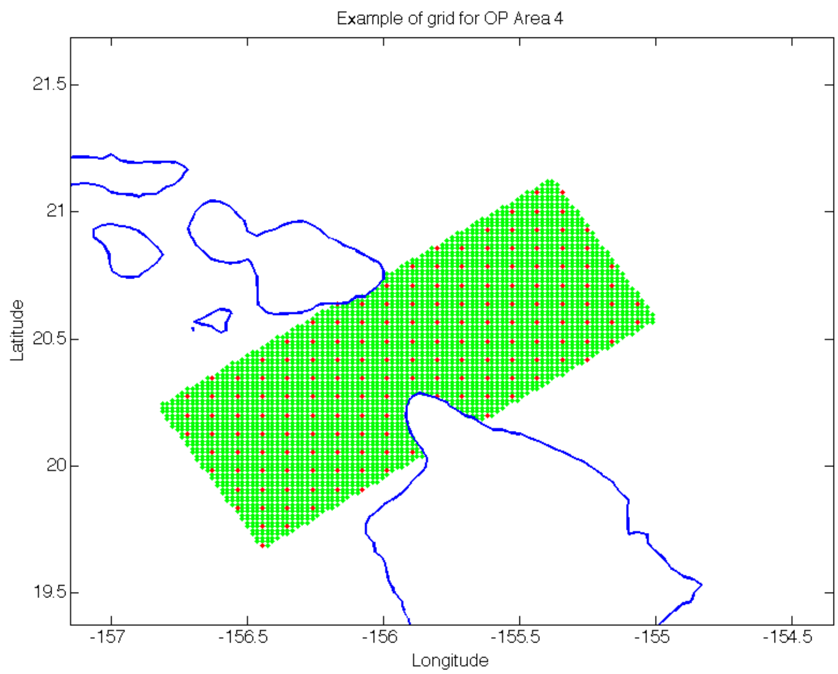


Figure J-22. Grid example, SOA 4. The dense grid is shown by the near continuous green dots. For illustrative purposes, every 25th point is shown as a red dot.

For each grid point, the land shadow is computed by combining the distance to land and the azimuth coverage. The process finds all of the points within 120 km of the gridpoint, as shown in Figure J-23:

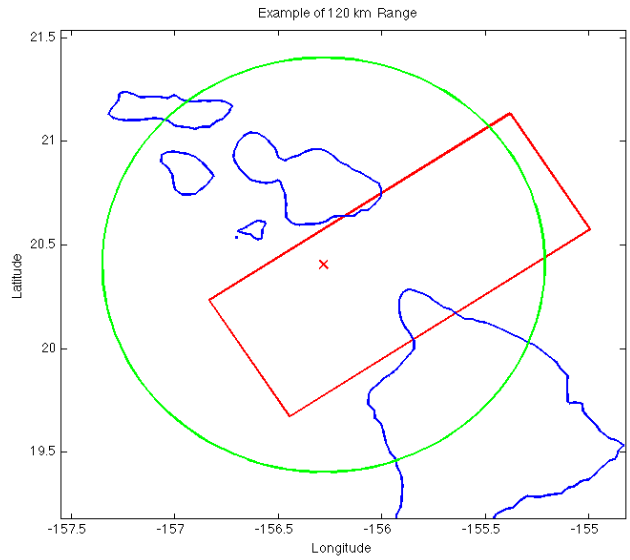


Figure J-23. The red box is the SOA. The red X is one grid point, with the green circle corresponding to a radius of 120 km from the grid point.

For each of the coastal points that are within 120 km of the grid, the azimuth and distance is computed. In the computation, only the minimum range at each azimuth is computed. The minimum range compared with azimuth for the sample point is shown in Figure J-24:

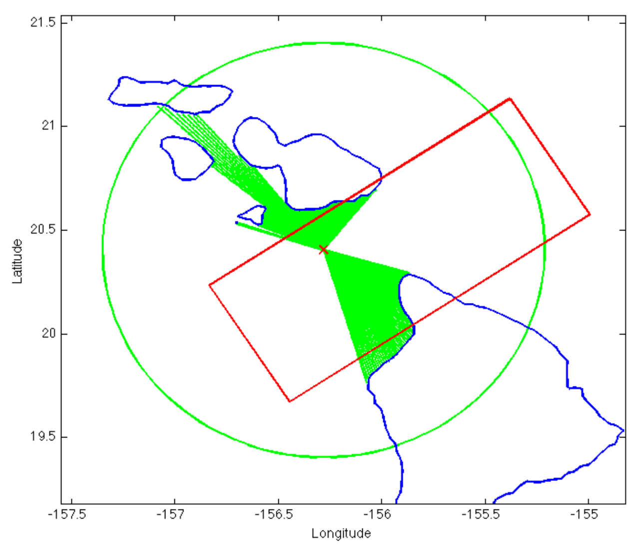


Figure J-24. The nearest point at each azimuth (with 1° spacing) to a sample grid point (red X) is shown by the green lines

Now, the average of the distances to shore, along with the angular profile of land is computed (by summing the unique azimuths that intersect the coast) for each grid point. The values are then used to compute the land shadow for the grid points. The land shadow effect at the example point is .9997, or there is a 0.03 percent reduction in effect due to land shadow.

Computing the Land Shadow Effect at Each Grid Point

The effect of land shadow is computed by determining the levels, and thus the distances from the sources. Table J-50 shows the distances at which harassments occur from for the risk function (SPL) and TTS/PTS (EFD) impact criteria. Figure J-25 displays the percentage of behavioral harassments resulting from the risk function for every 5 dB (bin) of received level.

Table J-50. Harassments at each received level bin

Received Level	Distance at which Levels Occur in HRC	Percent of Harassments Occurring at Given Levels
Below 140 dB SPL	36 km–125 km	<1%
140>Level>150 dB SPL	15 km–36 km	2%
150>Level>160 dB SPL	5 km–15 km	20%
160>Level>170 dB SPL	2 km–5 km	40%
170>Level>180 dB SPL	0.6–2 km	24%
180>Level>190 dB SPL	180–560 meters	9%
Above 190 dB SPL	0–180 meters	2%
TTS (195 dB EFDL)	0-110 meters	2%
PTS (215 dB EFDL)	0-10	<1%

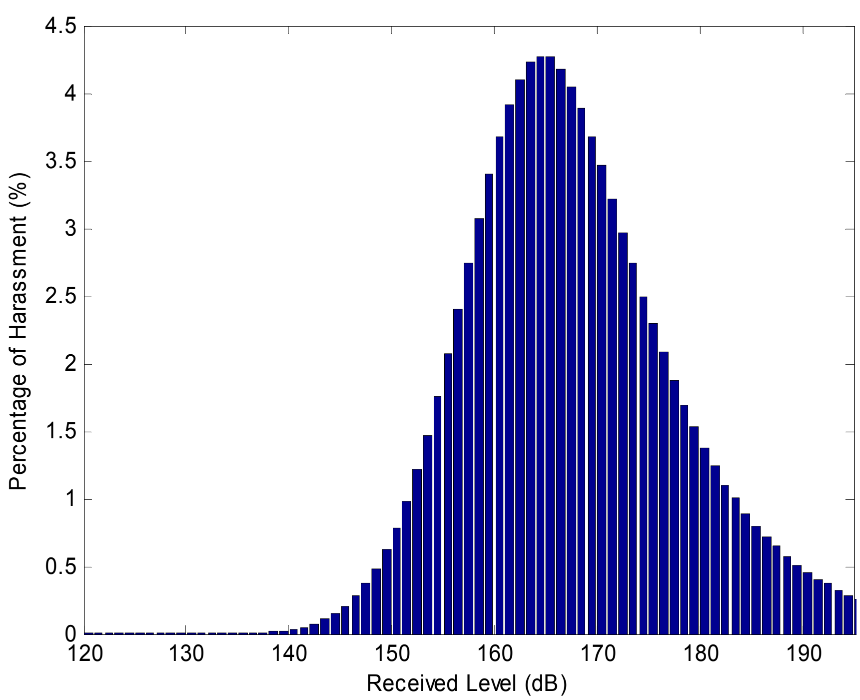


Figure J-25. The percentage of behavioral harassments resulting from the risk function for every 5 dB of received level

The information about the levels at which harassments occur allows for an estimation of the correction required if land obstructs the path of sound before it reaches 120 dB (Figure J-26).

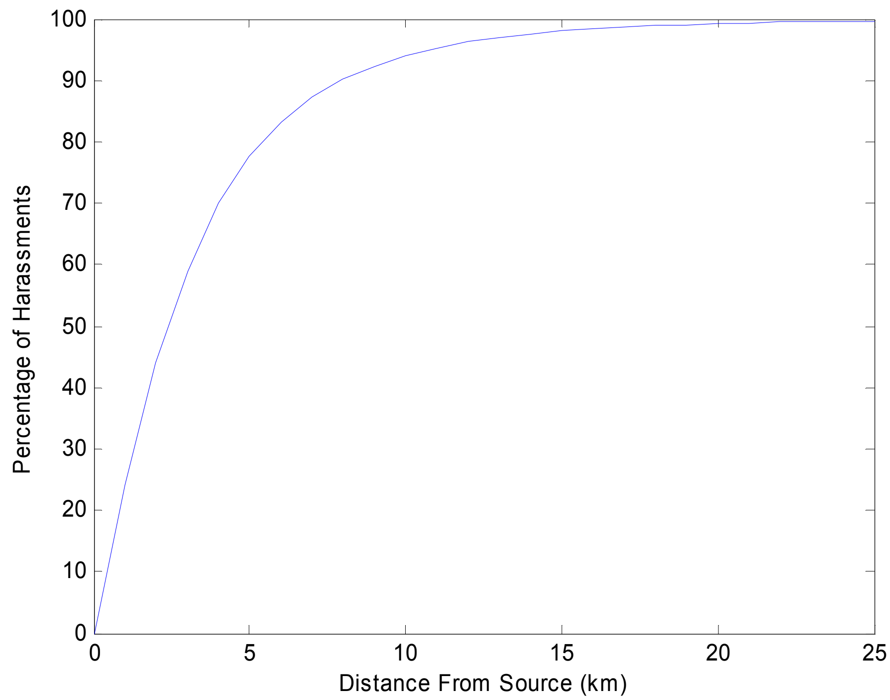


Figure J-26. Percentage of Harassments Occurring Within a Given Distance

With the data used to produce this figure, the effect reduction for a sound path blocked by land can be calculated. For example, since approximately 94 percent of harassments occur within 10 km of the source, a sound path blocked by land at 10 km will cause 94 percent the effect of an unblocked path.

As described above, the mapping process determines the angular profile of and distance to the coastline(s) from each grid point. The distance, then, determines the reduction due to land shadow when the sonar is pointed in that direction. The angular profile, then, determines the probability that the sonar is pointed at the coast.

Define θ_n = angular profile of coastline at point n in radians

Define r_n = mean distance to shoreline

Define A(r) = average effect adjustment factor for sound blocked at distance r

The land shadow at point n can be approximated by $A(r_n)\theta_n/(2\pi)$. The following plots (Figures J-27 through J-33) give the land shadow reduction factor at each point in each SOA. The white portions of the plot indicate the areas more than 120 km from land. The land shadow effects for most points are white (not within 120 km), or burgundy (within 120 km, but negligible effect).

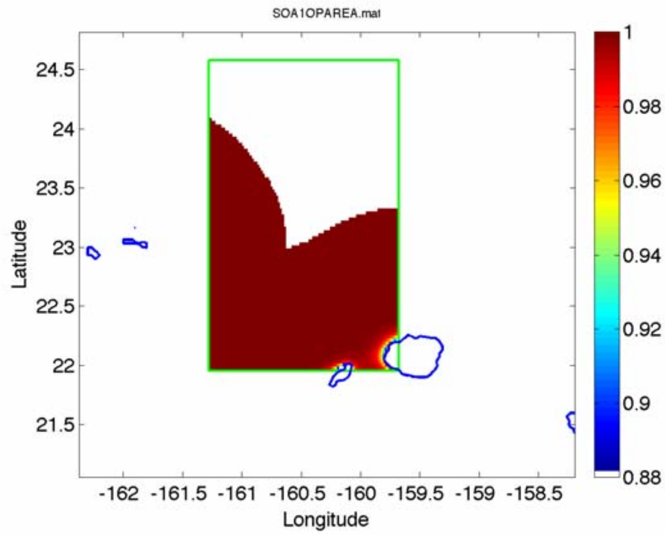


Figure J-27. Land Shadow Factor for SOA 1

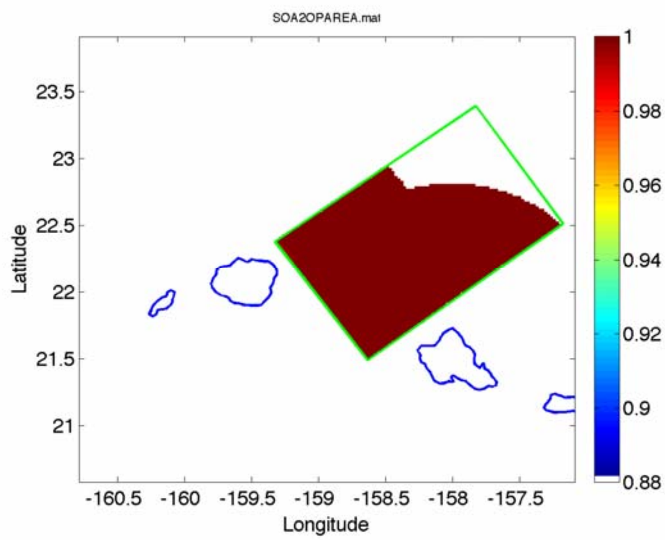


Figure J-28. Land Shadow Factor for SOA 2

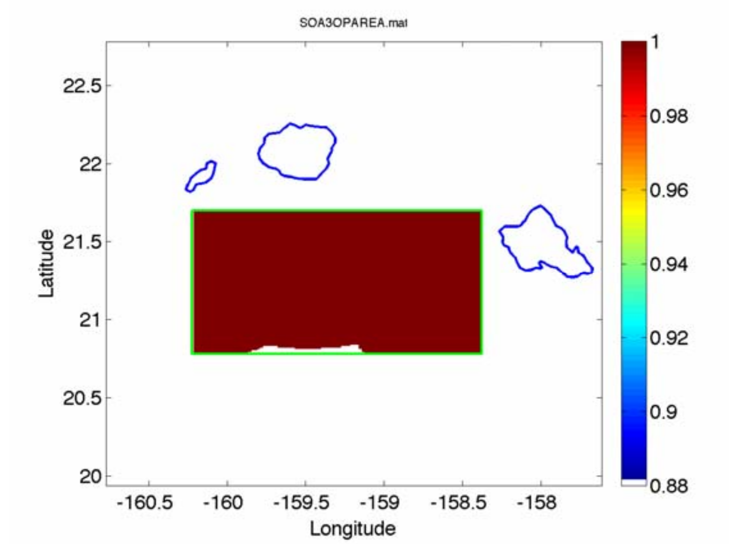


Figure J-29. Land Shadow Factor for SOA 3

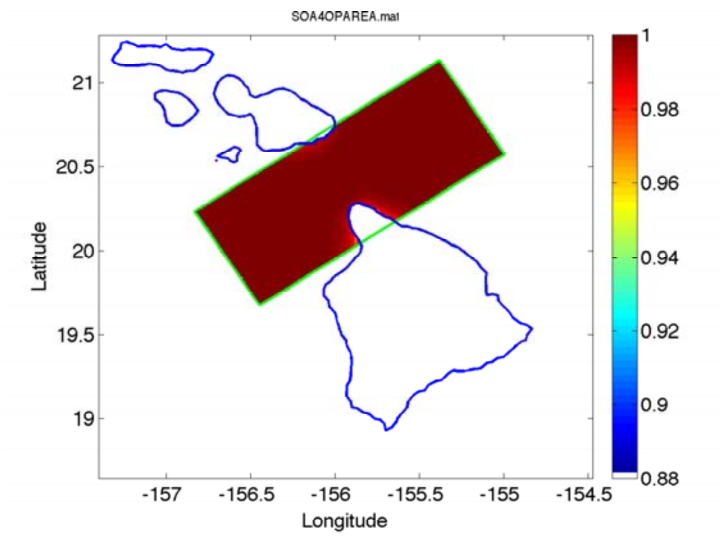


Figure J-30. Land Shadow Factor for SOA 4

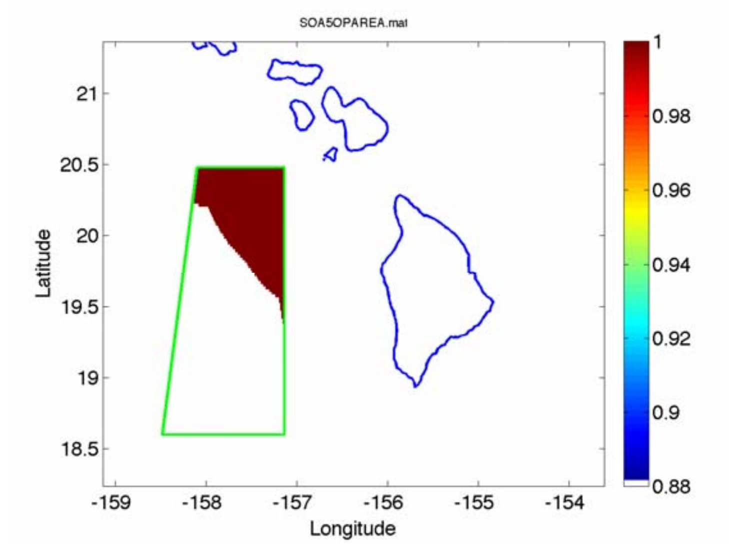


Figure J-31. Land Shadow Factor for SOA 5

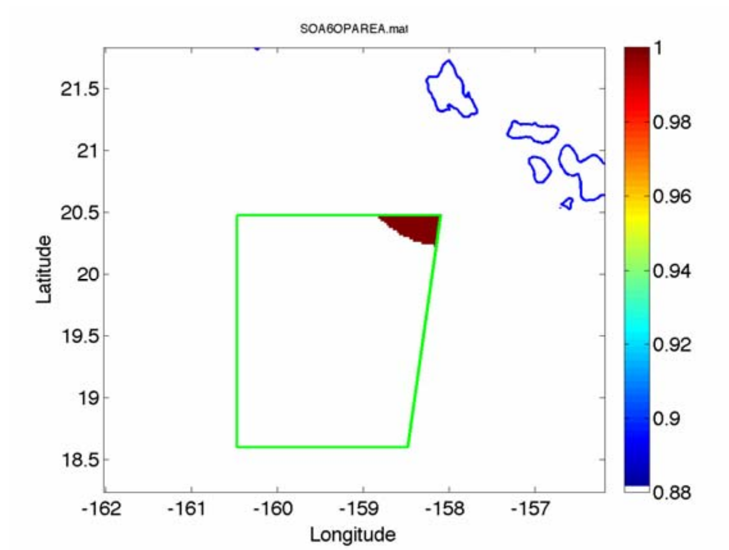


Figure J-32. Land Shadow Factor for SOA 6

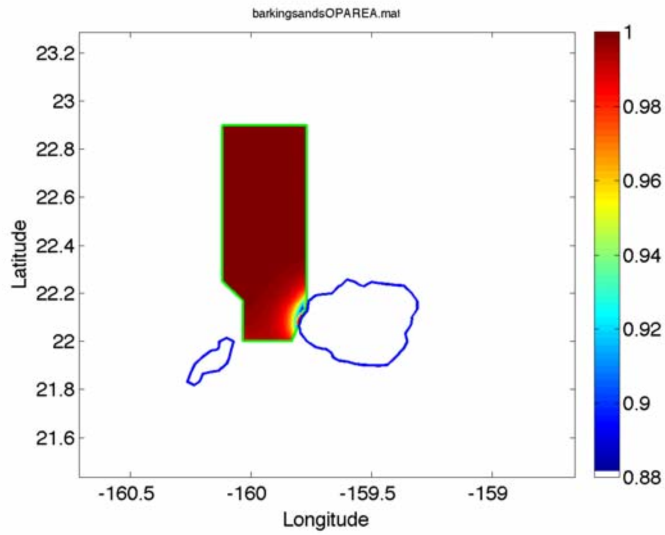


Figure J-33. Land Shadow Factor for Barking Sands Area

Computing the average of the factor value for each area by computing the mean of all sample points' factors yields a greater than 99 percent average factor for each area. In other words, assuming that action is evenly distributed over each SOA, land shadow effects affect the harassment count by less than 1 percent.

The Effect of Multiple Ships

Behavioral harassment, under risk function, uses maximum sound pressure level over a 24-hour period as the metric for determining the probability of harassment. An animal that receives sound from two sonars, operating simultaneously, receives its maximum sound pressure level from one of the ships. Thus, the effects of the louder, or closer, sonar determine the probability of harassment, and the more distant sonar does not. If the distant sonar operated by itself, it would create a lesser effect on the animal, but in the presence of a more dominating sound, its effects are cancelled. When two sources are sufficiently close together, their sound fields within the cutoff range will partially overlap and the larger of the two sound fields at each point in that overlap cancel the weaker. If the distance between sources is twice as large as the range to cutoff, there will be no overlap.

Computation of the overlap between sound fields requires the precise locations and number of the source ships. The general modeling scenarios of HRC do not have these parameters, so the effect was modeled using an average ship distance, 20 km, and an average number of ships per training event. The number of ships per training event varied based on the type of training event, as given in Table J-51.

Table J-51. Average Number of Ships in the HRC by Training Event Type

Training Event Type	Average Number of AN/SQS-53-Transmitting Ships
Other HRC ASW Training	1.5
USWEX	3
RIMPAC	4
Multiple Strike Group	4

The formation of ships in any of the above-referenced training events has been determined by Navy planners. For modeling purposes the ships are located in a straight line, perpendicular to the direction traveled. Figures J-34 and J-35 show examples with four ships, as in RIMPAC or a Multiple Strike Group, and their ship tracks.

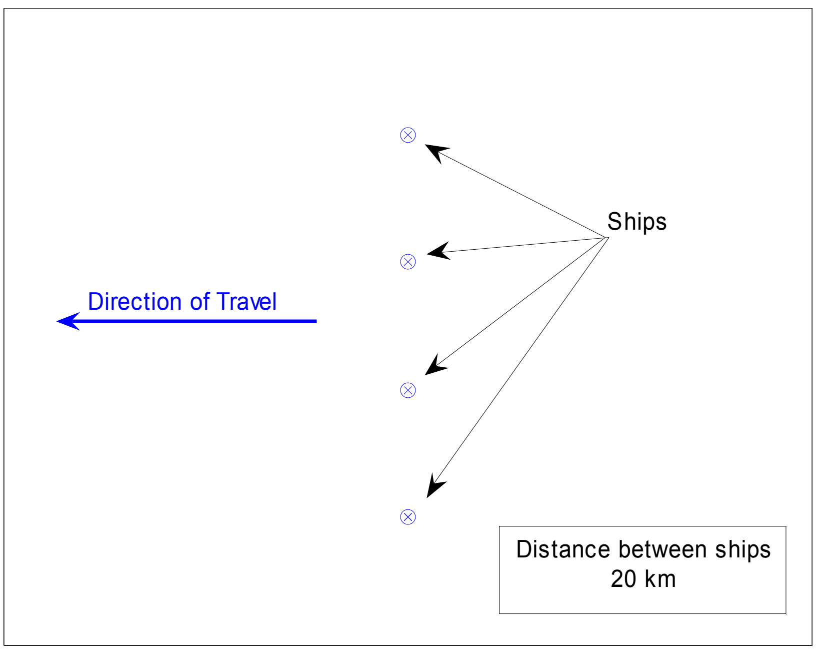


Figure J-34. Formation and Bearing of Ships in RIMPAC

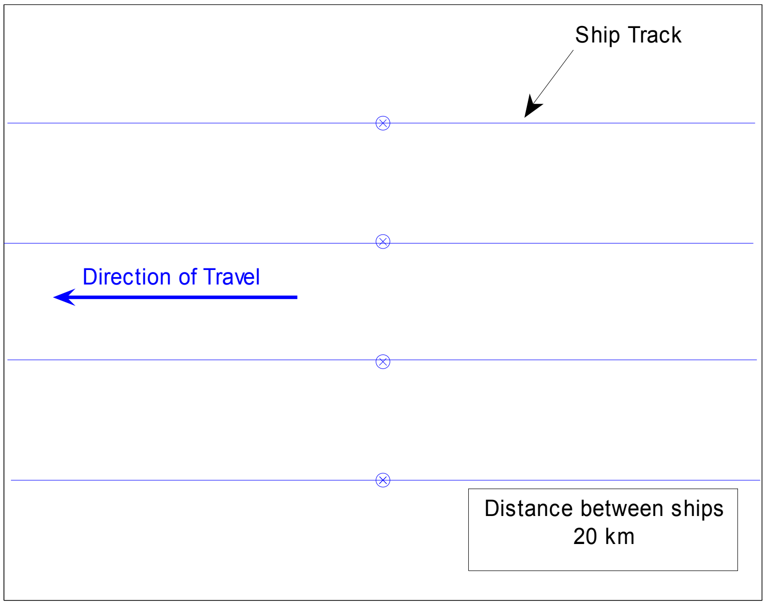


Figure J-35. Ship Tracks of Ships in RIMPAC

The sound field created by these ships (Figure J-36), which transmit sonar continually as they travel, will be uniform in the direction of travel (or the “x” direction), and vary by distance from the ship track in the direction perpendicular to the direction of travel (or the “y” direction).

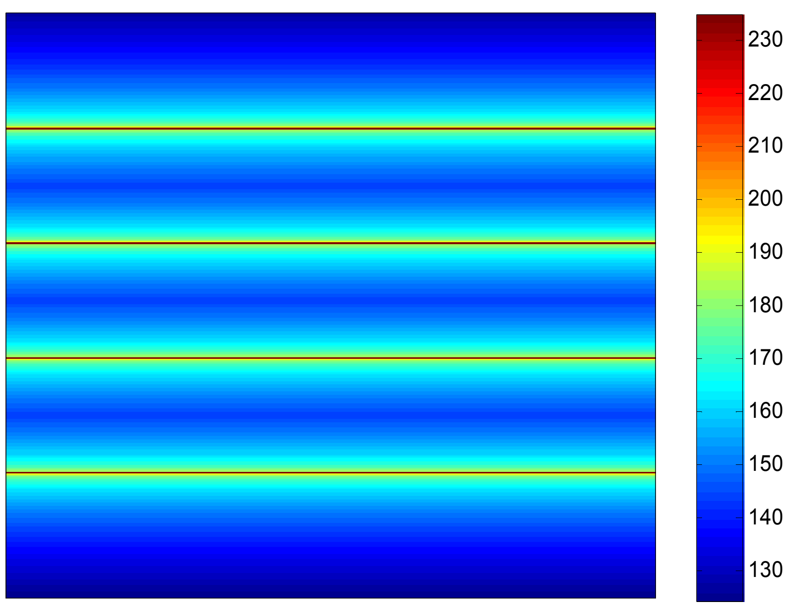


Figure J-36. Sound Field Produced by Multiple Ships

This sound field of the four ships operating together ensonifies less area than four ships operating individually. However, because at the time of modeling, even the average number of ships and mean distances between them were unknown, a post-calculation correction should be applied.

Referring to Figure J-37, the sound field around the ship tracks, the portion above the upper-most ship track, and the portion below the lower-most ship track sum to produce exactly the sound field as an individual ship.

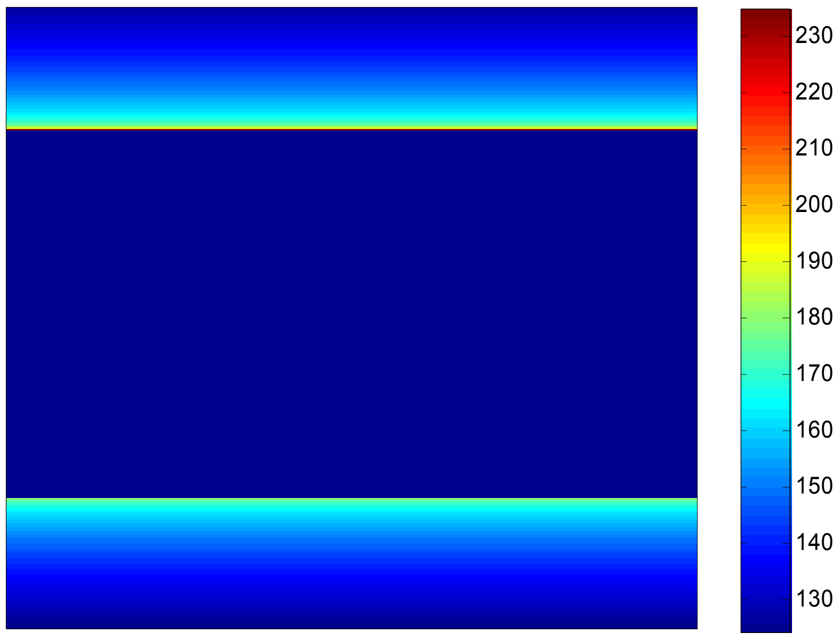


Figure J-37. Upper and Lower Portion of Sound Field

Therefore, the remaining portion of the sound field, between the uppermost ship track and the lowermost ship track, is the contribution of the three additional ships (Figure J-38).

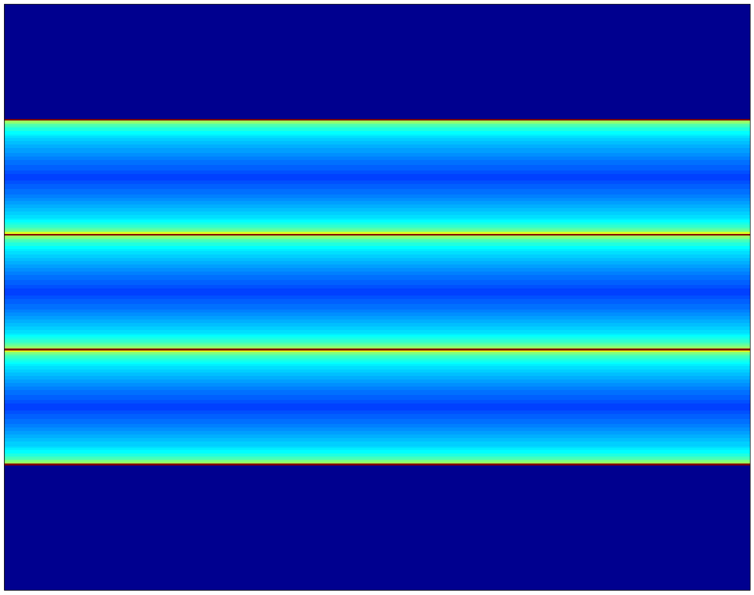


Figure J-38. Central Portion of Sound Field

This remaining sound field is made up of three bands. Each of the three additional ships contributes one band to the sound field. Each band is somewhat less than the contribution of the individual ship because its sound is overcome by the nearer source at the center of the band. Since each ship maintains 20-km distance between it and the next, the height of these bands is 20 km, and the sound from each side projects 10 km before it is overcome by the source on the other side of the band. Thus, the contribution to a sound field for an additional ship is identical to that produced by an individual ship whose sound path is obstructed at 10 km. The work in the previous discussion on land shadow provides a calculation of effect reduction for obstructed sound at each range. For example, an AN/SQS 53 MFA sonar with an obstructed signal at 10 km causes 94 percent of the number of harassments as a ship with an unobstructed signal. Therefore, each additional ship causes 0.94 times the harassments of the individual ship. Applying this factor to the four training event types from Table J-52, an adjustment from the results for a single ship can be applied to predict the effects of multiple ships.

Table J-52. Adjustment Factors for Multiple Ships in HRC Training Events

Training Event Type	Average Number of AN/SQS-53-Transmitting Ships	Adjustment Factor from Individual Ship for Formation and Distance
Other HRC ASW Training	1.5	1.47
USWEX	3	2.88
RIMPAC	4	3.82
Multiple Strike Group	4	3.82

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Appendix K
Missile Launch Safety and Emergency Response

APPENDIX K MISSILE LAUNCH SAFETY AND EMERGENCY RESPONSE

This appendix discusses in general terms the potential health and safety hazards associated with missile launch activities and the corresponding procedures that are in place to protect people and assets. The information herein focuses on the nature and control of the potential hazards and public risks associated with pre-launch, launch, and emergency response.

While range safety is location, facility, and mission-dependent, the Department of Defense (DoD) has established standards and protocols to eliminate or acceptably minimize potential health and safety risks/hazards. For missile launch activities, the safety offices coordinate efforts and standards through the Range Safety Group of the Range Commander's Council (RCC). Three key products of this group are the documents:

- RCC Standard 319, Flight Termination Systems Commonality Standard
- RCC Standard 321, Common Risk Criteria for National Test Ranges, Subtitle: Inert Debris
- RCC Standard 324, Global Positioning and Inertial Measurements Range Safety Tracking Systems Commonality Standard

The Pacific Missile Range Facility (PMRF) Range Safety Office is an active participant in the Range Safety Group, and the Range mandates specific policies that follow from these guidance documents in *PMRF Instruction 8020.16, Missile/Rocket Flight Safety Policy*.

Safety regulations are directed at preventing the occurrence of potentially hazardous accidents and minimizing or mitigating the consequences of hazardous events. This is accomplished by employing system safety concepts and risk assessment methodology to identify and resolve potential safety hazards.

The range safety process is predicated on risk avoidance, minimization of accident impacts, and protection of population centers. Risk values related to missile launch activities are categorized in two ways: probability of vehicle failure, including all possible failure modes that *could* lead to debris impact events, and the probabilities of the adverse consequences that could result from impact events. The consequence estimation is quantified by two key measures: the probability of individual casualty, defined as the probability of a person at a given location being injured, or the expected number of casualties (collective risk), defined as the average number of persons that may be injured in a launch (typically a very small number, such as a few injuries per million launches).

Range safety is accomplished by establishing:

- Requirements and procedures for storage and handling of propellants, explosives, radioactive materials, and toxics

- Evaluation of mission plans to assess risks and methods to reduce risk
- Performance and reliability requirements for flight termination systems on the vehicle
- A real-time tracking and control system at the range
- Mission rules that are sufficient to provide the necessary protection to people both on and outside the boundaries of the launch facility

Procedures and analyses to protect the public can be generally divided into five aspects:

- Ground safety procedures—handling of propellants, ordnance, noise, hazardous operations, toxics, etc.
- Pre-flight mission analysis—vehicle, trajectory, etc.
- Flight termination system verification
- In-flight safety actions
- Emergency response

Ground Safety Procedures

Procedures have been established to handle and store all materials (propellants, etc.) which may be a hazard, control and monitor electromagnetic emissions, and govern transportation of materials to and from a facility. Storage of propellants and explosives is controlled by quantity–distance criteria. Failure modes and effects analyses are prepared when necessary for all potentially hazardous activities and devices.

Accidents that occur before launch can result in on-pad explosions, potential destruction of the vehicle, damage to facilities within range of the blast wave, and dispersion of debris in the vicinity of the pad. The types of accidents depend upon the nature of the propellants. An accident in handling storable hypergolic propellants could produce a toxic cloud, likely to move as a plume and disperse beyond the boundaries of the facility. The risk to the public would then depend upon the concentration of population in the path of this toxic plume and on the ability to evacuate or protect the population at risk until the cloud is dispersed. It is obviously advantageous if the winds generally blow away from populated areas. There are also specific safety requirements and risks associated with ground support equipment. The design and use of this equipment must incorporate safety considerations.

In order to protect personnel and the public from these types of hazards, careful analysis is performed. Each missile is evaluated for the toxic release hazard and explosive potential. When appropriate, more-detailed modeling of the transport of the toxic species is performed that incorporates atmospheric effects, such as local winds and turbulence. Where needed, a region may then be cleared of personnel. At PMRF, the amount of toxic substances is sufficiently small that the public is highly unlikely to be exposed to unhealthful levels of toxic chemicals from a missile accident. However, the range safety community has extensive experience with this type of hazard due to the large amount of toxic chemicals aboard some large space lift vehicles. When considering explosive potential, again each missile is evaluated for the hazard posed. Specific action is then taken to protect personnel within the higher risk region, such as ensuring that they are inside hardened structures (such as block houses) that will protect them from the blast wave. Although large explosions can lead to effects relatively far from the launch pad, the motors proposed at PMRF are small compared to the large space lift vehicles, and the possibility of injury to a person outside the Ground Hazard Area from a missile explosion is extremely remote.

Pre-Flight Mission Analysis

Minimization of the probability of terminating a “good” flight and simultaneous minimization of the potential of risk due to malfunctioning missile is accomplished through careful mission planning, preparation, and approval before launch. Planning is in two parts:

- Mission definition such that land overflights or other higher risk aspects of launch are avoided and/or minimized
- Development of data that support the real-time decision and implementation of active control and destruct activities

Hazard potential exists for a missile in-flight because of the impact of falling debris (at speeds that can cause direct injury or damage buildings with occupants inside) and because of the potential for explosion upon impact of liquid and/or solid propellants. This potential hazard from propellants decreases with time into the flight because the quantities of on-board propellants decrease as they are consumed.

Range Safety Planning

The actual implementation of operational plans under launch conditions ultimately determines the actual risk exposure levels on and off site. Integral to the analysis are the constraints posed by the following:

- Launch area/range geometry and siting
- Nominal flight trajectories/profiles
- Launch/release points
- Impact limit lines, whether based on risk to population/facilities or balanced risk criteria
- Flight termination system and destruct criteria
- Wind/weather restrictions
- Instrumentation for ground tracking and sensing onboard the vehicle
- Essential support personnel requirements

The Range Safety Office typically reviews and approves launch plans, imposes and implements destruct lines, and verifies that appropriate warnings areas have been published.

The launch (normal and failure) scenarios are modeled, and possible system failure modes are superimposed against the proposed nominal flight plan. The hazard to third parties is dependent on the vehicle configuration, flight path, launch location, weather, and many other factors.

A blast danger area around the missile on the launch pad and a launch danger area (typically a circle centered on the pad with tangents extended along the launch trajectory) are prescribed for each missile depending on its type, configuration, amount of propellants and their toxicity, explosive blast wave potential, explosive fragment velocities anticipated in case of an accident, typical weather conditions, and plume models of the launch area.

Each launch is evaluated based on:

- Range user data submission requirements from the hazard analysis viewpoint
- Launch vehicle analyses to determine all significant failure modes and their corresponding probability of occurrence
- The vehicle trajectory, under significant failure mode conditions, which is analyzed to derive the impact of probability density functions for intact, structurally failed, and destructed options
- The vehicle casualty area based on anticipated (modeled) conditions at the time of impact, based on the vulnerability of people, buildings, and vehicles to the hazards to which they may be exposed
- Computed casualty expectations given the specific launch and mission profile, population data near the range and along the ground track. Shelters may be provided or evacuation procedures adopted, in addition to restricting the airspace along the launch corridor and notifying the air and shipping communities to avoid and/or minimize risks

Launch Hazards

Failures during the launch and ascent can be divided into two categories: propulsion and guidance/control. In-flight destruct of the vehicle enables dispersion of propellants, thus reducing the possibility of secondary explosions upon ground impact. The destruct systems on vehicles having cryogenics are designed to minimize the mixing of the propellants, i.e., holes are opened on the opposite ends of the fuel tanks. Solid rocket destruct systems usually consist of linear shaped charges running along the length of the rocket, which open up the side of the casing like a clam shell, causing an abrupt loss of pressure and thrust. They may, however, produce many pieces of debris in the form of burning chunks of propellant and fragments of the motor casing and engines.

Propulsion failures produce a loss of thrust and the inability of the vehicle to ascend. Depending on its altitude and speed when thrust ceases, the vehicle can fall to the ground intact or break up under aerodynamic stresses. The debris from these types of failures typically falls on or very near the intended flight track. If the vehicle falls to the ground intact, the consequences may be similar to those of an explosion on the ground. An explosion leads to a blast wave, which can directly injure people or damage structures with people inside. If there is potential for a significant explosion, a vehicle is destroyed during descent to prevent an impact intact. An example of a propulsion failure is a solid-rocket motor burn-through. Solid rocket motor failures can be due to a burn-through of the motor casing or damage or burn-through of the motor nozzle. In a motor burn-through there is a loss of chamber pressure and an opening is created in the side of the case, frequently resulting in structural breakup. The nozzle burn-through may affect both the magnitude and the direction of thrust. There is no way to halt the burning of a solid rocket once initiated. Hence, a solid rocket motor failure almost inevitably puts the entire launch vehicle and mission at risk.

The Range Safety System (RSS) is critical in the case of guidance or control failures. The purpose of the RSS is to destroy, halt, or neutralize the thrust of an errant vehicle before its debris can be dispersed off-range and become capable of causing damage or loss of life. Without a flight termination system, an errant missile could continue flying toward a population center or other valuable asset. The debris could then injure people or cause considerable damage. The destruct system generally is activated either on command or automatically soon after the time of failure.

In addition to complete loss of control, three other early flight guidance and control failures have been observed with launch vehicles over the life span of the space program: failure to pitch over, pitching over but flying in the wrong direction (i.e., failure to roll before the pitchover maneuver), and having the wrong trajectory programmed into the guidance computer. The likelihood of these circumstances depends on the type of guidance and control used during the early portion of flight. The types are open or closed loop (i.e., no feedback corrections) and programmer or guidance controlled. In the case of vehicles that use programming and open-loop guidance during the first portion of flight, failure to roll and pitch is possible, although relatively unlikely, based on historical flight data. If the vehicle fails to pitch over, it rises vertically until it is destroyed. As it gains altitude, the destruct debris can spread over an increasingly larger area. Consequently, most ranges watch for the pitchover, and if it does not occur before a specified time, they destroy the vehicle before its debris pattern can pose significant risk to structures and people outside the launch facility or the region anticipated to be a hazard zone, where restrictions on airspace and ship traffic apply. Failure to halt the vehicle within this time can produce a significant risk to those not associated with launch activities.

The potential for damage to ground sites from a launch vehicle generally decreases with time into flight since fuel is consumed as the vehicle gains altitude. If it breaks up or is destroyed at a higher altitude, the liquid fuels are more likely to be dispersed and lead to lower concentrations on the ground. In addition, if there are solid propellants, they would have been partially consumed during the flight period before the failure and would continue to burn in free fall after the breakup.

Risk Modeling

The evaluation of launch associated hazards is based on range destruct criteria designed to minimize risk exposure to on- and off-range population and facilities.

Range safety reports, safety analysis reports, and other such probabilistic hazard analyses are prepared by range users for each vehicle. An updated data package is provided for each mission with key unique parameters, such as the flight paths and minor vehicle changes.

Modeling by the Range Safety Office computes risks based on estimating both the probabilities and consequences of launch failures as a function of time into the mission. Input data includes the mission profile, launch vehicle specifics, local weather conditions, and the surrounding population distribution. In many cases, the Range works in advance with the user to optimize a launch trajectory to minimize risk while meeting mission objectives. Destruct lines, which will be implemented in real-time, are established during the risk evaluation process to confine and/or minimize potential public risk of casualty or property damage. The debris impact probabilities and consequences are then estimated for each launch considering the geographic setting, normal jettisons, failure debris, and demographic data.

For all launches, the boosters, sustainers, and other expendable equipment are always jettisoned and fall back to the Earth. Therefore, in planning a mission, care must be taken to keep these objects from impacting on land, aircraft, and shipping lanes. These impact locations are normally quite predictable, so risks can be avoided on a nominal mission.

Destruct lines are designed to protect the public from launch accident debris and are a key result in the risk modeling. They are offset from populated areas to accommodate:

- Vehicle performance characteristics and wind effects
- The scatter of vehicle debris following an explosion
- The accuracy and safety-related tolerances of the vehicle tracking and monitoring system
- The time delays between the impact point impingement on a destruct line and the time at which flight termination actually takes place (i.e., human decision time lag)

By proper selection of destruct lines, the probability of debris impacting inhabited areas can be reduced to extremely small levels.

The first step in modeling debris from failures is to understand the type of failures to which a particular vehicle may be subject. Estimates for failure mode probabilities are typically based on knowledge of a vehicle's critical systems and expert assessment of their reliability combined with historical data, when available.

Then the response of the vehicle to each failure must be modeled. Simulation of the vehicle systems and the resulting vehicle trajectory allow for understanding the effects of a failed component. The modeling is very vehicle-specific until thrust is terminated (by direct result of the failure, automatic on-board termination, flight safety action, or aerodynamic breakup). If the vehicle breaks apart or is destroyed, the resulting debris is then characterized by both aerodynamic properties and properties that affect the consequences if it impacts a person or object. There is inherent uncertainty in these parameters, which is included in the risk modeling.

After thrust is terminated the debris from the accident propagates ballistically (the only forces are drag, lift, and gravity). Debris that is very dense and has a high ballistic coefficient (β) is less affected by the atmosphere and will tend to land closer to the vacuum instantaneous impact point than lower ballistic coefficient pieces. High ballistic coefficients can be associated with pumps, other compact metal equipment, etc. Panels or pieces of motor and rocket skin offer a high drag relative to their mass (a low ballistic coefficient) and consequently slow down much more rapidly in the atmosphere. After slowing down they tend to fall and drift with the wind. A piece of debris with a very low ballistic coefficient (β =1) is shown to stop its forward flight almost immediately and drift to impact in the direction of the wind. Pieces having intermediate value ballistic coefficients show a combination of effects. The uncertainties in the wind and aerodynamics of the pieces are accounted for during this stage, resulting in a dispersion of debris.

For each debris piece that may impact, the consequence is then modeled. Impacting launch vehicle fragments can be divided into four categories:

- Inert pieces of vehicle structure,
- Pieces of solid propellant (some of which may burn up during free fall),
- Vehicle structures which contain propellant (solid or liquid) that may continue to burn after landing (but are non-explosive), and
- Fragments which contain propellant and which can explode upon impact

The consequence of a single fragment impact is quantified by the "casualty area." The casualty area of an impacting fragment is the area about the fragment impact point within which a person would become a casualty. Casualties may result from a direct hit, from a bouncing fragment, from a collapsing structure resulting from an impact on a building or other shelter, from the overpressure pulse created by an explosive fragment, from a fire or toxic cloud produced by the fragment, or some combination thereof. The hazard area is increased if a fragment has any significant horizontal velocity component at impact which could result in bouncing or other horizontal motion near ground level. Casualty area is also affected by the sheltering of people by structures. Usually structures protect people from debris, but a very large impact may also cause portions of a building to collapse, and the people inside are then also hazarded by the debris from the structure. From a consequence standpoint, the pieces having a higher ballistic coefficient impact at a higher velocity (and usually have larger mass) so can cause more severe injuries and more damage.

The regions or areas exposed to accident hazards must be identified and the vulnerability to debris quantified. This is called population modeling. A population model includes the location and number of groups of people as well as the types of structures they are in.

The final step is the computation of risk, both individual probability of casualty and collective expectation of casualty. This calculation incorporates the debris dispersion, the consequence determination, and the population model.

Safety Criteria

Acceptable risk criteria at PMRF are based on the guidance of RCC 321-02, and are currently as follows (per mission):

For mission essential personnel and assets,

- Probability of casualty for each individual must be less than 3 in 1 million (3×10^{-6}),
- Total expectation of casualty must be less than 300 in 1 million (3×10^{-4}),
- Probability of impact upon each aircraft with a 1 gram or greater piece of debris must be less than 1 in 1 million (1×10^{-6}), and

- Probability of impact upon each ship of debris with greater than 11 foot-pounds force (ft-lbf) of energy must be less than 10 in 1 million (1×10^{-5}).

For the general public,

- Probability of casualty for each individual must be less than 1 in 10 million (1×10^{-7}),
- Total expectation of casualty must be less than 30 in 1 million (3×10^{-5}),
- Probability of impact upon each aircraft with a 1 gram or greater piece of debris must be less than 1 in 10 million (1×10^{-7}), and
- Probability of impact on each ship of debris with greater than 11 ft-lbf of energy must be less than 1 in 1 million (1×10^{-6}).

Aircraft and Ship Clearance Procedures

The criteria above are used to determine clearance area for aircraft and ships. Larger warning areas are also published that include the entire region where a hazard may exist.

For aircraft, clearance and warning areas are distributed through the Airmen's Information System and the Notice to Airmen (NOTAM) System. The Airmen's Information System consists of civil aeronautical charts and publications, such as airport/facility directories, published and distributed by the Federal Aviation Administration, National Aeronautical Charting Office. The aeronautical charts and the airport/facility directories contain more permanent data and are the main sources to notify airmen of changes in or to the National Airspace System.

The NOTAM System is a telecommunication system designed to distribute unanticipated or temporary changes in the National Airspace System, or until aeronautical charts and other publications can be amended. This information is distributed in the Notice to Airmen Publication. The Notice to Airmen Publication is divided into four parts: (1) NOTAMs expected to be in effect on the date of publication, (2) revisions to Minimum En Route Instrument Flight Rules Altitudes and Changeover Points, (3) international—flight prohibitions, potential hostile situations, foreign notices, and oceanic airspace notices, (4) special notices and graphics such as military training areas, large scale sporting events, air shows, and airport specific information—Special Traffic Management Programs. Notices in Sections 1 and 2 are submitted through the National Flight Data Center, ATA-110. Notices in Sections 3 and 4 are submitted and processed through Air Traffic Publications, ATA-10. Air Traffic Publications, ATA-10 issues the NOTAM Publication every 28 days.

For ship protection, clearance and warning areas are provided to the Coast Guard. The Coast Guard District is responsible for developing and issuing Local Notices to Mariners. Local Notices to Mariners are developed from information received from Coast Guard field units, the General Public, U.S. Army Corps of Engineers, U.S. Merchant Fleet, National Oceanic and Atmospheric Administration, National Ocean Service, and other sources, concerning the establishment of, changes to, and deficiencies in aids to navigation and any other information pertaining to the safety of the waterways within each Coast Guard District. This information includes reports of channel conditions, obstructions, hazards to navigation, dangers, anchorages, restricted areas, regattas, information on bridges such as proposed construction or modification, the establishment or removal of drill rigs and vessels, and similar items.

Range Safety System Validation

In order for mission rules such as destruct limits to be implemented, the range safety system must work, especially the flight termination system. For tracking (position and velocity data), multiple reliable, independent sources are required for each vehicle. Extensive effort is applied to the validation of the flight termination system. PMRF Instruction 8020.16 includes specific appendices for both tracking systems and for flight termination systems.

Tracking systems include both ground based systems (i.e., radar) and on-board systems (i.e., global positioning systems). Radar systems have been used extensively at PMRF for many years, and have very high reliability, having successfully tracked many vehicles. Radar tracking can either be performed to track a beacon on-board the vehicle or in skin-track mode. On-board data is sent to the ground through telemetry. On-board systems typically have very high accuracy. The standards in *RCC Standard 324, Global Positioning and Inertial Measurements Range Safety Tracking Systems Commonality Standard* provide guidance and specifications for testing of these systems to ensure their reliability.

A flight termination system consists of several components. The ground unit contains a transmitter, which can send simple tones on a mission-specific radio frequency. On the vehicle there is a radio receiver and a termination system. The termination system may either be a non-destructive thrust-termination action or a destruct charge that breaks apart the vehicle. The choice of the system depends on mission, vehicle, and safety constraints. This system must have high reliability, and numerous tests are performed on each flight termination system unit to ensure that it will work throughout all conceivable missile flight environments. *RCC Standard 319, Flight Termination Systems Commonality Standard* provides guidance and specifications for testing of these systems to ensure their reliability.

In-flight Safety Actions

In real-time, the impact points of debris are computed based on the current position and velocity of the vehicle. The impact points are based on telemetry and/or radar data of the vehicle position and velocity. These are displayed to the Missile Flight Safety Officer (MFSO), who monitors them relative to prescribed destruct lines. If the vehicle encroaches upon these lines, a destruct decision is made or withheld according to clearly formulated destruct criteria. A backup system during early flight is visual observation, where an observer watches the vehicle through a “skyscreen” with pre-determined boundaries. The observer advises the MFSO through handheld radio whether the missile is within the acceptable flight corridor.

Early in the flight the (predicted) instantaneous impact point advances slowly. As the vehicle altitude, velocity, and acceleration increase, the instantaneous impact point change rate also increases from zero to several miles per second. It is the instantaneous impact point that the Range Safety Officer usually observes during a launch. Prior to launch, a map with lines indicates the limits of excursion, which, when exceeded, would dictate a command signal to terminate flight.

Generally, the on-board destruct system is not activated early in flight (during the first few seconds or so) until the failed vehicle clears the launch. This is intended to protect valuable launch assets. Debris from such accidents will land within the Ground Hazard Area.

Emergency Response

PMRF has an Emergency Response Plan that defines the initial response requirements and procedures to be implemented in the event that a missile malfunction and/or flight termination occurs during flight activities. The following paragraphs present a general description of the emergency response process.

Initial response to any areas impacted by flight hardware shall be to secure and render safe the area for follow-on recovery and restoration activities. All areas affected by ground impact of flight hardware shall be cleared of all recoverable debris and environmentally restored. The recovery of launch hardware shall be accomplished in a manner consistent with each launch location's requirements as set forth in applicable environmental documentation and conditions specified by the appropriate land owner.

In the event of a flight termination or malfunction, Flight Safety would immediately determine the projected impact area(s) for all debris and flight hardware. The Emergency Response Coordinator would be notified, and the Emergency Response Plan would be initiated.

An initial assessment team would be immediately dispatched to the predicted impact area(s) to assess the situation.

Key elements of information to be obtained by the initial assessment team include:

- Exact impact location(s)
- Extent and condition of impact location(s)
- Personnel injuries
- Indications of fires and/or hazardous materials releases
- Extent of property damage

Results would be reported back to the Emergency Response Coordinator as expeditiously as possible. Based on this assessment, the Emergency Response Coordinator would call up and dispatch to the impact site(s) the appropriate elements of a contingency team.

The Contingency Team would be designated by the Emergency Response Coordinator and would consist of those elements determined to be required, based on the initial assessment. Elements that may be included on the Contingency Team may include, depending on the situation, communications, logistics, public affairs, staff judge advocate, security, health and safety, Explosive Ordnance Disposal, recovery, fire safety, and civilian agency personnel.

The initial priorities for the Contingency Team are the following:

- Emergency rescue and/or emergency medical treatment
- Establish site security
- Contain, control, and extinguish fires
- Confine hazardous materials

All elements of the Contingency Team would be under the control of an On Scene Incident Coordinator, designated by the Emergency Response Coordinator. The On Scene Incident Coordinator would retain on-scene control of all initial response elements until initial response operations are complete and recovery and site restoration activities commence.

The highest priorities during any emergency response operation are the rescue of injured or trapped personnel and the control of any fires produced by a launch or impact event. Rescue of injured and trapped personnel is of the highest priority. Responsibility for emergency rescue is shared among all initial response personnel but most especially by the first-on-scene security personnel and the fire response units (military or civilian). Rescues should be attempted using appropriate safety equipment and protective clothing (i.e., respirators, protective clothing, etc., as necessary). Since rescue may require entry into the impact area, care should be taken to avoid hazards associated with hazardous debris or fires. Under no circumstances shall rescue personnel unnecessarily endanger themselves during rescue activities. Rescue personnel should *never* require rescue by other response personnel.

Emergency response operations are complete once all impact sites have been secured, rescue operations are completed, any fires have been extinguished, and initial site reconnaissance has been performed. Recovery and site restoration activities can then be initiated. Using the results of the initial site reconnaissance, plans would be developed for the recovery of all debris and the restoration of the site(s) to natural conditions.

Additional post-launch recovery and restoration areas may be determined by the launch operator before and throughout mission-specific activities. The recovery of launch hardware would be accomplished in a manner consistent with the launch site procedures, and requirements set forth in applicable environmental documentation and conditions specified in agreements with appropriate land owners.

The launch site operator is responsible for planning, performance, and control of launch activities. This includes:

- Using results of analysis provided by Flight Safety to determine flight hardware impact zones which fully encompass the areas designated in the analysis
- Ensuring that appropriate agreements with all affected landowners are in place and adequately address recovery requirements
- Coordinating with local civilian authorities concerning recovery requirements
- Providing recovery plans to applicable agencies/personnel in accordance with current launch site policies
- Establishing appropriate travel routes (ground/air) prior to launch activities to outline access into recovery areas
- Perform visual inspections and obtain radar data to insure expeditious recovery of the missile
- Ensure complete recovery of missile hardware

The recovery team is responsible for the recovery of all missile debris and restoration of impact areas to their natural condition. Recovery personnel would have overall responsibility for controlling recovery and restoration activities. Air units composed of helicopters and support equipment would transport recovery personnel to road-inaccessible impact sites. Air support equipment would also transport the missile components out of all land and near-shore impact sites and perform quality assurance inspections or sweeps to ensure proper recovery procedures.

Each launch location is subject to all Federal and State regulations involving waste/material handling and disposal, endangered species, and historical resource preservation. Implementation of these regulations may require the assistance of civilian agencies and law enforcement authorities during recovery and restoration activities. Civilian assistance would be requested by each launch location in accordance with existing agreements.

The following is a list of personnel, equipment, transportation, and operational requirements that typically would be necessary to perform recovery activities.

Personnel

- Helicopter pilots
- Helicopter co-pilots
- Helicopter crew chief
- Explosive Ordnance Disposal personnel (two)
- Recovery personnel
- Project representative
- Owner representative (if required by controlling agent)
- Environmental representative (if required by controlling agent)

Roadblocks

Roadblocks shall be utilized to limit unauthorized access into recovery areas that include locations in the vicinity of public roadways or thoroughfares. The Recovery Team Coordinator would designate appropriate roadblock locations on roads leading into recovery areas. Roadblocks would be coordinated by the launch site security personnel, augmented as needed by local law enforcement personnel. At each roadblock positive communication would be established and maintained with the Recovery Team Coordinator and other security personnel/roadblocks. This communication would occur using either landlines (telephones), cellular telephone, or military radio systems.

Certain critical response personnel, such as ambulance/medical or fire response units, shall be permitted to pass through “active” roadblocks in the performance of their duties.

Debris Recovery

Personnel would arrive at impact site by appropriate mode. Recovery transportation vehicles would remain at the nearest accessible road. Explosive Ordnance Disposal members of the recovery team would be the first on scene and would be responsible for the identification, handling, control, and rendering safe of minor detonating charges and other minor hazardous debris. Other responsibilities include:

- Providing initial impact site control to prevent exposure for recovery personnel (Security personnel would assume this role as impact zone access controls are eased.)
- Maintaining area safety and rendering safe potential explosive materials
- Conducting initial impact site assessments for the identification of debris and the determination of recovery equipment requirements
- Assisting in dismantling of launch hardware prior to recovery and transport activities

Recovery personnel would then handle the next phase of the recovery including:

- Collect small missile parts
- Dismantle larger pieces into manageable sections
- Transport recovered parts by helicopter to recovery vehicles waiting at accessible roads

Environmental Restoration

Recovery activities would be coordinated with the Environmental Office at each launch site. If deemed necessary, an archaeologist and biologist would accompany Explosive Ordnance Disposal personnel during the initial site assessment to determine if cultural or sensitive biological resources are present at the impact site. These resource specialists would assist in the determination of recovery equipment requirements and recovery transport routes.

All recovery and restoration activities would be carried out in accordance with Memorandums of Agreement signed by appropriate State and Federal agencies and other potentially affected organizations. Impacted areas would be restored to a natural condition in accordance with land-owners' agreements and agency requirements.

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Acronyms and Abbreviations

ACRONYMS AND ABBREVIATIONS

A-A MISSILEX	Air-to-Air Missile Exercise
A-S GUNEX	Air-to-Surface Gunnery Exercise
A-S MISSILEX	Air-to-Surface Missile Exercise
AAF	Army Airfield
AAQS	Ambient Air Quality Standards
AAR	After Action Report
AAV	Amphibious Assault Vehicle
AAW	Anti-air Warfare
ABL	Airborne Laser
ABR	Auditory Brainstem Response
ACAM	Air Conformity Applicability Model
ACM	Air Combat Maneuver
ACTH	Adrenocorticotropic Hormone
ADAR	Air Deployable Active Receiver
ADCAP	Advanced Capability
AEP	Auditory Evoked Potentials
AFAST	Atlantic Fleet Active Sonar Training
AFB	Air Force Base
AFS	Air Force Station
AGL	Above Ground Level
AICUZ	Air Installation Compatible Use Zone
AIROPS	Aircraft Operations
AIS	Automatic Identification System
ALMDS	Airborne Laser Mine Detection System
ALTRV	Altitude Reservation
AMNS	Airborne Mine Neutralization System
AMPHIBEX	Amphibious Exercise
AMW	Anti-Missile Warfare
ANSI	American National Standards Institute
AP	Ammonium Perchlorate
API	Agricultural Preservation Initiative
APZ	Accident Potential Zone
ARDEL	Advanced Radar Detection Laboratory
ARP	Antenna Radiation Patterns
ARTCC	Air Route Traffic Control Center
ASDS	Advanced Sea, Air, and Land Delivery System
ASFA	Aquatic Sciences and Fisheries Abstract
ASRM	Advanced Solid Rocket Motor
AST	Aboveground Storage Tank
ASUW	Anti-Surface Warfare
ASW	Anti-Submarine Warfare
ATCAA	Air Traffic Control Assigned Airspace
ATF	Acoustic Test Facility

ATOC	Acoustic Thermometry of Ocean Climate
AWOIS	Automated Wreck and Obstruction Information System
BARSTUR	Barking Sands Tactical Underwater Range
BATS	Ballistic Aerial Target System
BMD	Ballistic Missile Defense
BMUS	Bottomfish Management Unit Species
BOMBEX	Bombing Exercise
BRAC	Base Realignment and Closure
BSURE	Barking Sands Underwater Range Extension
BWS	Board of Water Supply
C2	Command and Control
C3	Command, Control, and Communications
CAA	Clean Air Act
CAS	Close Air Support
CASEX	Close Air Support Exercise
CATM	Captive Air Training Missile
CCD	Coastal Consistency Determination
CEC	Cooperative Engagement Capability
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFFC	Commander, Fleet Forces Command
CFR	Code of Federal Regulations
CHAFFEX	Chaff Exercise
CHCRT	Currently Harvested Coral Reef Taxa
CHESS	Chase Encirclement Stress Studies
CHRIMP	Consolidated Hazardous Material Reutilization and Inventory Management Program
CMUS	Crustacean Management Unit Species
CNEL	Community Noise Equivalent Level
CNO	Chief of Naval Operations
COMNAVSURFPAC	Commander, Naval Surface Force, U.S. Pacific Fleet
COMPTUEX	Composite Training Unit Exercise
COSIP	Coherent Signal Processing
CPA	Closest Point of Approach
CPF	Commander, Pacific Fleet
CRRC	Combat Rubber Raiding Craft
CSAR	Combat Search and Rescue
CSG	Carrier Strike Group
CSSQT	Combat System Ship Qualification Trial
CV	Coefficient of Variation
CWA	Clean Water Act
CWB	Clean Water Branch
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
DA	Direct Action
dB	Decibel

dBA	A-Weighted Decibels
DBDBV	Digital Bathymetry Data Base Variable Resolution
dBP	Decibels (Peak)
DDC	Defense Distribution Center
DDC	Department of Design and Construction
DDT	Dichlorodiphyenyltrichloroethane
DEIS	Draft Environmental Impact Statement
DEMO	Demolition
DHHL	Department of Hawaiian Homelands
DICASS	Directional Command-Activated Sonobuoy System
DLNR	Department of Land and Natural Resources
DMR	Dillingham Military Reservation
DNT	Dinitrotoluene
DoD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
DTS	Department of Transportation Services
EA	Environmental Assessment
EC	Electronic Combat
EC50	Effective concentration where 50 percent of maximal effect is observed
ECM	Electronic Countermeasures
EER	Extended Echo Ranging
EEZ	Exclusive Economic Zone
EFD	Energy Flux Density
EFDL	Energy Flux Density Level
EFH	Essential Fish Habitat
EFV	Expeditionary Fighting Vehicle
EIS	Environmental Impact Statement
EL	Energy Level
EM	Electromagnetic
EMESS	Electromagnetic Environmental System Simulator
EMI	Electromagnetic Interference
EMR	Electromagnetic Radiation
ENSO	El Niño Southern Oscillation
EO	Executive Order
EOD	Explosive Ordnance Disposal
EODMU	Explosive Ordnance Disposal Mobile Unit
EPCRA	Emergency Planning and Community Right-to-Know Act
ERGM	Extended Range Guided Munition
ESA	Endangered Species Act
ESG	Expeditionary Strike Group
ESM	Electronic Warfare Support Measures
ESQD	Explosive Safety Quantity Distance
ET	Electronically Timed
EW	Electronic Warfare

FAA	Federal Aviation Administration
ºF	Degree Fahrenheit
FACSFAC	Fleet Area Control and Surveillance Facility
FACSFACPH	Fleet and Area Control and Surveillance Facility Pearl Harbor
FAR	Federal Acquisition Regulation
FAST	Floating At Sea Target
FCLP	Field Carrier Landing Practice
FEIS	Final Environmental Impact Statement
FIR	Flight Information Region
FIREX	Fire Support Exercise
FL	Flight Level
FLAREX	Flare Exercise
FM	Frequency Modulation
FMP	Fishery Management Plan
FOIA	Freedom of Information Act
FORACS	Fleet Operational Readiness
FRTP	Fleet Response Training Plan
FSEL	Flat Sound Equivalent Level
ft	Foot (Feet)
ft^2	Square Foot (Square Feet)
FTEC	Fleet Technical Evaluation Center
FTF	Flexible Family Target
ft-lb	Foot-pound Force
FY	Fiscal Year
gal	Gallon
GDEM	Generalized Dynamic Environmental Model
GEM	Graphite Epoxy Motor
GHA	Ground Hazard Area
GPD	Gallons Per Day
GUNEX	Gunnery Exercise
HA/DR	Humanitarian Assistance/Disaster Relief
HAFB	Hickam Air Force Base
HAO/NEO	Humanitarian Assistance Operation/Non-Combatant Evacuation Operation
HAPC	Habitat Areas of Particular Concern
HAR	Hawaii Administrative Regulations
HARM	High-Speed Anti-Radiation Missile
HATS	Hawaii Area Tracking System
HCF	Hawaii Community Foundation
HDAR	Hawaii Department of Aquatic Resources
HDLNR	Hawaii Department of Land and Natural Resources
HE-ET	High Explosive Electronically Timed Projectile
HERF	Hazard of Electromagnetic Radiation to Fuel
HERO	Hazard of Electromagnetic Radiation to Ordnance
HERP	Hazard of Electromagnetic Radiation to Personnel
HF	High Frequency
HFA	High-Frequency Active

HFBL	High Frequency Bottom Loss
HIANG	Hawaii Air National Guard
HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
HMR	Helemano Military Reservation
HMX	High Melting Explosive
HRC	Hawaii Range Complex
HRS	Hawaii Revised Statutes
Hz	Hertz
ICAO	International Civil Aviation Authority
ICMP	Integrated Comprehensive Monitoring Plan
ICRMP	Integrated Cultural Resource Management Plan
IEER	Improved Extended Echo Ranging
IFF	Identification Friend or Foe
IFR	Instrument Flight Rules
IHA	Incidental Harassment Authorization
INRMP	Integrated Natural Resources Management Plan
IP	Implementation Plan
IR	Infrared
IRFNA	Inhibited Red Fuming Nitric Acid
IRP	Installation Restoration Program
ISTT	Improved Surface Towed Targets
ITAM	Integrated Training Area Management
IUCN	International Union for Conservation of Nature and Natural Resources (World Conservation Union)
IWC	International Whaling Commission
JATO	Jet-Assisted Takeoff
JNTC	Joint National Training Capability
JTF WARNET	Joint Task Force Wide Area Relay Network
JTFEX	Joint Task Force Exercise
KE-ET	Kinetic Energy Projectile
kHz	Kilohertz
KIUC	Kauai Island Utility Cooperative
km	kilometer
KTA	Kahuku Training Area
KTF	Kauai Test Facility
kV	Kilovolt
KW	Kilowatt
LASH	Littoral Airborne Sensor Hyper-spectral
LATR	Large Area Tracking Range
lb	Pound(s)
LC50	The lethal concentration that kills 50 percent of test animals
LCAC	Landing Craft, Air Cushioned
LCU	Landing Craft, Utility
L_{dn}	Day-Night Average Sound Level
L_{eq} 1 sec	1-Second Averaged Equivalent Sound Level
L_{eq}	Energy Equivalent Sound Level

LFA	Low-Frequency Active
LFBL	Low-Frequency Bottom Loss
LFX	Live Fire Exercise
L_{max}	Maximum Sound Level
LMRS	Long-term Mine Reconnaissance System
LOA	Letter of Authorization
LOS	Level of Service
LSRB	Laser Safety Review Board
LTO	Landing and Takeoff
LWAD	Littoral Warfare Advanced Development
m	Meter
m/sec	Meter per Second
MAGTF	Marine Air Ground Task Force
MATSS	Mobile Aerial Target Support System
MBTA	Migratory Bird Treaty Act
MCBH	Marine Corps Base Hawaii
MCM	Mine Countermeasures
MCTAB	Marine Corps Training Area–Bellows
MDA	Missile Defense Agency
MDSU-1	Mobile Diving and Salvage Unit One
MEU	Marine Expeditionary Unit
MFA	Mid-Frequency Active
MFSO	Missile Flight Safety Officer
MGD	Million Gallons Per Day
mg/kg	Milligrams Per Kilogram
mg/m^2	Milligrams Per Square Meter
mg/m^3	Milligrams Per Cubic Meter
$\mu g/m^3$	Micrograms Per Cubic Meter
MHz	Megahertz
mi	Mile
mi^2	Square Mile
MIDPAC	Mid-Pacific
MINEX	Mine Exercise
MISSILEX	Missile Exercise
MIW	Mine Warfare
MMHSRP	Marine Mammal Health and Stranding Response Program
MMPA	Marine Mammal Protection Act
MMR	Makua Military Reservation
MMR	Military Munitions Rule
µPa	Micropascal
µPa-m	Micropascal-Meter
μPa^2-s	Micropascal Squared-Second
MSAT	Marine Species Awareness Training
msec	Microsecond
MSE	Multiple Successive Explosions

MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSL	Mean Sea Level
MW	Megawatt
N/A	Not Applicable
NAA	Non-attainment Area
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NAVEDTRA	Naval Educational Training
NAVMAG	Naval Magazine
NAVSEA	Naval Sea Systems Command
NAVSEAOP	Naval Sea Systems Command Publication
NAWQC	National Ambient Water Quality Criteria
NCA	National Command Authority
NDAA	National Defense Authorization Act of 2004
NEO	Noncombatant Evacuation Operation
NEPA	National Environmental Policy Act
NEW	Net Explosive Weight
nm	Nautical Mile
nm^2	Square Nautical Miles
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuaries Act
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOTAM	Notice to Airmen
NOTMAR	Notice to Mariners
NPAL	North Pacific Acoustic Laboratory
NRHP	National Register of Historic Places
NSFS	Naval Surface Fire Support
NSW	Naval Special Warfare
NTA	Navy Tactical Task
NUWC	Naval Undersea Warfare Center
OAMCM	Organic Airborne Mine Countermeasures
OASIS	Organic Airborne and Surface Influence Sweep
OC	Oceanic Control
OEEZ	Outer Exclusive Economic Zone
OEIS	Overseas Environmental Impact Statement
OMCM	Organic Mine Countermeasures
ONR	Office of Naval Research
OPA	Oil Pollution Act
OPAREA	Operating Area
OPNAVINST	Office of the Chief of Naval Operations Instruction
ORMP	Ocean Resources Management Plan
OSHA	Occupational Safety and Health Administration

OTTO	Torpedo Fuel
oz/gal	Ounces per Gallon
oz/lb	Ounces Per Pound
PA	Programmatic Agreement
PAH	Polycyclic Aromatic Hydrocarbons
PBX	Plastic Bonded Explosive
PCB	Polychlorinated Biphenyl
PCMUS	Precious Corals Management Unit Species
PETN	Pentaerythritol Tetranitrate
pH	Hydrogen Ion Concentration (a measure of acidity/alkalinity)
PHCRT	Potentially Harvested Coral Reef Taxa
PL	Public Law
PM-10	Particulate Matter with an Aerodynamic Diameter Less Than or Equal to 10 Microns
PM-2.5	Particulate Matter with an Aerodynamic Diameter Less Than or Equal to 2.5 Microns
PMAR	Primary Mission Area
PMRF	Pacific Missile Range Facility
PMRFINST	Pacific Missile Range Facility Instruction
POL	Petroleum, Oil, and Lubricants
POW/MIA	Prisoner of War/Missing in Action
ppb	Parts Per Billion
ppm	Parts Per Million
psi	Pounds Per Square Inch
psi-ms	Pounds Per Square Inch–Millisecond
PTA	Pohakuloa Training Area
PUTR	Portable Undersea Tracking Range
Q/L	Quick Look
QDR	Quadrennial Defense Review
RAMICS	Rapid Airborne Mine Clearance System
RCC	Range Commanders Council
RCD	Required Capabilities Document
RCMP	Range Complex Management Plan
RCRA	Resource Conservation and Recovery Act
RDF	Radio Direction Finding
RDT&E	Research, Development, Test, and Evaluation
RDX	Royal Demolition Explosive
RF	Radio Frequency
RHIB	Rigid Hull, Inflatable Boat
RIMPAC	Rim of the Pacific
RL	Received Level
RMS	Remote Minehunting System
RMS	Root Mean Square
ROD	Record of Decision
RSOP	Range Safety Operation Plan

RSS	Range Safety System
S-A GUNEX	Surface-to-Air Gunnery Exercise
S-A MISSILEX	Surface-to-Air Missile Exercise
S-S GUNEX	Surface-to-Surface Gunnery Exercise
S-S MISSILEX	Surface-to-Surface Missile Exercise
SARA	Superfund Amendments and Reauthorization Act
SAT/UNSAT	Satisfactory/Unsatisfactory
SBMR	Schofield Barracks Military Reservation
SD	Standard Deviation
SDV	Sea, Air and Land Delivery Vehicle
SEAL	United States Navy Sea, Air and Land
sec	Second
SEL	Sound Equivalent Level
SEPTAR	Seaborne Target
SESEF	Shipboard Electronic Systems Evaluation Facility
SHPO	State Historic Preservation Office
SICO	System Integration Checkout
SINKEX	Sink Exercise
SM	Standard Missile
SMA	Sonar Modeling Area
SOA	Submarine Operating Area
SOP	Standard Operating Procedures
SPAWAR	Space and Naval Warfare
SPECWAROPS	Special Warfare Operations
SPL	Sound Pressure Level
SPORTS	Sonar Positional Reporting System
SR	Special Reconnaissance
SSC	SPAWAR Systems Center
SSG	Surface Strike Group
SSTA	Submarine Sonar Training Area
STS	Strategic Target System
STW	Strike Warfare
SUA	Special Use Airspace
SURFSAT	Surface Weapons System Accuracy Test
SURTASS	Surveillance Towed Array Sensor System
SVP	Sound Velocity Profile
SWSA	Submarine Warfare System Assessment
SWTR	Shallow Water Training Range
T&E	Test and Evaluation, Threatened and Endangered
T/G	Touch-and-Go Landing
TA	Training Area
TACAN	Tactical Air Navigation
TAP	Tactical Training Theater Assessment and Planning
TBP	Tributyl Phosphate
THAAD	Terminal High Altitude Area Defense

TL	Transmission Loss
TM	Tympanic Membrane
TMDL	Total Maximum Daily Load
TNT	Trinitrotoluene
TOA	Temporary Operating Area
TORPEX	Torpedo Exercise
TPY	Tons Per Year
TRACKEX	Tracking Exercise
TTS	Temporary Threshold Shift
U.S.	United States
U.S.C.	United States Code
UAV	Unmanned Aerial Vehicle
UESA	Ultra High Frequency Electronically Scanned Array
UHF/VHF	Ultra High Frequency/Very High Frequency
UME	Unusual Mortality Event
UNDS	Uniform National Discharge Standard
USACE	United States Army Corps of Engineers
USAKA	United States Army Kwajalein Atoll
USARHAW	United States Army, Hawaii
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USSPACECOM	United States Space Command
UST	Underground Storage Tank
USTRANSCOM	United States Transportation Command
USV	Unmanned Surface Vehicle
USWEX	Undersea Warfare Exercise
USWREF	Undersea Warfare Readiness Evaluation Facility
USWTR	Undersea Warfare Training Range
UXO	Unexploded Ordnance
VBSS	Visit, Board, Search, and Seizure
VERTREP	Vertical Replacement
VFR	Visual Flight Rules
VHF	Very High Frequency
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
VTOL	Vertical Takeoff and Landing
W	Warning Area
WAAF	Wheeler Army Airfield
WIT	Waterfront Integration Test
WNTC	Wheeler Network Communications Control
WPRFMC	Western Pacific Regional Fishery Management Council
WWTP	Waste Water Treatment Plant
ZOI	Zone of Influence